International Studies in Entrepreneurship

Karl Wennberg
Christian Sandström *Editors*

Questioning the Entrepreneurial State

Status-quo, Pitfalls, and the Need for Credible Innovation Policy

OPEN ACCESS

Springer

International Studies in Entrepreneurship

Volume 53

This series highlights cutting-edge research in entrepreneurship, small business/SMEs, economic development, and policy. Volumes in the series feature empirical studies, theoretical analyses, practical applications, and policy recommendations in regional and global contexts, and explore a wide variety of topics with regard to entrepreneurship, including demographics, new venture financing, research & development, business creation, labor dynamics, technology management, and education. Springer and Series Editors welcome proposals for research monographs, edited volumes and reference works in all areas of entrepreneurship research.

More information about this series at https://link.springer.com/bookseries/6149

Karl Wennberg • Christian Sandström
Editors

Questioning the Entrepreneurial State

Status-quo, Pitfalls, and the Need for Credible Innovation Policy

Springer

Editors
Karl Wennberg
Stockholm School of Economics
Stockholm, Sweden

Christian Sandström
Jönköping International Business School
Jönköping, Sweden

ISSN 1572-1922 ISSN 2197-5884 (electronic)
International Studies in Entrepreneurship
ISBN 978-3-030-94272-4 ISBN 978-3-030-94273-1 (eBook)
https://doi.org/10.1007/978-3-030-94273-1

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

"Creative destruction, innovation, and entrepreneurship are at the core of economic growth. The government has a clear role, to provide the basic fabric of a dynamic society, but industrial policy and state-owned companies are the boulevard of broken dreams and unrealized visions. This important message is convincingly stated in Questioning the Entrepreneurial State."

—**Anders Borg**, *former Minister of Finance, Sweden*

"While governments undoubtedly have an important role in 'setting the table' for entrepreneurship, their track record in direct interventions to this end has been much more problematic. The thoughtful essays in this volume highlight the many obstacles that aggressive government efforts to boost entrepreneurs can encounter, and provide a healthy corrective to naïve prescriptions by academics and policymakers alike."

—**Josh Lerner**, *professor, Harvard Business School*

"Simple policy solutions won't solve complex societal challenges, as this book thoroughly demonstrates. The proper remit of policy is to respect current societal and economic structures while also supporting new directions. These can be unleashed through the creative potential of new knowledge, innovations, and entrepreneurs as agents of change in many spheres of society."

—**Maureen McKelvey**, *Professor of Industrial Management and Economics, University of Gothenburg, Sweden*

"Misreading the dynamism of American entrepreneurship, European intellectuals and policymakers have embraced a dangerous fantasy: catching up requires constructing an entrepreneurial state. This book provides a vital antidote: The entrepreneur comes first: The state may support. It cannot lead."

—**Amar Bhidé**, *professor, Thomas Schmidheiny Professor of International Business, Tufts University*

"This important new book subjects the emergence of the entrepreneurial state, which reflects a shift in the locus of entrepreneurship from the individual to the public sector, to the scrutiny of rigorous analysis. The resulting concerns, flaws, and biases

inherent in the entrepreneurial state exposed are both alarming and sobering. The skill and scholarly craftsmanship brought to bear in this crucial analysis is evident throughout the book, along with the even but ultimately consequential thinking of the authors. A must-read for researchers and thought leaders in business and policy."

—**David Audretsch**, *Distinguished Professor, Ameritech Chair of Economic Development, Indiana University*

Contents

Contributors

Zoltan Acs School of Public Policy and Director Center for Entrepreneurship and Public Policy, George Mason University, Fairfax, VA, USA
University of Pecs, Pécs, Hungary

Carl Alm Örebro University, Örebro, Sweden

Carlo Amenta University of Palermo, Palermo, Italy
Institute Bruno Leoni, Milan, Italy

John-Erik Bergkvist House of Innovation, Stockholm School of Economics, Stockholm, Sweden

Anna Brattström Lund University School of Economics and Management, Lund, Sweden
House of Innovation, Stockholm School of Economics, Stockholm, Sweden

Alex Coad Waseda Business School, Tokyo, Japan

Elias Collin School of Economics and Management, Lund University, Lund, Sweden

Sven-Olov Daunfeldt Institute of Retail Economics (Handelns Forskningsinstitut), Stockholm, Sweden

Sinclair Davidson Blockchain Innovation Hub, RMIT University, Melbourne, VIC, Australia

Niklas Elert The Research Institute of Industrial Economics (IFN), Stockholm, Sweden

Klas A. M. Eriksson Department of Economic History and International Relations, Stockholm University, Stockholm, Sweden
Hoover Institution, Stanford University, Stanford, CA, USA

Nicolai Foss Department of Strategy and Innovation, Copenhagen Business School, Frederiksberg, Denmark

Jonas Grafström Ratio Institute, Stockholm, Sweden
Luleå Technical University, Luleå, Sweden

Daniel Halvarsson The Ratio Institute, Stockholm, Sweden

Peter Harasztosi European Investment Bank, Luxembourg, Luxembourg

Magnus Henrekson The Research Institute of Industrial Economics (IFN), Stockholm, Sweden

Dan Hjalmarsson Center for Strategy and Competitiveness, Stockholm School of Economics, Stockholm, Sweden

Peter Klein Hankamer School of Business, Baylor University, Waco, TX, USA
Department of Strategy and Management, Norwegian School of Economics, Bergen, Norway

Johan P. Larsson Department of Land Economy, University of Cambridge, Cambridge, UK

Alexander McKelvie Whitman School of Management, Syracuse University, Syracuse, NY, USA

Jerker Moodysson Jönköping International Business School, Jönköping University, Jönköping, Sweden

Samuele Murtinu Utrecht University School of Economics, Utrecht University, Utrecht, the Netherlands

Rasmus Nykvist House of Innovation, Stockholm School of Economics, Stockholm, Sweden

Rozália Pál Country and Financial Sector Analysis Division, Economics Department, European Investment Bank, Luxembourg, Luxembourg

Jason Potts Blockchain Innovation Hub, RMIT University, Melbourne, VIC, Australia

Christian Sandström Jönköping International Business School, Jönköping, Sweden
The Ratio Institute, Stockholm, Sweden

Saras D. Sarasvathy Darden School of Business, University of Virginia, Charlottesville, VA, USA
Indian Institute of Management, Bangalore, Bengaluru, India

Carlo Stagnaro Istituto Bruno Leoni, Milan, Italy

Siri Terjesen Florida Atlantic University, Boca Raton, FL, USA
Department of Strategy and Management, Norwegian School of Economics, Bergen, Norway

Mercedes Teruel Department of Economics, Universitat Rovira i Virgili, Reus, Spain

Patrik Tingvall Södertörn University, Södertörn, Sweden

Karl Wennberg Stockholm School of Economics, Stockholm, Sweden

Part I
Introductory Chapter

Introduction

Karl Wennberg and Christian Sandström

Abstract Western economies are struggling to recover from a decade of Plagued by structural crises, an ongoing pandemic, high unemployment and sluggish growth. As progressively looser monetary and fiscal policies have not helped, both the EU and national governments have increasingly turned towards interventionist industrial policies. Mariana Mazzucato's *The Entrepreneurial State* (2011) provided an intellectual justification for these efforts, and consequently gained popularity. The message was clear: in order to get more innovation, entrepreneurship, sustainable development and growth we need more government, not less. In this book, 30 international scholars address the core ideas underpinning the entrepreneurial state. We provide evidence of both historical and recent failures of "green deals" and similar efforts, while also developing novel directions for innovation policy. In many regards, this book is a warning: huge government schemes towards specific, noble outcomes have historically been plagued with failures. In sum, we argue that innovation policy needs to be inverted: instead of being specific and targeted, it needs to be broad and general, focusing on the general conditions for firms to operate. Instead of providing targeted support to certain firms, industries or even technologies, innovation policy needs to constructively deal with barriers to innovation, including the proactive handling of vested interest groups.

Keywords Entrepreneurial state · Innovation policy · Green deal

Many Western economies have been plagued by prolonged structural crises, persistent unemployment, and the lack of durable economic recovery after the great

K. Wennberg (✉)
Stockholm School of Economics, Stockholm, Sweden
e-mail: Karl.wennberg@hhs.se

C. Sandström
Jönköping International Business School, Jönköping, Sweden

The Ratio Institute, Stockholm, Sweden
e-mail: christian.sandstrom@ju.se

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_1

recession in 2008–2009, the Euro crisis of 2011–2012, as well as the ongoing pandemic and its repercussions.

These crises have resulted in several rapid shifts in economic policy. Low interest rates, quantitative easing, and a myriad of public stimulus packages have followed on top of each other. While available venture capital and new digital startups reach record figures from year to year, public and private debt is mounting, yet productivity growth and job creation have been sluggish. Populist and nationalist agendas have emerged and with them calls for the protection of national interests and industries, as well as well-founded worries of increasing economic inequality and global climate change.

This intellectual and economic milieu has become a fertile ground for the rebirth of top-down industrial policies. Mariana Mazzucato's book *The Entrepreneurial State* (2011) has become a best seller that has fueled the renaissance of industrial interventionism. As policymakers around the world were looking for answers and ways to deal with issues such as global climate change, sluggish economic growth, and increasing inequality, Mazzucato's book was perfectly positioned to go viral. Her follow-up book, *Mission Economy* (2021), expands on Richard Nelson's work on *innovation missions* and *moonshots* from the 1970s and 1980s to argue that governments should formulate missions by which to spur innovations seeking to solve great societal challenges—from green energy to national security to building resilient health systems.

Mazzucato provided an intriguing and simple argument: the state had been the main agent behind innovation and industrial renewal, and independent entrepreneurs and large companies have merely followed and capitalized upon the efforts of courageous governments over the years. Economic policy, and innovation policy in particular, has therefore been misguided. Innovation and renewal do not happen through independent entrepreneurial endeavors and innovations launched in a free market economy. On the contrary, Mazzucato argues, prosperity instead comes from large government efforts aimed at solving grand challenges faced by humanity.

The aim of this book is to take a serious look at Mazzucato's ideas. As policymakers were, and are, desperate in their search for solutions, few scholars or politicians have scrutinized or questioned the idea of the entrepreneurial state. Scholars have tended to ignore these ideas since they emerged from a popular science book and not in peer-reviewed academic journals, and arguably they were not subject to much academic debate. On the other hand, policymakers have tended to uncritically accept these ideas as *the next big thing*, for several potential reasons. After the great recession, the need for fresh ideas and perspectives in public policy was great. Further and perhaps most importantly, by propagating the need for public direction and coordination, especially that governments should be driven by large *missions*, *The Entrepreneurial State* and *Mission Economy* provided public officials with a sense of importance and authority. For these and other reasons, the message was accepted rapidly throughout Europe and elsewhere. Mazzucato has served as an advisor to the European Commission and numerous governments across the world. More cautious policymakers seeking empirical evidence or detailed theoretical rationale for redirecting public investments into large, top-down industrial policy

schemes have not been equipped with arguments or evidence to critically examine the story that was advanced.

As a consequence, the ideas of *The Entrepreneurial State* and *Mission Economy* have been put into practice and rolled out across Europe over recent years, without much prior analysis. Notwithstanding the increasing number of policy reports and theoretical papers on *missions*, to date there have been hardly any empirical evaluations or studies of how such missions are designed and executed, or when they work or do not. As foundational innovation scholars Foray, Nelson, and Mowery argued in a special issue on "a new generation of policy instruments to respond to the Grand Challenges," mission-oriented innovation policies "are not the right models for new programs aimed at the challenges we now face" (2012, p. 1697). They argue that regarding proposals for a new Manhattan or Apollo project focusing on issues such as climate change, such challenges "are all very different than the challenges faced and met by Manhattan and Apollo. These programs were aimed to develop a particular technological capability, and the achievement of their technological objective signaled the end of the program." Also currently leading innovation economists such as Bloom, Van Reenen, and Williams (2019, p. 179) write that moonshot examples "lack a counterfactual example" and are by design geared toward political decision-making which "may be more likely to favor sectors or firms that engage in lobbying and regulatory capture, rather than the most socially beneficial." This point is also emphasized in several contributions to this book (see e.g. the chapter "Third-Generation Innovation Policy: System Transformation or Reinforcing Business as Usual?" by Bergkvist et al.). In short, while the idea of aiming high and leveraging large portions of society's resources to address some fundamental human challenges may sound appealing to many, such ideas have limited scientific credibility.

Currently, ideas emanating from *The Entrepreneurial State* and *Mission Economy* are being implemented in large state initiatives in order to accomplish what are currently seen as vital outcomes. The European Union's Green Deal amounts to investments of around €1000 billion over the next ten years, including €430 billion on hydrogen gas. What do we know—really—about the theoretical logic behind these ideas, and what empirical support is there for the idea that such massive top-down initiatives will bring about the innovative capacity to address global climate change and other *missions*?

Over the past few years, some scholars have reviewed and discussed different arguments related to *The Entrepreneurial State* and *Mission Economy* and have thereby contributed to both scholarly and policy discussions (Aspromourgos, 2018; Brown, 2021; Mingardi, 2015; Pradella, 2017; McCloskey & Mingardi, 2020). However, we are not aware of any systematic effort to scrutinize the raison d'être of *The Entrepreneurial State* and *Mission Economy*, their theoretical validity, or empirical support. Hence this book. We address the core ideas behind the entrepreneurial state and related innovation policy agendas, discuss contrasting and complementary perspectives, showcase empirical evidence, and articulate a new, and in our view better founded, direction for innovation policy.

This book is in many ways a warning. Grand schemes toward noble outcomes have a disappointing track record in human political and economic history. Conventional wisdom regarding authorities' inability to selectively pinpoint certain technologies, sectors, or firms as *winners*, and the fact that large support structures for specific technologies are bound to distort incentives and result in opportunism, seems to have been forgotten. This book serves as a theoretical and empirical reminder.

1 The Contributions to the Present Volume

While each chapter in the current volume can be read as one distinct piece, there is also an overall idea and logic to the book. Chapters "The Entrepreneurial State and the Platform Economy", "An Effectual Analysis of Markets and States", "The Entrepreneurial State: An Ownership Competence Perspective", "Innovation Without Entrepreneurship: The Pipe Dream of Mission-Oriented Innovation Policy" discuss theoretical perspectives that complement and contrast the theories underpinning the entrepreneurial state. These chapters demonstrate that ideas about top-down innovation policies often fail to consider central aspects of human individual and collective decision-making, idea ownership, and the nature of digitalization. In "The Entrepreneurial State and the Platform Economy", Sinclair Davidson and Jason Potts (2022) explain how value is created in the platform economy and how Mazzucato's description of the platform economy essentially misses out on value creation by employing outdated theories of value creation in the network economy. In "An Effectual Analysis of Markets and States", entrepreneurship scholar Saras Sarasvathy (2022) outlines how theories of entrepreneurial decision-making that incorporate creativity, genuine uncertainty, and docility may be fruitfully leveraged to study markets and market design. In "The Entrepreneurial State: An Ownership Competence Perspective", organizational economists Samuele Murtinu, Nicolai J. Foss, and Peter G. Klein (2022) discuss how several of the key ideas underpinning *The Entrepreneurial State* are at odds with notions of *economic competence* and *ownership competence*. As government actors lack the owner's responsibility and incentives, the state is also bound to be less entrepreneurial, as are top-down initiatives governed by public actors.

The first section of the book concludes with Johan P. Larsson's "Innovation Without Entrepreneurship? The Pipe Dream of Mission-Oriented Innovation Policy" (Larsson 2022), which argues that fundamentally, the state cannot act as an entrepreneur because it faces no real risk, does not address a real market, and cannot be evaluated. Larsson deconstructs the idea of mission-oriented policies and concludes that these policies do not work in practice because of the impossibility of dispersed actors with differing priorities and incentives to, in practice, agree on the mission undertaken or on how it should be accomplished and evaluated.

From these chapters we learn that what may sound good on paper in terms of *collective missions* and *directionality* are often—but not always—at odds with the received wisdom of individual action and coordination in open democratic societies.

Chapters "Building Local Innovation Support Systems: Theory and Practice", "Reducing Higher Education Bureaucracy and Reclaiming the Entrepreneurial University", "Cultural Ideals in the Entrepreneurship Industry", "Evaluating Evaluations of Innovation Policy: Exploring Reliability, Methods, and Conflicts of Interest", "Do Targeted R&D Grants toward SMEs Increase Employment and Demand for High Human Capital Workers?" contain empirical examples of innovation policies in terms of creating entrepreneurial ecosystems, making universities more innovative, and nurturing the innovativeness of new and small enterprises. In "Building Local Innovation Support Systems: Theory and Practice", Dan Hjalmarsson (2022)—an innovation scholar turned public decision-maker with decades of experience in designing and evaluating innovation policies—applies his ideas to the region of greater Umeå in northern Sweden and discusses what we can learn from decades of policy support to enhance innovation and entrepreneurship in seeking to foster university-industry collaboration. He concludes that successful policymaking is about creating the right incentives, avoiding picking winners, and direct efforts in ways that do not interfere with competition.

In "Reducing Higher Education Bureaucracy and Reclaiming the Entrepreneurial University", Siri Terjesen (2022) leverages academic research and policy practice from her position as an associate dean to discuss ways in which current top-down policies hamper rather than encourage experimentation and mindful decision-making at higher education institutions, a crucial set of institutions in any innovation paradigm. She argues that bureaucratization and top-down governance stifle innovation both at universities and in corporations. Terjesen describes the worrying trend of increases in bureaucracy and reports on successful anti-bureaucracy policies and practices such as calculating 'bureaucratic mass' and the implementation of new technology.

In the chapter "Cultural Ideals in the Entrepreneurship Industry," Anna Brattström (2022) outlines the increasingly prevalent paradox that although there appears to be much innovative activity in "local ecosystems," in tangible ways there is little innovative output. Leveraging in-depth data on entrepreneurs, associations, and public sector activities in Skåne, Sweden, she argues that entrepreneurship and "being innovative" has become a cultural ideal that both firms and policymakers sympathize with and enact as a form of social signaling, but with often limited tangible output. In "Evaluating Evaluations of Innovation Policy: Exploring Reliability, Methods and Conflicts of Interest", Elias Collin, Christian Sandström, and Karl Wennberg (2022) take a closer look at how innovation policies are evaluated and by whom. They conclude that the vast majority of evaluations in Sweden tend to be positive but that these statements are usually not backed by studies of effects. This section concludes with chapter, "Do Targeted R&D Grants Toward SMEs Increase Employment and Demand for High Human Capital Workers?" in which Sven-Olov Daunfeldt, Daniel Halvarsson, Patrik Tingvall, and Alexander McKelvie (2022) report the results of a counterfactual study into the effects of targeted innovation support. Their most significant result is the absence of any statistically significant

effects on employees, turnover, or profit. Bearing administrative costs in mind, these findings suggest that the overall impact of such support structures may often be negative for the economy. These chapters showcase how innovation policies are executed in practice, with what impact—both direct and indirect, long term and short term—and how they are commonly evaluated. We learn about practical challenges related to the design, execution, and evaluation of innovation policy in practice.

Chapters "Third-Generation Innovation Policy: System Transformation or Reinforcing Business as Usual?", "Less from More: China Built Wind Power, but Gained Little Electricity", "The Failures of the Entrepreneurial State: Subsidies to Renewable Energies in Europe", "Directionality in Innovation Policy and the Ongoing Failure of Green Deals: Evidence from Biogas, Bio-ethanol, and Fossil-Free Steel" showcase alternative approaches to innovation policy such as transformative policies and missions, focusing specifically on top-down approaches toward more ecologically sustainable economies. Lessons from recent transformative policy programs in the European Union, China, and Swedish regions are discussed. The chapter by John-Erik Bergkvist, Jerker Moodysson, and Christian Sandström (2022), "Third-Generation Innovation Policy: System Transformation or Reinforcing Business as Usual?," provides a discussion of some ongoing attempts around the Western world to accomplish innovation and renewal through large collaborative schemes. Based on case studies across the European Union, the authors conclude that these collaboration policies are likely to favor established interest groups rather than contribute to industrial transformation.

Chapters "Less from More: China Built Wind Power, but Gained Little Electricity"–"Directionality in Innovation Policy and the Ongoing Failure of Green Deals: Evidence from Biogas, Bio-ethanol, and Fossil-Free Steel" provide empirical evidence that problematize recent green industrial policies. In the chapter, "Less from More: China Built Wind Power, but Little Electricity Came," Jonas Grafström (2022) reports evidence of failed wind power policies in China. Similarly, Carlo Amenta and Carlo Stagnaro (2022) document that European subsidies to renewable energy have had limited positive effects on the natural environment and done little good for the economy in the chapter, "The Failures of the Entrepreneurial State: Subsidies to Renewable Energies in Europe." The chapter by Christian Sandström and Carl Alm (2022), "Directionality in Innovation Policy and the Ongoing Failure of Green Deals: Evidence From Biogas, Bio-ethanol, and *Fossil-Free* Steel," reports on historical cases of policy failure regarding innovation and sustainable development. Documenting the costly failures of biogas and ethanol efforts in Sweden, the authors identify the underlying mechanisms and apply them to the ongoing development of supposedly fossil-free steel. Sandström and Alm (2022) argue that large pools of "free" public money directed toward specific technologies may distort incentives and make firms immune to risk, which in turn results in reckless investments into specific technologies that may have little potential.

The final section of the book discusses how we can turn the page and move on from ideas such as an *entrepreneurial state* toward more holistic innovation policy anchored in what we have learned from almost a century of such policies. Chapters "Policy Instruments for High-Growth Enterprises", "Public-Steering and Private-

Performing Sectors: Success and Failures in the Swedish Finance, Telecoms, and City Planning Sectors", "The Digital Platform Economy and the Entrepreneurial State: A European Dilemma" compare more or less successful innovation policies and describe what we can learn from them about how institutionalized sectors can be transformed. In "Policy Instruments for High-Growth Enterprises", Alex Coad, Peter Harasztosi, Rozalia Pal, and Mercedes Teruel (2022) provide an in-depth review of decades of knowledge accumulated on high-growth enterprises; their impact in terms of innovation, change, and job creation; and how policy instruments can, or cannot, be used to encourage the emergence and direction of such enterprises. Among other things, they highlight the importance of getting incentives right, and the coordination and consistency of policies over time. This evidence-based approach is perhaps less spectacular than the moonshot policies of the entrepreneurial state, but likely to be more effective in the long term.

In the chapter "Public-Steering and Private-Performing Sectors: Success and Failures in the Swedish Finance, Telecoms, and City Planning Sectors", Klas A. M. Eriksson and Rasmus Nykvist (2022) discuss showcase three in-depth longitudinal cases of sectoral transformation, documenting the difference in innovation and competitiveness between the sectors that have been liberalized and city planning, which resembles more of a planned economy. In doing so, they also highlight the critical role of vested interest groups in blocking attempts at policy renewal. Relatedly, they highlight that innovation policy needs to deal better with incumbent interest groups. In the chapter "The Digital Platform Economy and the Entrepreneurial State: A European Dilemma," Zoltan J. Acs (2022) shows how the nature of digital markets causes a dilemma for top-down policies seeking to steer innovation in directional ways. Comparing the state of the rapidly growing digital platforms and their impact in the United States, East Asia, and the European Union, he argues that the absence of competitive European tech firms is a direct function of the ideas and policy recommendations related to *The Entrepreneurial State*. Literature on innovation systems has emerged and been diffused among policymakers in Europe. American industrial policy tends to put a more direct emphasis on entrepreneurial ventures, and according to Acs, this is the primary reason why Europe is lagging behind.

In the book's final chapter, "Collaborative Innovation Blocs and Mission-Oriented Innovation Policy: An Ecosystem Perspective," Niklas Elert and Magnus Henrekson (2022) compare and integrate insights from mission-oriented innovation policy with an older innovation paradigm: that of collaborative innovation blocks. By highlighting how some aspects of "mission interventions" may be beneficial if enacted prudently and with the consideration of the institutional contingencies underpinning innovative activities in various contexts, the chapter discuss how more holistic and resilient innovation policies can be articulated to leverage the strengths of today's rapidly growing innovation ecosystems.

2 Why Is the Entrepreneurial State so Popular?

The Entrepreneurial State gave policymakers what they needed, when they needed it. With economies struggling to recover and increased demands for sustainability, they were in great need of solutions or at least actions that seemed credible. The book provided a flattering message to politicians and government agencies, highlighting them as heroes and visionaries.

As we have seen in the current volume, it is far from evident that this is the case. As already noted by Lerner (2009) in *Boulevard of Broken Dream*, history is full of policy failure in the area of innovation and entrepreneurship. Several recent cases of policy failure have been documented in this book. At the same time, efforts in the European Union continue to gain momentum as the EU Green Deal is rolled out across member states.

Another reason why *The Entrepreneurial State* has been so popular is its compatibility with established interest groups. As observed in several contributions in this book, support structures, platforms for private-public cooperation, and large volumes of technology-specific money usually end up in the hands of established interest groups. Hence, they are not very likely to question these policies but will rather *go along with the ride*.

As noted by Potts et al. (2016), innovation policy can be classified either as giving various forms of support or as policies aimed toward removing barriers and removing destructive vested interests. The political economy of these two alternatives looks very different. Giving support does not result in any enemies. The cost of support programs is distributed across the wider collective of taxpayers; potential benefits are concentrated for a few actors. Conversely, policies aimed at dealing with resistance are politically less popular. Dealing with opposition to innovation in the form of incumbent oligopolies, regulations, or institutional obstacles is associated with considerable political costs. While the long-term benefits of doing so may be large, such benefits are less visible and distributed over many actors and over time. We therefore conclude that the entrepreneurial state has become so popular because it seems to cater to established interest groups in society: politicians and government administrations are heralded as entrepreneurial and innovative while big incumbent firms are often sheltered from competition via large collaboration schemes.

3 Innovation Policy, Inverted

As exemplified in several chapters of this book, due to forces of interest groups and political logic, innovation policy tends to become a matter of *providing selective support* instead of constructively dealing with resistance to innovation. We acknowledge that it is politically difficult to enact policies that deal with powerful interest groups. Yet, there is nevertheless a need to invert innovation policy. Innovation

policy should be a matter of removing barriers to growth and renewal instead of handing out targeted support that tends to end up reinforcing vested interests.

Also, it should focus on general conditions for entrepreneurship and innovation rather than specific efforts targeting certain technologies. Targeting certain technologies or setting up large missions relates to an inherent risk of targeting the wrong technology, resulting in distorted competition and lock-in around the wrong solution. As the right technology cannot be known beforehand, markets provide a cumulative and emergent selection mechanism that results in innovation over time.

4 What Should Governments Do?

Innovation is a complex evolutionary process characterized by failures and unpredictable breakthroughs (Aldrich, 1999). Top-down interventions aiming at directionality suffer from the problems of dispersed knowledge emphasized by Hayek (1945). Perhaps the most unanimous conclusion of the broad theoretical and empirical literature on innovation and innovation policy suggests that good institutions, not attempts by bureaucrats to pick winning firms, technologies, and industries, are the key to societally valuable innovations (Aghion et al., 2016; Baumol, 2002; North, 1990). For this reason, the best policies to promote innovation are those that promote productive economic activity more generally: property rights protection, open and contestable markets, a stable monetary system, and legal rules that favor competition and entrepreneurship. Policy should promote an institutional environment in which innovation and entrepreneurship can flourish without trying to anticipate the specific outcomes of those processes—an impossible task in the face of uncertainty, technological change, and a dynamic, knowledge-based economy.

In their recent work synthetizing extant knowledge on central institutional determinants of innovation, Elert et al. (2019) provide a collection of guiding principles for policymaking: neutrality, transparency, moderation, contestability, legality, and justifiability.

Neutrality means not supporting or helping either side in a conflict or disagreement. From this perspective, policymakers should strive toward a level playing field between new incumbent organizations and new entrants—including, importantly, potential entrants (Djankov et al., 2002). With the large financial and network power among large firms, the playing field is all too often tilted against new entrants.

Transparency means that policymakers should operate in such a way that it is easy for others to see what actions are performed and what consequences they will entail. As such, transparency implies openness, communication, and accountability. Ensuring more transparency about the criteria that determine how labor, knowledge, and financial resources are made available or regulated in society reduces the source of institutional uncertainty inherent in innovative endeavors and facilitates innovative actors to focus on the type of uncertainty they seek to engage in—technological, organizational, or market uncertainty (Fleming, 2001; Schumpeter, 1934). As one successful *Unicorn Entrepreneur* told us when asked in an open panel whether high

taxes were a problem, "Well, taxes are like rain. It often rains a lot in this country. That's ok, as long as we can plan for it. We focus on other things, like hiring the best people wherever in the world we can find them; seeking to produce something new and better for our customers. As long as taxes and regulations are fair and transparent, and apply to everyone, that's not a problem for us."

Moderation is commonly defined as the avoidance of excess or extremes or the process of eliminating or lessening extremes (Elert et al., 2019). This means that if regulations or taxes are changed, or subsidies of some sort are deemed necessary, policymakers should be modest in extracting and allocating resources lest such measures become costly to reverse. Uncertainty is all around us and the future is unknowable; thus, altering course in policymaking may also be needed. When this is done, moderate, gradual reforms are usually more wise than large, hard-to-change reforms.

Contestability means that not only markets should be contestable, but also policymaking. When followed, this principle entails that all vested positions, opinions, and truths should be open to challenge and debate (Popper, 1945/2020). If institutions, policies, and markets cease to be contestable, they risk becoming outdated and obsolete in an ever-changing environment. Contestability is thus the cure for societal sclerosis and rigidity.

Legality refers to the idea that de jure and de facto institutions need to coincide, such that legality ensures the rule of law is both upheld and aligned with the institutional framework. This principle is a fundamental precondition in all modern economies and underpins any liberal democratic political order—to the point that it is occasionally taken for granted in much of the European Union. Nevertheless, it is important to realize that formally enacting the appropriate laws does not automatically ensure the legality of institutions that support innovation if policy practice accepts de facto institutions that break with what is formally legalized. When this is done, it is seen as *institutional hypocrisy*, and it gradually breaks down legitimacy and acceptance of the law.

Justifiability refers to the appropriate balancing of public and private interests that is needed to justify policy interventions beyond a simple laissez-faire attitude. It is not only active policies and institutions that need to be justified but also passive institutions, such as (intellectual) property rights, if they are to be effectively implemented and respected. Common-pool resources like our natural environment need to be taken seriously in institutional governance and policymaking, as do incumbent, new, and potential entrant organizations alike.

When considering commonly heralded institutions theorized to foster socially beneficial innovations like those above, it is clear that the entrepreneurial state violates many of these criteria. Large, top-down innovation schemes and moonshot projects are not compatible with neutrality in terms of a level playing field between entrepreneurs and incumbent firms. They are also less incompatible with moderation as most of the ongoing efforts are large and directed toward certain predefined tasks. When increasingly large swathes of common resources are pooled in very specific missions, these efforts and the institutional backing that they receive become less

and less contestable, and how they are evaluated and governed is often not very transparent (Janssen et al., 2021).

It is indeed true, as Mazzucato and others have noted, that successful products and industries often follow military projects, publicly subsidized R&D, and similar programs. It does not follow, however, that governments are better than market participants (entrepreneurs, managers, and those who fund entrepreneurial and innovative projects) at anticipating these successes ex ante. For these reasons we are confident that independent markets actors, not public decision-makers, should be the key actors in innovation policy.

Specific policy interventions may have a sizeable effect on innovation. However, those that turn out to have a significant impact on innovation are usually those that had nothing to do with innovation when they were enacted. For example, migration waves after the collapse of the Soviet Union pushed large numbers of skilled engineers and mathematicians to Israel and the United States, which granted them generous residency and citizenship rights. These migrants made a substantial positive contribution to innovation in those countries. In countries such as the United States or Sweden, tax policies aimed at the deduction of household personal computers or broadband have also been documented to generate innovative entrepreneurship in broader population strata, even if innovation was never a main goal of those policies (Fairlie, 2006; Olsson & Hallberg, 2018). Economists have also argued that broader institutional policies such as housing regulations or access to education may be sizably more important for innovation than any specific intervention (Bell et al., 2019; Bloom et al., 2019).

In short, innovation policy needs to move from a focus on support to a removal of barriers, and toward general improvements rather than specific technologies or missions. While such a recipe is less politically appealing and less tangible than spectacular-sounding moonshot policies, it nevertheless has the best track record. The contributions to this book tell precisely such a story.

5 Lessons from Sweden

Several cases in this book concern the Swedish economy. Despite its small size, Sweden has become somewhat of an entrepreneurial powerhouse over the past two decades, especially within IT and software. The country has become one of Europe's most dynamic startup hubs, experiencing the largest inflow of venture capital in the EU. Why is this the case? Central to the success of the Swedish technology sector are, first, the large general investments in IT infrastructure and education made back in the mid-1990s. Broadband access throughout the country was highly prioritized, it was possible to deduct taxes on home computing, and educational efforts regarding IT were directed toward the general population, meaning that a new generation of self-taught developers emerged in the early 2000s (Olsson & Hallberg, 2018). Access to free and high-quality university education, as in many European countries, has also been important.

Second, conditions and incentives for starting and running business have been greatly improved. Sweden is still often mistakenly regarded as a semi-socialist economy. Corporate taxation has gone from 50% in 1990 to below 20% today. While taxes on employment remain high, taxes on ownership, capital, and dividends are much lower. The combined effect of high taxes on labor and lower taxes on ownership means that incentives for entrepreneurship have improved greatly (Henrekson & Sanandaji, 2016).

Beyond strong incentives for entrepreneurship and a comparatively efficient and transparent government administration, the country has also undergone a process of privatization and deregulation over the past three decades, effectively opening up markets and making them contestable for entrepreneurial activity. The country was the first to create a fully private and electronic stock exchange in 1992. The postal and shipping market was opened up for competition in 1992, and several welfare sectors such as education and health have also been subject to competition, with many innovative, high-growth companies emerging as a result.

These reforms have led to Sweden rising in international rankings on competitiveness and innovativeness (Karlson, 2018), yet at the same time a strong welfare state provides a cushion and environmental legislation is strict: During the time period 1990–2018, total domestic carbon dioxide emissions in Sweden fell by 27%, driven by a transition to more renewable energy, more efficient utilization of resources, and more growth related to IT and services as opposed to heavy industry (Grafström & Sandström, 2021).

We have also witnessed remarkable improvements with regard to fuel efficiency in Sweden and other countries. Water consumption has been subject to steep declines, both in absolute and relative numbers. Air quality has improved a lot over the past three decades. Out of 26 different air pollutants, 24 have been reduced in absolute figures, with an average decline of 52%. In relation to GDP, the decline is even greater—77%. Lead emissions have seen the greatest decline (97%) (Grafström & Sandström, 2021). In short, Sweden has been on a successful path toward sustainability, which has primarily been focused on regulation, taxes, and legislation.

6 Swedish Failures Are Failures of the Entrepreneurial State

In some sectors, however, Sweden has followed the route of the entrepreneurial state, initiating grand, moonshot projects in order to accomplish great leaps toward sustainability. It is also in these areas that we see the greatest disappointments, as outlined in chapter "Directionality in Innovation Policy and the Ongoing Failure of Green Deals: Evidence from Biogas, Bio-ethanol, and Fossil-Free Steel" (Sandström & Alm, 2022) of this volume: Municipal investments into biogas failed to deliver anything but mounting debt and technology that did not work. Ethanol cars that were

heavily subsidized in the early 2000s resulted in a bubble that eventually burst in 2009–2010. Efforts were made to extract ethanol from cellulose in the rural north in order to reindustrialize the region and create sustainability and new jobs. This turned out to be a financial disaster in the years after 2008 (Sandström & Alm, 2022).

What all these policy failures have in common is that ideas related to the entrepreneurial state and the innovation-systems perspective underpinned them. Large sources of public funding at the regional, national, and European levels were combined, making actors immune to risks, resulting in overinvestments in technologies that had little potential.

7 Toward Credible Innovation Policy

Revisiting the guiding principles of Elert et al. (2019)—neutrality, transparency, moderation, contestability, legality, and justifiability—we would argue that the success in recent decades with regard to innovation is related to these guiding principles. Markets have become contestable through open access and competitive reforms, and broad reforms focused on things like skills development and broadband access have resulted in neutrality and moderation.

The findings of this book imply that innovation policy should not be about schemes for public-private collaboration, technology-specific large public investments, or targeted support schemes for specific types of innovators or firms. Instead, innovation policy needs to be inverted. Instead of giving active and specific support to firms or technologies that are deemed to contribute to certain grand challenges, it needs to be passive in focusing on general conditions and incentives, while also actively dealing with interest groups. Instead of being mission and technology oriented—regardless of how important those missions may seem to be—innovation policies seeking to move society in a more equitable, productive, and sustainable way need to focus on the *conditions* required to create desired outcomes: broad reforms improving the conditions for any person to be able to launch or join new disruptive organizations, whatever their background; ensuring competence through a well-functioning educational system; and dealing constructively with vested interests to make industries more contestable. The protection of common-pool resources and efforts to curb global climate change should be based on environmental legislation and taxation that prohibits or makes it expensive to pollute, but remains technology neutral, since nobody knows from where and through whom the next world-changing or world-saving innovation will come. That is the beauty of innovation.

Acknowledgments Our deepest gratitude is directed toward all the researchers who have contributed to this book, and for the anonymous peer reviewers on earlier drafts. Without your efforts and constructive ideas, this book would not have been possible. Special thanks also to the Ratio Institute for fostering a research environment where scholarly work can develop and for administrative support. We are especially indebted to Rickard Björnemalm and Jonathan Grayson for editorial assistance.

References

Acs, Z. J. (2022). The digital platform economy and the entrepreneurial state: A European dilemma. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Aghion, P., Akcigit, U., Deaton, A., & Roulet, A. (2016). Creative destruction and subjective Well-being. *American Economic Review, 106*(12), 3869–3897.

Aldrich, H. (1999). *Organizations evolving*. Sage.

Amenta, C., & Stagnaro, C. (2022). The failures of the entrepreneurial state: Subsidies to renewable energies in Europe. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Aspromourgos, T. (2018). Mazzucato on value and productive activity: A review. *History of Economics Review, 70*(1), 72–82. https://doi.org/10.1080/10370196.2018.1552482

Baumol, W. J. (2002). *The free-market innovation machine: Analyzing the growth miracle of capitalism*. Princeton University Press.

Bell, A., Chetty, R., Jaravel, X., Petkova, N., & Van Reenen, J. (2019). Who becomes an inventor in America? The importance of exposure to innovation. *The Quarterly Journal of Economics, 134*(2), 647–713.

Bergkvist, J.-E., Moodysson, J., & Sandström, C. (2022). 3rd Generation innovation policy: System transformation or reinforcing business as usual?. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Bloom, N., Van Reenen, J., & Williams, H. (2019). A toolkit of policies to promote innovation. *Journal of Economic Perspectives, 33*(3), 163–184.

Brattström, A. (2022). Cultural ideals in the entrepreneurship industry. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Brown, R. (2021). Mission-oriented or mission adrift? A critical examination of mission-oriented innovation policies. *European Planning Studies, 29*(4), 739–761.

Coad, A., Harasztosi, P., Pál, R., & Teurel, M. (2022). Policy instruments for high-growth enterprises. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Collin, E., Sandström, C., & Wennberg, K. (2022). Evaluating Evaluations of innovation policy: Exploring reliability, methods and conflicts of interest. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Daunfeldt, S.-O., Halvarsson, D., McKelvie, A., & Tingvall, P. G. (2022). Do targeted R&D grants towards SMEs increase employment and demand for high human capital workers? In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Davidson, S., & Potts, J. (2022). The entrepreneurial state and the platform economy. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Djankov, S., LaPorta, R., Lopez-de-Silanes, F., & Shleifer, A. (2002). The regulation of entry. *Quarterly Journal of Economics, 117*(1), 1–37.

Elert, N., Henrekson, M., & Sanders, M. (2019). *The entrepreneurial society: A reform strategy for the European Union*. Springer Nature.

Elert, N., & Henrekson, M. (2022). Collaborative innovation blocs and mission-oriented innovation policy: An ecosystem perspective. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Eriksson, K. A. M., & Nykvist, R. (2022). Public-steering and private-performing sectors: Success and failures in Swedish finance, telecom and city planning sectors. In K. Wennberg, & C.

Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.
Fairlie, R. W. (2006). The personal computer and entrepreneurship [article]. *Management Science, 52*(2), 187–203. http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=20252352&site=ehost-live
Fleming, L. (2001). Recombinant uncertainty in technological search. *Management Science, 47*(1), 117–132.
Grafström, J. (2022). Less from more: China built wind power, but gained little electricity. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.
Grafström, J., & Sandström, C. (2021). *Mer för mindre? Tillväxt och hållbarhet i Sverige. Ratio*. Stockholm.
Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review, 35*(4), 519–530.
Henrekson, M., & Sanandaji, T. (2016). Owner-level taxes and business activity. *Foundations and Trends in Entrepreneurship, 12*(1), 1–94.
Hjalmarsson, D. (2022). Building local innovation support systems: Theory and practice. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.
Janssen, M. J., Torrens, J., Wesseling, J. H., & Wanzenböck, I. (2021). The promises and premises of mission-oriented innovation policy–a reflection and ways forward. *Science and Public Policy, 48*(3), 438–444.
Karlson, N. (2018). *Statecraft and Liberal reform in advanced democracies*. Springer International Publishing.
Larsson, J. P. (2022). Innovation without entrepreneurship? The pipe dream of mission-oriented innovation policy. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.
Lerner, J. (2009). *Boulevard of broken dreams*. Princeton University Press.
Mingardi, A. (2015). A critique of Mazzucato's entrepreneurial state. *Cato Journal, 35*, 603–625.
McCloskey, D. N., & Mingardi, A. (2020). *The myth of the entrepreneurial state*. American Institute for Economic Research.
Murtinu, S., Foss, N. J., & Klein, P. G. (2022). The entrepreneurial state: An ownership competence perspective. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.
North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.
Olsson, B., & Hallberg, M. (2018). FinTech in Sweden: Will policymakers' (in)action nurture or starve its growth? In R. Teigland, S. Siri, A. Larsson, A. Moreno Puertas, & C. Ingram Bogusz (Eds.), *The rise and development of FinTech* (pp. 66–84). Routledge.
Popper, K. R. (1945/2020). *The open society and its enemies*. Princeton University Press.
Potts, J, Allen, D.W., and MacDonald, T.J. (2016). Keep your friends close, your enemies closer: The case for inclusive innovation policy. *SSRN Working Paper*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2836301
Pradella, L. (2017). The entrepreneurial state by Mariana Mazzucato: A critical engagement. *Competition & Change, 21*(1), 61–69.
Schumpeter, J. A. (1934). *The theory of economic development*. Harvard University Press.
Sandström, C., & Alm, C. (2022). Directionality in innovation policy and the ongoing failure of green deals: Evidence from biogas, bio-ethanol and *fossil-free* steel. In C. Sandström & K. Wennberg (Eds.), *Questioning the entrepreneurial state*. Springer.
Sarasvathy, S. D. (2022). An effectual analysis of markets and states. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Terjesen, S. (2022). Reducing higher education bureaucracy and reclaiming the entrepreneurial university. In K. Wennberg, & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

Part II
The Entrepreneurial State: Theoretical Perspectives

The Entrepreneurial State and the Platform Economy

Sinclair Davidson and Jason Potts

Abstract We critique the view of the platform economy as implying a necessary regulation of big tech in the form outlined in "the entrepreneurial state." The basis for this view is a combination of fallacy, error, and political choice. The combinations of these factors drive toward a conclusion that the platform economy adds little or no value to the economy and subsequently should be heavily regulated, and moreover, regulated in an internationally coordinated manner. We instead argue that the rise of large platform firms is exactly what we expect to observe in the transition from an industrial to a digital economy.

Keywords Innovation policy · Platform economy · Digital economy

> If you were successful, somebody along the line gave you some help. There was a great teacher somewhere in your life. Somebody helped to create this unbelievable American system that we have that allowed you to thrive. Somebody invested in roads and bridges. If you've got a business, you didn't build that. Somebody else made that happen.
>
> U.S. President Barack Obama (2012).

1 Introduction

In a 2012 campaign speech, former U.S. President Barack Obama correctly pointed out that the market economy relies on cooperation and the division of labor. Anyone familiar with Adam Smith's discussion of the division of labor would view that comment, at face value, as uncontroversial. Adam Smith had written (1976, p. 30),

> In civilised society he stands at all times in need of the co-operation and assistance of great multitudes, while his whole life is scarce sufficient to gain the friendship of a few persons.

S. Davidson (✉) · J. Potts
RMIT Blockchain Innovation Hub, RMIT University, Melbourne, Australia
e-mail: sinclair.davidson@rmit.edu.au; jason.potts@rmit.edu.au

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_2

President Obama, however, was scoring a political point, not making an economic argument. He would have been entirely correct if he had stated, "Somebody else *helped* make that happen."

The fact remains that the notion of individuals cooperating under the division of labor is not controversial in economics. What Adam Smith had argued is that individuals cooperated even in the absence of conscious control and intentional planning: "he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention." This latter notion, however, is somewhat controversial. It is widely believed that in the absence of planning and some conscious control, market economies will underprovide some goods and services such as education and roads: the very things President Obama was referring to. There is a large, unresolved, empirical, and theoretical literature that addresses the issue of so-called public goods.

This chapter addresses a special case of the public goods literature that extends beyond the state having to provide basic education and roads, and generally accepted public goods such as courts of law and enabling regulation and standards. Even economists such as Friedrich Hayek had argued these goods and services were appropriately within the power of the state (Hayek, 1960, ch. 15). An argument promoted by Mariana Mazzucato (2013), however, suggests a far greater role for government in the market economy. We do not intend to provide a critique of her original contribution (see McCloskey & Mingardi, 2020) but rather to provide a critique of an extension to the notion of the entrepreneurial state theory. That is to address a question posed by Mazzucato (and others) in a 2021 essay: how should the entrepreneurial state regulate the platform economy?

Innovation policy has always operated at the intersection of both industrial and growth policy (i.e., in the Schumpeterian tradition, which emphasizes the value or necessity of monopoly to create incentives to private investment in innovation) and antitrust or competition policy, which by construction seeks to resolve the economic problems caused by monopoly or imperfect competition. Joseph Schumpeter (1942, p. 91) was himself particularly clear about the nature of this trade-off:

> There is no general case for indiscriminate 'trust-busting' or for the prosecution of everything that qualifies as a restraint of trade. Rational as distinguished from vindictive regulation by public authority turns out to be an extremely delicate problem which not every government agency, particularly when in full cry against big business, can be trusted to solve.

But the platform economy—and platform economics—which is an innovation that we mostly owe to the digital economy, brings a new angle to this trade-off. Platforms (Rochet & Tirole, 2003) are in almost all cases firms, and when successful they are very large firms. For instance, in early 2021, of the ten largest firms in the world, seven are platforms (Apple, Microsoft, Amazon, Alibaba, Alphabet, Facebook, Tencent). This represents a relatively recent structural shift. Just two decades ago, most of the world's largest companies were industrials, with only a handful of platforms (e.g., Visa). The central reason for this transformation is that digitalization lowers transaction costs (Goldfarb & Tucker, 2019). Following Coasean's

reasoning, this lowers levels of vertical scope, resulting in vertical disintermediation as those wanting things, for instance, can be matched by the platform directly with those supplying things, where the platform is able to be sufficiently attractive to both sets of economic agents, often by engineering side payments or creating the institutional conditions to incentivize all the relevant parties to turn up. A platform, in this sense, is a business that does not so much produce things, like a factory, but rather produces coordination, getting everyone together and reducing barriers and costs to transactions. Digital technologies thus reduce transaction costs, which sets in motion a competitive innovative process leading to the disintegration of industries and the rise of platforms. Those platforms are now, in some instances, the size of the industries they vertically disintegrated and disintermediated. But at the same time, they are no less competitive, as platforms also compete with each other and continually seek to displace each other. For instance, MySpace, an early pioneer of social media, was disrupted by a startup called Facebook, which grew into one of the largest companies in the world but is now under threat from a range of new platforms that include photo-sharing websites and online gaming companies. In each instance, platforms seem like monopolies, but as Schumpeter (1939, p. 107) explained, "practically every enterprise [is] threatened and put on the defensive as soon as it comes into existence" and especially so when that business earns huge profits that can be competed away through further innovation.

But platforms are critical economic infrastructure for the digital economy, providing economic foundations such as markets and matching, search, money and payments, and identity and distributed communication (i.e., social media). These large digital platform firms provide services that were often provided by governments in the industrial economy or were heavily regulated when privately held. So while many digital economy platform firms are large, the relevant comparison is not just to the industrials of the past, but to the comparative size of economic infrastructure organizations, many of which were utilities, often government owned. All the new platforms are the result of a highly competitive Schumpeterian innovation process and operate in contestable markets, in the sense that none hold monopoly licenses or patents, or Royal charters, or are designated and protected national champions. This situation is not true everywhere, for example, in China.)

However, as platforms, they are undeniably big. And that *bigness* has made them targets of new variants of progressive innovation and competition policymaking. There are two overarching forms of this: the new mission-oriented and broadly Schumpeterian innovation policy, as led by Mariana Mazzucato, and the so-called *hipster antitrust* policy, as led by Lena Kahn. We shall consider these in turn.

1.1 The Entrepreneurial State as a Regulator

In a 2021 *Project Syndicate* essay, Mazzucato, Kattel, O'Reilly, and Entsminger set out arguments for regulating the "platform" economy. Readers are told,

> There is a growing consensus that platforms have been abusing their power, driving profits by exploiting consumer privacy, crushing the competition, and buying up potential rivals.

Yet, there is no evidence that consumer welfare is being compromised. Therefore,

> Regulators therefore need to look at the other side of the equation, particularly the supplier marketplace. Even if consumers are not being harmed directly, there is the question of how Google treats content creators, how Amazon treats sellers, how Uber treats drivers, and how Facebook treats merchants. . . .
>
> Because digital platforms tend to fall outside of the existing antitrust framework, we need a new tool kit, with new metrics of market power, and a clear definition of platform power in particular.
>
> But outdated theories are only one part of the story. When modified to account for new realities, market power arguments tend to conclude that the major platforms should be broken up, and key mergers rolled back. But if we push these new theories further, it also follows that some digital services should be considered social infrastructure.

At face value this is an unusual argument. Mazzucato et al. immediately concede that there is no argument that these platforms are outside the scope of existing antitrust laws and concede that these platforms do not appear to harm consumers (not too much, anyway). Yet they still argue that antitrust, of some description, should apply to these organizations. It seems these platforms may be harming other players in the economy: suppliers, contractors, and the like.

It is true that the platform organizational form is somewhat new. Historically, they have not obviously dominated the economy as they now do. Mind you, banks and media firms are identifiable as platform organizations, but economists have only taken notice of the unique features of this organization form since Rochet and Tirole (2003). It is intriguing that Mazzucato et al. make no effort to argue that this organizational form may disadvantage consumers.

> But with Google, Amazon, Facebook, and others offering 'free' services to their users, the calculus has changed. Even if the leading platforms were to pay their users, they could still end up ahead, because one of the main sources of value in these markets lies in amassing user-generated data with which to sell or drive targeted advertising.

The benefits of their business model are so great that consumers cannot be at a disadvantage. At best, it can be argued that consumers get too little from the exchange, but not that they are worse off for the exchange. This leaves Mazzucato et al. having to introduce a different set of arguments to justify (increased) regulatory control over platform organizations. Having already determined that the large digital platforms should be either broken up or, in some instances, nationalized—that is how we interpret the notion that they are "social infrastructure"—Mazzucato et al. correctly point out that platform organizations are a different form of organization to those policymakers are used to dealing with. Quite rightly, policymakers should re-evaluate their assumptions and expectations relating to the regulation of these different organizational forms. Yet Mazzucato et al. never provide that analysis. They declare platforms organizations to be different, concede they do not harm consumers, and proceed to evaluate them as if they did cause harm and were in the need of additional regulation.

In the first instance, they argue that platforms have some market power over suppliers and merchants. This is an argument about unequal bargaining power. They also argue that many of the profits earned by these platforms are "rent" in an Adam Smith sense; that they are not earning returns from adding to the productive capacity of the economy (i.e., profit) but that they are extracting value from their consumers. Mazzucato et al. also appear hostile to the notion of advertising:

> If personal data is used for micro-targeted advertising, we should ask whether the platform is in the business not only of identifying but of creating consumer desires through subtle forms of psychological manipulation.

Finally, it should not be overlooked that the European Union (and the United Kingdom) would like to increase the tax burden placed on (predominately) U.-S. organizations. While Mazzucato et al. do not explicitly discuss taxation, it is clear that increased taxation forms part of the general agenda. The European Union, for example, is attempting to use competition policy to increase Apple's tax burden in Ireland.

2 Rent Is a Classical Fallacy

Mazzucato et al. make the following argument:

> We need to recognise, as Adam Smith—'The Father of Economics'—did, that there is a difference between profits and rents—between the wealth generated by creating value and wealth that is amassed through extraction.

That is a powerful argument. An appeal to authority, to the authority of Adam Smith, no less. Yet, it is an error. As much as we loathe to admit it, Adam Smith was wrong. At least, wrong in thinking that rent could explain important attributes of the economy.

Rent was a very important component of classical economics, being the return to *land*, one of the three factors of production; the other two being capital and labor. Land has a very specific meaning in this context. Land is the bounty of nature: David Ricardo (1996, p. 45) referred to "the original and indestructible powers of the soil." Fred Foldvary (2002, p. 185) writes that economic land "includes all natural resources and natural opportunities." Land is a bounty of nature, where nature is defined as "all resources prior to and apart from alteration by human action" (Foldvary, 2004, p. 166).

Rent essentially has its origin in the classical theory of value. If we employ a labor theory of value, or a cost theory of value, it is difficult to understand why the bounty of nature has any value at all. Rent becomes a device to explain why some resources have value when no labor power has been exerted to create that value. Joseph Schumpeter (1954, p. 675) sums up the argument very well:

> If we do insist on a labor-quantity conception of value, or even on a theory of value that rests on real cost in the sense of disutility and abstinence, and accordingly wish to eliminate requisites of production that are costless in this sense, the device does its duty.

Rent serves a purpose in explaining phenomena that the classical theory of value cannot otherwise explain; land has the ability to produce goods of value despite the lack of human intervention. It is only after the marginal revolution in the 1870s and the introduction of subjective value that *rent* can be explained. Modern economists understand why land with different fertility and soil quality is valued differently. It turns out that land is not a homogenous asset and a device called rent does not need to be introduced to equalize returns from very different assets. As Ludwig von Mises (1949, p. 636) explained,

> It does not astonish the farmer that buyers pay higher prices and tenants higher leases for more fertile land than for less fertile. The only reason why the old economists were puzzled by this fact was that they operated with a general term—land—that neglects differences in productivity.

The value of land is determined not by some notion of rent; rather it is determined by the ability of an entrepreneur to employ that land to generate a good or service that can be profitably sold on the market. Land that can be employed more productively is more valuable than land that is less productive. Similarly, since effort is a discretionary variable, employees who are more enthusiastic are more valuable than those who would seek leisure on the job; at a given wage, the former are a source of rent to their employers.

The notion of rent remains in modern economics either as a so-called quasi-rent (a temporary excess return associated with inelastic supply curves) or as a basis for taxation. The basis for taxation also relies on supply curves being inelastic. It may well be that Mazzucato et al. are basing their argument on the platforms having access to quasi-rents, but they make no argument that platforms have perfectly inelastic supply curves.

Many economists have argued that what Adam Smith called rent—and could not explain in the classical theory of value—is really a return to entrepreneurship. David Ricardo (1996, p. 58) comes very close to this insight:

> The metals, like other things, are obtained by labour. Nature, indeed, produces them; but it is the labour of man which extracts them from the bowels of the earth, and prepares them for our service.

Ricardo is ultimately blinded by the classical theory of value, yet he does recognize that natural resources are not naturally valuable. Picking up on that theme, Frank Knight (1921, p. 160) argued,

> It should be self-evident that when the discovery, appropriation, and development of new natural resources is an open, competitive game, there is unlikely to be any difference between the returns from resources put to this use and those put to any other.

Unless money grows on trees, nature does not simply provide economic assets—even if money did grow on trees, it would still require a labor input to pick the money from the trees. In a hunter-gatherer environment, nature may well provide some bounty, but at any level of economic activity above hunter-gathering, and critically only at low population densities relative to those resources (i.e., the Malthusian curse), natural produce must be combined with capital, labor, and entrepreneurial

insight before economic value can be established. Even hunting requires an investment in skills and human capital. Adam Smith, when establishing the notion of rents, used the example of collecting kelp to create alkaline salt (1976, p. 162). The land or the kelp itself did not generate a return; the knowledge that alkaline salts can be derived from kelp and subsequently turned into soap generated the returns. The rent is not inherent within the land itself; it is a return to entrepreneurial discovery. Land is an input into the wealth creation process just as any other factor of production.

What the classical economists called rent is, at the very least, a return to human capital, or entrepreneurial insight.

Mazzucato et al. attribute platform firms' high levels of profit to either risk-taking or rent extraction. In doing this, they paradoxically fail to consider that the platforms may add value to their users. That individuals may enjoy using their products. Furthermore, Mazzucato et al. are convinced that the platforms simply extract and exploit data from their users. The impressions readers have is that the platforms simply acquire private data from users and are able to profit from it at no cost.

Like any other natural resource—or gift of nature—data is not valuable in and of itself. It must be found, it must be curated, it must be presented to the market in a usable format. What is overlooked is that value on a platform is co-produced. The data generated by users interacting with other users and interacting with the platform itself is the valuable resource being created. The returns from that resource are not somehow *free* or zero-cost. They are a return to developing the platform and providing valuable interaction opportunities on the platform.

Mazzucato et al. are able to side-step those considerations by suggesting that platform users become "addicted" to the platform and are manipulated by advertising.

> Recommendation algorithms mediate between advertising incentives and microtargeting demands (encouraging practices that lead users to give over more data for fewer benefits); and user interfaces are designed to maximise data collection by fostering addiction.

They are somewhat scathing of advertising and the profit motive.

> The implication, as Google co-founders Larry Page and Sergey Brin foresaw in a 1998 paper, is that advertisers or any other third-party interest can embed mixed motives into the design of a digital service. In the case of internet search, the advertising imperative can distract from efforts to improve the core service, because the focus is on the value generated for advertisers rather than for users. . . . As this example shows, it is necessary to ask who benefits the most from the design of a given service. If a platform's core mission is to maximise profits from advertising, that fact will shape how it pursues innovation, engages with the public, and designs its products and services. . . . How data is used, and which data is collected in the first place, are therefore paramount questions. If personal data is used for micro-targeted advertising, we should ask whether the platform is in the business not only of identifying but of creating consumer desires through subtle forms of psychological manipulation.

It seems advertising simply exists to manipulate consumers against their own interests and in the interests of business. It also appears that Mazzucato et al. believe the gains from trade mostly accrue to sellers and not buyers. Finally, we are invited

to imagine that the profit motive misallocates resources and distorts decision-making.

Both of those views are simply wrong.

3 Modern Fallacies

Mazzucato et al.'s views on advertising echo those of John Kenneth Galbraith, articulated in his 1958 book *The Affluent Society*. There he argues (2001, pp. 33–34),

> Production only fills a void that it has itself created. . . . Consumer wants can have bizarre, frivolous or even immoral origins, and an admirable case can still be made for a society that seeks to satisfy them. But the case cannot stand if it is the process of satisfying wants that creates the wants. . . . The even more direct link between production and wants is provided by the institutions of modern advertising and salesmanship. These cannot be reconciled with the notion of independently determined desires, for their central function is to create desires—to bring into being wants that previously did not exist.

At face value, that first sentence reads somewhat like Say's law: Supply creates its own demand. But that is not the point Galbraith is making. Nor Mazzucato et al. The argument is that rather than meeting consumer needs, generated by the consumer, the firm simultaneously generates and then meets the consumer need. The consumer is a passive player and is manipulated by the firm. Galbraith (2001, p. 37) labeled this phenomenon the "dependence effect." This is the very claim that Mazzucato et al. make in relation to platform organizations.

Neoclassical economics has been hostile to advertising in general. The strong perfect information and perfect knowledge assumptions inherent within neoclassical economics preclude any valuable role for advertising. Why would consumers need to be informed about goods and service available in the market, when—by definition—they already know everything to know about those goods and services?

Nonetheless, some neoclassical economists, such as George Stigler, have countered the Galbraithian view with scorn (1976, p. 57):

> The contrasting view, to which I am led by this same professional training, is that consumers generally determine what will be produced, and producers make profits by discovering more precisely what consumers want and producing it more cheaply. Some may entertain a tinge of doubt about this proposition, thanks to the energy and skill of Professor Galbraith, but even his large talents hardly raise a faint thought that I live in a house rather than a tent because of the comparative advertising outlays of the two industries.

Stigler, however, also analyzed the economics of information and had an appreciation for the role advertising plays in the economy. Another neoclassical economist, Harold Demsetz, had a less scornful, yet still dismissive attitude to Galbraith's views on advertising (1968, p. 174):

> The formation of wants is a complex process. No doubt wants are modified by Madison Avenue. They are also modified by Washington, by university faculties, and by churches. And it is not at all clear to this reviewer that Madison Avenue has the advantage when it comes to false claims and exaggeration.

While both Harold Demsetz and George Stigler are neoclassical economists, they are also firmly within the so-called Chicago tradition.

A better analysis of the importance and value of advertising has come from economists in the Austrian tradition. Ludwig von Mises (1949, pp. 321–322) makes the obvious counterargument:

> It is a widespread fallacy that skillful advertising can talk the consumers into buying everything that the advertiser wants them to buy. The consumer is, according to this legend, simply defenseless against 'high-pressure' advertising. If this were true, success or failure in business would depend on the mode of advertising only. ... The idea that business propaganda can force the consumers to submit to the will of the advertisers is spurious. Advertising can never succeed in supplanting better or cheaper goods by poorer goods.

Unlike Galbraith, Mises is making an empirical claim. Far too many new products fail in the market for advertising to be the powerful force that Galbraith suggests it is. Furthermore, while it may be possible for advertising to induce a consumer to buy the product once, it cannot also convince the consumer that purchasing the product has actually satisfied their wants. The point being that although advertising may satisfy the need to acquire information about a good or service, advertising cannot also satisfy the actual consumption expectations the consumer has when consuming the good or service.

The notion that advertising itself can manipulate consumers, in the long run, contrary to their own best interest is discredited. But that still leaves the unexplored question—unexplored also by Mazzucato et al.—of whether platform firms are uniquely placed to manipulate their users through advertising.

What the platforms do, however, is offer their clients targeted advertising. This service is valuable. As U.S. retailer John Wanamaker is purported to have said, "Half the money I spend on advertising is wasted; the trouble is I don't know which half." Advertising is a cost to business. Simultaneously, undirected advertising is a distraction for consumers. Targeted advertising reduces costs for both business and consumers. It may even represent a Pareto improvement to the economy as information and search costs fall for all market participants.

Similarly to advertising, there is a lot of confusion as to the role of profit in the economy. Mazzucato et al. imply that the profit motive has distorted platform decisions away from what they otherwise might have been. This is almost certainly true. That is what profits are intended to do. As Schumpeter said (1939, p. 105), "Profit is the premium put upon successful innovation in capitalist society and is temporary by nature: it will vanish in the subsequent process of competition and adaptation." The decisions that would be made were the profit motive not in place would be quite different.

The approach to profit of Mazzucato et al. flows from their view that platforms exploit users. Not only do they provide no evidence that platforms exploit their users—they do make that assertion—but they also do not recommend policy action on consumer welfare grounds. Rather, their argument is that the entrepreneurial state can better manage the platforms, i.e., it could direct resources to capture value differently or have different priorities to those the platforms currently pursue. This

argument is trivially true. Being true, however, does not make the argument a viable or even desirable policy option.

What is clear is that the platform firms are particularly good at meeting consumer wants. These wants can be good or bad, even vulgar. As Mises (1949, pp. 299–300) has pointed out,

> It is not the fault of the entrepreneurs that the consumers—the people, the common man—prefer liquor to Bibles and detective stories to serious books, and that governments prefer guns to butter. The entrepreneur does not make greater profits in selling 'bad' things than in selling 'good' things. His profits are the greater the better he succeeds in providing the consumers with those things they ask for most intensely. People do not drink intoxicating beverages in order to make the 'alcohol capital' happy, and they do not go to war in order to increase the profits of the 'merchants of death.'

The Mazzucato et al. argument invites the reader to imagine that bureaucrats could better meet the needs of consumers. Their argument, however, is that consumers have been misled into holding the preferences they hold and that other preferences should be substituted for consumer preferences. This argument is popular and widespread among academic and political elites. It forms the basis of the *nudge* movement within behavioral economics.

Berg and Davidson (2017) have provided a critique of the policy consequences of behavioral economics and nudge. Many of the challenges facing *libertarian paternalists* using behavioral economic insights are those that face central planners. As Ludwig von Mises and Friedrich Hayek argued in the 1920s and 1930s, the information costs and incentives that planners (or bureaucrats or libertarian paternalists) face make it impossible for them to actually plan an economy. The Hayekian information problem is fatal to many forms of planning—and nudging—beyond very trivial instances.

That, however, is not the Mazzucato et al. view. Indeed, Mazzucato herself has been at the forefront of arguing that the state can, and does, do much more than what even many neoclassical economists claim it can and should do. This is especially so in the case of R&D and innovation.

The first point to make is that Mazzucato (2013) has an industrial conception of R&D. In her 2013 book, for example, she makes the following argument (2013, p. 82):

> . . . it is also true that if a country has lower than average R&D spending, this is not necessarily a problem if the sectors that the country specializes in are not sectors in which innovation occurs necessarily through R&D (Pierrakis 2010). For example, the UK specializes in financial services, construction and creative industries (such as music)—all with relatively low needs for basic R&D. And there are many industries, especially in the service sector, that do no R&D at all.

Yet creative industries do not do little R&D; they *are* R&D (Potts, 2011). Indeed, as Potts et al. (2008) argue, the creative industries are not really industries at all, but are better understood as being a type of social network market.

It is important to realize that R&D is an input—it is a cost to business—and innovation is an output. The difference between R&D and innovation is Knightian uncertainty. We cannot know which R&D will be valuable and which will not be

valuable. This is why there is value in private order institutions that pool knowledge in early-stage innovation in order to discover entrepreneurial opportunities (Potts, 2019). It may be true that the U.S. military built the internet as a communications system to survive a nuclear war, but until someone realized that it could be used to trade (or even share cat pictures), no innovation had occurred.

Mazzucato's critique of Apple, for example (and this is *her* example), misses the important point (2013, p. 143):

> . . . Apple concentrates its ingenuity not on *developing* new technologies and components, but on *integrating* them into an innovative architecture: its great in-house innovative product designs are, like that of many 'smart phone' producers, based on technologies that are mostly invented somewhere else, often backed by tax dollars. . . . Apple's capabilities are mainly related to their ability to (a) recognize emerging technologies with great potential, (b) apply complex engineering skills that successfully integrate recognized emerging technologies, and (c) maintain a clear corporate vision prioritizing design-oriented product development for ultimate user satisfaction. It is these capabilities that have enabled Apple to become a global powerhouse in the computer and electronics industry.

These are not trivial abilities. No doubt Apple has many competitors and would be imitators. Yet it has succeeded where many others have failed. Moreover, if it was such a trivial thing to develop these capabilities, which in turn have created manifestly enormous profits, then we may reasonably ask why those clearly observable profits did not induce the many other technology firms around the world to imitate these allegedly trivial capabilities and erode Apple's profits. The fact that Apple retained a sufficiently competitive lead, and one that enabled it to exploit premium pricing models for decades in one of the world's most competitive businesses, suggests that those capabilities were perhaps not as trivial as Mazzucato et al. suppose.

What is also important to note is that the state has *not* been entrepreneurial. The state has provided many of the *inputs* to the entrepreneurial process. Some of these inputs are more obvious and important than others. Military expenditure, however, is mostly waste. It reflects well on entrepreneurs that they are able to create value from what would otherwise be wasteful expenditure.

Building on that point, it is the entrepreneurs who add value in platform economies. Mazzucato et al. make an intriguing concession:

> But the foregone compensation here is not really about remuneration (the value of one's individual data production is miniscule, amounting to perhaps a few dollars per year).

The value of the data that platforms collect is low. The value of the platforms themselves is extremely high. It is the entrepreneurs who have added value to the data being collected. This is not acknowledged in Mazzucato et al. It is difficult to reconcile their argument that platforms simply earn rents, but at the same time that the value of the data they collect is low, "perhaps a few dollars per year."

4 The Techlash and the Hipster Takeover

What is known as competition policy in most parts of the world, but as antitrust in the United States, has for the past half century been significantly shaped by the analytic perspective of the Chicago school of economics. This approach argues for a powerful and direct focus on revealed consumer welfare as being the standard whereby competition policy is evaluated. The Chicago approach thereby allows that highly competitive market structures that maximize consumer welfare can occur with large and even very large seemingly monopolistic firms. This recognizes that when firm size is the result of scale economies and markets are contestable, the benefits of scale and innovation flow to consumers through aggressively competitive pricing. In the Chicago approach, whether or not big is bad is to be evaluated by the effect on pricing and consumer welfare, not directly by the size of the firms.

However, the new progressive antitrust—also known as "hipster antitrust" (Shapiro, 2018)—has sought to block mergers and enforce breakups to reduce market power by taking a principled position against size per se, irrespective of any evidence—or even in the face of counter evidence that indicates clear benefits to consumers—of harm to consumers, even when these same firms, which are all platforms, are lowering prices, often to zero, in their markets. The hipster antitrust approach is foremost concerned with countering the perceived "power and influence" of these "big tech" firms (see especially Kahn, 2017, and Wu, 2019).

The hipster antitrust approach that works to threaten large (and almost entirely U.S.) platforms with forced de-mergers or breakups, as well as global taxation, has proven to be a popular policy agenda on the progressive side of politics, with U.S. President Biden appointing prominent *hipsters* (including Lena Kahn) to high-ranking positions in his administration. The European Union has also sought to drive competition policy in this direction, emphasizing data privacy concerns and seeking to enact significant taxes on tech platforms operating in the Union. Very large and profitable companies, irrespective of the competitive structure of their industries, represent a perennially popular (and populist) target for political bargaining and rent-seeking, irrespective of whether the economic logic of the attack makes any sense.

However, a number of prominent legal and economics scholars (Schrepel, 2019; Dorsey et al., 2020) have pushed back against these progressive developments, arguing that these populist proposals are not backed by any evidence that consumer welfare is being harmed, nor that antitrust policy enforcement is failing or currently misdirected. Indeed, they worry that—just as happened 50 years ago, prior to the Chicago revolution in antitrust strategy (as detailed in Dorsey et al., 2020)—the populist approach may end up causing economic harm due to its fundamental incoherence as a policy approach by blindly targeting anything big.

Mazzucato et al. are at least right about this point, arguing against a hipster antitrust approach and recognizing that breaking up one large platform will just result in a bunch of smaller, less efficient platforms.

> Moreover, it is important to understand that even if antitrust authorities were empowered to break up companies such as Google and Facebook, that would not eliminate the data extraction and monetisation that lie at the heart of their business models.
>
> Creating competition among a bunch of mini-Facebooks would not weed out such practices, and may even entrench them further as companies race to the bottom to extract the most value for their paying customers.

The very nature of platform competition is that it works best when the platforms are big—buyers want to go where there are lots of sellers, and sellers want to go where there are lots of buyers—so the most competitive and innovative marketplace will inevitably be a large platform, which under competition is going to be a private or public firm. If this is nationalized, then you lose the benefits of incentives to innovate in the platform and create contestability. So, the most competitive and consumer welfare maximizing market structure will tend toward a large monopolistic platform. Hipster antitrust policy applied to this context in an unsophisticated form will harm social welfare, even if it is politically popular due to the opportunities for populist big-tech–bashing and multinational corporation tax shakedowns.

Mazzucato is wrong about industrial R&D applied to digital platform innovation, but she is not wrong to recognize that antitrust is not the answer. However, Kahn is wrong about the social welfare implications of antitrust directed at big firms, due to the fact that these policy reform targets will inescapably target platforms. Breaking up platforms may well be good retail (i.e., populist) politics, but it will definitely harm innovation and consumer welfare because it does not ameliorate the need for platforms; it just leaves them less efficient and less effective.

We are currently in an era undergoing a deep historical transition from an industrial economy to a digital economy. This is likely to be as profound and disruptive as the transition from the feudal to the industrial economy that occurred several centuries ago (although more recently in some economies). The transition from an industrial to a digital economy has many manifestations, including the rise of digital and computer capital and of intangible value added; the growth of software ("software eats the world," wrote Marc Andreessen (2011)); servicization (X-as-a-service); integration (e.g., dev-ops) and full-stack design; shifts in the value of particular skills and types of jobs; the growth of data as a resource; and the emergence of new cross-cutting layers in the economy such as infosec, cybersecurity, and identity.

But the other major shift that the transition from an industrial to a digital economy brings is a shift from the comparative efficiency of administrative hierarchy (whether corporate or government) toward the comparative efficiency of platforms (or protocols), made possible by the ability of digital platforms (and protocols) to automate many administrative functions into software-embedded rules. The most advanced form of this evolution is currently the Web3 environments of blockchain (Berg et al., 2019), with protocol money (cryptocurrencies), protocol contracts (smart contracts), which then enable decentralized markets (DEXes), decentralized finance (so-called DeFi), digital assets (tokens, including so-called NFTs), and decentralized autonomous organizations (so-called DAOs) as a network of

distributed protocol infrastructure. Some of these networks, platforms, and protocols can be extremely large. The Bitcoin and Ethereum blockchains, for instance, are at the scale of small countries in terms of value, or number of users, which is also true of other large digital platform companies such as Facebook and Amazon, which are familiar corporate entities and are both companies. But they are also platforms, in effect marketplaces that provide infrastructure for a local and specific economy, matching buyers and sellers, providing rules and governance services, managing identity, providing security, and even experimenting with offering their own money (e.g., Facebook is currently experimenting with a private money called Diem, developed from an earlier experiment called Libra). While it is technically correct to call these large companies, they are also, to the extent that they provide much of their own economic infrastructure, a type of small economy. The layer 1 protocols of Bitcoin and Ethereum, as with the next generation of layer 1 blockchains such as Cosmos and Agoric, are arguably better understood as startup digital economies, rather than as firms per se. Indeed, they will often form a company or foundation to manage the launch (or *bootstrap*) phase.

In the transition from an industrial to a digital economy, some large firms are industrial and some are digital. Almost all the digital firms are platforms, and the new blockchain firms are exclusively platforms in the form of protocols. Large industrial firms are a legitimate target for concern with respect to anticompetitive behavior, but a standard should still be met with respect to manifest harm. However, the large digital firms, many of which are very young (Google was founded in 1997, Facebook in 2004, and the Bitcoin protocol was written in 2008), are better understood as innovative new economic infrastructure. The transition from an industrial to a digital economy requires this infrastructure, and in almost every case, governments have utterly failed to provide it, while the private sector has produced, and continues to competitively produce, high-quality functional and operational digital infrastructure (what Davidson et al., 2018 call "institutional technologies").

5 Conclusion

This chapter has offered a critique of Mazzucato et al.'s (2021) view of the platform economy. In particular, Mazzucato et al. argue that the entrepreneurial state should regulate big tech. The basis for this view is a combination of fallacy, error, and political choice. The combination of these factors drives toward a conclusion that the platform economy adds little or no value to the economy and subsequently should be heavily regulated in an internationally coordinated manner. For example, the European Union wishes to tax U.S. multinational corporations but is deploying competition policy in order to do so, and Australia has already gone down this path. To derive this perverse result, it is necessary to refocus competition or antitrust policy away from the concept of consumer protection and toward either targeting size per se, or introducing notions of unequal bargaining power among suppliers.

The notion that big tech platforms should be considered *social infrastructure* is code for very high levels of regulation, if not outright nationalization. These political outcomes are justified by the reintroduction of fallacy (i.e., classical rent) and error (i.e., that advertising does not benefit consumers). Modern economic theory employs the concept of rent as being a gift from government. Classical economics viewed rent as a gift of nature. As a theoretical concept, *rent* explained away anomalies in the classical theory of value. In particular, classical rent masks the role of entrepreneurship in the modern economy.

Platforms are an entrepreneurial innovation, not an exercise in harvesting classical rent that can then be taxed with no deadweight loss. Ignoring information costs in the economy leads to the error that advertising plays no efficiency role in the economy. Ultimately, Mazzucato et al. draw attention to the (digital) platform economy's difference from the industrial economy, but then analyze it using outdated economic frameworks. Unsurprisingly, they fail to appreciate the value of the platform economy and view it with traditional hostility. To paraphrase Ronald Coase (1974), they have seen something they do not understand, or do not like, and have reached for a monopoly explanation.

References

Andreessen, M. (2011, 20 August) Why software is eating the world'. *Wall Street Journal*.

Berg, C., & Davidson, S. (2017). Nudge, calculation, and utopia. *Journal of Behavioral Economics for Policy, 1*, 49–52.

Berg, C., Davidson, S., & Potts, J. (2019). *Understanding the Blockchain economy: An introduction to institutional Cryptoeconomics*. Edward Elgar.

Coase, R. (1974). The lighthouse in economics. *Journal of Law and Economics, 17*(2), 357–376.

Davidson, S., de Filippi, P., & Potts, J. (2018). Blockchains and the economics institutions of capitalism. *Journal of Institutional Economics, 14*(4), 639–658.

Demsetz, H. (1968). The technostructure, 46 years later. *Yale Law Journal (March)*. Reproduced in Harold Demsetz. (1989). Efficiency, competition, and policy. Basil Blackwell.

Dorsey, E., Manne, G., Rybnicek, J., Stout, K., & Wright, J. (2020). Consumer welfare & the rule of law: The case against the new populist antitrust movement. *Pepperdine Law Review, 47*, 861–916.

Foldvary, F. (2002). Site-value taxation and the rule of law. In D. Racheter & R. Wagner (Eds.), *Politics, taxation, and the rule of law: The power to tax in constitutional perspective*. Kluwer Academic Publishers.

Foldvary, F. (2004). Public revenue from land rent. In J. Backhaus & R. Wagner (Eds.), *Handbook of public finance*. Kluwer Academic Publishers.

Galbraith, J. (2001). *The essential Galbraith. Edited and selected by Andrea Williams*. Houghton Mifflin Company.

Goldfarb, A., & Tucker, C. (2019). Digital economics. *Journal of Economic Literature, 57*(1), 3–43.

Hayek, F. (1960). *The constitution of liberty*. Liberty Fund.

Kahn, L. (2017). Amazon's antitrust paradox. *Yale Law Review, 126*, 710–805.

Knight, F. (1921). *Risk, uncertainty and profit*. Augustus M. Kelley.

Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press.

Mazzucato, M., Kattel, R., O'Reilly, T., & Entsminger, J. (2021). Reimagining the platform economy. *Project Syndicate*. https://www.project-syndicate.org/onpoint/platform-economy-data-generation-and-value-extraction-by-mariana-mazzucato-et-al-2021-02?

McCloskey, D., & Mingardi, A. (2020). *The myth of the entrepreneurial state*. American Institute for Economic Research.

Mises, L. (1949). *Human action: A treatise on economics*. Fox & Wilkes.

Potts, J. (2011). *Evolutionary economics of creative industries*. Edward Elgar.

Potts, J. (2019). *Innovation commons: The origin of economic growth*. Oxford University Press.

Potts, J., Cunningham, S., Hartley, J., & Ormerod, P. (2008). Social network markets: A new definition of the creative industries. *Journal of Cultural Economics, 32*(3), 167–185.

Ricardo, D. (1996) [1817]). *Principles of political economy and taxation*. Prometheus Books.

Rochet, J., & Tirole, J. (2003). Platform competition in two-sided markets. *Journal of the European Economic Association, 1*(4), 990–1029.

Schrepel, T. (2019). *Antitrust without romance*. SSRN working paper https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3395001

Schumpeter, J. (1939). *Business cycles: A theoretical, historical, and statistical analysis of the capitalist process*. McGraw-Hill.

Schumpeter, J. (1942). *Capitalism, socialism, and democracy* (3rd ed.). Harper and Brothers.

Schumpeter, J. (1954). *History of economic analysis*. Oxford University Press.

Shapiro, C. (2018). Antitrust in a time of populism. *International Journal of Industrial Organization, 61*, 714–748.

Smith, A. (1976) [1776]). *An inquiry into the nature and causes of the wealth of nations*. University of Chicago Press.

Stigler, G. (1976). Do economists matter? *Southern Economic Journal, 42*(3), 347–354.

Wu, T. (2019). *The curse of bigness: Antitrust in the new gilded age*. Columbia Global Reports.

An Effectual Analysis of Markets and States

Saras D. Sarasvathy

Abstract Entrepreneurial expertise consists in nonpredictive heuristics grouped under the rubric of effectuation. The principles and process of effectuation specify ways to tackle multiple uncertainties, allowing the cocreation of innovative upsides even without large, upfront investments. In focusing attention on the differences between risk and uncertainty, effectuation compels us to rethink the familiar relationships between risk and reward. Entrepreneurs and their stakeholders self-select into the effectual process not only to build products and ventures but also to reshape their environments, including markets and states. An effectual perspective, therefore, offers new frameworks to analyze the role of markets and states in innovation, especially in shaping and choosing goals worth pursuing in the face of complex interacting uncertainties. Additionally, it suggests that the question, "What are we willing to live with if we get it wrong?" has to become a larger part of the public discourse than it is today.

Keywords Effectuation · Market design · Uncertainty

1 Introduction

We know from over two decades of research that entrepreneurial expertise consists in heuristics of nonpredictive control, grouped under the rubric of effectuation (Sarasvathy, 2009). The principles of effectuation allow entrepreneurs to act under multiple uncertainties. Moreover, the effectual process logically implies a high probability of innovation, while keeping losses within the control of entrepreneurs and their stakeholders. This vitiates the taken-for-granted relationship between high risk and high reward.

Conventional wisdom about entrepreneurs being risk-takers is not accurate. In fact, the familiar relationship between risk and reward speaks to investor behavior

S. D. Sarasvathy (✉)
Darden School of Business, University of Virginia, Charlottesville, VA, USA

Indian Institute of Management, Bangalore, Bengaluru, India
e-mail: saras@virginia.edu

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_3

rather than how entrepreneurs act and the lessons they learn. This does not mean that risk-taking is unimportant to entrepreneurship. Instead, it means we need to pay attention to differences between risk-taking and uncertainty-bearing. All individuals, risk loving, risk neutral, and risk averse can learn to tackle uncertainty through effectual approaches. In analyzing markets and states from an effectual perspective, it is therefore important not to confound investor behavior with entrepreneurial behavior.

As explained in the brief overview below, effectuation explicitly tackles the three dimensions of the entrepreneurial problem space consisting of Knightian uncertainty, goal ambiguity, and isotropy. These three dimensions also occur in the context of the central question this essay aims to tackle: What are the implications from the theory of effectuation for the design of governance mechanisms, particularly the roles of markets and states in fostering innovation?

I undertake a careful analysis below to show that states, through their representatives, elected or otherwise, tend to act more like causal investors who try to predict the future to justify risky bets than effectual entrepreneurs who eschew or at least minimize the use of predictive information. This may seem counterintuitive, since one would expect states to lead the way under uncertainty. Yet both historical evidence and the analysis below will show why effectual entrepreneurs are necessary in tackling uncertainty, even in cases usually argued for in the purview of public, nonprofit, or governmental action.

I begin the analysis with a quick overview of effectuation.

1.1 Overview of Effectuation

Briefly, effectuation consists in the following principles:

- Bird-in-hand principle: Be means-driven rather than goal-driven. In other words, begin with things already within your control, instead of chasing means you do not have to achieve some predetermined goal. The canonical example here is cooking based on a recipe for a preselected dish (causal) vs. cooking based on what is available in the kitchen and garden, even if that means having to substitute ingredients or cook up something for which there exists no recipe at all (effectual).
- Affordable loss principle: Instead of placing large bets in pursuit of high expected returns (causal), invest only what you can afford to lose (effectual). This does two things—it keeps the downside within your control and removes irrational exuberance about predicted upsides.
- Crazy quilt principle: Allow stakeholder self-selection. Instead of predicting and targeting particular stakeholders who can help achieve predetermined goals (causal), effectuators are open to working with anyone and everyone who self-selects into the venture by making actual commitments for the opportunity to shape the goals of the venture (effectual). In other words, those who come on

board have a say in where the venture is headed, rather than the goals of the venture determining whom to invite on board.
- Lemonade principle: Leverage (effectual), rather than avoid (causal) contingencies. Even when things outside your control inject positive or negative surprises into the process, consider ways to incorporate these into the effectual process. An obvious interpretation of this principle is, when life throws lemons at you, make lemonade. A more nuanced view argues for a radical revision of attitudes toward failures and successes. For example, separating the performances of entrepreneurs from the performances of their ventures.
- Pilot in the plane: Futures are cocreated through human action, and environments are endogenous to the effectual process. This principle emphasizes the role of human beings (effectual) and dampens the idea of trends or inevitable trajectories (causal). It rejects the idea that history runs on autopilot.

As mentioned earlier, effectuation explicitly tackles the entrepreneurial problem space consisting of Knightian uncertainty, goal ambiguity, and isotropy.

2 Three Dimensions of the Effectual Problem Space

As I explicate each of the three dimensions below, it will be useful to keep in mind that these can interact and combine. Even though they can occur independently of each other, they are not always mutually exclusive.

2.1 Problem Dimension One: Knightian Uncertainty

Effectuation has been studied relatively well in the context of Knightian uncertainty, a term originating from Frank Knight's taxonomy of uncertainty in his 1921 thesis, *Risk, Uncertainty, and Profit*. In lay terms, Knightian uncertainty refers to situations in which the future is not only unknown but also fundamentally unknowable. An iconic example from decision theory can help clarify Knight's taxonomy. Imagine you are playing a game in which you draw balls from an urn containing 50 green balls and 50 red balls. You will win if you draw a green ball. Although you do not know which ball you will draw, you can still calculate the odds as 50–50 since you know the distribution of balls in the urn. This captures the idea of "risk"—namely, a known set of possibilities but an unknown draw.

Another concept of interest is the notion of "uncertainty" in which you know neither the distribution nor the draw. This would be like an urn containing many different colored balls, but you do not know how many of each color or even the total. The game, however, is the same: You win if you draw a green ball. It is easy to see that this game is much more difficult to play than the game of risk. Many organizational, economic, and socio-political problems are conceptualized as

problems of uncertainty that can only be tackled through sophisticated techniques for prediction ranging from systematic hypothesis-testing to scenario analysis and other approaches based on simulation and big data.

In both the above thought experiments, we knew something about the urn's contents. In situations in which Knightian uncertainty is involved, even this information is unavailable. The urn may contain things that defy classification or even recognition, making it impossible to classify them into a distribution on which predictive techniques can work. It is as though the urn could contain umbrellas, snakes, bars of gold, disease, anything and everything that can and may exist. You get something different every time you draw—not just balls. In other words, Knightian uncertainty refers to the impossibility of imagining, let alone specifying a distribution, on the basis of which you can make predictions. In dealing with Knightian uncertainty, you need to come up with techniques that either minimize or completely avoid prediction altogether. The lessons that expert entrepreneurs learn consist in nonpredictive techniques that we call effectuation or effectual logic, contrasted with predictive or causal logic.

Effectuators develop an awareness of and even a preference for Knightian uncertainty. Hence, in addition to cocreating futures with self-selected stakeholders, effectual approaches emphasize possible errors as decision criteria rather than predicted upsides (e.g., the affordable loss principle). This is a powerful tool to help bring downsides within one's control, without constraining upsides. Therefore, one starting point for an effectual analysis of markets and states is to ask: In any given governance choice, what are we willing to live with if we get it wrong?

2.2 Problem Dimension Two: Goal Ambiguity

The literature on effectuation also highlights problems of goal ambiguity and isotropy, both of which are also relevant to an analysis of markets and states, especially in terms of their roles in innovation. At the level of analysis of individuals, goal ambiguity refers either to not knowing what one's preferences are or not knowing how to translate high-level goals into actionable subgoals. The latter applies at the levels of organizations and institutions as well. Especially when faced with complex problems such as climate change, goal-setting is fraught with ambiguities. For example, it is not clear if certain species are more crucial for conservation, bees for example, and therefore need to be protected more than others, say mosquitoes. What about frogs? Or crickets? The *foundation species* literature argues that there are species that are foundational, but there is little agreement on how to decide which ones at any given point in time. Also consider the famous Julian Simon wager against Paul Ehrlich on peak oil and futures in commodity prices (Simon, 1982). In 1980, Ehrlich chose five metals he predicted would increase in scarcity within 10 years and hence in price, but Simon won the bet in the other direction. Prices of most commodities, including oil, have not hit peak 30 years

since. Even with increasing consensus on the reality of climate change, goal ambiguities continue to plague this problem. Effectual action is surely called for here.

Organizations as Fabricators of Artificial Predictability and Goal Clarity. Interestingly, organizations (including states) are a way for us to reduce Knightian uncertainty and goal ambiguity. Hence their ubiquity in human affairs, as argued by Joseph Schumpeter, Herbert Simon, and others. Unlike markets that enable open-ended interactions, organizations are for the most part hierarchical in structure (Williamson, 1973). Note that in the ensuing discussion, I will use the word *organization* to include a variety of hierarchical structures ranging from familiar for-profit firms to normative institutions such as regulations and customs. At the extreme end of this spectrum are states, which are organizations endowed with the right to use coercive force.

By constraining what members can and cannot do through contractual obligations, organizations create artificial predictability amidst pervasive uncertainty. Traffic lights offer a simple example. By simply agreeing to stop when traffic lights turn red, we create predictability and hence safety for both pedestrians and drivers. However, simple agreement is not sufficient. Some amount of effective enforcement against transgressors is also necessary. Particular combinations of voluntary compliance and enforcement differ across different socio-political contexts (just compare busy streets in Mumbai with those in Frankfurt). In the case of designing traffic systems, contextual elements involve different types and speeds of vehicles, numbers of pedestrians, widths and types of streets, as well as historical and cultural antecedents to behavior. When designed well, *organization* can provide reasonable predictability in a wide variety of contexts.

On the face of it, it seems easier to see how market interactions (such as interpersonal negotiations) can be more efficacious in the case of organizations such as small businesses than in the case of larger societal institutions such as traffic lights. It seems absurd to think about negotiating with traffic lights. Yet there is more of a role for market interactions in the case of traffic lights, just as, on the flip side, there can be enforcement within organizations, even completely voluntary organizations. For example, communities do negotiate and vote on a variety of institutions around traffic lights, including speed limits on roads, placement of lights, and widths and numbers of lanes. It is unfamiliar, however, to consider any of these as *market* activities. In such cases, the missing link is provided by institutional entrepreneurs, people acting effectually to build these institutions. As we develop the ensuing analysis of markets and states from an effectual perspective, we will use a more general view of entrepreneurship than a narrow focus on the building of for-profit firms. This generalization is common to the works of noted economists such as Williamson, Ostrom, and North, as well as most entrepreneurship scholars today.

Once formed and functioning well, organizations can also resolve goal ambiguity at the individual level by creating and enforcing norms around particular missions, often defined in behavioral, technological, and strategic terms. Jim March's "garbage can" model shows how organizations do these through simple mechanisms such as deadlines (Cohen, March, and Olsen, 1972). In market-based societies, individuals can select in and out of particular organizations for a variety of reasons,

including alignment with the stated and actual missions embodied in norms practiced within organizations. Whereas individuals with high levels of goal ambiguity might still vacillate in their choices, most will strive to align themselves with the goals of organizations they sign on to.

Similarly, organizations strive to both select in individuals with some degree of mission coherence and then invest in processes and incentives that seek to realign individual and organizational goals as needed and feasible over time. To the extent that they succeed at this function, organizations also create oases of predictability and goal clarity, both for individuals and communities, at least for reasonable periods of time, so that reasonably positive outcomes for both can be fabricated.

This method of reducing uncertainty already involves a move from goal ambiguity to goal alignment. Returning to the example of traffic lights, trade-offs between speed and safety can be efficiently managed by solving the problem of behavioral (human beings), contextual (types of streets), and technological unpredictability (types of vehicles), through a combination of voluntary commitment and enforcement of compliance with that commitment. Voluntary commitments, for example, a community's determination of an acceptable speed limit, resolve goal ambiguity. Once the limit is determined, anyone ambiguous about it still has to comply with the limit. Or exit. Move to Montana or Manila.

In other words, one way to remove goal ambiguity is through organizations' efforts to align the goals of its members, through voluntary commitments during formation, and thereafter through incentives and enforcement. Furthermore, multiple goals embodying differing tastes, preferences, and values can be leveraged and achieved through organizations aligned with these. For unaligned individuals, the choice then becomes unwilling compliance or exit. This works in the case of organizations and markets. But it can be problematic or even impossible in the case of states.

2.3 Problem Dimension Three: Isotropy

The third dimension of the effectual problem space, isotropy, differs from Knightian uncertainty and goal ambiguity. Isotropy refers to the problem of relevant vs. irrelevant information. In contexts of reasonable predictability, it is relatively easy to evaluate the relevance of any given piece of information. But contexts of innovation are contexts of unpredictability. And in these, even when goals are clear, the isotropy problem is rampant. In fact, the more innovation called for, the more this problem might become salient to all kinds of endeavors, including the enterprise of policymaking. Decisions and actions for the fabrication of organizations involve isotropy. Even more so the making of markets and the shaping of states. And most importantly, isotropy pervades choices between markets and hierarchies. In order to clarify the concept of isotropy a bit more extensively, let us consider a standard problem that budding entrepreneurs face.

Suppose you have come up with the idea for a green widget. Most standard textbooks and courses in entrepreneurship would suggest you go talk to potential customers and ask for their input in making marketing and production decisions. This advice is based on conventional wisdom that makes a series of assumptions, each of which is usually not only unjustified, but has the potential to misguide entrepreneurial action:

- There exists a market for the product.
- You know who your potential customers are likely to be.
- Your potential customers know what they want.
- They will actually do what they say—buy what they say they will buy, not buy things they say they will not buy, etc. Note that these two are not the same, nor are they symmetrical.
- You have the time and resources to talk to enough potential customers to figure out what they want and do not want.
- Your potential customers will not want completely contradictory features.
- There are no customers you do not know about.

You can combine the above into the most important and fatal assumption of all: Markets are out there, in an objective sense, and they can give you reliable, actionable answers. This implies that markets are not themselves artifacts of what you and others do. In other words, markets are mostly exogenous to human action, not endogenously created through it.

Not only entrepreneurs, but large established companies who can afford the best market research techniques and talents available, routinely make two bad bets based on these assumptions:

1. They make decisions assuming markets are more predictable than they are.
2. They miss out on making markets that could be made without resorting to prediction.

Effectual entrepreneurs choose to make the opposite set of bets, choosing to make the opposite error on predictability. They treat markets as artifacts and approach them as less predictable than they might be. Let us now consider how that enables them to overcome the isotropy problem.

How the Crazy Quilt Principle Helps Overcome Isotropy. If you approach markets as exogenous, but predictable, and you ask for information, advice, and feedback from *potential* customers, one of the interesting problems that arises is not that you do not get enough information, but that you get too much information. *Too much* in the sense that the information confuses, rather than clarifies, your understanding of the situation. If you now take seriously the idea that there may be other customer segments out there that you may not have predicted and widen the circle for your research, the isotropy problem of too much and too varied information without clear criteria to distinguish relevance only increases in quantity and intensity. No brainer as it may be, seeking more information does not usually reduce isotropy.

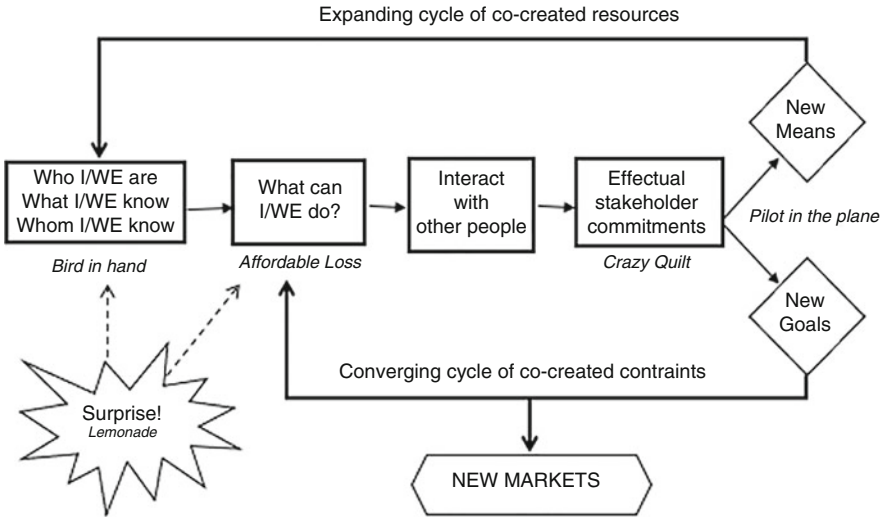

Fig. 1 The Effectual Process. Note: *Author's creation*

The only way to overcome isotropy is to ask for actual commitments, not merely information, advice, or feedback. In other words, market mechanisms such as deal terms, real investments of financial and nonfinancial resources, preselling, etc., are examples of ways to overcome isotropy. When someone says they will or will not buy something at a price, that is predictive information of little or no value to effectual entrepreneurs. But if someone underwrites the next step in the venture, by actually producing a prototype for you, or by introducing you to someone who can do a trial run without charging you up front, or signs a preorder that allows you to set up favorable terms with vendors, etc., then the next step is not a speculative bet. Instead it is an actionable task you can accomplish for affordable loss.

By stitching together a series of such actual commitments (See Fig. 1 for a graphic illustration of this process), effectuators end up cocreating a market that neither entrepreneurs nor anyone else might have predicted. Hence markets themselves become an artifact of the effectual process. In this sense, as Schumpeter argued, entrepreneurship is more about cocreating new markets than innovative products and ventures within extant markets.

Relevant information in the effectual process therefore gets its relevance from individuals and/or organizational actors who, for idiosyncratic reasons of their own, enable you to accomplish key venture-building actions for affordable loss. These individuals or organizational actors self-select into the process—an act characteristic of markets, not states. Yet the deal terms of each effectual commitment entail elements of governance, constraints on future actions, and future interactions with future self-selected stakeholders that become the building blocks of the hierarchy that comes to be as well. In other words, the effectual process offers the quintessential microprocess of mixing and matching market-like and state-like elements that

add up to actual new markets and new organizations that come to populate economies and societies. Ergo, it is worthwhile to take a bottom-up view of markets and states through an effectual lens.

3 Markets in Effectuation

It is worth explicitly acknowledging that I am assuming a world in which individuals are relatively free to act effectually, as in modern democracies in which there exist reasonable avenues for entry and exit into labor markets, different types of private and public organizations, and even some movement in and out of states. At least a minimal level of property rights and contract enforcement are also the norm in this analysis. Of course, this is not readily true for a large portion of humanity. But for the purposes of this analysis, I assume a minimal level of existing norms and institutions of individual freedom.

Is the existence of relatively free markets necessary for effectuation? Yes and no. Without belaboring the point, remember that effectuation is a method of shaping and cocreating institutions and environments, including institutions of freedom. However, an analysis of how effectuation can work under varying degrees of tyranny or coercive oppression is beyond the scope of this essay.

The Hayekian notion of variation in and across individuals, whether in the form of preferences and values, or experiences and situations that disperse knowledge and ignorance in totally unpredictable ways throughout society makes effectuation more efficacious. This is not surprising since effectual action is the micro-foundational prior to market transactions. The effectual process coheres well with the idea of markets as games without goods (Buchanan and Vanberg, 1991). The role of markets, from an effectual perspective, is not to optimize resource allocation, but to allow productive innovation to happen. In this sense, effectuation endorses a view of markets as (co)creative processes rather than allocative or discovery processes.

But the effectual process, as depicted in Fig. 1, also provides the microfoundations for the cocreation of organizations and institutions, not only products and markets. In other words, every effectual commitment from two or more entities, entrepreneurs and their stakeholders, results in shaping governance mechanisms related to the commitment. Each commitment also makes particular futures more predictable, as goals converge toward clarity while reducing isotropy. In other words, as the effectual process fabricates longer standing relationships and governance mechanisms, a more causal/predictive approach becomes feasible and even necessary in some cases. This implies that you can design, create, and set up governance mechanisms effectually, but once set up, it is far more difficult for them to operate effectually. This is a case of effectuation leveraging market processes to shape and cocreate hierarchies all the way from transactions to firms to polycentric governance systems and even states.

In sum, the effectual process can cocreate both markets and hierarchies, reshaping socio-political environments and states. In designing markets, effectuation can result

in new goals worth pursuing. At the same time, in designing hierarchies, effectuation may result in goal alignment of the kind that may hinder innovation. To the extent that effectuators seek to avoid quick goal coagulation and strive to keep both entry and exit of stakeholders open even as they build stable organizational structures, they can nurture markets as well as enduring ventures.

It is interesting to ask whether the above analysis can go in the opposite direction, namely, can states effectuate?

4 States in Effectuation

Experienced effectuators, including those who have built and are running large companies, will tell you that it gets harder and harder to effectuate as organizations grow. The very success and endurance of organizations develops a stiffening of the arteries through a creeping bias toward a belief in the predictability of the future, as well as an exaggerated estimate of one's own ability to predict. Even isotropy, inevitable in areas such as new product development, begins to be tackled through pretensions of predictability rather than with an explicit acknowledgment of the pervasive persistence of uncertainty and the various forms it can take. As illusions of predictability grow, nonpredictive techniques and processes that foster them get neglected and wither away due to disuse. Instead, leaders begin to tout strategies such as the need to see around the corner and *skating to where the puck will be* as the ideal path to innovation.

This clogging of arteries can take on an aspect of rigor mortis when it comes to states. It is not easy for states to act without clearly stated goals, budgets, and targeted stakeholders. Here the analogy of venture capitalists is much more appropriate to states than any allusions to entrepreneurs. People routinely confound investing, especially private equity investment involving other people's money (OPM), with entrepreneurial behavior. Yet it is easy to see why venture capitalists almost always are totally ineffectual, or rather, causal.

In actual fact, investors face multiple uncertainties, just as entrepreneurs do. Yet they embrace complex predictive approaches, confounding risk-taking with uncertainty-bearing. One reason for this misapplication of prediction to circumstances of Knightian uncertainty could be due to the fact that they invest OPM. This sets up high expectations of return from their (institutional) investors, who may be persuaded by their apparent predictive prowess in selecting high-potential ventures. Additionally, the need to design winning term sheets with predetermined milestones makes it even more difficult for them to not hinder, let alone facilitate, effectual approaches. As a result, they may come to believe in the illusion of predictability with regard to their own investments and in turn set up obstacles in the way of entrepreneurs trying to build ventures effectually.

In general, private equity investors' approaches, mimicked by so-called entrepreneurial states, consist in one or more of the following three strategies:

- Place a bet (net present value calculations).
- Place many bets (portfolio diversification).
- Place staged bets (real options).

The effectual process, in contrast, is about not placing a bet. As explained in detail elsewhere, bets involve taking event spaces as given and outside one's control. All one can do then is to calculate or estimate the event space to the best extent possible. The non-bet alternative is to focus on the conditioning assumptions that can be reified or falsified through effectual action so as to reshape the event space itself. For example, entrepreneurs are often taught to carry out market research to *find out* what potential customers want. In contrast, expert entrepreneurs discount market research because both presumptions of who *potential* customers are as well as any information they provide as to what they will or will not want can be inaccurate and unreliable. Instead, effectual entrepreneurs choose to cocreate product and market through precommitments, even before building prototypes, from actual customers. Actual sales, they learn, is the best form of market research. This further has the advantage that no major financial outlay is called for in starting new ventures.

This is precisely why it is important not to confound predictive investing and investors, especially those investing OPM with effectuating entrepreneurs. Discussions of entrepreneurial states or public entrepreneurs often confound the two, attributing entrepreneurial mindsets to investors and funding activities. This is not to say that investors cannot act or invest effectually. It is just that most investors, unless they are investing their own money, for example, angel investors, either do not or cannot act effectually. Just as states cannot or do not.

Only those investing their own money, with a willingness to lose what they invest for reasons or preferences of their own, can self-select into uncertain, isotropic projects. This is because reasons other than predicted upsides are called for in the effectual process. Variations in preferences and values and the infinitely splendored glass of textured lived experiences drive the effectual process. Unlike in the case of investing OPM, accountability is limited to delivering on particular commitments made and not to any overall promised upside outside the control of effectuators or a prespecified goal.

In order to justify their own fundraising as well as to keep up some semblance of accountability, investors of OPM turn to predictive approaches even when aware that these may not be reliable. Interestingly, we found in our empirical work that the more experienced a venture capitalist, the more effectual their approach. This could simply be a side effect of working with expert entrepreneurs and having deal flows heavier in effectual ventures as a consequence. Also, in the case of angel investors investing their own money, we found that the more effectual the approach, the higher their overall hit rate without reducing the number of home runs, again attesting to the fact that effectuation is not about placing large bets (Wiltbank et al., 2009).

Since states, and their representatives, elected or otherwise, almost always invest OPM (monarchies and oligarchies may pretend otherwise), they are much more likely to act like causal investors rather than effectual entrepreneurs.

5 Two Frameworks for Tackling Isotropy and Fostering Innovation

In general, individuals can exhibit and leverage idiosyncratic variation in ways and to extents that become unjustifiable in the case of larger fiduciary organizations, especially states. Justification typically takes shape in stated goals and/or predictive information argued to lead to the achievement of those goals. Once goals are set, they become difficult to change, especially as they begin to generate payoffs. These payoffs become predictable opportunity costs that are then weighed against isotropic innovative possibilities. Since the latter are unpredictable, it becomes harder and harder to make a case for them and easier to dismiss them as infeasible. Consider how both large firms such as the automobile giants in Detroit as well as various states around the world acted or failed to act in the face of carbon emissions exacerbating climate change. On the one hand are predictable opportunity costs such as jobs lost. On the other are a variety of isotropic innovative possibilities, each of which may or may not succeed in technical, financial, and political terms.

Logically, one would expect states to lead the way in taking on isotropic possibilities in the face of Knightian uncertainty. Yet history shows that it is individual entrepreneurs, using market transactions and/or collective action that lead the way. Not because states are inherently myopic and individual entrepreneurs are clairvoyant. But because it is easier for individuals (and some budget-owners inside organizations) to act based on subjectively calculated affordable loss rather than pseudo-objectively calculated expected return. Larger organizations and states follow as upsides become clearer to predict and envision. Eventually. This is true even in the case of basic science or technologies for defense, in which states make large a priori investments. Take the case of the internet. State investments led to the internet. But in addition to targeted technical developments, a variety of actions and interactions, intended and unintended, as well as effectual entrepreneurship over 15 years, helped reshape it into the universe of endless possibilities that it has become today. This reshaping involved idiosyncratic, even idiotic, transformations such as technologists inventing UNIX to play video games and college kids inventing Facemash to rate females on campus *hot or not* that became Facebook, leading to the fount of fortune and misery that is social media today.

There is something about the lived experiences of conscious human beings that seems to be an important input into all creativity leading to any kind of innovation, even serendipitous or accidental innovations. A purely calculative process leading to innovation seems unlikely, even absurd, especially in innovations in goals themselves, innovations in what is deemed worth pursuing or not. We will get to these in the concluding section of this essay. For now, let us organize the arguments so far into a usable conceptual framework in two parts.

Figure 2a and b depict the analysis above in a simplistic two-part framework that can nonetheless be useful for thinking through the role of markets and states in innovation. Figure 2a considers cases characterized by the need for funding, especially funding using OPM—other people's money. Figure 2b illustrates situations

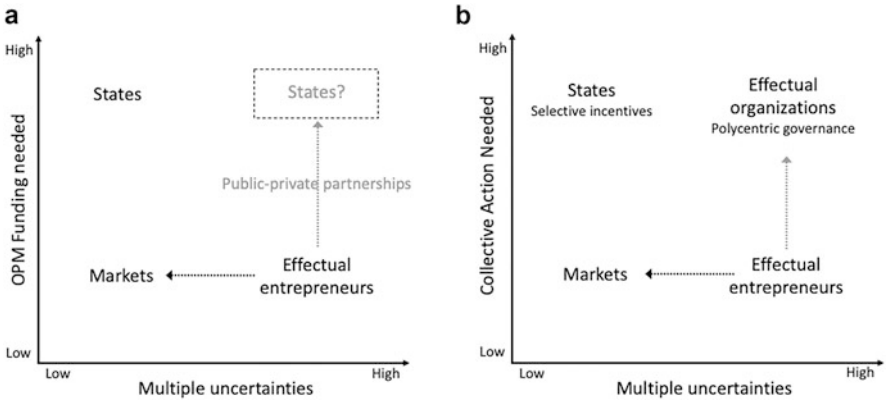

Fig. 2 **a**, **b** The role of markets and states in innovation. Note: *Author's creation*

requiring more than funding, such as those involving collective action even before funding becomes salient. These are usually dubbed situations of market failure. I will, however, eschew that term since it sets up an overly rigid dichotomy between markets and states and completely obscures the role of effectual entrepreneurs in building and reshaping both.

Figure 2a captures the argument that both markets and states will find it difficult to tackle the effectual problem space. Without restricting effectuation to individual actors, it is still easy to see why idiosyncratic individuals may be more likely to kick off the effectual process, even though the process almost immediately moves to more than one cocreative stakeholder, hence not an individual-level phenomenon at all. The point here is not about whether only individuals can effectuate. Rather it is to highlight the idea that something other than prediction-based reasoning is needed and used on the right-hand side of both Fig. 2a and b. In other words, waiting for consensus based on reasons and projections is not a necessary condition for effectual action leading to the cocreation of new markets. Means-driven possibilities within affordable loss are sufficient.

Once kicked off, the effectual process can stitch together several different kinds of partnerships, including public-private partnerships that can eventually lead to a larger role for states in funding isotropic possibilities whose promise might be more easily folded into politically palatable predictive approaches. In sum, when funding requirements are very large, states will have a larger role to play even though they may need to be cajoled into it through effectual action. SpaceX and other companies collaborating with state space agencies are cases in point.

Figure 2b addresses situations requiring collective action, such as those involving common pool resources or persistent inequities often ignored by those with power and privilege. In such cases, effectual entrepreneurship is even more crucial in the face of isotropic possibilities under Knightian uncertainty. In a recent study, we reanalyzed the data Elinor Ostrom had collected on how a variety of different stakeholders came together to cocreate polycentric governance mechanisms for the

administration of the water basins in the Los Angeles area (Sarasvathy and Ramesh, 2019). The reanalysis allowed us to spell out the effectual process that constituted its behavioral microfoundations. Studies have examined effectual action in other settings requiring collective action such as art movements (Callander, 2019; Olive-Tomas and Harmeling, 2020), disaster relief (Nelson and Lima, 2020), and communal well-being in first nations such as the Toquaht (Murphy, Danis, and Mack, 2020).

The literature on collective action argues for the need for selective incentives to induce individuals to contribute to the common good (Olson, 1965). In more predictable situations in which the path to societal goods might be clear even if the problem of selective incentives is large, states can provide those. Incentives provided to those reluctant to get vaccinated for Covid-19 are a case in point. However, when the situation contains isotropic possibilities in the face of Knightian uncertainty, effectual entrepreneurs have to kickstart the collective action process and even carry it forward for long periods of time before the environment gets reshaped enough to engender the political will needed. The years of *Don't ask, don't tell* even when presidents in office were morally supportive of gay rights are a case in point here.

5.1 Applying the Framework to Innovation Policy

A word on applying effectual approaches to innovation policy. While the development of scientific institutions such as universities, peer-reviewed journals, R&D departments, and national innovation funding agencies such as the National Science Foundation (NSF) attest to the importance of both public and private organizations, it is interesting to consider the role of smaller companies and even individuals in this arena. For example, partnerships between new (smaller) ventures and large established firms abound in several industries such as biopharmaceuticals, fintech, and telecommunications. Additionally, multinational firms routinely engage in corporate entrepreneurship of various kinds.

In examining the role of effectual entrepreneurs in this arena, it is important to note that innovation and valuable innovation are two different things. Furthermore, not all innovations, especially valuable innovations, are produced by scientists in R&D, whether within large companies or public sector organizations. Users, suppliers, and other stakeholders in the value chain often produce innovations that prove to be more valuable in terms of actual adoption in the market or even in creating new markets. In fact, innovators often miss markets because they rely on predictions about who the customers will be that later turn out to be incorrect. The CD-ROM, for example, was invented by scientists that auctioned it off just before their patents were about to expire. Using the invention for music was an act of effectual entrepreneurship. Even the internet served only scientists for about 15 years before it was commercialized by entrepreneurs who built more user-friendly interfaces allowing nonscientists to use it for a myriad of purposes.

In other words, while innovation policy has been shown to work in moving forward the frontiers of science, transforming that frontier and ensuing technologies into valuable products and markets seems to leverage the dispersion of knowledge across idiosyncratic individuals argued for by economists such as Hayek (1977) and Buchanan and Vanberg (1991). Such idiosyncrasies are impossible to predict ex ante, making effectual approaches invaluable, a point I will return to later in this chapter. Innovation policymakers need to carefully consider how to invite in effectual entrepreneurs or at least not barricade the system against them. One way to accomplish that could be to institute X-prizes such as the privately funding Ansai X-prize that kickstarted SpaceshipOne and the cocreation of the private space industry in recent times.

6 Markets and States as Outcomes of the Effectual Process

Any analysis of markets and states has to examine their role in human well-being and the societal innovation and productivity that feed into that well-being. As seen above, one organizing principle of markets consists in the role of idiosyncratic preferences. Whether attributed to the Adam Smith of *Moral Sentiments* or *Wealth of Nations*, preferences and values need not be extrinsically dictated and enforced, nor is collective consensus required before transactions happen. In fact, effectuation shows how market transactions can be one way for such consensus to come about and even for new frontiers for moral sentiments to be shaped both at individual and societal levels. Both new goals worth achieving and new governance mechanisms for alignment and enforcement can be forged through chains of intersubjective interactions in the effectual process.

However, market transactions are still deemed to be driven by expectations of the upside, whether economically or social-psychologically speaking. As proponents of markets have argued and social entrepreneurs have shown in practice, a wider range of problems can be tackled through market mechanisms than might have been conceptualized in economics textbooks. Recent examples include microfinance in the alleviation of poverty through entrepreneurship, income-share agreements to fund education, and of course renewable energy, as well as refugee entrepreneurship. Each of these, while not immediately and predictively tied to returns, do offer the possibility of economic upsides in the longer run that can fuel market-based creativity.

Yet, there do exist problems that do not have economic upsides, whether for individuals in their lifetimes or for society in the longer run. Caring for the elderly or the severely mentally ill comes to mind. The upsides in these cases are more difficult to capture in economic terms and even more subject to the three dimensions of the effectual problem space. My aim in bringing these examples to fore is neither to enter a discussion of market nor moral failures. Instead, it is to acknowledge the argument that states may be required for tasks beyond the facilitation or augmentation of markets.

States are insurers of last resort against the multiple uncertainties that characterize the effectual problem space in individual human lives. The invention and practice of taxation in human history is not an arbitrary development. The oft-repeated quote attributed to Benjamin Franklin, "Nothing is certain but death and taxes," uncovers a profound truth under the effectual lens, that has a different meaning than the one usually associated with it. Consider, for example, the fact that as life expectancy increases, taxes become even more important to protect us through the uncertainties that may accidentally debilitate us in physical, emotional, and other ways. Another example consists in the technologies that allow billions of people to survive and thrive, while concurrently threatening to unmoor us from our homes, spatially as well as temporally. It is a plausible hypothesis that immortality is not likely to reduce, let alone eliminate uncertainty. Hence funding for some form of insurer of last resort may be inevitable. Certainly for now, life is more uncertain, without death; and however unpalatable this fact, without taxes.

Political philosophy endorses the fact that at the minimum, the most important task of states is protection. That includes protection from the uncertainties of life. Yet paradoxically, their structure, whether in terms of hierarchy and bureaucracy, as well as their function in terms of investing OPM collected through differing degrees of coercive force, makes it more difficult for them to use effectual techniques. From an effectual perspective, therefore, it is time to rethink states as artifacts of effectual action, not only arenas within which markets and organizations function. History shows us how labor markets and state institutions were reshaped in concurrence with the development of the scientific method. Hence we routinely accept state investments in basic science so long as the investment decisions are overseen by reliable and reputable scientific bodies and made accessible sooner or later to private enterprise as well. I see a similar evolution of new institutions and radical rearrangements of the roles of markets and states driven by the effectual entrepreneurial method.

Human well-being requires investments in the productive without giving up on the seemingly unproductive. In fact, as already mentioned in the case of UNIX and social media, unproductive situations and experiences produce new goals worth pursuing. In conventional dichotomies of markets and states, market mechanisms are notoriously bad at fostering unproductive activity. Their efficiency is the efficiency of separating wheat from chaff. This may be arguable, but not unreasonably so. Hence, also arguably, only states can step in to take up the slack to take care of those who need care, productive in the longer run or not. But the analysis I offer here from the effectual perspective uncovers a process that sifts and reshapes relationships between markets and states in a dynamic way. Both markets and states become inputs into the effectual process. But they are also refabricated outcomes of the process.

7 The Ultimate Innovation: Goals Worth Pursuing

In *Development as Freedom,* Amartya Sen explained that to thrive, humans need to choose their own ends, not merely get access to resources for achieving externally set developmental goals. In building multiple ventures, including successes and failures, expert entrepreneurs learn the same lesson through the principles and processes of effectuation that help engender goals worth pursuing. Additionally, this process of shaping new goals not only leverages market-like variations in the lived experiences of individual stakeholders, but is also crucial to build viable governance mechanisms that coalesce into enduring ventures and environments that nurture them.

At the extreme, an argument could be made that if we already know with clarity and precision which goals are worth achieving and can predict with reasonable accuracy how to achieve them, we may not need markets or states. Or the effectual process. Or conscious, lived human experiences for that matter. We could program artificial intelligence (AI) to structure societies that offer comfort and efficiency in the achievement of the chosen goals with Bitcoin for currency and Ethereum for enforcing property rights and contracts. However, even with AI and unfettered digital decentralization, it is not clear which goals are worth achieving. Hence, the most important goal might be the freedom to fashion new goals arrived at through the push and pull of variations in lived experiences not subject to static frameworks neatly sifting positive from negative valences in those experiences. Furthermore, new goals can also emerge in the process of achieving old ones. And unsavory unintended consequences can arise from the very acts of prescribing and pursuing preset goals that were deemed worth achieving. All of these get embodied in the effectual problem space.

The effectual problem space brings into stark relief the question I began this essay with: Even as we strive to find best-possible solutions to achieve goals we believe are worth achieving, what are we willing to live with if we get it wrong? We know from behavioral economics that we react differently to losses than to gains. For example, we experience aversive feelings in response to a loss of $5 more acutely than positive feelings when we gain $5. In terms of goal-setting, this shows up in a different asymmetry. It is easier for us to know what we do not want than what we do. It is easier, for example, to teach children what not to do to avoid bad consequences than how to take action to achieve good outcomes. *Avoid talking to strangers* does not usually tell us how to form new friendships and build lasting relationships. Similarly, when it comes to governance, even at the level of states, it is easier to choose from loss aversion, *Avoid job losses* than foster ways to create jobs. Or worse still, create jobs while saving the environment.

As we have seen in the analysis above, the lessons that entrepreneurs learn could be of use here. But that requires us to invert traditional conceptualizations of goals and prediction in good decision-making. Isotropy compels us to confront the fact that we face Type I-Type II errors more often than we would like to believe. Consider this at the meta-decision level. We could erroneously deem the future

more predictable than it may be and goals clearer and more worth achieving when they may not be. Similarly we may also be wrong in seeing the future as less predictable than it actually turns out to be or unnecessarily or frivolously question extant goals.

However, note that the errors in both directions involve unpredictability. Thus the question of which error we are willing to live with if we are wrong lurks around the corner of *all* our decisions. This pervasive, persistent unpredictability looms larger at the state level, where wealth and power can deepen, enlarge, and painfully exacerbate either error. That is why building and shoring up effectual toolboxes and processes in addition to predictive decision-making is important. A new focus on downsides, not as prices to be paid for predicted upsides in the risk-return space, but as skin in the game in attempts to fashion goals worth pursuing even in the face of near-certain failure, has to become a more explicit part of the public discourse.

Without the seemingly solid anchoring of decisions to achieve clearly specified goals through strategies based on good quality predictions, we feel at the mercy of idiosyncratic preferences and the vagaries of power politics. Effectual entrepreneurship offers practical guidance based on cumulated evidence on how idiosyncratic preferences can be transformed step by step into productive and innovative governance mechanisms that in the process, allow us to arrive at new goals worth pursuing. In fact, functioning markets and states that we take for granted rest on underlying microfoundations of effectual action and interaction. Uncovering the movement beneath reveals not chaos, but a set of systematic principles and a learnable logic that propels the process forward.

History shows uses for both markets and states. Both have arguably been important for humans to survive and thrive. Yet history also offers cautionary tales of presumptions about what constitutes thriving. It may be time to realize that we need principles and processes that can design and reshape markets and states without defining a priori which goals lead to thriving and are therefore worth pursuing. The freedom to design purpose itself. Coming full circle, is not that why we invented markets and states in the first place?

References

Buchanan, J. M., & Vanberg, V. J. (1991). The market as a creative process. *Economics & Philosophy, 7*(2), 167–186.

Callander, A. (2019). Artmaking as entrepreneurship: Effectuation and emancipation in artwork formation. *Art, 8*(2), 61–77.

Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A garbage can model of organizational choice. *Administrative Science Quarterly, 17*(1), 1–25.

Hayek, F. A. (1977). Creative powers of a free civilization. In F. Morley (Ed.), *Essays on individuality* (pp. 284–289). Liberty Press.

Murphy, M., Danis, W. M., & Mack, J. (2020). From principles to action: Community-based entrepreneurship in the Toquaht nation. *Journal of Business Venturing, 35*(6), 106051.

Nelson, R., & Lima, E. (2020). Effectuations, social bricolage and causation in the response to a natural disaster. *Small Business Economics, 54*(3), 721–750.

Olive-Tomas, A., & Harmeling, S. S. (2020). The rise of art movements: An effectual process model of Picasso's and Braque's give-and-take during the creation of cubism (1908–1914). *Small Business Economics, 54*(3), 819–842.

Olson, M. (1965). *Logic of collective action: Public goods and the theory of groups (Harvard economic studies. v. 124)*. Harvard University Press.

Sarasvathy, S. D. (2009). *Effectuation: Elements of entrepreneurial expertise*. Edward Elgar Publishing.

Sarasvathy, S. D., & Ramesh, A. (2019). An effectual model of collective action for addressing sustainability challenges. *Academy of Management Perspectives, 33*(4), 405–424.

Simon, J. L. (1982). Paul Ehrlich saying it is so doesn't make it so. *Social Science Quarterly, 63*(2), 381–385.

Williamson, O. E. (1973). Markets and hierarchies: Some elementary considerations. *The American Economic Review, 63*(2), 316–325.

Wiltbank, R., Read, S., Dew, N., & Sarasvathy, S. D. (2009). Prediction and control under uncertainty: Outcomes in angel investing. *Journal of Business Venturing, 24*(2), 116–133.

The Entrepreneurial State: An Ownership Competence Perspective

Samuele Murtinu, Nicolai J. Foss, and Peter G. Klein

Abstract Academics, pundits, and policymakers have recently called for a stronger governmental role in the economy to tackle social issues such as inequality and *grand challenges* like global warming. Despite a general recognition among economists and management scholars that government efforts to guide and control innovation or subsidize private entrepreneurs have failed to yield results, these calls also describe an *entrepreneurial state* in which bureaucrats, not entrepreneurs, direct not only basic research but also applied technological development. Building on the notions of *economic competence* and *ownership competence* we argue that even well-intentioned and strongly motivated public actors lack the ability to manage the process of innovation, especially under *Knightian* uncertainty. As stewards of resources owned by the public, government bureaucrats do not exercise the ultimate responsibility that comes with ownership. Moreover, government ownership of firms and labs and government intervention in the management of privately owned assets hampers the competitive process of putting ownership of innovative firms and projects in the hands of individuals and groups with higher levels of ownership ability. We suggest that ownership competence differs systematically between public and private actors, particularly around innovation, with important implications for innovation policy.

Keywords Ownership · Competence · Innovation · Knightian uncertainty · Market for corporate control: Public choice

S. Murtinu (✉)
Utrecht University, Utrecht, Netherlands
e-mail: s.murtinu@uu.nl

N. J. Foss
Copenhagen Business School, Frederiksberg, Denmark
e-mail: njf.si@cbs.dk

P. G. Klein
Baylor University, Waco, TX, USA
e-mail: peter_klein@baylor.edu

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_4

1 Introduction

Until recently, most academics, pundits, and policymakers saw the collapse of socialism and the poor record of nationalized firms and industries as evidence that private ownership and market competition were the superior drivers of economic growth and societal well-being. The *neoliberal consensus* held that entrepreneurs with skin in the game, rather than state bureaucrats, should direct productive resources to their highest-valued uses. Instead of targeting particular technologies, firms, and industries for public support, policy should focus on creating a competitive environment in which private entrepreneurship and innovation can flourish (Bradley et al., 2021).

Within the last few years, however, prominent voices have called for significantly more government involvement in the economy. These calls have been prompted in part by corporate scandals perceived to be driven by short-term thinking and unethical behavior by managers, scandals that destroyed value for shareholders and for society as a whole. Enron went through the largest bankruptcy in history after hiding billions of dollars through controlled special purpose vehicles; Lehman Brothers collapsed due to its exposure to subprime mortgages; Volkswagen faked emissions data to pass environmental rules. While details of these cases were complex (and the result of regulatory failure as much as *unfettered capitalism*), they suggested to many that the government has been playing too passive a role and needs to intervene more actively to curb abuses by private actors.

Many of these calls focus on social issues such as inequality and health care, as well as *grand challenges* like environmental protection, but governments have also asked to play a stronger role in managing the innovation process. The public sector has long been involved in funding basic scientific research, typically through government-owned national laboratories and research institutes, as well as grants to public and private universities. Applied research and the development of commercial technologies was thought to be the realm of the private sector. That line is increasingly blurred, however, with writers such as Mariana Mazzucato (2011) arguing that state support lies behind the most important new commercial products, firms, and markets and that, therefore, the state should play a more active role in financing and directing these developments. In the United States, the *neo-Brandeisian* school of antitrust (exemplified by new Federal Trade Commission chair Lina Khan) envisions a more vigorous role for government experts in managing the competitive process, particularly in the tech sector. Support for market solutions seems to be waning, with the *entrepreneurial state* playing a stronger role.

Such arguments must confront the well-known incentive and information problems facing public actors. Government decision-makers lack the high-powered incentives and access to the specialized knowledge held by market participants, those whose livelihoods depend on creating economic value. The differences in incentives between private-sector entrepreneurs (who seek to maximize profits) and government officials (who seek to maximize influence) and politicians (who seek to maximize votes) have been explored in detail in the property rights, rent-seeking,

and political economy literatures, most recently from the perspective of agency and incomplete contracting theories (De Bettignies & Ross, 2009; Laffont & Tirole, 1991; Schmidt, 1996a, b). Also relevant is the poor performance of government-led innovation programs (Krueger, 1990; Kwerel, 1977; Le Grand, 1991; Levy & Peart, 2015; Winston, 2000). Projects such as Minitel (in France), Solyndra (in the U.S.) and Universal Credit (in the U.K.) are three salient cases out of thousands of examples (Datta-Chaudhuri, 1990; Helm, 2010; Keech & Munger, 2015).

While most research has highlighted incentive and property-rights problems of government ownership and control of resources and projects, here we also focus on a different issue: Even the best-intentioned and most strongly motivated directors and managers of state-run programs tend to lack the *ability* to play an ownership role. Ownership itself is an economic, as well as legal, function that can be exercised with greater or lesser ability (Foss et al., 2021). Ownership involves taking ultimate responsibility, or exercising residual decision-making authority, over resources deployed in productive uses. The ownership function is distinct from management, leadership, and similar functions. Those can be exercised on behalf of others, while ownership per se—the right to make decisions about the use of resources under conditions not specified by prior agreement (Hart, 1995)—cannot be delegated to non-owners. Competence arguments for value creation are different from incentive arguments because even owners with strong incentives to increase value may lack the competence to do so.

From an ownership competence perspective, the benefit of markets and market competition are not only that private ownership mitigates agency and moral hazard problems, but also that the market process tends to place ownership titles (the right to exercise ownership) in the hands of individuals and groups with higher levels of ownership ability (those using privately owned resources to create value) (Pelikan, 1993). This process is hampered, or entirely absent, in parts of the economy dominated by public ownership or with a strong state role in the management of privately owned assets.

The idea that government actors often lack ownership ability appears in popular discussions of the failures of "state capitalism" (e.g., The Economist, 2014), but is almost entirely absent from the academic literature (Musacchio & Lazzarini, 2014). For instance, state-owned banks in China and India display much lower valuations than their private peers, not to talk about the fall of state-owned telecommunications operators like China Mobile (The Economist, 2014). One of the main reasons is that private owners were "invited" by the state to play a subordinate role in the management of those companies, with the state holding a golden share or other forms of control mechanisms, which results in misallocation of capital, bad debt, and sometimes liquidation. While these problems certainly have an incentive dimension, they also have a competence dimension: the owners hand-picked by the state are unlikely to be those best positioned to innovate and create value. More generally, we suggest that ownership competence differs systematically between public and private actors, particularly around innovation, and that this difference has important implications for innovation policy.

Our reasoning about the competence of government owners builds on Pelikan's (1989, 1993) notion of "economic competence," developed in the context of comparative economic systems, and Foss et al.'s (2021) concept of "ownership competence," developed in the context of strategic management. Pelikan (1993) defines competence as the ability of owners to assign managers to firms and tasks and points out that different institutional rules (e.g., private capital markets versus state-controlled resource allocation) can be understood as alternative mechanisms for matching owners to competence. Foss et al. (2021) dimensionalize ownership competence into decisions concerning *which* resources to own (matching competence), *how* to create value by owning these resources (governance competence), and *when* to own them (timing competence). These decisions take place in situations with significant levels of ("Knightian") uncertainty. Under uncertainty, decision-makers typically lack, or cannot agree upon, meaningful probabilities they can assign to future events. Instead, while they may rely on formal routines or procedures such as scenario-planning, mental experiments, and the like, decision-making under uncertainty ultimately involves intuitive, subjective *judgments* about the future (Foss & Klein, 2012).

As we argue below, this kind of decision-making is particularly difficult for public actors who, as stewards of resources owned by the public (Klein et al., 2010), cannot exercise the ultimate responsibility that comes with ownership. We use these ideas and augment them with public choice arguments to better understand the effects of government (in)competence in markets and businesses.

We begin with a brief review of Mazzucato's arguments for the entrepreneurial state. We next show that, unlike competitive capital markets, democratic processes for assigning public actors to act like owners of public resources do not select for ownership competence. We show how a political party's true competence may be very different from that perceived by the median voter (Murtinu et al., 2021). Thus, by manipulating voters' rational inattention (Sims, 2003, 2010), incompetent politicians are often in place, and their incompetence leads to the implementation of (too) expansionary policies, which materialize via a massive presence of politics in firms and in markets.

Next, we show how government ownership is conducive to an inefficient market for corporate control for two main reasons. One is that the pursuit of political goals leads to horizontal agency costs, that is, conflicts between principals (private owners and government owners) who have different interests, preferences, and objectives. For instance, government owners may push for the appointment of controllable managers who are not the most economically competent but who are politically aligned with the government agenda. Another reason is that government owners are less capable than private owners of selecting competent managers because of a lack of high-powered incentives, more red tape, inefficient compensation schemes, less talent, and a lack of independence in decision-making.

2 The Myth of the Entrepreneurial State

In the last 40 years, free markets have brought millions of people (especially in developing and underdeveloped countries) out of absolute poverty. Openness of trade and financial markets gave emerging economies (e.g., China between the mid-1990s and the first decade of the twenty-first century) the possibility to attract foreign capital. Foreign direct investment helped to bring about a technology catch-up toward advanced economies. Free-market policies allowed production inputs like capital and human resources to move freely, with money being invested in the most productive investments and capable people choosing the country where the synergy between their individual competences and a country's resources is maximized. Despite such demonstrated successes of free-market policies, many economists increasingly call for a return to older, more interventionist models with massive government involvement in the economy. Economic disruptions such as the 2008 financial crisis and the recent Covid-19 pandemic, despite their different causes and dynamics, are described as instances of market failure that call for preventive or corrective activity by government. Inequality, the rise of tech-based superstar firms, and what some see as a global ecological crisis are also used to motivate increased government intervention. More government control over research and development (R&D) and innovation is argued to be necessary to handle a number of these challenges simultaneously. Policymakers, journalists, and some academics argue that more government involvement here can both curb the dominance of the tech superstars (Dans, 2021), reduce inequality (Keeley, 2015), and provide needed research into how climate change is best handled (Pew Research Center, 2020).

2.1 The Entrepreneurial State

Mazzucato's (2011) account of the "entrepreneurial state" starts from the well-known idea that private companies are often reluctant to invest in technologies with long-term, highly uncertain returns. State actors, free from the profitability requirements imposed by private capital markets, can pursue a variety of innovative projects unattractive to market participants. Sometimes, those investments can pay off, at which point private players enter the arena and manage the technology development process to commercialize the technological outcomes and monetize the investment. In other words, some commercially viable technologies typically emerge out of prior government investment in nascent projects that were not attractive to private investors.

It does not follow, however, that state investment in particular technologies generates net gains; for that, we would need a systematic analysis of the entire portfolio of state projects rather than sampling on the dependent variable. Nonetheless, examples popularized by Mazzucato such as the internet, GPS, and nanotechnology have been used to promote a more general, activist role for the state in

innovation. Mazzucato (2011) calls for government, not decentralized market players such as startups and unicorns, large firms, or venture capital funds, to be the driving force in the development of innovations and technological progress. According to Mazzucato, only the state can play this role because it (properly) socializes the risk of long-term technological investment. The state can invest in whatever technologies it likes because it has access to the taxpayer's bottomless purse. By contrast, private investors operating in competitive markets risk their own money and entrepreneurs are accountable to their financiers, who can withhold future support in the event of poor performance.

In Mazzucato's account, when innovative entrepreneurial firms contribute to societal improvement by means of new products, new organizational processes, and other innovations (Audretsch, 2009), the state deserves credit for providing—at least indirectly, via initial high-risk investments—entrepreneurial firms with the necessary resources and assets to challenge incumbents. Moreover, the state needs to regulate these profit-seeking big players who, in this interpretation, "do little more than free-ride on government-funded research and development activities" (Mingardi, 2015).

It is certainly true that innovation requires long-term, high-risk investments, many of which fail to deliver the intended benefits. Conventional market-failure arguments, as inspired by Walrasian assumptions, suggest that, because private actors often cannot capture the spillover benefits from basic scientific research, they will not invest enough in fundamental breakthroughs (Nelson, 1959; Arrow, 1962); this is the usual justification for public funding of basic science. Mazzucato goes much further, however, insisting that government should guide and direct applied research and development, with state funders displacing private angel investors and venture capitalists in providing resources to innovative companies and projects. There are several problems with this argument, however. First, Mazzucato conflates invention with innovation (Karlson et al., 2021); while the former (an engineering concept) can be performed by a variety of actors, the latter (an economic concept) only makes sense with respect to subjective entrepreneurial judgments and beliefs—about future consumer preferences, market conditions, the value of alternative uses of resources, and so on (Foss et al., 2007; Foss & Klein, 2012)—and the activity of entrepreneurs in combining and recombining resources and assets with the final aim to maximize consumer experience and value (Bylund & Packard, 2021).

Moreover, analysis of alternative means for promoting innovation should be comparative; while Mazzucato focuses on alleged market failures arising from information and incentive problems, she does not address the potential policy failures that also arise from public funding and execution of research and development projects which are also plagued with information and incentive problems—which are likely substantial given the lack of evidence for the success of industrial policies for innovation (Karlson et al., 2021).

2.2 Policy Ineffectiveness

Evidence on social welfare programs such as transfers, government consumption, and public investment is mixed (Brückner & Tuladhar, 2014; Hansson & Henrekson, 1994). Consider universal basic income: In developing countries, Banerjee et al. (2019) show that while several cash transfer programs had positive impacts, targeted measures to reduce extreme poverty were unsuccessful. In the case of Sweden, Bergh (2016) argues that state-sponsored cash transfers for sickness, family allowance, and unemployment reduced relative poverty and income inequality, although Ahmed (1986) shows that government spending in the United Kingdom crowds out private spending and produces negative wealth effects (see also Yuan & Li, 2000). Moving to taxation, income taxation has negligible or negative effects on investment in human capital (Trostel, 1993). Corporate income taxes negatively affect entry into entrepreneurship (Djankov et al., 2010; Gentry & Hubbard, 2000; Keuschnigg & Nielsen, 2003, 2004) and the efficiency of global value chains (Foss et al., 2019), while capital gain taxes are negatively correlated with both entrepreneurial entry and the supply of venture capital (VC) financing (Gompers & Lerner, 1998), although the exact mechanisms are complex and vary with firm characteristics (Henrekson & Sanandaji, 2016). At a more macroeconomic level, Afonso and Furceri (2010) show that both government revenue (indirect taxes) and spending (social contributions, public consumption, subsidies, public investment) are detrimental to the growth of OECD and E.U. countries.

The bottom line is that, in general, investment of public money in unproductive projects leads to higher deficits and debt without a positive impact on aggregate productivity. This translates into a stagnant productivity in the long run, a reduced sustainability of debt (that is, a country needs to pay higher interest rates to refinance its debt, with then fewer resources to be spent on public goods), and to less cash to be used in the case of negative shocks like the recent Covid-19 pandemic.

The microeconomic evidence on government attempts to help innovative entrepreneurial firms is also mixed. Bianchi et al. (2019), Colombo et al. (2011), and Grilli and Murtinu (2012, 2018) find a positive, partial equilibrium effect of direct innovation subsidies. Many other studies reach opposite conclusions. Wallsten (2000) shows that government-funded commercial R&D in the form of Small Business Innovation Research (SBIR) grants fully crowds out privately financed R&D spending. Other studies found small effects of R&D subsidies net of the crowding-out effect (see Zúñiga-Vicente et al., 2014). Paff (2005) shows that R&D tax credits in California targeting biopharmaceutical and software firms did not stimulate contract research with universities and nonprofit research centers. Cappelen et al. (2012) show that the Norwegian tax credit scheme SkatteFUNN does not contribute to new products for the market or enhanced patenting activity. As in the case of R&D subsidies, other studies find more positive effects of tax credits (e.g., Agrawal et al., 2020; Czarnitzki et al., 2011). Interestingly, Kong (2020) shows that being headquartered in states characterized by increases in government spending

is detrimental for firms, because these firms display a reduced innovation output in terms of patent production and patent citations.

2.3 The Effects of Government Ownership

In modern industrial economies, governments typically play a substantial role not only as regulators of private activity but also as owners of firms and industries. For example, the Chinese government has recently taken a stake and one board seat in Beijing ByteDance Technology Co. Ltd., a company that controls the platforms of ByteDance, which owns the popular video service company TikTok. Besides the conventional rationales for government ownership, such as national security, natural monopoly, and so on, public investment has also more recently been justified as a means of providing stable, long-term ownership to firms. Because government has access to the deep pockets of taxpayers, it is less likely than private owners to be constrained by short-term cash requirements and it can take large stakes, held for long periods. This size and stability can, in principle, support the monitoring of managers and lead to effective corporate governance (Chen et al., 2007; Ferreira & Matos, 2008; Shleifer & Vishny, 1986). Moreover, political owners may have key information about future policies, which can reduce the uncertainty faced by firms (Murtinu, 2021).

However, government ownership can also stymie firm performance (Megginson & Netter, 2001) because political owners pursue political goals that are detrimental to firm value (Shleifer & Vishny, 1994). Indeed, the involvement of politicians in firm ownership and government, particularly when they play an active role, likely leads to actions and decisions that do not maximize value creation, even considering that government actors may prioritize different objectives from those of private actors. In technology industries, government ownership can also be used to control technological development and as a form of regulation, pushing firms to adopt technologies and business models that serve the state's objectives instead of the firm's. Regulation can also encourage state-owned or partially state-owned firms to engage in illegal shortcuts and corruption (Mudambi et al., 2013) to recover part of the value lost to excessive regulation and government intrusion (Zeume, 2017).

The overall evidence suggests that government ownership is associated with low governance quality (Borisova et al., 2012). Moreover, when government ownership translates into active governance (for example, in the form of golden shares), governance quality is further reduced. A recent example is given by the effects of robots on manufacturing productivity and employment in China (Jia et al., 2021). While robots lead to productivity and employment growth in private firms, this relationship does not hold in government-owned firms, which fail to make the necessary complementary investments in human and physical capital. Another negative example of government ownership is public venture capital investments. Previous studies on government equity investments in entrepreneurial firms show the inefficiency of public venture capitalists as owners in fostering portfolio

companies' performance (Cumming et al., 2017; Grilli & Murtinu, 2014, 2015), unless they syndicate with private financiers and leave them the leadership and the due diligence of portfolio deals.

In sum, despite some theoretical arguments suggesting advantages of government ownership, the evidence suggests that making government a shareholder, especially when it takes an active role, is not conducive to improved firm governance and performance. For this reason, any purported national or social advantage deriving from government ownership must consider the expected harm to firm performance, including investments in value-creating technological and organizational innovations.

3 Ownership Competence

How does ownership competence inform the debate about the role of the state in guiding entrepreneurial and innovative processes? It is well known that ownership provides incentives to create economic value (Erturk et al., 2010; Villalonga & Amit, 2006) and that problems arise where property rights are ill-defined or costly to trade. The property-rights approach to the firm shows how, by assigning residual claims and control rights, ownership provides incentives for monitoring (reducing agency costs), improves coordination, and stimulates investments in resources that support team production.

However, as emphasized in the recent work by Foss et al. (2021), the ability of owners to create economic value depends not only on their incentives for doing so, but also on their ability. Because ownership conveys residual control over resources (Hart, 1995), the owner's unique idiosyncratic competence drives their ability and efficiency to access resources, invest them in productive projects and activities, and creatively combine, deploy, and recombine resources to maximize value creation. Thus, different owners display different levels of ownership competence (Alchian, 1961). Different categories of owners show a different distribution of competence levels (Bennedsen et al., 2007). What is the direct consequence of this nonuniform distribution of competences? The consequence is that the above advantages about ownership vary across owners and owner categories, such that a key decision for an organization or economic system is *who the owners should be.*

The decision of whom to allocate ownership translates, as theorized by Foss et al. (2021), into a decision about who is most competent at figuring out (1) *which* resources to own (matching competence), (2) *how* to own them (governance competence), and (3) *when* to own them (timing competence). These arguments are particularly important under Knightian uncertainty, when it is impossible to decide in advance how resources will be allocated under various contingencies. When the future is known (or predictable), parties can write detailed contracts that specify actions and responsibilities under different circumstances. Under uncertainty, these decisions must be made after the fact, and someone has to make them. Ownership can thus be defined as the right to make decisions about the uses of resources in

conditions not specified by prior agreement, what Hart (1995) calls "residual rights of control."

This understanding of ownership has led to a flourishing of theoretical and empirical work on how firms are organized and contracts are written. A key claim is the idea that, to maximize value creation, ownership rights should be assigned to those parties whose marginal effort has the greatest influence on a project's positive outcome (Grossman & Hart, 1986; Hart & Moore, 1990). This provides an explanation, not only for vertical integration or horizontal consolidation of production, but for which individuals or groups should own the joint production process. However, following Foss et al. (2021), we argue that the property-rights approach to the firm can be expanded by considering not only the incentives of various parties to use their ownership rights to create value, but their competence in doing so—which the Grossman-Hart-Moore approach assumes to be the same for everyone.

Are government bureaucrats or elected officials likely to be competent owners? Government actors face Knightian uncertainty and unforeseen contingencies as much as private actors (and can create Knightian uncertainty for the latter in the form of erratic economic policies; Higgs, 1997). In the next section, we shift the above arguments from the corporate world to politics and look at the interaction of ownership competence in politics with markets and businesses. As Pelikan (1989, 1993) points out, the process by which ownership is matched with ownership competence—in a market economy, via competition in product and factor markets and by the market for corporate control—is a critical issue in overall societal organization.

How do political processes, democratic or otherwise, allocate ownership and control of productive assets to particular individuals and groups? In democratic systems, public agencies and state-owned enterprises are run by elected officials, civil servants, or bureaucrats appointed by elected officials. As Klein et al. (2010) point out, these government actors are not literal owners, but stewards of resources in principle *owned* by citizens or taxpayers. For simplicity, we focus on elected politicians and their staff and political appointees.

How are politicians selected, and according to what criteria? The behavioral political science literature observes that "the people who are called upon to make reasoned choices may not be capable of doing so" (Lupia & McCubbins, 1998): Simply put, politicians are often incompetent and not up to the tasks to which have been appointed. Moreover, voters face information asymmetries when judging the competence of politicians (Martinelli, 2001). Thus, incompetent politicians can manipulate such asymmetries and sell themselves to voters as talented and capable with respect to, for example, administering the public budget. This manipulation can get those politicians into office. For instance, politicians may announce a loose fiscal policy, which is financially unsustainable in the long run. However, being that most voters do not allegedly understand inter-temporal budget constraints, incompetent politicians can convince those voters about their ability—which is poor but sold to voters as high—to implement loose fiscal policies and, at the same time, assure budget sustainability to future generations. This lie cannot be captured by voters

because of the above information asymmetries (Rogoff & Siebert, 1988; Rogoff, 1990).

The above arguments do not hold for all voters. Certain voters are endowed with better individual cognitive abilities and are then better equipped than others to collect and process information on proposed policies, thus inferring more precisely the competence of politicians (which is never fully observable). The announced policies represent a signal through which politicians aim to oversell their abilities in a specific policy domain. This signal is surrounded with noise, which is larger for voters with lower cognitive abilities. Thus, politicians can exploit and shape such noise to manipulate (certain) voters' beliefs about their competencies.

For example, in the case of fiscal policies, Murtinu et al. (2021), inspired by the financial literacy literature (Lusardi & Mitchell, 2014; Fornero & Lo Prete, 2019), suggest that the relevant cognitive ability is the voter's mastery of economic knowledge. Even if this "noise mechanism" does not work for all voters, what matters for a politician to be elected is the vote of the median voter (for a review of the median voter model and its implications, see, for instance, Congleton, 2004). Thus, assuming that half of the voting population is not capable of accurately inferring the (unobservable) (in)competence of politicians through the announced policies, it is rational for politicians to engage in manipulation. As shown by Murtinu et al. (2021), politicians "attempt to manipulate the inference on their ability through excessively loose platforms."

The incompetence of politicians thus leads to the implementation of (overly) expansionary policies, which materialize via a massive presence of politics in firms and in markets. Politicians can create uncertainty in markets for two reasons. First, frequently changed regulation makes it more difficult for firms to estimate future returns, thus reducing investments. Second, politics in markets leads to ill-functioning markets for corporate control, which makes the matching between competent managers and firms less efficient. For example, policy uncertainty, as measured by the Economic Policy Uncertainty Index,[1] increased substantially after April 2020 as lockdowns, school and business closures, travel restrictions, and other new rules emerged at the start of the Covid-19 pandemic.

4 Government Incompetence in Markets and Firms

A further problem with an active state role in entrepreneurship and innovation is that a state's interventions interfere with private ownership competence. First, by increasing uncertainty, they make it more difficult for owners to exploit their governance, matching, and timing competences. Second, by interfering with market competition, they distort the process by which owners and their competence are matched with firms.

[1] http://policyuncertainty.com

The theoretical premise of top-down innovation policies, which lie at the core of Mazzucato's advocacy of the *entrepreneurial state*, is that imperfect markets fail, and only the state can provide a solution to such a failure. According to this argument, market failures mean R&D investments are too low because private players, knowing they cannot appropriate all the value they create, lack the incentives to invest "enough" in innovation (Klette et al., 2000). As Baumol (2002) noted, if these private actors are competing with each other, it only requires a few to stimulate substantial R&D investments. Moreover, who knows the optimal level? How is it possible to calculate the social optimum?

Especially under Knightian uncertainty, there are no answers to those questions. Thus, a policy change under Knightian uncertainty contributes to even more uncertainty for entrepreneurs, with negative backlashes for investments. Under Knightian uncertainty, the identification of future scenarios is far from unanimous across market agents and comes from the exercise of entrepreneurial judgment. In these situations, centrally planned structures like the state are very inefficient in collecting and processing the information necessary to appraise and assess profit opportunities, new technologies, etc., and then in implementing effective policies. By contrast, it is competition in decentralized markets that makes knowledge available to innovative entrepreneurship (Hayek, 1945; Schumpeter, 1934).

An example of the inefficiency of top-down innovation approaches is provided by comparing the commercialization of university intellectual property in the United States and Sweden (Goldfarb & Henrekson, 2003). Sweden's policies are typical of those in most European countries, depending on direct government action to create mechanisms for technology transfer that foster commercialization. The United States, by contrast, relies on a decentralized model in which academic institutions experiment and search for the best way to commercialize their research outputs. Goldfarb and Henrekson (2003) find a noticeable lag in the commercialization of academic research in Sweden, suggesting the advantages of a decentralized approach.

Besides possibly creating further uncertainty in already uncertain markets, political intervention in markets may make the market for corporate control less efficient. Building on Alchian (1950) and Winter (1971), Pelikan (1989, p. 281) argues that the market for corporate control strongly influences the efficiency through which firms select managers and executives on the basis of their economic competence, defined as "the competence to receive and use information for solving economic problems and taking economic decisions." Economic competence is tacit (Polanyi, 1962) in the sense that it can be thought of as a form of informational capital or cognitive ability to use and process information, which is intrinsically attached to the manager. Economic competence is then not directly observable, and a firm's owners need to use cues or signals (e.g., a manager's background or previous performance) to select the most suitable manager. Thus, *owners need to be competent to select an economically competent manager*. Indeed, it is not (only) a matter of incentives: The same incentives given to two managers equally motivated to maximize the same utility function produce different outcomes on the basis of their different economic competence.

A well-functioning market for corporate control—that is, *a market in which ownership titles tend to flow into the hands of owners and ownership groups with higher levels of ownership competence*—can replace a lazy or incompetent manager, thus pushing managers to maximize a firm's shareholder value because of the threat of takeover or replacement. Given that the economic competence of managers is a scarce resource in the market (Mackey et al., 2014; Pelikan, 1989), it is vital that the process through which managers are matched with firms is efficient, so as to bring the economic system to a new configuration characterized by a higher dynamic efficiency. The key question here is "is it the competence of private owners or the competence of the government that leads to the best matching between managers and firms, that is, the best matching between the economic competence of each manager in the market with the task required by each firm?" (Heiner, 1983).

Here we are not interested in the institutional features that hamper the most efficient matching between firms and managers, such as government restrictions on private ownership and transferability of capital; by contrast, we theorize why government ownership is conducive to an inefficient matching process. The focus is placed on government ownership because, at the firm level, political involvement often means that governments become owners targeting firms in need of equity capital. As suggested by Murtinu (2021, p. 280), in principle "government equity capital is more patient than private equity capital, and this is especially important in the context of technology ventures where private investors may look for short term gains, thus targeting only projects with shorter time horizons and closer to the market." Hence government ownership has potential advantages for firms, such as the availability of short-term cash, which is necessary for investments and access to resources (Chen et al., 2007; Ferreira & Matos, 2008; Shleifer & Vishny, 1986). Another advantage is the possibility for political owners to convey information about future policy shifts (Murtinu, 2021) that may help the firm to better organize its production function and its strategies.

However, government owners will typically not seek to maximize value (Shleifer & Vishny, 1994; Megginson & Netter, 2001) due to conflicts of interest (1) between owners, (2) between the government and government owners, and (3) between government owners and managers. First, government owners are typically politicians or agents placed by politicians that aim to pursue political goals in addition to, or sometimes in substitution of, economic goals. This may lead to horizontal agency costs, also called principal-principal conflicts (Colombo et al., 2014; Young et al., 2008), that is, conflicts between principals (private owners and government owners) who have different interests, preferences, and objectives (Connelly et al., 2010; Walsh & Seward, 1990).

Second, political ownership may exert pressure (for instance, on the board of directors) to appoint managers who are not the most economically competent but who are politically aligned with the governmental agenda. This means that different from private owners, government owners prioritize the control of the appointed manager—for instance, via (tacit) promises of future appointments in other government-owned firms or entities—and not their competence; thus, government

owners may be less likely than private owners to both give ownership rights to the appointed manager and select managers on the grounds of competence.

Finally, government owners are less capable than private owners of selecting competent managers for three main reasons, all of them related to contracts and individual talent. Let us take the example of a particular class of owners: (private and public) venture capitalists (VCs). First, public VCs are less capable than private VCs of incentivizing the appointed manager not to engage in perk consumption, empire-building strategies, and other non-value-maximizing behaviors. For instance, De Bettignies and Ross (2009, p. 358) argue that, "[p]rivate development can dominate public financing through more efficient termination decisions for bad projects, resolving soft budget constraint problems." Indeed, government ownership may be characterized by more red tape than private ownership. Second, the difference in compensation between public and private VCs is huge. While private VCs "typically are structured with a 2% fixed fee (based on committed capital) and a 20% performance fee, with hurdle rates and clawbacks in the event of poor performance" (Cumming et al., 2017, p. 441), public VCs receive a fixed wage. Third, because of these compensation issues, more talented people self-select into the private sector, or leave public VC funds in favor of private funds. This difference in talent between private VCs and public VCs is also due to the impossibility of public VCs taking independent decisions once owning a company. Indeed, most managerial or administrative decisions of public VCs as owners depend on the government's goals and need to operate in a framework of politics.

A further reason that government ownership typically lacks competence in the selection of competent managers is provided by the incomplete contracts approach to privatizations (Schmidt, 1996a). As suggested by Dixit (1997, p. 378), "Government agencies and public enterprises are generally thought to perform poorly because their managers and workers lack the high-powered incentives that are believed to prevail in private firms. This belief motivates many attempts to privatize public services."

In sum, while there may be heterogeneity across and within countries, the incompetence of politicians and bureaucrats as effective owners, taken together with their pursuit of noneconomic goals to meet their constituencies' preferences so that they themselves can remain in office, is likely to orient government owners toward inefficient projects, select less competent managers for such projects, and generally play the role of venture capitalists with taxpayers' money in ways that are not in the long-run interest of those taxpayers.

5 Concluding Remarks

Mazzucato (2011) deserves credit for reinvigorating the discussion of the role of the state in the innovation process. As she correctly points out, innovation is a complex and messy process, with many fits and starts along the way, and historically state agencies and state funding have played important roles in promoting technological progress. Moreover, some of the most successful recent commercial innovations,

particularly in information technology, relied on discoveries and developments from state-funded projects.

However, we think this evidence does not suggest a stronger role for the state in promoting entrepreneurship and innovation, much less a fundamental rethinking of the cumbersome, bureaucratic, politicized governmental apparatus as a praiseworthy *entrepreneurial state*. States fund a lot of R&D projects and, inevitably, some will end up being commercially (and socially) beneficial. But this is simply the law of large numbers! The relevant question is whether heavy state involvement gives us better innovations than we otherwise would have had, and here both theory and evidence are less persuasive.

Specifically, we have argued here that the case for the entrepreneurial state rests on an undertheorized and superficial view of the state itself, one that discounts what we know from property-rights economics, public administration, technology strategy, and public finance about how state funding and intervention can harm market performance. In particular, we have pointed to the *ownership competence* perspective as a missing element in these discussions. When considering the relative competence of private and public owners, the case for government intervention in markets for technology becomes even weaker. Private ownership and competition tend to direct ownership titles into the hands of those with the highest levels of ownership competence (Foss et al., 2021), and these are likely to be private entrepreneurs and firms, not state bureaucrats. Entrepreneurship, not state action, is the key to successful innovation, economic growth, and improvements in overall well-being.

References

Afonso, A., & Furceri, D. (2010). Government size, composition, volatility and economic growth. *European Journal of Political Economy, 26*(4), 517–532.

Agrawal, A., Rosell, C., & Simcoe, T. (2020). Tax credits and small firm R&D spending. *American Economic Journal: Economic Policy, 12*(2), 1–21.

Ahmed, S. (1986). Temporary and permanent government spending in an open economy: Some evidence for the United Kingdom. *Journal of Monetary Economics, 17*(2), 197–224.

Alchian, A. A. (1950). Uncertainty, evolution, and economic theory. *Journal of Political Economy, 58*(3), 211–221.

Alchian, A. A. (1961). *Some economics of property*. Rand Corporation.

Arrow, K. (1962). Economic welfare and the allocation of resources for invention. In Universities-National Bureau Committee for Economic and Council (Ed.). In *The rate and direction of inventive activity: Economic and social factors* (pp. 609–626). Princeton University Press.

Audretsch, D. B. (2009). The entrepreneurial society. *Journal of Technology Transfer, 34*(3), 245–254.

Banerjee, A., Niehaus, P., & Suri, T. (2019). Universal basic income in the developing world. *Annual Review of Economics, 11*, 959–983.

Baumol, W. J. (2002). *The free-market innovation machine*. Princeton University Press.

Bennedsen, M., Nielsen, K. M., Pérez-González, F., & Wolfenzon, D. (2007). Inside the family firm: The role of families in succession decisions and performance. *Quarterly Journal of Economics, 122*(2), 647–691.

Bergh, A. (2016). *Sweden and the revival of the capitalist welfare state*. Edward Elgar.
Bianchi, M., Murtinu, S., & Scalera, V. G. (2019). R&D subsidies as dual signals in technological collaborations. *Research Policy, 48*(9), 103821.
Borisova, G., Brockman, P., Salas, J. M., & Zagorchev, A. (2012). Government ownership and corporate governance: Evidence from the EU. *Journal of Banking & Finance, 36*(11), 2917–2934.
Bradley, S. W., Kim, P. H., Klein, P. G., McMullen, J. S., & Wennberg, K. (2021). Policy for innovative entrepreneurship: Institutions, interventions, and societal challenges. *Strategic Entrepreneurship Journal*. forthcoming.
Brückner, M., & Tuladhar, A. (2014). Local government spending multipliers and financial distress: Evidence from Japanese prefectures. *Economic Journal, 124*(581), 1279–1316.
Bylund, P. L., & Packard, M. D. (2021). Subjective value in entrepreneurship. *Small Business Economics*. forthcoming.
Cappelen, Å., Raknerud, A., & Rybalka, M. (2012). The effects of R&D tax credits on patenting and innovations. *Research Policy, 41*(2), 334–345.
Chen, X., Harford, J., & Li, K. (2007). Monitoring: Which institutions matter? *Journal of Financial Economics, 86*(2), 279–305.
Colombo, M. G., Croce, A., & Murtinu, S. (2014). Ownership structure, horizontal agency costs and the performance of high-tech entrepreneurial firms. *Small Business Economics, 42*(2), 265–282.
Colombo, M. G., Grilli, L., & Murtinu, S. (2011). R&D subsidies and the performance of high-tech start-ups. *Economics Letters, 112*(1), 97–99.
Congleton, R. D. (2004). The median voter model. In C. K. Rowley & F. Schneider (Eds.), *Encyclopedia of public choice* (pp. 707–712). Springer.
Connelly, B. L., Hoskisson, R. E., Tihanyi, L., & Certo, S. T. (2010). Ownership as a form of corporate governance. *Journal of Management Studies, 47*(8), 1561–1589.
Cumming, D. J., Grilli, L., & Murtinu, S. (2017). Governmental and independent venture capital investments in Europe: A firm-level performance analysis. *Journal of Corporate Finance, 42*, 439–459.
Czarnitzki, D., Hanel, P., & Rosa, J. M. (2011). Evaluating the impact of R&D tax credits on innovation: A microeconometric study on Canadian firms. *Research Policy, 40*(2), 217–229.
Dans, E. (2021, May 2). *Around the world, governments are readying to regulate big tech*. Forbes.
Datta-Chaudhuri, M. (1990). Market failure and government failure. *Journal of Economic Perspectives, 4*(3), 25–39.
De Bettignies, J. E., & Ross, T. W. (2009). Public–private partnerships and the privatization of financing: An incomplete contracts approach. *International Journal of Industrial Organization, 27*(3), 358–368.
Dixit, A. (1997). Power of incentives in private versus public organizations. *American Economic Review, 87*(2), 378–382.
Djankov, S., Ganser, T., McLiesh, C., Ramalho, R., & Shleifer, A. (2010). The effect of corporate taxes on investment and entrepreneurship. *American Economic Journal: Macroeconomics, 2*(3), 31–64.
Erturk, I., Froud, J., Johal, S., Leaver, A., & Williams, K. (2010). Ownership matters: Private equity and the political division of ownership. *Organization, 17*(5), 543–561.
Ferreira, M. A., & Matos, P. (2008). The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics, 88*(3), 499–533.
Fornero, E., & Lo Prete, A. (2019). Voting in the aftermath of a pension reform: The role of financial literacy. *Journal of Pension Economics and Finance, 18*(1), 1–30.
Foss, K., Foss, N. J., & Klein, P. G. (2007). Original and derived judgment: An entrepreneurial theory of economic organization. *Organization Studies, 28*(12), 1893–1912.
Foss, N. J., & Klein, P. G. (2012). *Organizing entrepreneurial judgment: A new approach to the firm*. Cambridge University Press.

Foss, N. J., Klein, P. G., Lien, L. B., Zellweger, T., & Zenger, T. (2021). Ownership competence. *Strategic Management Journal, 42*(2), 302–328.

Foss, N. J., Mudambi, R., & Murtinu, S. (2019). Taxing the multinational enterprise: On the forced redesign of global value chains and other inefficiencies. *Journal of International Business Studies, 50*(9), 1644–1655.

Gentry, W. M., & Hubbard, R. G. (2000). Tax policy and entrepreneurial entry. *American Economic Review, 90*(2), 283–287.

Goldfarb, B., & Henrekson, M. (2003). Bottom-up versus top-down policies towards the commercialization of university intellectual property. *Research Policy, 32*(4), 639–658.

Gompers, P., & Lerner, J. (1998). Venture capital distributions: Short-run and long-run reactions. *The Journal of Finance, 53*(6), 2161–2183.

Grilli, L., & Murtinu, S. (2012). Do public subsidies affect the performance of new technology-based firms? The importance of evaluation schemes and agency goals. *Prometheus, 30*(1), 97–111.

Grilli, L., & Murtinu, S. (2014). Government, venture capital and the growth of European high-tech entrepreneurial firms. *Research Policy, 43*(9), 1523–1543.

Grilli, L., & Murtinu, S. (2015). New technology-based firms in Europe: Market penetration, public venture capital, and timing of investment. *Industrial and Corporate Change, 24*(5), 1109–1148.

Grilli, L., & Murtinu, S. (2018). Selective subsidies, entrepreneurial founders' human capital, and access to R&D alliances. *Research Policy, 47*(10), 1945–1963.

Grossman, S. J., & Hart, O. D. (1986). The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy, 94*(4), 691–719.

Hansson, P., & Henrekson, M. (1994). A new framework for testing the effect of government spending on growth and productivity. *Public Choice, 81*(3–4), 381–401.

Hart, O. (1995). *Firms, contracts, and financial structure*. Clarendon Press.

Hart, O., & Moore, J. (1990). Property rights and the nature of the firm. *Journal of Political Economy, 98*(6), 1119–1158.

Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review, 35*, 519–530.

Heiner, R. A. (1983). The origin of predictable behavior. *American Economic Review, 73*(4), 560–595.

Helm, D. (2010). Government failure, rent-seeking, and capture: The design of climate change policy. *Oxford Review of Economic Policy, 26*(2), 182–196.

Henrekson, M., & Sanandaji, T. (2016). Owner-level taxes and business activity. *Foundations and Trends in Entrepreneurship, 12*(1), 1–94.

Higgs, R. (1997). Regime uncertainty: Why the great depression lasted so long and why prosperity resumed after the war. *Independent Review, 1*(4), 561–590.

Jia, N., Liu, Q., & Seamans, R. C. (2021). *Robots at work in China*. New York University, Stern School of Business.

Karlson, N., Sandström, C., & Wennberg, K. (2021). Bureaucrats or Markets in Innovation Policy?–a critique of the entrepreneurial state. *Review of Austrian Economics, 34*(1), 81–95.

Keech, W. R., & Munger, M. C. (2015). The anatomy of government failure. *Public Choice, 164*(1), 1–42.

Keeley, B. (2015). *Income inequality: The gap between rich and poor*. OECD Publishing.

Keuschnigg, C., & Nielsen, S. B. (2003). Tax policy, venture capital, and entrepreneurship. *Journal of Public Economics, 87*(1), 175–203.

Keuschnigg, C., & Nielsen, S. B. (2004). Start-ups, venture capitalists, and the capital gains tax. *Journal of Public Economics, 88*(5), 1011–1042.

Klein, P. G., Mahoney, J. T., McGahan, A. M., & Pitelis, C. N. (2010). Toward a theory of public entrepreneurship. *European Management Review, 7*(1), 1–15.

Klette, T. J., Møen, J., & Griliches, Z. (2000). Do subsidies to commercial R&D reduce market failures? *Microeconometric evaluation studies. Research Policy, 29*(4–5), 471–495.

Kong, L. (2020). Government spending and corporate innovation. *Management Science, 66*(4), 1584–1604.

Krueger, A. O. (1990). Government failures in development. *Journal of Economic Perspectives, 4*(3), 9–23.
Kwerel, E. (1977). To tell the truth: Imperfect information and optimal pollution control. *The Review of Economic Studies, 44*(3), 595–601.
Laffont, J. J., & Tirole, J. (1991). The politics of government decision-making: A theory of regulatory capture. *The Quarterly Journal of Economics, 106*(4), 1089–1127.
Le Grand, J. (1991). The theory of government failure. *British Journal of Political Science, 21*(4), 423–442.
Levy, D. M., & Peart, S. J. (2015). Learning from failure: A review of Peter Schuck's why government fails so often: And how it can do better. *Journal of Economic Literature, 53*(3), 667–674.
Lupia, A., & McCubbins, M. D. (1998). *The democratic dilemma: Can citizens learn what they need to know?* Cambridge University Press.
Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature, 52*(1), 5–44.
Mackey, A., Molloy, J. C., & Morris, S. S. (2014). Scarce human capital in managerial labor markets. *Journal of Management, 40*(2), 399–421.
Martinelli, C. (2001). Elections with privately informed parties and voters. *Public Choice, 108*(1), 147–167.
Mazzucato, M. (2011). *The entrepreneurial state*. Demos.
Megginson, W. L., & Netter, J. M. (2001). From state to market: A survey of empirical studies on privatization. *Journal of Economic Literature, 39*(2), 321–389.
Mingardi, A. (2015). A critique of Mazzucato's entrepreneurial state. *Cato Journal, 35*, 603–625.
Mudambi, R., Navarra, P., & Delios, A. (2013). Government regulation, corruption, and FDI. *Asia Pacific Journal of Management, 30*(2), 487–511.
Murtinu, S. (2021). The government whispering to entrepreneurs: Public venture capital, policy shifts, and firm productivity. *Strategic Entrepreneurship Journal, 15*(2), 279–308.
Murtinu, S., Piccirilli, G., & Sacchi, A. (2021). Rational inattention and politics: How parties use fiscal policies to manipulate voters. *Public Choice*, forthcoming.
Musacchio, A., & Lazzarini, S. G. (2014). *Reinventing state capitalism: Leviathan in business, Brazil and beyond*. Harvard University Press.
Nelson, R. R. (1959). The simple economics of basic scientific research. *Journal of Political Economy, 67*(3), 297–306.
Paff, L. A. (2005). State-level R&D tax credits: A firm-level analysis. *The BE Journal of Economic Analysis & Policy, 5*(1), 1–27.
Pelikan, P. (1989). Evolution, economic competence, and the market for corporate control. *Journal of Economic Behavior & Organization, 12*(3), 279–303.
Pelikan, P. (1993). Ownership of firms and efficiency: The competence argument. *Constitutional Political Economy, 4*(3), 349–392.
Pew Research Center. (2020, June). *Two-thirds of Americans think government should do more on climate*.
Polanyi, M. (1962). *Personal knowledge*. The University of Chicago Press.
Rogoff, K. (1990). Equilibrium political budget cycles. *American Economic Review, 80*, 21–36.
Rogoff, K., & Siebert, A. (1988). Elections and macroeconomic policy cycles. *The Review of Economic Studies, 55*(1), 1–16.
Schmidt, K. M. (1996a). Incomplete contracts and privatization. *European Economic Review, 40*(3–5), 569–579.
Schmidt, K. M. (1996b). The costs and benefits of privatization: An incomplete contracts approach. *The Journal of Law, Economics, and Organization, 12*(1), 1–24.
Schumpeter, J. A. (1934). *The theory of economic development*. Harvard University Press.
Shleifer, A., & Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy, 94*(3, Part 1), 461–488.

Shleifer, A., & Vishny, R. W. (1994). Politicians and firms. *The Quarterly Journal of Economics, 109*(4), 995–1025.
Sims, C. A. (2003). Implications of rational inattention. *Journal of Monetary Economics, 50*(3), 665–690.
Sims, C. A. (2010). Rational inattention and monetary economics. In B. M. Friedman & M. Woodford (Eds.), *Handbook of monetary economics (Vol. 3, pp. 155–181)*. Elsevier.
The Economist. (2014). State capitalism in the dock. https://www.economist.com/business/2014/11/20/state-capitalism-in-the-dock
Trostel, P. A. (1993). The effect of taxation on human capital. *Journal of Political Economy, 101*(2), 327–350.
Villalonga, B., & Amit, R. (2006). How do family ownership, control and management affect firm value? *Journal of Financial Economics, 80*(2), 385–417.
Wallsten, S. J. (2000). The effects of government-industry R&D programs on private R&D: The case of the Small Business Innovation Research program. *The Rand Journal of Economics, 31*(1), 82–100.
Walsh, J. P., & Seward, J. K. (1990). On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review, 15*(3), 421–458.
Winston, C. (2000). Government failure in urban transportation. *Fiscal Studies, 21*(4), 403–425.
Winter, S. G. (1971). Satisficing, selection, and the innovating remnant. *The Quarterly Journal of Economics, 85*(2), 237–261.
Young, M. N., Peng, M. W., Ahlstrom, D., Bruton, G. D., & Jiang, Y. (2008). Corporate governance in emerging economies: A review of the principal–principal perspective. *Journal of Management Studies, 45*(1), 196–220.
Yuan, M., & Li, W. (2000). Dynamic employment and hours effects of government spending shocks. *Journal of Economic Dynamics and Control, 24*(8), 1233–1263.
Zeume, S. (2017). Bribes and firm value. *The Review of Financial Studies, 30*(5), 1457–1489.
Zúñiga-Vicente, J. Á., Alonso-Borrego, C., Forcadell, F. J., & Galán, J. I. (2014). Assessing the effect of public subsidies on firm R&D investment: A survey. *Journal of Economic Surveys, 28*(1), 36–67.

Innovation Without Entrepreneurship: The Pipe Dream of Mission-Oriented Innovation Policy

Johan P. Larsson

Abstract In this chapter, I analyze state entrepreneurship, as exercised through mission-oriented innovation policy: the mobilization of large pools of resources and capabilities to solve the pressing issues of our time. The state entrepreneur is not subject to real risk, often faces no market, and cannot be properly evaluated. It pays no price for being wrong and it struggles in assigning responsibility. Missions are motivated by a false dichotomy: that there is a difference in principle between fixing and creating markets. This premise is splitting hairs at best. Instead, what sets missions apart, other than sheer ambition, is a shift from bottom-up to top-down approaches to knowledge creation. Missions are most likely to achieve intended ends when reasonable people agree on the problem, what needs to be done, and when responsibility can be assigned. Even then, opportunity costs are ignored. The entrepreneurial state is currently pushing to solve those issues where it is likely to do the least good and the most harm: where we lack the knowledge of what to do, where accountability is unassigned, and where the failure-success axis cannot be meaningfully assessed. Successful mission *policy* further requires *politics* well beyond what democratic systems can achieve.

Keywords Mission-oriented innovation · Innovation · Entrepreneurship

1 Introduction

Calls for the state to act entrepreneurially are currently permeating innovation policy in large parts of the world. But what does it really mean to be an entrepreneur in a system of innovation, and further, for the state to act out that role? Those are, in a nutshell, the questions posed in this chapter. Before we turn to state entrepreneurship and its corollary, mission-oriented innovation policy, we need to grapple with the

J. P. Larsson (✉)
Department of Land Economy, University of Cambridge, Cambridge, UK
e-mail: jpl66@cam.ac.uk

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_5

first question. What is an entrepreneur and why do we need to understand that function to assess innovation policy?

Entrepreneurs who assume risk by putting their money and reputation on the line provide us with new and better things, but they also play a different role. They constitute the glue in any well-performing system of innovation by probing the commercial viability of knowledge, broadly defined as know-how to fulfill desired ends. By prowling for commercially useful knowledge, they also spread it (Acs et al., 2009) and advertise its use across occupations, industries, and other settings. But the complexity, decentralized nature, and sheer range of all potential sources of knowledge and opportunities imply that economists have generally considered it *impossible* for the entrepreneurial function to be performed centrally, as argued by Hayek (1945).

The above statements represent known facts of the market economy and are hardly controversial. To anyone in the business of trying to improve a system of innovation, encouraging productive entrepreneurship should then seem like low-hanging fruit. We also know a substantial amount about how to promote productive entrepreneurship, at least in the sense that businesses respond to incentives. For instance, Baumol and Strom (2012) discuss how we can learn from historical institutional arrangements to prune our present institutions to make entrepreneurship more socially productive. Elert et al. (2019) convincingly argue that regulations of capital and labor markets, the taxation system, property rights, and entry and exit barriers all represent areas that are *both* important for productive entrepreneurship *and* actionable for makers of policy. In the *Knowledge Spillover Theory of Entrepreneurship*, Acs et al. (2009) similarly argue that regulations, administrative burdens, and market intervention create friction as knowledge diffuses in the economy. By focusing on supporting the production of knowledge, proper infrastructure in the broad sense, and maintaining and sometimes carefully shaping institutions, politicians can fuel and lubricate what Baumol (2002) dubbed *the innovation machine*. Broadly speaking, this is what successful societies have done in the past (see e.g., Landes et al., 2010).

But when governments set out to improve our present innovation systems, they decreasingly do what we know how to do and what we have successfully done in the past. Today, they direct their efforts and our resources toward what we *do not* know how to do, in attempts to solve what politicians and civil servants consider the big issues of our time. This is all in response to challenges identified by the state and formulated as *missions*. The call is for the state to be outright entrepreneurial in the generation and application of knowledge to different ends, in steering the direction of private sector innovation, and in mobilizing the entire breadth of the state apparatus to do so. That is, a first difference to note between entrepreneurship and state entrepreneurship is that they depart from opposite ends of the scale in terms of how they identify an opportunity (or threat). While entrepreneurs work at the intersection of available capabilities and opportunities, the state can afford to ignore either, or both.

At the heart of this matter lies the current push for the state *to go beyond market failures*. More specifically, some academics and many policymakers now call “for

public policy to actively create and shape markets, not only to fix them" (Mazzucato & Penna, 2015, p. 4). These calls are generally accompanied by anecdotes of how this practice has presumably worked in the past, rather than by clear guidance for how it can work in the future, or how missions can be evaluated. Hekkert et al. (2020, p. 77) note that while "'missions' is the new buzzword in policy departments, both analysts and policy makers are struggling in their attempts to design and implement [mission-oriented innovation policy]."

The call, I argue, is for the state to work on issues better described as subject to *genuine market failure*: specific problems or opportunities of great public interest, but with an often unclear end goal to be arrived at by often unknown means. The notion that these issues are not characterized by market failure is only true by an overly strict definition of that term. Because why are they of great public interest? Because they are subject to large positive or negative externalities, or other market failures, making it unattractive for the market to engage. Bringing about a sector or market that is not there because of market failure *is* fixing it. Before we had a national defense, creating it may not have seemed like fixing a market, but it was ultimately about coordinating buyers and sellers of a service who could not come together because of its public good like properties, i.e., market failure. The perceived dichotomy between *the new* and *the old* is splitting hairs, and the raison d'être for mission-oriented innovation policy is still market failure in this broader sense.

The call for state entrepreneurship is for the state to be not just entrepreneurial, but rather something like *the entrepreneur*: what Schumpeter (1961) identified as the force that moves the economy toward new equilibria. The difference is that the forces bringing those equilibria about are determined from the top down rather than from the bottom up. The result is a situation in which state entrepreneurship crowds out market-driven entrepreneurship. Indeed, a central tenet of mission-oriented policy is tilting the playing field away from unwanted solutions (Mazzucato, 2016). This process then obviously involves picking winners—an activity for which many of us are not convinced of the state's expertise.

Researchers who push this narrative do argue that the state must be brave in these endeavors and indeed willing to fail. The problem is that the *risk* component inherent in the definition of entrepreneurship (Shane & Venkataraman, 2000) is lacking in state entrepreneurship. It is simply difficult to draw the line for what constitutes failure. Failure takes place in two main ways: we can succeed at doing the wrong thing, or we can fail at doing the right thing. The market is a mechanism that distinguishes failure from success in brutal fashion, regardless of the source of the failure. Whether entrepreneurs are unsuccessful at valued ends or successful at unvalued ends does not matter. Whether an entrepreneur produces bad ice cream and falls to competition from other ice cream firms or produces the best typewriters in the world and falls to competitive pressures from the computer industry matters little for the result. The government would need two mechanisms: one for each source of error. When the state fails at the right thing, the main risk is crowding out, in the ordinary sense: firms and technologies that would have better solved the problem are outcompeted. But the biggest long-term threat is that the state *succeeds* at doing the wrong thing and locks us into a suboptimal equilibrium by tilting the playing field: It crowds out alternative solutions and means altogether. No known

method of evaluation could deal with these problems, because the biggest risk is wrapped in a counterfactual.

The two overarching questions are first, how do we ensure that the state pays a price for being wrong? And second, when is that price high enough for us to know it is time to cut our losses? The fact that the state can produce policy failure by being wrong about means *or* ends severely complicates this question. In addition, even when and if the state's venture appears highly successful, we simply do not know the counterfactuals. How large is the graveyard of ideas that were never put into practice because the state tilted the playing field the other way? The answer is not merely unknown but unknowable. It is, in Bastiat's (1850) words, *not seen.*

Many specific problems—often the most obvious ones—that involve genuine market failure are also global, and it is far from obvious that individual governments should be involved in trying to solve them. For most states trying to be entrepreneurial, there exists a small economy paradox: when the identified issues are significant and evident enough, the small state lacks critical mass. But in the opposite situation, with problems of sufficiently narrow scope, the state itself almost always lacks the expertise both in identifying and solving the problems. When it demonstrably possesses that expertise, it is likely to meet little opposition. The entrepreneurial state narrative has grown out of a big state context, mostly with examples from the United States, where the state has access to resources and know-how that other states simply do not possess. The idea that nation-states a tiny fraction of the size of the United States could in any way be employed in solving similar problems is like asking your local pizzeria to produce a gourmet dinner for 500 guests. It is possible that smaller states have enough research or business excellence to solve some component of a larger problem, but then they are probably better off employing those smart specialization strategies that already exist and that we know much more about (see e.g., the overview in McCann & Ortega-Argilés, 2015). That is, proponents of entrepreneurial states and their missions regularly ignore several facets of the market economy but also of political reality.

The chapter is outlined as follows. Section two selectively reviews growth theory to put our innovation efforts in a larger perspective. It also moves on to draw some conclusions for state policy based on theoretical developments in economics. Section three takes a more detailed look at the market failure vs. market creation justification for state entrepreneurship. Section four asks to what extent anecdotes from large countries can be extrapolated to smaller ones and ponders the possibility of international cooperation. Section five concludes.

2 Innovation and Entrepreneurship: A Knowledge-Based View

The canonical growth models, i.e., the exogenous growth framework (Solow, 1956) and its endogenous counterpart (Lucas, 1988; Romer, 1986), have guided our thinking around economic growth in academia and policy circles alike. These

models clearly contain something deeply important about economic growth and prosperity. By learning how to do things more efficiently, and by coming up with new things to do, we can have products and services of higher quantity and quality, at a cheaper price than before, and entirely new products and services. In short, growth models tell us that we need to innovate to grow.

The point of departure for endogenous growth models was that growth built on increasing, not decreasing, returns to ideas. The more we learned, the more we managed to combine old and new ideas in a cumulative growth process. In turn, these models have often been criticized for not explicitly associating knowledge-creation or growth with a mechanism, and sometimes for ignoring the role of innovation. Rosenberg (1982, p. 4) and Baumol (2002, p. 9) both refer back to an old English saying and comment that thinking of technical progress without innovation "is to play Hamlet without the prince." Rosenberg also pointed out that researchers generally, and Schumpeter in particular, had been more interested in the way innovations reshaped society, rather than in the actual sources of innovation. These are certainly objections that a serious treatment of *systems of innovation* will have to take seriously.

Policy to enhance growth through innovation can come in two broad categories. First, it can accumulate and help the spread of knowledge, i.e., it can support our brains and give us infrastructure to spread what we know and verify that our know-how is indeed commercially viable. This first category contains a crucial, and up until a couple of decades ago understudied, component: entrepreneurship. Baumol (2002, p. 10) pointed out that even though medieval China and ancient Rome did produce a solid number of *inventions,* a "systematic innovation mechanism" was lacking. We may loosely refer to approaches aimed at these functions as bottom-up policy because their main objective is to exploit, nourish, and support the grassroots in the quest for eventual gains at a more global level.

Second, and clearly, the state can also identify *what specific* knowledge we need, bring about innovations itself, or bring about growth through state-owned businesses and other bodies. This second category of solutions has always been appealing to politicians and representatives of the state more widely, which is no wonder. This category represents solutions in which the state is brave, heroic in effort, and indeed entrepreneurial. We may, equally loosely, call this top-down policy.

Many top-down policies misunderstand a crucial aspect of knowledge: it is not a public good, but in fact mostly a club good. Rather than non-rival and non-excludable it is non-rival and partially excludable, and it is particularly excludable in the early stages of development. Entrepreneurs do not merely *spread* knowledge; they take club goods and push them closer to being public goods through the innovation process. When Henry Ford searched for profit by mass-producing cars, he also demonstrated his knowledge to a much wider audience. Without engaging the best entrepreneurs, any innovation policy will be inefficient. That is to say: any efficient top-down approach must be linked to bottom-up forces and find ways of prioritizing some bottom-up actors over others.

Baumol (2002) argues that the market economy is in effect an innovation machine. By having no choice but to arms race each other, firms are forced to find

new niches, improve existing products, and find new markets. That is, innovation becomes the primary weapon in each individual firm's battle for survival. If the right knowledge is out there, and if the framework conditions are right, an entrepreneur will find it and turn it into something valuable. If that person is successful, more firms will follow suit and further refine the innovation, and of course introduce competing technologies.

A new wave of thinking about growth has come to incorporate entrepreneurship more explicitly. Acs et al. (2009) remark that part of "the endogenous" in endogenous growth theory is the creation of technological opportunities, driven by conscious investments in knowledge. In their model, entrepreneurs exploit knowledge that leaks out from incumbent firms and unto the rest of the economy. An entrepreneur is something like a dynamic conduit for finding, probing, and ultimately spreading knowledge. Acs et al. (2009) show that greater regulation, administrative burdens, and market intervention will reduce the knowledge available to us.

To be sure, this role of private enterprise does not preclude a substantial role for the state; it is not a point of ideology. But the knowledge-carrying function of entrepreneurship implies that intervening with the process comes at a risk. It is certainly possible that by steering firms into more productive, or more socially desirable activities, the state may improve upon things. This much seems to have been known by almost every ruler since the invention of enterprise (see for instance, the exposé in Landes et al., 2010). But this almost self-evidently correct claim—the *could*—does not in and of itself lead to the conclusion that the state *should* be actively involved in these things, because we are not living in a first-best world. This would require the state to have some method for picking the right paths among many possible ones.

A key thing to understand is that private sector entrepreneurship has not been invented; it has evolved (Winter & Nelson, 1982). In a cocktail of local and regional institutions, available human capital, and input from markets, small and large firms have butted heads. What remains is, with simplification, either deeply battle-tested, currently challenging the status quo, or funded by investors who are too patient. Actors in social systems can indeed copy behaviors of others and entrepreneurship is no exception (Andersson & Larsson, 2016), so it is by no means impossible for top-down entrepreneurs to do well by learning from the past and the present in similar ways. In fact, the best-case scenario—when one entrepreneurial state figures something out that really works, other states copy it—can work under the right circumstances. But key for the state is to know two things: first, it must challenge the status quo *in the right way*. Even when the state appears to have been highly successful, it is possible that the results are disastrous if it has crowded out better solutions to the problem at hand. Second, it needs to be able to tell when it has turned into an overly patient investor that should cut its losses.

There is a key difference between the state as innovator and the free-market system the way Baumol describes it: it is not clear how the state can bear any costs of being wrong (in part because it is unlikely to know when it is wrong, as noted above). The *arms race* that drove firms to innovate to stay ahead of the competition is not there for the state, except for in a few exceptional cases, such as literal arms

races. The one real cost that the state does bear for being wrong is possible embarrassment a long time into the future, if at that point it is obvious that it backed the wrong horse. That is, the state does not carry much risk, mostly none at all, and as such *it cannot act entrepreneurially* the way we normally define the term (see e.g. Shane & Venkataraman, 2000, p. 222). It simply is not its area of expertise, just as running the police force is no area for private businesses. That the incentives are skewed the wrong way is *not* evidence that the state cannot mimic entrepreneurial behavior, or for that matter, that competing private enterprises could not run a working police force. But these are extraordinary claims, and we should require extraordinarily good arguments from those who want to go down those paths.

3 Market Failure and the Entrepreneurial State

A central claim in motivating the wider role for the state is that it must do much more than fixing broken markets. The state should create markets. Mazzucato (2016) juxtaposes this view against what she calls "market failure theory." Mazzucato (2016, p. 143) claims that "[market failure theory] justifies public intervention in the economy only if it is geared toward fixing situations in which markets fail to efficiently allocate resources (Arrow, 1951)" (reference in original). It remains unclear who the proponents of this theory really are and what their influence is. Mazzucato's reference is to Kenneth Arrow's famous extension of the welfare theorems of economics. It is doubtless true that it can be inferred from the referenced article that the presence of market failures can motivate government involvement. Arrow (1962) made this point eloquently, where he showed how invention suffered from *all* classical sources of market failure and note that *invention* in Arrow's vocabulary referred to the production of knowledge in a broad sense. Does this in any way show that *the only* reason for governments to intervene is market failure? No, it does not; it simply means that investment in knowledge suffers from a particularly difficult form of uncertainty. Arrow himself most certainly did not think that any such ideological view followed upon his theory. He was clear on the fact that efficiency was not necessarily the main value in an economic system, and he often sketched out a nuanced role for the state, as his magazine article *A Cautious Case for Socialism* (1978) makes abundantly clear. He did not pick the title of the article, but it shows how his thinking, even at the time of working on welfare theorems, was very clearly *never* that market failure was the ultimate or only motivation for government involvement. Few of the classical economists held that view. Given a certain framework of law and order and certain necessary governmental services, they seem to have conceived that the object of economic activity was best attained by a system of spontaneous cooperation (Robbins, 1978). This meant mostly that *we should not intervene in the way we produce or consume, given existing means-ends*. What an economist should think of the development of *new* means-ends is simply not clear from theory alone.

What can definitely be said is that a dominant innovation policy for a time was promoting R&D with the motivation that market failures caused societies to underinvest (Schot & Steinmueller, 2018). A narrower statement of the *market failure theory* would propose that "government support of R&D should only be justified on grounds of 'market failure'" (Nelson, 2011 p. 687). This position certainly does have adherents in the economics profession, and it does limit the scope of policy. Nelson continues by noting that while this position is (Ibid) "not necessarily a high obstacle to the development of active policy in an area, the market-failure orientation starts by asking what the market will not do, rather than what kinds of fruitful roles active policy can play." He notes that the latter view could probably often be more fruitful when asking what we can do to improve innovation systems.

At the center of this issue is the question of what it means to create a market and what it means for markets to fail. This discussion resembles the issue of whether the proverbial falling tree makes a sound or not. Akerlof's (1970) point in *The Market for Lemons* was not simply that information asymmetries would make the market function less smoothly. A central argument was that if the information asymmetries are severe enough, there would be no market! But surely, the state is not *creating a market* by mandating that used car salesmen offer warranties.

Judging by the wide range of innovation policies that exist in all developed nations, as well as those innovation funds for risky ventures and ideas that are now ubiquitous, the *fix market failures only* paradigm is not too influential at present. Few economists seem to think that the most cited missions—putting a man on the moon or helping plant the seeds for the internet—were in any way bad ideas. It is easy to imagine that part of the reason is that these accomplishments were associated with enormous positive externalities. That is, the investor in them could not keep the gains private. That is, at least to some extent, these successes can be understood through a theory of market failure perfectly consistent with Arrow (1962). There is, in that sense, no real difference between what proponents of the entrepreneurial state or mission-led innovation propose as *the old* and *the new*.

It is of course a fact that economists and others subscribe to a *market failure way of thinking*, but that does not mean that the only reason for government involvement is market failure in the Pigouvian sense in which a tax or a subsidy bridges the difference between private and social costs (and most governments seem to prefer regulation and government ownership, anyway). In many circumstances—I shall argue which below—even most classically schooled economists are probably prepared to go far beyond Pigouvian fixing and into something that we may tentatively refer to as *genuine market failure*: problems or intriguing opportunities that most can agree on but where means and often ends are obscured.

Historically, with things that have clear outcomes, measurability, and in which buyer–seller incentives are clear enough, economists seem to have been rather supportive of large-scale state innovation efforts, even in the absence of narrowly defined market failures. I would argue that the recurring example of *putting a man on the moon* is precisely the kind of thing that the classical economists could probably get behind: it is an intriguing feat; it was generally a popular idea among the public;

it was likely to lead to some real insights and technological spillovers; the process would indirectly let us evaluate a large number of theories, and given some time it would be possible to determine whether it was time to pull the plug. Crucially, As Nelson (2011, p. 688) pointed out, the same entity was in fact "the intended and eager user of the technology developed, as well as the funder of the R&D." Accountability and incentives were in place. The state investing in ARPANET would seem to follow a similar logic. In addition, it was infrastructure, which most consider at least largely a state activity that we generally believe comes with large spillovers if done right. Investment in high-risk infrastructure is of course nothing new and debates on cost-benefit analysis, accessibility, and spillover effects, as well as many other considerations, typically precede its construction.

In fact, the technological advances (the internet, biotech, the IT revolution, etc.) that act as canonical examples of good mission-oriented innovation also come with enormous positive externalities, have completely changed the way we think of information asymmetries, or relate to market failures in other ways. What really constitutes fixing markets that do exist on one hand and researching technologies that can fix markets that do not yet exist on the other can hardly be properly distinguished.

So, what really sets the new and old innovation strategies apart? The main difference—other than sheer size and risk of the endeavors—is a sizeable shift in favor of bottom-up, relative to top-down approaches.

3.1 Bottom-Up, Top-Down, and the Role of the (Entrepreneurial) State

For the purposes of our discussion here, by bottom-up approach, I will refer to processes in which the key decisions are taken by those with knowledge of *time and place* in Hayek's (1945) analysis. By top down, I will mean that decisions are taken further up in a hierarchy, by someone who by construction is unable to overview all significant consequences of the actions taken. Bottom up is not always better and the context dictates what *works*, how, and when. Sowell (1980) argued that in the Soviet Union, top-down production plans worked relatively better in heavy manufacturing, whereas they almost always failed miserably in agriculture, where knowledge of time and place were keys to producing output.

The entrepreneurial state narrative represents a combination of top-down and bottom-up approaches. The call is for states to create markets, radically change the direction of research and development, and then let bottom-up forces work their magic. The example par excellence is the internet, for which radical public sector (defense) research seeded a development that was combined with exponentially increasing entrepreneurial effort to commercialize the new technology and extend it to more areas.

A mission needs to be backed by considerable central power from the very top. The leaders of a large mission will need to subsidize, regulate, and continuously find new top-down paths if the old ones are not working. Each path chosen will eliminate alternative paths, including those that would have followed on those alternative paths, and so on. One reason why economists and proponents of theories of market failure tend to support R&D subsidies is that such a policy works from the bottom up: It does not (at least not necessarily) tell firms what to do or how to do it. When the state is *the entrepreneur*, grassroot entrepreneurs are not as free to work, and ultimately to spread knowledge, because they are no longer as free to decide the direction of their efforts.

It follows that a main problem with top-down policies is that this category of activity crowds out bottom-up solutions. Crowding out can happen either through higher taxes, more regulations, or direct competition. It can also happen since top-down policies by construction alter the profitability of firms in different sectors, as well as of firms that employ unequally preferred means toward similar ends. Even if you are the most innovative manufacturer of a product, you will face problems if the state chooses to back a competing technology. Even if you develop the best technology to produce renewable energy, the state may already have supported a competing technology and pushed it across the Valley of Death, to the point at which it is just too cheap relative to your own.

What then seems to be the key characteristic of the entrepreneurial state narrative, other than sheer ambition, is that it moves more responsibilities over to the state in terms of picking the direction of innovative activity. What is not currently discussed very much is exactly what to do if a mission, say, to reduce greenhouse gas emissions by some number, appears unfulfilled. Exactly which tools should the state have at its disposal to make a mission work, particularly if it appears to be failing? Should state bureaucrats be able to close firms that use carbon-emitting technologies? Should we be able to invade countries that counteract our missions? These are extreme cases in point, indeed, but not really knowing when to stop is an inherent problem with top-down policy. So are slippery regulation slopes; to make past efforts work, we need just one more tariff, one more regulation, or one last big-push subsidy. These questions raise a related problem: We seem to have absolutely no tools for evaluating these kinds of policy bundles, and in particular their effects on crowding out alternative technologies.

3.2 The Evaluation of a Mission

That mission-oriented innovation policy must be evaluated is uncontroversial. Nelson (2011, p. 684) noted that “one cannot learn from experiments if one does not have ability to identify, control, and replicate effective practice.” At present, there does not appear to exist a solution to this problem.

One source of several problems with state entrepreneurship is that a state departs from issues that it thinks need solving, whereas entrepreneurs in the innovation machine generally depart from issues they think they can solve. The former issues are subject to substantially more uncertainty. Most entrepreneurs are ultimately forced to be realistic, at least in terms of large investments. When they have attempted to solve a problem for too long, they run out of investors. When they fail at solving actual problems, or when they succeed at solving immaterial problems, they are broken by markets.

With state entrepreneurship, there are no such mechanisms. Taxpayers are not investors because they do not have equity. They do not know what is going on and even if they did, collective action problems would almost invariably stop them from showing up outside the board room. To the extent that there is a market, and often there will not be, a loss does not really mean anything if the politicians choose to remain committed to the enterprise. In democratic states, state entrepreneurship is venture without meaningful risk.

These issues clearly call for other mechanisms to evaluate the progress of state entrepreneurship and its missions. Mazzucato (2016, p. 141) calls for missions to be "concrete enough to translate into specific problems to solve, so that progress toward the mission can be evaluated on a continual basis." It is not controversial to say that such evaluation methods are still missing, and that is even if we disregard opportunity cost.

Is there any reason to be hopeful that credible evaluation methods may emerge? To begin with, it is of course correct that missions must at the very least be concrete; they cannot simply consist of *making the world better*. But even in the case of something concrete, like *cutting carbon emissions by 50% in ten years*, a myriad of problems remains to be dealt with. Even if this is a national target, for an accurate evaluation, we would need to know the direct effect of the policy, the indirect effects of the policy, including opportunity costs imposed on seemingly unrelated sectors, and whether the policy was achieved or not achieved through acceptable means. The latter point is important because the state's powers are so far-reaching. Simply regulating all carbon-heavy firms out of business would not seem like success to most people, although it could certainly achieve the goal.

Taken together, these points can be summarized to mean that it is not enough for the goal to be concrete and measurable. The indirect outcomes must be clear and quantifiable as well. And even when they are, there can be no one and nothing else to blame for failure. In the end, state entrepreneurs are often not accountable to anyone, whereas the Apollo and Manhattan projects, for example, were notable exceptions since the goals were perfectly defined and there were formidable competitors. Even when someone is accountable, one of the main tenets in the mission-oriented innovation literature is that we should be prepared for the state to fail in these high-risk and large-scale endeavors. Indeed, the state should *experiment,* and we should often expect failure, although to what extent is not clear. It seems as an entity, *the entrepreneurial state cannot fail.* Whatever we are to call this process, it is not entrepreneurship.

4 External Validity and Scalability: The Problem with Arguing from Anecdote

I have argued that we should not expect the state to be able to act entrepreneurially, at least not in terms of the currently accepted use of the word. But one argument remains. Most would agree that some problems are clearly so large and so urgent that the market cannot properly address them, and perhaps whoever is addressing them may need both the resources and the capacity to make rules and regulations as well. What does that tell us in practice?

As noted, an entrepreneurial state departs from issues it thinks should be solved, whereas the innovation machine departs from issues that its firms are likely to be able to solve. Sometimes we cannot direct the machine's effort to the most important issues of our time. A common problem in a high-risk venture is embodied in the question, *are we engaged with a problem that we can solve?* Ask any producer of pharmaceuticals. One obvious problem that has flown under the radar in the debate about the entrepreneurial state and its ambitions is the seemingly innocuous fact that there is not one state out there. Arguing over what *a state* should do is like arguing what *a business* should do, without considering whether the business is a multinational firm with thousands of scientists or whether it is your local ice cream vendor. Sweden is currently less than one-thirtieth of the size of the United States. Sweden could never have mobilized a defense initiative to put a man on the moon, because it lacks the scale. If you depart from what needs to be done—as the state is prone to—rather than from what we can do, this fact is likely to be ignored.

So, is the international arena the solution? Perhaps, but the current track record of cooperation over global warming and resistant bacteria are not too encouraging. Politicians are also increasingly wary of centralizing policy because it turns out that people who are not centrally located tend dislike centralization and cast votes for parties that align with their views (Rodríguez-Pose, 2018).

By necessity, resources pooled in the international arena would probably need to go to the most efficient environments to make the most good. As noted above, cutting-edge knowledge is to a large extent a club good. Even absent patents and secrecy, advanced knowledge is tacit, and as Glaeser (2011) has remarked, it flows easier across hallways than oceans. Researchers in the regional sciences have shown that promoting research excellence in the central agglomerations is most efficient (Varga, 2015). This peculiarity clearly favors building those knowledge-creating environments that are already strong, and over time, to the extent they favor the best proposals to deal with our missions, funds will naturally favor already-strong environments. But taking resources locally and concentrating them in central locations is ever-less popular politics, even when it is nominally the right policy. There is perhaps a way that we could get over any democratic challenges. But the international arena would also need far-reaching regulatory power at the local level. If missions are to be effective politics, many issues remain to be answered in terms of how they can operate within, as well as across, democratic systems.

Within nations, efficient missions will need to be wrapped in an unpopular anti-cohesion agenda. Across nations, we face a macrocosm of the same problem. Our

national-political innovation systems are not built for this development, just as our political systems are not. In fact, the only man-made entities that act efficiently across borders are armed forces and multinational firms.

5 Concluding Remarks: Can Missions Work?

This chapter has analyzed the innovation machines within our societies, making a case that *the entrepreneur* is, next to human capital, its most integral part. I have also argued that those market forces that spur and fetter entrepreneurs do not translate in any simple way to the realities of the state. A firm that is hijacked by a bad idea suffers financially. A state that is hijacked by a bad idea is unlikely to suffer by any parameters it cares about. It might even find parameters by which it appears successful and tout its success.

The most recent call for the state to be entrepreneurial involves so-called mission-oriented innovation policies: the mobilization of great resources across many sectors to solve a great problem or act on an opportunity. Missions suffer from three overarching weaknesses. First, we do not know how to pick them or operationalize them. Second, we do not know how to evaluate their successes and failures, and it is likely that we will never be able to do so in a satisfactory way, since the opportunity costs are incredibly complex. Third, it is difficult to make an actual flesh-and-blood person accountable, which greatly increases the risk that an unproductive, or even destructive, project is initiated, as well as supported past its due date.

Sometimes a simple answer is not simplistic. In his famous 1977 book, *The Moon and the Ghetto*, Richard R. Nelson asked how it came to be that humankind managed to put a man on the moon but could not help ghetto kids read. It is of course a hopeful proposition that resources and political willpower are the missing pieces, as embodied in the call for missions. But when Nelson reflected back on his book almost 35 years later (Nelson, 2011, p. 685), he recalled that a central argument of the book, and something he considered still central to things we could not do, was "not so much political, as a consequence of the fact that, given existing knowledge, there were no clear paths to a solution."

With problems for which what to do is reasonably straightforward, it is obvious who the experts are, we can draw on already well-developed knowledge in science and private enterprises, and there is currently a lack of critical mass, missions may work in theory. The question is how many problems of significant importance fit those criteria. We must also figure out how these things interact with the institutional-technological issues of our time. Hammurabi could not have flown to the moon, but he is likely to have been able to fix a few issues with readability in ghettos if he had so intended. Today, things like *fly a rocket to land on the moon* clearly qualify for the list of achievable missions, as do things like building the world's fastest car or the world's best chess computer. Find an accountable head, hire the best minds, and pour endless resources into them. The problem of opportunity cost would remain, but the mission's goals could probably be reached.

It is possible that putting enormous amounts of resources into staying ahead of resistant bacteria would qualify as well, given that the taxpayers involved are willing to pay for everybody else's spillovers. Some vaccine research and roll-out programs may also be candidates. But then again, would that not be best performed through enormous R&D subsidies or innovation prizes, rather than through missions?

Sadly, dealing with global warming (and many other issues of our time) is not on the list of problems that are likely solvable through missions: We just do not know what to do about it, at least not in a way that enough people find acceptable. Contrary to the Apollo or Manhattan projects, it is unlikely that one technological solution will take us past the global warming scare (Mowery et al., 2010), exponentially increasing the complexity of the problem and likewise reducing the likelihood that a mission can solve it. Alas, those are the kind of missions that we are steering against. Indeed, not really knowing what to do is perhaps what ultimately separates *fixing markets* from *creating markets.* Proponents of entrepreneurial states and their missions are trying to convince us to apply top-down approaches to issues for which the knowledge required is too complex and too incomplete for top-down approaches to work. If we allow our states to take on such issues, they are likely to fail in more ways than one. Many politicians and civil servants will likely have a favorable view of their ability to do the impossible. The rest of us must keep our heads cool.

References

Acs, Z. J., Braunerhjelm, P., Audretsch, D. B., & Carlsson, B. (2009). The knowledge spillover theory of entrepreneurship. *Small Business Economics, 32*(1), 15–30.

Akerlof, G. A. (1970). The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics, 84*(3), 488–500.

Andersson, M., & Larsson, J. P. (2016). Local entrepreneurship clusters in cities. *Journal of Economic Geography, 16*(1), 39–66.

Arrow, K. J. (1951). An extension of the basic theorems of classical welfare economics. Paper presented at the Second Berkeley Symposium on Mathematical Statistics and Probability, .

Arrow, K. (1978). A cautious case for socialism. *Dissent (Fall issue)*, 472–480.

Arrow, K. J. (1962). Economic welfare and the allocation of resources for invention. In R. R. Nelson (Ed.), *The rate and direction of inventive activity*. Princeton University Press.

Bastiat, F. (1850). *Selected essays on political economy (Ch 1. What is seen and what is not seen)*. Foundation for Economic Education.

Baumol, W. J. (2002). *The free-market innovation machine: Analyzing the growth miracle of capitalism*. Princeton University Press.

Baumol, W. J., & Strom, R. J. (2012). "Useful knowledge" of entrepreneurship: Some implications of the history. In D. S. Landes, J. Mokyr, & W. J. Baumol (Eds.), *The invention of Enterprise: Entrepreneurship from ancient Mesopotamia to modern times*. Princeton University Press.

Elert, N., Henrekson, M., & Sanders, M. (2019). *The entrepreneurial society: A reform strategy for the European Union*. Springer Open.

Glaeser, E. L. (2011). *Triumph of the City–how our greatest invention makes us richer, smarter, greener, healthier and happier*. The Penguin Press.

Hayek, F. A. (1945). The use of knowledge in society. *The American Economic Review, 35*(4), 519–530.

Hekkert, M. P., Janssen, M. J., Wesseling, J. H., & Negro, S. O. (2020). Mission-oriented innovation systems. *Environmental Innovation and Societal Transitions, 34*, 76–79.

Landes, D. S., Mokyr, J., & Baumol, W. J. (2010). *The invention of Enterprise: Entrepreneurship from ancient Mesopotamia to modern times*. Princeton University Press.
Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3–42.
Mazzucato, M. (2016). From market fixing to market-creating: A new framework for innovation policy. *Industry and Innovation, 23*(2), 140–156.
Mazzucato, M., & Penna, C. C. R. (2015). Introduction: Mission-oriented finance for innovation. In M. Mazzucato & C. C. R. Penna (Eds.), *Mission-oriented finance for innovation* (pp. 1–10). Rowman & Littlefield.
McCann, P., & Ortega-Argilés, R. (2015). Smart specialization, regional growth and applications to European Union cohesion policy. *Regional Studies, 49*(8), 1291–1302.
Mowery, D. C., Nelson, R. R., & Martin, B. R. (2010). Technology policy and global warming: Why new policy models are needed (or why putting new wine in old bottles won't work). *Research Policy, 39*(8), 1011–1023.
Nelson, R. (1977). *The moon and the ghetto: An essay on policy analysis*. W W Norton.
Nelson, R. (2011). The moon and the ghetto revisited. *Science and Public Policy, 38*(9), 681–690.
Robbins, L. (1978). *The theory of economic policy: In English classical political economy* (2nd ed.). The Macmillan Press.
Rodríguez-Pose, A. (2018). The revenge of the places that don't matter (and what to do about it). *Cambridge Journal of Regions, Economy and Society, 11*(1), 189–209.
Romer, P. M. (1986). Increasing returns and long-run growth. *The Journal of Political Economy, 94*(5), 1002–1037.
Rosenberg, N. (1982). *Inside the black box: Technology and economics*. Cambridge University Press.
Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy, 47*(9), 1554–1567.
Schumpeter, J. (1961). *The theory of economic development*. Oxford University Press.
Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *The Academy of Management Review, 25*(1), 217–226.
Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics, 70*(1), 65–94.
Sowell, T. (1980). *Knowledge and decisions*. Basic Books.
Varga, A. (2015). Place-based, spatially blind, or both? Challenges in estimating the impacts of modern development policies: The case of the GMR policy impact modeling approach. *International Regional Science Review, 40*(1), 12–37.
Winter, S. G., & Nelson, R. R. (1982). An evolutionary theory of economic change. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.

Part III
The Entrepreneurial State, Entrepreneurial Universities, and Startups

Building Local Innovation Support Systems: Theory and Practice

Dan Hjalmarsson

Abstract Interest in innovation as a way of meeting societal challenges is increasing. Interest in different types of public innovation support is therefore increasing as well. Umeå University has many years of experience in developing and operating a well-functioning innovation support system. A common theme is to offer project owners creative arenas as context for entrepreneurial judgments and assessments during the various steps of the innovation process. Improved program theories are needed to enable evaluations that provide feedback, learning, and accountability.

Keywords Coaching · Networking · Community · Active ownership · Learning by doing

1 Introduction

Public support to university researchers and students who are in the process of starting businesses is receiving increasing worldwide attention as an essential and more prevalent part of selective public innovation and environmental policy spending. The effectiveness of these support measures is often taken for granted. This study discusses long-standing experiences of active innovation support and incubator support and raises the following questions: How can an even more effective local innovation support system be built in order to foster innovations and spinoffs from universities more efficiently? What explicit, valid program theories—theoretical generalizations that connect policy interventions to desired outcomes—can be constructed? The chapter is divided into three main sections: First, an empirical section briefly describes the innovation support system linked to Umeå University: The innovation office, three majority-owned business incubators, and a business angel network that interacts with the academic entrepreneurs during the whole startup process, exhibiting different modes of support. Second, a theoretical section

D. Hjalmarsson (✉)
Stockholm School of Economics, Stockholm, Sweden

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_6

discusses the identified types of support in light of different conceptual models in an attempt to explore possible program theories. In line with Vedung (1997), the aim is to reconstruct program theories that involve both the individual actor, the firm level, and the market level. Support is vital for startups which have positive effects at the overall market level. Further, a concluding discussion of all types of publicly financed support examines the overarching questions of how the identified practices are validated in light of (different) theoretical approaches, and whether and how program theory arguments can be further translated into a framework for local structures that develops local innovation support systems. Finally, some ideas for further discussion are suggested.

2 The Umeå Region Innovation System: Organizing Entrepreneurial Judgment

Three incubators linked to the University of Umeå in northern Sweden offer the empirical basis for this chapter. These incubators are well known, have received high ratings from several external reviews, and receive annual support from the Swedish innovation agency Vinnova. The state-owned Almi Business Partner—one of Sweden's major provider of support for small and medium-sized firms (SMEs)—ranks one of the incubators, *Uminova Innovation*, as one of Sweden's leading university incubators. The other incubator, *Umeå Biotech Incubator* (UBI), has been declared Scandinavia's best biotech incubator. The most recently established incubator, *eXpression*, develops new methods to support new creative industries. In total, the incubators facilitate over 100 startups every year.

All incubators are majority-owned by the Umeå University Holding Company. They are closely linked to the university's innovation office, which manages the system and exercises pre-incubation activities like scouting for business ideas with commercialization potential and research ideas that can be utilized by society. The innovation office acts as a bridge between the university, the incubators, and society at large.

This first part of the chapter uses primary and secondary data as an empirical basis and point of departure for a better understanding of the work being done in practice. It draws material from a prior survey of 222 startups in Umeå (Hjalmarsson, 2017) in which one in four respondents reported receiving some kind of public support. About one-tenth of all startups emerged from university research of some kind. An understanding of incubator support was sought in three different ways: First, the CEOs of the innovation office and the three incubators were interviewed in the spring of 2019, focusing on how they view the process of starting new academic-based companies and how they perceive the rationale behind the support they offer. Second, the understanding here results from a decade of participatory observation as a member of the board of Umeå University's Holding Company, which is responsible for the innovation office and also the majority owner of the three incubators.

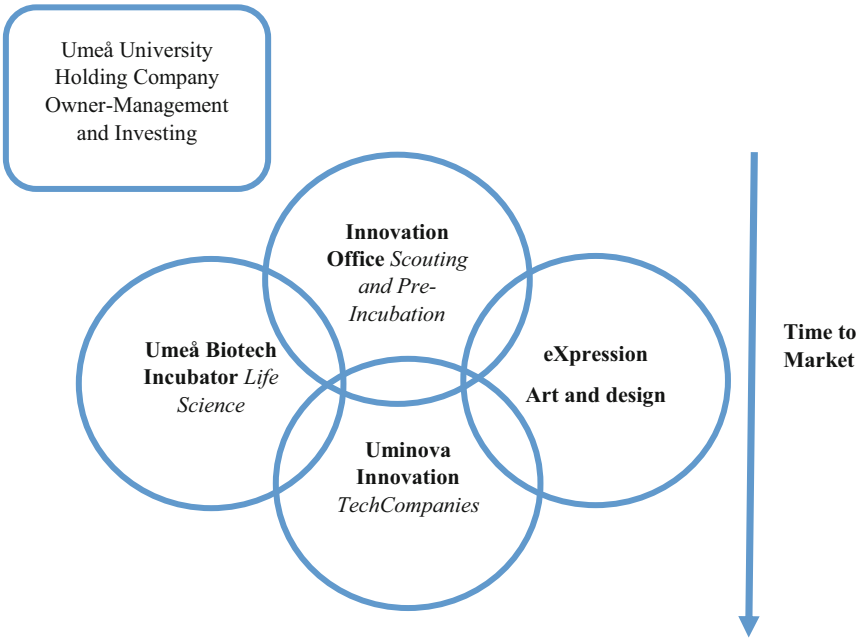

Fig. 1 Umeå academic innovation support system: from idea to market

Third, the discussion draws upon public documents and evaluations of the Swedish incubator support system and innovation systems in general (SOU, 2020:59) *Innovation as a driving force, from research to practice*. Figure 1 depicts an initial schematic view of the local innovation support system and the type of companies it seeks to attract.

An empirical description of actual support activities is summarized in four short narratives, crystallizing the essence of incubator support activities as kinds of Weberian ideal types (Giddens, 2006). The aim is to identify a few central concepts that can cover the empirical content of the support activities. Throughout the chapter, concepts like *direct support*, *sounding board coaching*, and *creative arenas* will be discussed.

2.1 Academic Innovation Support in Practice

This section rests on interviews, participatory observation, written documents, and earlier studies. The interviews, as the main source of information, were conducted as conversations with CEOs of the innovation office and the incubators, comprising the following questions: How can the process of starting a new business be understood? How do support needs differ at different stages of the development process? Are there differences between startups in different lines of business? What does the

incubator do? What are the basic support measures? Does support differ between startup cases? Will action differ over time? What kind of *program logic* guides the incubator's work?

The innovation office and the incubators work within the Umeå academic innovation support system (Hjalmarsson, 2017). The incubators are also members of the Swedish Incubators & Science Parks (SISP) organization, which has a total of 63 members throughout Sweden. The innovation support system in Umeå consists of Umeå University Holding Company, which is responsible for the innovation office and is the majority owner of the incubators: *Umeå University Innovation Office*; *Uminova innovation* (UI); *Umeå Biotech Incubator* (UBI); *eXpression;* and a *minority-owned business angelsnetwork*. A total of about 50 people work in the Umeå academic innovation support system, including the Holding Company's own employees.

Umeå Innovation Office. The innovation office presents itself online as follows:

> We help you to refine and realize your ideas. Regardless of faculty or discipline, our well-developed innovation support system is here to help you explore the possibilities and potential of your idea.

The innovation office thus aims to help individuals at Umeå University, from ideas to markets, with the utilization and commercialization of innovative ideas generated within the university. The innovation office is run as a separate part of the Holding Company's organization. Its activities are divided into two categories: First, its task is to inform and encourage people in academia to take an interest in entrepreneurially utilizing ideas emerging from academic activities. This information-sharing can be seen as a kind of *nudging* to convince people to consider commercialization and utilization. Second, its role is to provide early, development-stage support. Here, the innovation office offers pre-incubator activities to verify the idea for the potential entrepreneur.

The innovation office's information-sharing activities comprise a broad set of activities to stimulate and *nudge* utilization activities: In 2018, ten seminars were conducted to generate an inflow of ideas from the various faculties at the university, as was a course for researchers and doctoral students in collaboration with the Swedish Patent Office. Furthermore, special funding from Vinnova supported collaboration with Companion and eXpression over the Social Innovation Hub project to strengthen the knowledge of social innovations.

The overall aim of the innovation office's attempts at stimulation and encouragement is to spread knowledge about and interest in the resources available within the innovation support system. The goal is to demonstrate that entrepreneurship can be an alternative career path and a way to realize dreams. During the summer, students on vacation can have their business ideas verified in order to generate students interested in commercializing their own academic ideas. Students are given advice in evaluating their business ideas and verifying commercial potential. Other activities include the Innovation Boot Camp, Startup Coffee (with Uminova Innovation), and Summer eXpression (with eXpression).

The innovation office's second central task is to verify whether business ideas have the potential to be commercialized in new companies or whether ideas can be utilized in other ways. In this role, the innovation office works to provide access to networks and skills that may be necessary in further development of the project. It is crucial to meet, to connect, to create *a startup community*. Activities also include more direct action. The innovation office offers the support needed in order to properly be able to sign contracts or otherwise secure intellectual property (IP) rights. Important work also includes offering resources for innovation development and advice, licensing, and social innovation. The innovation office can provide funding for verification at very early stages, an activity carried out in ongoing cooperation with the three incubators.

The innovation office stresses that "every business is unique." Further, that, "It is difficult to categorize in a world where service offerings and physical products are mixed with digital, often global, solutions … No processes are linear… but still there are useful tools to support like Lean Canvass, value-creating, and design and prototyping." The key to success for such firms is always "Grit and enactment."

The mission of Uminova Biotech Incubator AB (UBI) is to support the commercialization of ideas from Umeå University's life science research. In 2018, UBI handled 17 business ideas, 4 of which were carried further into the incubator. UBI describes its incubator as follows:

> Being a state-of-the-art biotech incubator, offering facilities, know-how and financing. We provide full service support for biomed innovators who are eager to test and verify their business ideas within the life sciences field. … UBI verifies and supports.

The focus is on taking academic research and ideas in biotechnology all the way from idea to startup company. Ideally, companies should remain in Umeå, preferably with 20–100 employees. The focus is on building companies and on supporting profitable businesses. For UBI, it is important to create growth, mainly in Umeå. Starting a business in biotech "takes place in a different context." Business models, public procurement systems, and regulations are specific to the life science industry. Another feature is that the business is global from day one. "A researcher with a possible idea may think that you do not need to talk to the customer early." But the definite view is that the customer must always be in focus, from the beginning and throughout the whole development process.

UBI provides each project or tenant startup a designated coach that facilitates the case and the work ahead with practical questions and issues related to the strategic development of the project. These coaches are given a clear activity plan. The working method is described in detail in a document that clarifies the development process from idea to established company or business deal, and how the process can be promoted. This process has been documented in a Standard Operation Procedure that resembles the development process in the Medtech business.

UBI operates in a scientific context in which verification and testing are central to the *business culture*. UBI's work has similarities with the testing stages that apply in the pharmaceutical industry, whereby each product goes through (1) an idea phase, (2) preclinical studies, then (3) three phases of clinical trial, to finally (4) market

launch. UBI stresses that it is crucial to set clear goals and sub-goals early in the development process, and then work purposefully according to the Standard Operation Procedures to effectively pursue the projects. At the same time, UBI emphasizes the creative role of the incubator in that the exact process "depends on what phase the current case or company is in. There is also some individual freedom in coaching as long as the overall incubation process is followed and reconciliation is discussed with others in the [business coach] team."

Uminova Innovation AB (UI)—the second incubator—offers support for "startup companies with growth potential." Venture ideas emanate from students, researchers, and staff at the university, the university hospital, and from the business community in the region. UI focuses on different types of business ideas with an emphasis on tech firms. UI offers initiatives such as (1) startup programs for new business ideas, and (2) an accelerator program for companies that can and want to scale quickly and already have a good team in place. In 2018, there were between 60 and 70 business ideas and startup companies at various development stages and phases in the incubator. "Nobody knows in advance what to do when starting a successful business, and what to do when you want to support a company. It changes over time." One of the general problems described in developing research from the idea stage to a growing company is that the idea-owner and team is not focused enough and fails to allocate enough time to move the project forward. UI therefore tries to provide external people who can participate and push the project forward, helping to build entrepreneurial teams. UI works to continuously supplement the team, set up shadow boards, and otherwise ensure that the original project owners are complemented with the resources needed for successful development. The incubators also charge tenant firms rent for staying in the incubator. The incubator, like other incubators, works according to common methods in the *entrepreneurship support industry*, such as *customer development* and *lean canvas*, to quickly find out if the idea is feasible and then uses *acceleration processes* to start scaling up.

The incubator is also involved in efforts to impact the local entrepreneurial ecosystem through external activities such as networking events and different types of external information. The goal here is to create meetings, *creative arenas,* between different individuals who can contribute to the development of ideas and to create good general conditions for commercialization. Every year an event called Umeå Tech Arena is organized. In 2018 about 400 participants—entrepreneurs, students, researchers, investors, and businesses—participated.

eXpression AB—the third incubator—was started in 2014 at the university's art campus. The purpose was particularly to support business ideas in the cultural, artistic, and creative industries, including business ideas in design, architecture, art, social media, informatics, journalism, music, film, fashion, and gastronomy. eXpression seeks to "unite creative minds… The incubator welcomes differences and similarities, in an environment of co-creation and community. With a dynamic method, innovative environment, and experienced coaches, the incubator supports the idea-owner to release their inner entrepreneur." During 2018, eXpression worked on several activities including a startup program (Express program) and an incubator program (Creative Corporation). The summer of 2018 was the second time the

summer eXpression activity was conducted. The incubator also managed a large number of workshops. eXpression emphasizes that people within the incubator's framework are often value driven and want to start operations as a means of achieving things like environmental sustainability and equal opportunities. Many are initially one-person companies "who, through the incubator, want to develop as part of a larger network, to reach further." Creating new ventures in the arts sector primarily stems from creativity, and the incubator staff argue that business is "more than just making money. But still the project-owner wants to be economically self-sufficient and wants to be responsible, and to move forward, to be active in 'new industry networks.'"

3 Incubator Support Action in Practice: A Conceptual Discussion

The narratives above display different aspects of incubator support. Intervention design depends on many different factors, internal incubator resources, and specific firm contexts. The narratives above can be coarsely summarized with three types of support measures.

3.1 Information and Nudging for Utilization

One crucial task for the innovation support system and especially for the innovation office is to *nudge* toward utilization, to foster an interest among students, professors, and other employees within academia to practically apply ideas to benefit society.

3.2 Direct Support in Solving Problems

The innovation office and incubators support the startup process with external expert advice and resources, with the aim of solving concretely identified problems. It could be an idea-owner in a pre-incubator phase or later a startup team that needs technical or business expertise to solve immanent problems. Thus, the innovation office and incubators provide—with their own resources or through intermediation with external consultants—concrete advice on legal intellectual property issues as well as production techniques and the like: problems where relevant parameters are known and can be identified and calculated as a basis for the advice given.

3.3 Coaching Along the Startup Process

As the empirical description of praxis has shown, it is not regarded as sufficient to provide direct support to solving identified problems. The innovation office can support the idea-owner in the early phase, and incubators—as with UBI—can offer *full service support*. Each project is given a designated coach that facilitates the case and the work ahead, and deals with practical and strategic questions. Hence, it is equally important to facilitate the whole startup process, to take the project all the way to economic and social realization of a *business deal*. For eXpression it is to "help the artists to release their inner entrepreneur."

3.4 Networking and Providing Creative Arenas

Much of the activities in the innovation support system concern networking, *bridge-building*, and providing *creative arenas*. The innovation office arranges different kinds of gatherings and seminars and other campus activities in order to *nudge* the utilization of activities. The incubators arrange different events where people from the business community meet and mingle with academic entrepreneurs. In Uminova Innovation, this is to build "Community and Culture" and eXpression talks about an "environment of co-creation and community." The aim expressed in all incubators is to enable creative meetings in which startup entrepreneurs or startup teams can extend their business networks in order to further refine their business ideas.

One challenge for these organizations is to construct an organizational structure that effectively maintains and enhances these support processes over time. The basic support processes identified in this chapter have been summarized in four different categories: Nudging, direct support, coaching, and creating arenas. The different activities take place in four different organizational structures: In the innovation office and in each of the three incubators. Figure 2 illustrates the challenge. Each part of the innovation support system has its own *specialties*: In short, a focus on scouting/nudging and pre-incubation; on biotech; on art and design; and on high-tech products and more general services. A crucial question is the extent to which the different support processes—the four basic activities—are specific to each organizational body or whether the measures can, and in that case how, be used more generically throughout the whole system to achieve synergies. Another is how the majority owner—the Holding Company—can facilitate and secure an even more effective use of existing and new innovative measures, without taking away the responsibility for strategic vital choices from the project-owner team.

Two intertwined aspects must be considered in the process depicted in Fig. 2 the ongoing support *processes* in the system and the organizational *structure* of the system. Closely related to the structuring of the system is the question of how results should be measured. More traditional measurements and indicators, such as estimating the number of companies leaving the incubators and the employment impact,

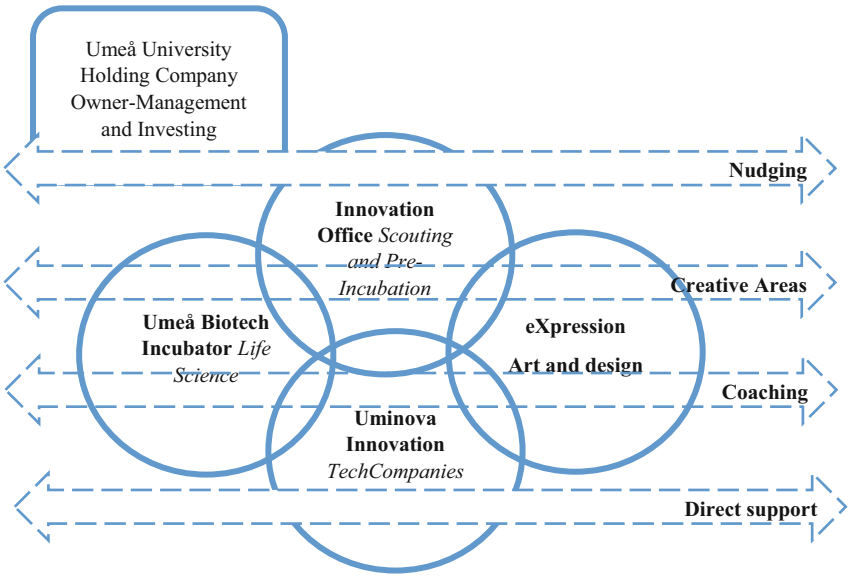

Fig. 2 Structures and processes in the Umeå innovation support system

profitability, and survival rate, are important. Yet such simple quantitative indicators generally indicate that most incubators may fall short of the goals they aim to achieve (Ejemo, 2019). Thus, alternative policy choices must be considered. It is important to ask how the system impacts attitudes and values toward utilization, and to what extent the system is an essential part of the Umeå region's economic ecosystem.

4 Conceptual Rationales Behind Public Support Systems for Innovation

In general there are few explicit theoretical arguments for the provision of economic interventions such as innovation policy. See SOU (1993:70) *Strategy for Small Business Development,* (SOU, 2000:93) *Governmental Organization for Industrial Policy*, and also OECD (2013). No explicit references to theoretical notions are made in the governmental inquiry (SOU, 2020:59).

The innovation support system—directly or through the mediation of consulting services—provides expert advice and ready-made solutions. This assumes that there are rational solutions to problems faced by entrepreneurs and that a generic knowledge is equally attainable for all startup companies. The reasoning is that it is possible to provide support to tackle intellectual property issues, labor-law problems, and other more strategic problems that constitute the *everyday reality* in startup processes and incumbent small businesses. This idea has been expressed by several government investigations besides the aforementioned governmental investigation

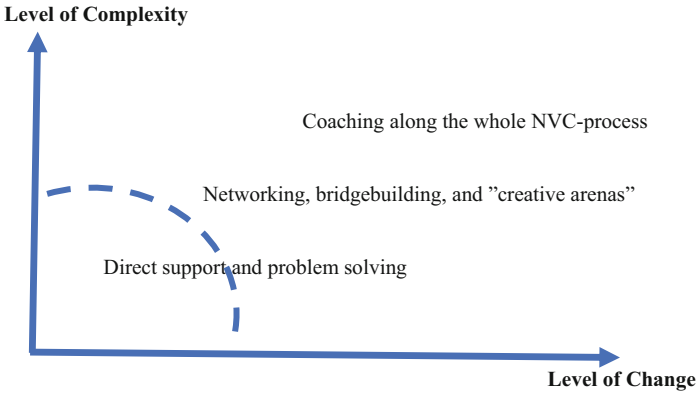

Fig. 3 Complexity and change in the incubation process

(SOU, 2020:5959). In these reports, investigators see no obstacles to offering operative or strategic support directly to startups.

However, two fundamental sets of questions always arise. First, what kind of resources can—efficiently—be provided through public interventions, and are there limitations? Second, if the intervention is, by necessity, limited to concrete and tradable services, how will that impact the market? Is there a risk that public interventions distort the functioning of the market?

Figure 3 schematically illustrates situations in which the complexity is so vast, and the level of change is so high that it is not realistic to find grounds to offer concrete and direct advice. Accordingly, in these circumstances there will be no viable advisory services to purchase on the private market. The *solution* is to organize a creative arena in which the project team is exposed to the resources they need for entrepreneurial judgment. It is simply too difficult to determine a market price and make a reasonable business contract. In these strategic circumstances, the startup team has to lean upon its own *entrepreneurial* judgments, within its own *organizational hierarchy*. Coase (1937) distinguishes between “initiative or enterprise” on the one hand and “management” on the other. Put simply, management can be purchased on the market or, as in this case, be offered by public support agencies, while initiative and enterprise remain basically entrepreneurial. This limit, where the complexity becomes too great, must be handled with entrepreneurial judgment—here labeled the Coase/Williamson line—and it is, of course, not static. Nor is it possible to determine in advance or in general. This boundary has also, not least in recent times, changed radically and has been moved *further away from the origin point* in Fig. 3.

4.1 Direct Interventions May Run the Risk of Causing Market Distortions

The interviews indicate that in practice, the innovation office and incubators rarely give direct advice on strategic issues, thus limiting their activity to organizing strategic arenas focusing on mediation of support and avoiding direct support measures. What is seen as effective in the individual case and to benefit certain individuals may be seen as counterproductive at the market level (see Growth Analysis, 2015; OECD, 2013). Do selective industrial policy cause growth?

The most common drawbacks associated with direct support are the so-called *pick-the-winner problem*s. When the support is selective, this means by definition that not everyone can receive support. Thus, the question arises, how should the support provider—in this case the incubator—select the *right* companies or projects to help? From a broader perspective, should the support provider impose positive change at the local market level? And how can the policymaker avoid supporting *wrong* companies that lack potential and thus in the worst-case scenario launch support that slows down or impedes a desirable process of creative destruction?

Another difficulty has to do with so-called *displacement problems*. In the previously mentioned Umeå study, Hjalmarsson (2017) shows that a significant proportion of the new companies in the region are active as consultants and business-to-business service providers. In the adverse case, incubators offering similar services to private actors could make it difficult for new companies to operate in local markets.

Other problems associated with providing direct support to startups can emerge. One may be that entrepreneurs use public support as their *business idea*: They simply see different types of grants and benefits as sources of income, something referred to as *rent-seeking* or *subsidy entrepreneurship*, that is, firms systematically apply for and obtain a collection of government subsidies. Research on such subsidy entrepreneurship has shown that firms that receive more government support tend to have lower productivity and pay higher wages (Gustafsson et al., 2020).

Public support systems for innovation—contrary to what has sometimes been assumed in government documents—do not provide a clear basis for program theories validating direct strategic support and extensive coaching. When incubators and other supporting agencies operate in *large worlds*, the theoretical basis for this kind of far-reaching direct support is missing. In these cases—as will be discussed in the concluding section—only the entrepreneurs themselves can make legitimate decisions (Foss & Klein, 2012). The service provider has in most cases limited their advisory services more concrete, tradable services to avoid direct intervening in entrepreneurial decisions. See also Hjalmarsson and Johansson (2003). As discussed above, the innovation support system should avoid causing *market distortions*. First and foremost, it should handle the so-called pick-the-winner problem. Additionally, there is always a risk of displacement and rent-seeking such as subsidy entrepreneurship. All these caveats are explicitly discussed and dealt with by the Umeå innovation support system.

4.2 Focus on Favorable Conditions

The ambition to provide favorable institutional conditions may from the local perspective serve as a kind of rationale or program theory for the efforts made by the incubators when they create *meeting places* and *creative arenas*. They actively *produce* favorable conditions, a kind of *free and thick market*, to allow for entrepreneurial judgments locally and regionally.

Incubators and innovation offices offer "*commons*," to use a concept from Sölvell's (2015*) Construction of the Cluster Commons*. The basic idea is that commons provide an arena in which entrepreneurs can meet potential customers and business partners and have an opportunity to find what Lachmann (1986) defines as "unthought-of information." Thus, a significant part of the resources within the innovation support system is used to design these kinds of creative environments or *local markets*; everything from the annual Umeå Tech Arena event to seminars and courses for researchers and doctoral students: The Social Innovation Hub, Summer Verification, Innovation Boot Camp, Startup Coffee, Summer eXpression, and much more. In principle, a public support program theory could then be based on an attempt to—using Foss and Klein's concept (2012)—"organize" entrepreneurial and creative meetings, based on regional and local conditions where *unthought-of information* can emerge. This explains the usefulness of providing *creative arenas*.

Consequently, it is possible to find theoretical support for organizing these different kinds of creative arenas. However, the questions remain, what is lacking in the local environment? What needs to be supplemented with these types of *arenas*? How can a better understanding of the incentives and motivations for individual entrepreneurs be developed?

5 Discussion and Conclusions

The empirical material discussed in light of various established theoretical perspectives suggests that there is no once-and-for-all *best* way to initiate and promote startup processes in local contexts. Thus, there is no once-and-for-all theoretical grounds for a simple and general program theory. One voice summarizes the complexity of innovation support:

> Nobody knows in advance what to do when starting a successful business, and what to do when you want to support a company. It changes over time. . . . the entrepreneurial journey is never predictable, and the development process is rarely *a piece of cake*. Therefore, the incubator must also be innovative in itself and able to adapt its own business model to each case, to the company's operations, and to the individual's skills and experiences.

The very concept of innovation connotes complexity and dynamism. Innovation is by definition something new, not a previously existing artifact. The process of starting a business with the aim of producing an innovation is indeed an elusive phenomenon. And public innovation policies with an aim of intervening in order to enhance this innovative startup process are indeed elusive as well.

Every innovative business concept and every entrepreneurial startup process has its own specific qualities, every regional and local development environment has its own unique conditions, and every incubator has its own strengths and weaknesses. Therefore, a program theory framework of the kind suggested above could be seen as a road map for policymakers in the process of developing specific innovation policy measures—in local and regional contexts—that addresses all these aspects of innovative developments simultaneously.

In some "thin" regional markets in northern Sweden, direct support may be of greater importance than in other more "thick markets" elsewhere (see Amezcua et al., 2013). Creative arenas or meeting places are always an important intervention, not least as a way to change attitudes toward starting businesses. In some economic ecosystems, there could be a lack of business role models and difficulties finding experienced board members. Here, sounding board coaching may be especially important. All kinds of activities are also involved in the crucial information and nudging task: The aim of fostering increased interest and ability to pursue the utilization of ideas.

5.1 Direct Support with Limits

In the spirit of Stinchcombe (1965), the innovation support system wants to provide startups with direct support during the whole New Venture Creation Process. Theoretical arguments for this type of direct advisory service have been expressed in various public government documents (SOU, 1993:70 and SOU, 2000:1993) based on a relatively superficial understanding of industrial organization economics, for example, on Stiglitz's (2000) discussions on mitigating market failures. This type of reasoning has also been reiterated in international bodies such as the OECD (2013) and the previously mentioned government investigations (SOU, 2020:59).

However, scholars like Coase (1937), Hayek (1945), and Williamson (1975) indicate clear practical and theoretical limitations for external resource supplementation. A direct effort to provide publicly funded strategic advice, which goes beyond what here has been labeled the Coase/Williamson limit, where the complexity and dynamics are too extensive, cannot be reasonably efficient when seen from both the individual level and the market level. As elaborated above, external expertise can be used when the task is of a concrete and rational kind; such advice could potentially be obtained on the private market. Here the following problem arises: If the publicly funded support system offers tradeable services, market distortion may occur. And if the support system offers *entrepreneurial judgment*, problems of accuracy and

economic responsibility arise. It is important that project owners constantly maintain the crucial decisions.

The "construction of new markets," as Kjellberg and Helgesson (2007) explain, is always associated with realizing something *new*. No one knows in advance what will succeed. When entrepreneurial (ownership) decisions are required, these decisions cannot be *outsourced* to external experts. Foss and Klein (2012) also discuss the possibilities of *organizing* this type of support to achieve "entrepreneurial judgments" in complex and genuinely uncertain situations. And like most proponents of the entrepreneurial university they claim that participation in strategic decision-making must include shared ownership and financial responsibility. In principle, this can lead to the public support provider, in effectuating this kind of direct support, in fact transforming into an entrepreneur. Thus, direct advisory services must be limited to services that in practice can be found in existing or potential markets.

As discussed in the previous section, a program theory must acknowledge the inherent caveats associated with direct support. Publicly funded support by necessity may come close to tradeable services, and the following shortcomings may arise and must be recognized in a framework for such programs. It is important to address these issues:

- Allocate selective resources to avoid the so-called *pick-the-winner problem*.
- Escape the risk of crowding out private companies—so-called *displacement problems*.
- Prevent *rent-seeking*, the possibility that entrepreneurs use public support as a way of earning a living, as a rent-seeking business idea in itself.

As mentioned in the introduction, improved program theories are needed as an important step to enable evaluations that provide feedback, learning, and accountability. Without a theory-driven learning process, the policymaker may fall short in understanding how to better provide selective public innovation support. And without this understanding, policy measures will be based only on faith and wishful thinking, not facts and proven experience. In Umeå, the acting entrepreneur is in focus, as addressed by the Austrian economic paradigm.

References

Amezcua, A. S., Grimes, M. G., Bradley, S. W., & Wiklund, J. (2013). Organizational sponsorship and founding environments: A contingency view on the survival of business-incubated firms, 1994–2007. *Academy of Management Journal, 56*(6), 1628–1654.

Coase, R. H. (1937). The nature of the firm. *Economica, 4*(16), 386–405.

Ejemo, O. (2019). *Does incubation lead to innovation?* Evidence from the Swedish incubation program. Sweden; Growth Analysis.

Foss, N. J., & Klein, P. (2012). *Organizing entrepreneurial judgement–A new approach to the firm*. Cambridge University Press.

Giddens. (2006). *Sociology* (5th ed.).

Growth Analysis. (2015). *Do selective industrial polices cause growth?* Growth Analysis.
Gustafsson, A., Tingvall, P. G., & Halvarsson, D. (2020). Subsidy entrepreneurs: An inquiry into firms seeking public grants. *Journal of Industry, Competition and Trade, 20*(3), 439–478.
Hayek, F. A. (1945). The use of knowledge in society. *The American Economic Review.*
Hjalmarsson, D. (2017). New companies, entrepreneurs and business ideas in a matching innovation support; in Swedish. *Umeå universitets*. holdingbolag.
Hjalmarsson, D., & Johansson, A. (2003). Public advisory services - theory and practice. *Entrepreneurship & Regional Development, 15*(1), 83–98.
Kjellberg, H., & Helgesson, C.-F. (2007). On the nature of markets and their practices. *Marketing Theory, 7*(2), 137–162.
Lachmann, L. (1986). *The market as an economic process*. Basil Blackwell.
OECD. (2013). Beyond industrial policy.
Sölvell, Ö. (2015). *Construction of the cluster commons. The Oxford handbook of local competitiveness* (pp. 84–101). Oxford University Press.
SOU. (1993). *Strategi för småföretagsutveckling (Strategy for small firm's development). Sveriges Offentliga Utredningar (SOU 1993:70)*. Fritzes.
SOU. (2000). *Statlig organisation för näringslivsutveckling (Public organisation for industrial development). Sveriges Offentliga Utredningar (SOU 2000:93)*. Fritzes.
SOU. (2020). *Innovation som drivkraft (Innovation as a driving force). Sveriges Offentliga Utredningar (SOU 2020:59)*. Fritzes.
Stiglitz, S.J. (2000). Economics of the public sector.
Stinchcombe, A. (1965). *Social structure and organizations*. Rand McNally.
Vedung, E. (1997). *Public policy and program evaluation*. New Transaction Publishers.
Williamson, O. E. (1975). *Markets and hierarchies*. Free Press.

Reducing Higher Education Bureaucracy and Reclaiming the Entrepreneurial University

Siri Terjesen

Abstract This chapter documents the worrying trend of increased levels of top-down policies that stifle universities' innovativeness and autonomy. I highlight the bureaucratization of corporations and higher education institutions, and how this sclerosis results in a widespread sapping of individual initiative and innovation. The chapter next reviews regulation and bureaucratization in higher education with a special focus on commonalities and differences at two levels: university-wide and one sub-unit, the college of business. I describe successful case studies in anti-bureaucracy policies and practices across higher education at the individual, business unit, university, and other levels to highlight cross-level best practices in higher education, including calculating the present bureaucratic mass and administrative burdens of proposed changes, implementing technology solutions, leading change management efforts across all levels, and employing best practices in decision-making. I conclude with a discussion of research directions that will lead to theoretical, methodological, and phenomenological contributions.

Keywords Bureaucracy · Business School · Decision-Making · Entrepreneurship · Higher Education · University

1 Introduction

A rich literature identifies how greater levels of regulation tend to thwart innovation and entrepreneurship (Bailey & Thomas, 2017), often conducted by scholars in business schools and economics departments. By comparison, there is strikingly little research on the effect of the rapidly growing set of regulations and sclerotic bureaucracy in higher education institutions. This gap is particularly worrisome

S. Terjesen (✉)
Florida Atlantic University, Boca Raton, FL, USA

Norwegian School of Economics, Bergen, Norway
e-mail: sterjesen@fau.edu

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_7

since business school academics attempt to teach best practices in strategy and structure to the next generation of business leaders, and would want both their institutions as well as their students' organizations to create and maintain effective, efficient, and entrepreneurial structures.

Bureaucracy is expensive in time, money, and other resources. As anthropologist David Graeber (2015) noted in *The Utopia of Rules*, in the history of the world, our present population spends the greatest amount of time on paperwork. And this bureaucracy is costly: since 2008, productivity growth has slowed 1.24% annually, even despite the "second machine age" with advanced robotics, artificial intelligence, and the Internet of Things. Bureaucracy is estimated to cost the U.S. economy $3 trillion annually and is "kryptonite for productivity" as individuals at the top of their organizations become more isolated, and consequently, their organizations become less responsive to external stimuli (Hamel & Zanini, 2020). The result is that many employees see themselves as powerless to shape their organization's strategies, and become resigned to a lack of initiative and responsibility for anything beyond a very narrow role.

Higher education bureaucracy grows exponentially due to both external (e.g., increased regulation of universities, particularly at federal and state levels) and internal (e.g., a labyrinth of time-consuming, low-value-added internal administrative processes) forces. The costs of an astronomical expansion of academic bureaucracy are usually passed on to students, and reflected in the nearly 200% increase in college tuition and fees from 2000 to 2021, as compared with a basket of goods in which some product prices dropped (e.g., televisions by 100%) (see Fig. 1; Perry, 2021).

This exponential cost increase is a tremendous burden for students, and ultimately their families who often fund their studies, and also for taxpayers who indirectly support students' federal loans. Moreover, these costs are often driven by top-down policies, which also stifle universities' functioning, innovativeness, and autonomy. The costs partly reflect the growing set of full-time administrators within universities, as documented by scholars around the world, and depicted in Table 1. A longitudinal study of the entire population of Swedish universities reports that the number of higher education administrators grew by almost 200% compared to just 23.9% for teachers and researchers from 2001 to 2013 (a nearly tenfold difference), and administrators increased in number another 14% from 2014 to 2018 while the number of teachers and researchers actually declined (Andersson et al., 2021). U.K. analyses reveal that greater administrative intensity leads to lower student satisfaction, suggesting that students would prefer resource allocation to front-line rather than back-line tasks (Andrews et al., 2017). This study also indicates an overall inverted u-shaped relationship between administrative intensity and multiple performance measures such that some central administration is essential, but beyond a certain point, there are rapidly diminishing returns.

Administrative layers are created for a variety of reasons. For example, new federal or state legislation may require additional reporting that requires an administrative line, which can be fulfilled by either staff or faculty who take on administrative responsibilities. Many assignments once under the domain of faculty can be

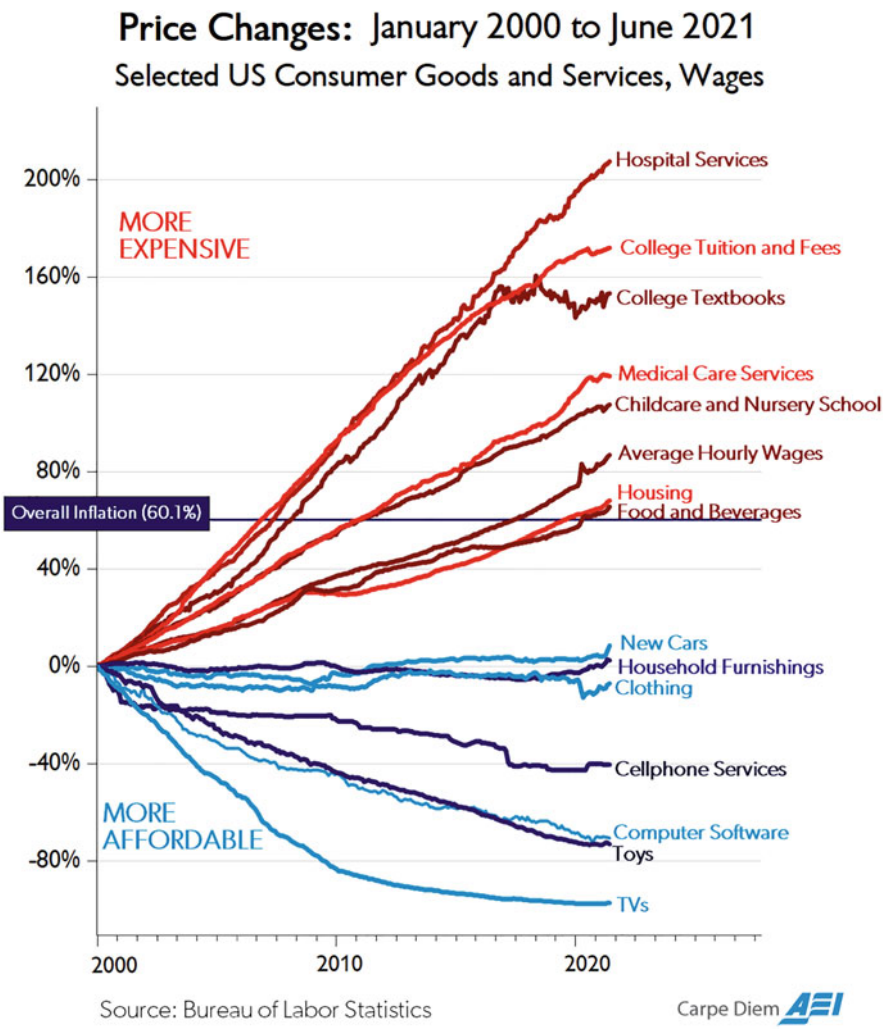

Fig. 1 Price changes for select U.S. consumer goods and services and wages (2000–2021). Source: Perry (2021)

capably handled by staff. Administrative staff positions sometimes require a certain title to reach a salary range, and also to provide career mobility and trajectory. This phenomenon then manifests in higher salaries, as documented by Andersson et al. (2021): The salaries of Swedish universities' group administration increased from 6% to 16% of total budget during the 2001–2013 time period.

Table 1 Administrative growth in higher education

Key Findings	Sample	Study
Changes in supply of and demand for administrative services +240% staff +85% administrators +56% student enrollments +50% faculty +50% # of degree granting institutions +57% # of BA degrees granted	U.S. universities 1985–2005	NCES 2006, cited in Ginsberg, (2011)
Changes in supply of and demand for personnel +23.9% researchers and teachers (2001–2013) +200% Administrators (2001–2013) −2.5% researchers and teachers +14.3% Administrators (2014–2018) **Changes in wages** +275% Administration (2014–2018) +52% researchers and teachers (2014–2018)	Swedish universities (entire population) 2001–2018	Andersson et al., (2021)

2 Regulation and Bureaucratization in Higher Education

There are two levels of bureaucracy in higher education: (1) externally from regulatory policies from government and other accreditors, and (2) internally in each university's processes for addressing these regulations and additional rules. Within the first level of bureaucracy, a university is subject to an array of regulations from federal (e.g., Department of Education, Department of State) and state (e.g., for public universities, respective Boards of Governors and other entities) governments, as well as accrediting bodies at university (e.g., regional for two- and four-year institutions: the Southern Association of Colleges and Schools Commission on Colleges [SACSCOC]; other categories include national faith-based and national career-related) and college/school programmatic (e.g., the Association to Advance Collegiate Schools of Business [AACSB] for business and accounting) levels. The second level, internal, captures universities' unique processes. External and internal policies can be scaled from very poor in terms of heightening bureaucratic administration and bloat to very good in terms of reducing bloat and leading to greater entrepreneurial activities, and there is not necessarily a correlation between the two. The tendency toward inefficient practices at external and internal levels highlights a clear case against Mazzucato's (2014) thesis of an entrepreneurial state comprised of highly functioning public bureaucracies. It is important to distinguish this bureaucracy from a pure measure of size. That is, economic theory suggests that size positively correlates with performance as greater size enables economies of scale and scope, thereby leading to lower fixed costs of services across a range of activities, greater purchasing power, more favorable fund rates, lower innovation

costs, and an improved ability to recruit and retain managers interested in working for large organizations (Jung, 2013; Andrews et al., 2017). The focus of the bureaucracy is on the administrative intensity around *empire-building*, of which extant research indicates that some administrative intensity is necessary to synchronize the many activities in public organizations.

At level one of external forces, some regulations are necessary to keep university efforts on track for mutually desired outcomes (see Kelchen, 2018, for a review of higher education accountability efforts and results; and Hall, 2019, for an overview of higher education accreditation). One important set of indicators is the *U.S. News and World Report's (USNWR)* annual ranking of U.S. state-level higher education, which focuses on students' completion times for two- and four-year programs, in-state tuition and fee costs, and graduates' debt burden. To achieve these outcomes, universities require some regulations around key functions such as admissions, financial aid, and registration. These regulations improve inter-state competition, e.g., resulting in Florida's consistent *USNWR #*1 rank in the United States, attributed to improvements in three of five metrics: four-year graduation rate, average debt, and tuition and fees (Florida Board of Governors, 2021).

At level two of internal forces, universities have some discretion to shape policies to address the government and accreditor guidelines, but may also exercise considerable discretion in creating a range of policies that exceed any guidance. Universities are large, complex organizations that serve many stakeholders, and require significant integration across areas. Several studies document that university employees have strong prosocial motivations (McNeely & Meglino, 1994; Grant & Sumanth, 2009), and are often intrinsically motivated, particularly in helping students succeed. A recent study of five research-intensive universities describes how major organizational and governance changes to strengthen inter-university coupling, control, and coordination lead to both positive and negative consequences (Maassen & Stensaker, 2019). Zywicki and Koopman (2019, pp. 148–149) highlight that an "inability to measure results and monitor outputs effectively in a nonprofit organization gives an opportunity for academic administrators to pursue their self-interest at the expense of the enterprise, which they do by increasing the size of their discretionary budgets and staffing, much as government bureaucrats traditionally have been thought to do. Yet those developments present a puzzle, as the growth of the administration apparently has resulted in a siphoning off of resources from the university's academic mission." Ginsberg's (2011) *Fall of the Faculty* argues that a considerable share of bureaucracy is unnecessary, often developed by career administrative bureaucrats with no teaching, research, or service obligations at their respective universities. These individuals with little exposure to the "front line" customer have a tendency to invent work for others, particularly faculty, in the university (Ginsberg, 2011), and the processes and outputs are very unpopular with faculty (Kallio et al., 2016). In a Swedish study, Andersson et al. (2021) noted that even when qualified administrators are hired, teachers' and researchers' time spent on administration does not decrease over this time period. One example of new internal administration is the appointment of a chief diversity officer (CDO), usually at the executive level in a vice-president position as a signal of commitment to a university's diversity and inclusion efforts, particularly around faculty hiring. A

recent study examined the effect of a CDO hire using a 15-year panel study of large four-year or higher institutions with high research standards: Carnegie Research 1 doctorate-granting universities with highest research activity, Carnegie Research 2 doctorate-granting universities with higher research activity, and Carnegie M1 with larger master's degree-granting activity; all with 4000 or more students. Bradley et al. (2018) report that a CDO appointment does not substantially change the pre-existing, organic growth of underrepresented racial/ethnic minority tenure and non-tenure track faculty, faculty hired with tenure, or university administrator hires. By contrast, a meta-analysis of 18 research papers identified that underrepresented minority faculty in academic medical centers benefit from dedicated mentoring programs (Beech et al., 2013). A recent study of four major California research universities found that women and minority Ph.D. students in STEM fields were more likely to publish research at rates comparable to male majority peers if they were well prepared for their graduate courses, accepted by colleagues (both faculty and fellow students), and undertook their studies in well-articulated and structured Ph.D. programs (Fisher et al., 2019). Taken together, these findings suggest that universities should devote time and effort to building the necessary infrastructure in culture and quality content, rather than creating new administrative positions.

2.1 Regulations and Bureaucracy Specific to Business Schools

Within the higher education context, regulations come at both university-wide and sub-unit levels such as that of a particular college. This section considers one of the most revenue-enhancing and usually largest units on a college campus: the college of business. Business schools face regulatory pressures from both external and internal bodies. Externally, most high-quality business schools seek accreditation and reaccreditation from one or multiple accrediting bodies that specialize in business schools including the AACSB (for both the entire business school, and sometimes also the accounting school), the European Foundation for Management Development's (EFMD) Quality Improvement System (EQUIS), and the Association of MBAs (AMBA). Although some universities pursue "triple crown accreditation" by all three entities, the leader is widely considered to be the AACSB, which has accredited 901 business schools in 58 countries (AACSB, 2021). In practice, many large business schools have at least half of a full-time employee (e.g., 20 hours per week full-time equivalent), usually, a staff member, who gathers and curates the required data, using a variety of published AACSB guidance, presently 55 and 67 pages, respectively, for the standards themselves and then the interpretations of these standards. This same employee might provide data for other reports such as the annual request for rankings such as *Businessweek*, *Entrepreneur/Princeton Review* (for entrepreneurship centers and programs), *Financial Times*, and the *Wall Street*

Table 2 Market-rate graduate programs in business schools: internal tax variance across Florida's State Universities

Tax paid to central administration	FAU	UCF	UF	FIU (some programs)	FIU (other programs)
On gross tuition	5.50%	11.00%	0.00%	0.00%	9.94%
On spending	14.19%	11.00%	13.21%	8.60%	8.60%
Cumulative rate	19.69%	22.00%	13.21%	8.60%	18.54%
Student fees	$68	n/a	n/a	n/a	n/a
Total tax rate w/fees	25.77%	22.00%	13.21%	8.60%	18.54%

Note: As of October 2021. Compiled from discussions with academic leaders at these institutions. FAU Florida Atlantic University; *UCF* University of Central Florida; *UF* University of Florida; *FIU* Florida International University

Journal. The AACSB standards almost always exceed university guidelines, for example mandating that a greater share of faculty qualify as "scholarly academic" by holding the highest degree (Ph.D. or in some cases J.D. or Ed.D.) in their respective fields, and publishing regularly in peer-reviewed journals. The AACSB's other categories are "practice academic," "scholarly practitioner," "instructional practitioner," and "additional faculty." Given the high number of rankings and the considerable attention directed at them, business schools must be most concerned with key ranking criteria such as graduates' employment, salaries, value for money, and aims achieved, as well as demographic considerations such as the ethnic, gender, and international diversity of the students and faculty.

Business schools also face serious regulatory pressure internally from their university, often in the form of internal taxes to central administration. For most universities, the business school is typically one of the most profitable business entities on campus. Leaders in well-run business schools can create and run *market-rate* programs for executive education and graduate education that generate substantial profit margins. Table 2 depicts the varying tax rates for the market-rate graduate programs at several business schools within Florida's state university system, from 8.6% to over 25%. The tax revenues are then deployed by the central university administration to fund underperforming or startup programs but can risk underfunding the high-performing program, particularly in competitive markets such as business education.

3 Reclaiming the Entrepreneurial University: Leading Anti-Bureaucracy Policies and Practices across Levels in Higher Education

There are many promising practices that reduce bureaucracies and reclaim entrepreneurial activities in the higher education system. This section provides examples at federal, state, university, school, business unit, staff, and scholar levels, which may inspire anti-bureaucracy, pro-innovation practices at other institutions.

3.1 Federal Level

In the United States, the Department of Education consistently tracks a variety of higher education indicators through the Institute of Education Sciences (IES). One particularly useful website for aspiring college students and their families is the College Affordability and Transparency Center (CATC) (2021), which provides a suite of tools including a College Navigator, College Scorecard, Net Price Calculator, and College Financing Plans. These resources provide instant comparisons across universities for tuition/fees, financial aid, net price, enrollment, admissions, retention and graduation rates, outcome measures, programs/majors, service members/veterans, accreditation, campus security and safety, cohort default rates, and varsity athletics. Figure 2 provides just one illustration of the many CATC tools: the highest costs for net tuition from four-year private and public not-for-profit institutions. The net price captures the tuition and required fees less grant and scholarship aid.

Private Not-for-Profit Higher Education Institutes in the United States (four years+)

Institution	City	State	Net Price	Students Receiving Grant Aid
California Institute of the Arts	Valencia	CA	$54,594	94%
Landmark College	Putney	VT	$54,548	100%
Ringling College of Art and Design	Sarasota	FL	$52,384	95%
The New School	New York	NY	$50,377	91%
School of the Art Institute of Chicago	Chicago	IL	$50,167	91%
Jewish Theological Seminary of America	New York	NY	$50,088	81%
Art Center College of Design	Pasadena	CA	$47,352	51%
San Francisco Art Institute	San Francisco	CA	$47,315	92%
Loyola Marymount University	Los Angeles	CA	$47,292	90%
New York School of Interior Design	New York	NY	$47,112	38%
The New England Conservatory of Music	Boston	MA	$46,620	94%
Emerson College	Boston	MA	$46,381	76%
U.S. National Average			**$22 458**	

Public Not-for-Profit Higher Education Institutes in the United States (four years+)

Institution	City	State	Net Price	Students Receiving Grant Aid
University of South Carolina-Columbia	Columbia	SC	$21,787	91%
University of Mary Washington	Fredericksburg	VA	$21,640	89%
Millersville University of Pennsylvania	Millersville	PA	$21,505	61%
Clemson University	Clemson	SC	$21,482	88%
California Polytechnic State University-San Luis Obispo	San Luis Obispo	CA	$21,232	51%
The University of Tennessee-Knoxville	Knoxville	TN	$21,024	84%
St. Mary's College of Maryland	St. Mary's City	MD	$20,996	93%
Virginia Commonwealth University	Richmond	VA	$20,968	68%
Indiana University of Pennsylvania-Main Campus	Indiana	PA	$20,944	70%
Georgia College & State University	Milledgeville	GA	$20,823	94%
Maine Maritime Academy	Castine	ME	$20,728	67%
U.S. National Average			$12,467	

Fig. 2 College cost affordability tool: highest net tuition four-year private and public not-for-profit. Source: https://collegecost.ed.gov/affordability (data accessed September 14, 2021)

3.2 State Level

At the U.S. state level, many governments are addressing fiscal challenges by consolidating state institutions' faculty, administration, and programs. The most recent example is the Pennsylvania State System of Higher Education (PASSHE) merging of six of the state's 14 public universities into two entities: California, Clarion, and Edinboro united in the western, and Bloomsburg, Lock Haven and Mansfield together in the eastern part of the state (PASSHE, 2021). State-based public university consolidations, including the Pennsylvania proposal, are usually very unpopular with faculty and staff, and some other stakeholders (Whitford, 2021). PASSHE (2021, p. 1) expects tremendous benefits including, "Expand program breadth while maintaining essential residential character at each campus; Capitalize on existing strengths at all institutions; achieve more together than any one of them could do alone; Invest in new areas to serve new students who need our help, growing enrollment, driving regional economic development; Re-tool and strengthen supports for all students; and Reduce administrative costs investing savings in student success" as well as taxpayer cost savings of at least $18.4 million in 5 years. The recent success of the University of South Florida's consolidation of the main Tampa campus together with the St. Petersburg and Sarasota-Manatee campuses demonstrates the ability to continue to provide a world-class education even through consolidation. Research by Slade et al. (2021), following the 5 years since consolidation in the University System of Georgia, suggests that these efforts must proactively consider strategies to maintain research productivity.

3.3 University Level

Several universities have undertaken university-level activities to develop entrepreneurial practices. Within the United States, Arizona State University is widely regarded as a model for other universities. Arizona State President Michael Crow and co-authors Kyle Whitman and Derrick Anderson (2020, p. 511) describe the "academic enterprise" as "inherently entrepreneurial in terms of the management of the university and its reliance on faculty and student entrepreneurship as a tool for broad-scale social and economic transformation." Crow et al. (2020) outlined a set of "dominant and emerging institutional logics" in higher education, from *the Academy,* to *Academic Bureaucracy, to the Market, to the Academic Enterprise.* They outline how Arizona State University's success as an "academic enterprise" is due to a complete transformation into highly entrepreneurial entities, including a very conscious effort to limit bureaucracy (Crow et al., 2020). Crow et al. (2020) discuss various forms of university actors and university governance, highlighting their difference in purpose, path to achieving public value, accountability mechanisms, and related assumptions of faculty and management. Specifically, they distinguish between the following:

- *The classic Academy*: With its overall purpose being *Enlightenment of individual students through immersive instruction*, the Academy is run by self-governing professionals whereby management is drawn from and blended with faculty.
- *The Academic Bureaucracy*: With its overall purpose being *Organizational preservation*, the Academic Bureaucracy seeks to achieve state-specified goals by appointing bureaucrats responding to rules. The Academic Bureaucracy is run by public managers (distinct from faculty) and largely governed by audits, public reporting, and standardized testing.
- *The Market*: Market actors in higher education are *driven by profit for owners and shareholders*. Governing mechanisms are characterized by efficiency and cost reduction executed by professional management (distinct from teaching faculty).
- *The Academic Enterprise*: This is an emerging hybrid form that may be public- or privately owned, *aiming at social transformation by connecting instruction to knowledge-generation and social impact*. The Academic Enterprise is managed by so-called knowledge entrepreneurs with management drawn from and blended with faculty, but acting entrepreneurially and seeks to demonstrate economic and social progress.

One example of academic enterprise is North Dakota State University's Challey Institute for Global Innovation and Growth. In just 6 months and with a generous $30 million in support led by alumni Sheila and Robert Challey, College of Business Dean Scott Beaulier created and implemented a vision for a business-school–based center that enhances economic opportunity and human flourishing. The new center leverages the interdisciplinary expertise of university faculty, including fellows from computer science, public health, construction management, and engineering, as well as business to research areas of innovation, trade, and institutions to identify policies and solutions to better society.

A further example of academic enterprise is that the U.S. universities that spawn the most new companies combine strong research and teaching, and do not necessarily build large structures around these entities (see Rothaermel et al., 2007, for a systematic review of university entrepreneurship, and Fini et al., 2020 for a review of university regulations that foster science-based entrepreneurship). This view is consistent with an emerging literature on value creation spotlighting the importance of knowledge-building proficiency (Madden, 2020). That is, a priority for the design and implementation of university research structures is to enable the development of knowledge and innovation.

3.4 Business School Level

Many business schools employ *base plus bonus* models to reflect faculty, and in some cases also staff, efforts. A typical model is a base salary, and then an additional annual stipend to hold a chair or fellowship position, which the faculty can apply for periodically based on solid performance. Another example from a private, globally

ranked business school in Europe is that faculty receive a base salary and then a bonus at the end of the year based on the quality of their teaching and other efforts. In contrast to other business school models, this bonus can exceed the base, thereby incentivizing faculty to teach the greatest share of classes at the highest quality, as teaching evaluations are used to calculate the bonus. Many other European, American, Australian, and Asian business schools provide bonus pay for faculty who publish in the highest tier of academic journals, typically between $2000 and $15,000 per article, but sometimes scaled to reflect co-authorship (e.g., if co-authors are at the same institution, the funding is split). As a general rule, faculty who are presently high-performing and plan to stay active in the future are more likely to accept innovative compensation models that place excess revenues in a *pool* such that the business school retains profits from some activities, which are then reallocated based on recent performance.

3.5 Business Unit Level

Business schools and other entities can also develop entrepreneurial policies at the business unit level. One example with six subsequent years of data is a memorandum of understanding (MOU) to establish online programs that resulted in nationally ranked programs and a strong revenue pipeline. In March 2014, Florida Atlantic University's (then) Provost Gary Perry, (then) CFO Dorothy Russell, and Dean of the College of Business Daniel Gropper signed a memorandum of understanding (MOU) that provided for the College of Business (COB) to develop a self-sustaining Online Bachelor's in Business Administration (OBBA) that would result in a 38.3% portion of total tuition and fees paid by students in the online BBA classes. The university did not provide any faculty lines or other resources from central administration to grow this online program, and the College of Business paid for online delivery technology, equipment, and personnel for tech support, as well as registration, advising, and other necessary support for students taking online business classes. At the time, the OBBA tuition was $261.29 per credit hour, including an e-learning fee of $60. The MOU specified that the COB would receive $100 per credit hour ($77 from tuition, and $23 of the $60 e-learning fee), and thus 38.3% of revenues, and providing 61.7% of revenue—equivalent to $161.29/credit hour—to the university. Since the OBBA MOU, the OBBA has grown into a self-sustaining program that has allowed the College of Business to be entrepreneurial and responsive. For example, FAU President John Kelly asked the colleges to offer classes over winter holidays, and the COB immediately offered multiple OBBA classes for this "intersession." The OBBA revenues allowed the COB to establish the Center for eLearning (CEL), which became the Center for Online and Continuing Education (CoCE), providing $549,000 in 2015–2016 and over $1 million in 2019–2020. In the most recent 2019–2020 academic year, OBBA generated over $7.6 million for FAU, of which $3 million went to the College of Business. The OBBA program also

achieved Florida Atlantic University's highest ranking in the *U.S. News and World Report* at #27 in the nation for online undergraduate business education.

3.6 Individual Level

Faculty and staff can undertake individual-level efforts to reduce bureaucracy. When Professor Robby George served as a tenured chair of political science at Princeton, he established two centers through which to implement his work: one on-campus James Madison Center, and the other off campus. As another example, individual scholars from several universities who choose to apply for government, private, and other grants can select which university is the *host* for the grant (and therefore conducts the majority of the administration and receives the largest share of these fees), and then the remaining institutions receive *sub-contracts*. Faculty can also choose how to direct external funding of gifts and grants to support research and teaching activities, commonly choosing between the foundation office (which typically comes with low administrative hurdles) and the office of sponsored programs (typically more paperwork, but may be preferred for signaling purposes). Universities' Carnegie research status variables include the HERD (Higher Education Research & Development) survey of research expenditures which can include both the office of sponsored programs and foundation funding. Professional staff members at universities can be empowered to play a key role in reducing bureaucracy and increasing ease of navigation for students. At Rice University's Jones Graduate School of Business, Executive Director Adam Herman relies on strategic management practices to lead the 20-member Academic Programs and Student Experience team. On the importance of considering input from team members, Herman (2014, p. 497) wrote, "[O]pen communication between all levels of the organization can lead to key information holders sharing important information." Student-facing team members, and process owners, first need to be empowered to share information, and to feel that it will be thoughtfully received, valued, and utilized.

3.7 Non-University Level

There are also many efforts among non-university entities such as think tanks and advisory organizations. One example is the independent, non-profit American Council of Trustees and Alumni's (ACTA, 2021) database, How Colleges Spend Money, which allows stakeholders to access the aforementioned federal IES data. ACTA then calculates ratios of administrative bloat and outcomes including administrative cost per student, instructional cost per student, administrative/instructional cost ratio, inflation-adjusted tuition, tuition as a percentage of state median household income, and graduate rates for students pursuing bachelor's degrees.

4 Toward Best Practices in Higher Education

There are many solutions to radically de-bureaucratize higher education. Faculty and staff can aspire to work in post-bureaucratic higher education institutions characterized by best practices including compensation tied to pay and profitability; support services offered to operating units at cost (or are optional); a culture of competition, collaboration, and mutual responsibility; aversion to formal titles and job descriptions; significant and ongoing investment in front-line employee skills; high levels of transparency; multiple channels for lateral communication; and radically simplified planning and budgeting.

4.1 Calculate Bureaucratic Mass

As Thomas Paine (1776) wrote in *Common Sense*, "A long habit of not thinking a thing wrong gives it a superficial appearance of being right." The first battle against indifference involves challenging accepted but cumbersome internal bureaucratic practices by gathering data—often a catalyst as bureaucrats focus on activities that can be measured. An emerging literature explores bureaucracies in for-profit organizations (e.g., Hamel & Zanini, 2020) with an increased focus on public administration (e.g., Battaglio Jr et al., 2019), but thus far limited attention to higher education. Recently, management scholars Hamel and Zanini (2020) proposed a "Bureaucracy Mass Index" (BMI) by which to measure the bureaucratic nature of organizations' *overhead, friction, insularity, disempowerment, conservatism,* and *mistrust*, with suggested ways to measure these systematically across organizations:

- *Overhead*: Number of management layers, Average span of control, Management compensation as a percentage of total compensation.
- *Friction*: Percentage of time non-managerial employees spend on internal compliance, Number of functional staff as a percentage of total headcount, Average review time for budget requests.
- *Insularity*: Percentage of total headcount that is not directly customer-facing, Percentage of time that managers devote to internal versus external matters, Cultural and professional homogeneity of the senior leadership team.
- *Disempowerment*: Percentage of employee time that is not self-directed, Average size of units with direct P & L responsibility, Percentage of employees who feel that they have little or no influence over key operational decisions (e.g., staffing, pricing, compensation).
- *Conservatism*: Extent of perceived disincentives to personal risk-taking, Percentage of spending devoted to projects that are incremental rather than innovative, Percentage of time functional staff spend on ensuring compliance versus supporting innovation and growth.
- *Mistrust*: Percentage of employees who do not have access to detailed financial performance for their unit and others, Degree to which compensation decisions

are opaque rather than transparent, Percentage of employees who do not have the opportunity to weigh in on key policy decisions.

Traditional for-profit organizations' BMIs range from 20 to 100 based on 20 questions, where 60 represents a moderate level of bureaucratic drag, and less than 40 represents an absence of bureaucracy. Hamel and Zanini (2020) report that less than 1% of traditional organizations have a BMI under 40, and that BMI strongly correlates with organization size such that 5000 or more employees tends to result in BMIs at around 75. BMIs for the large U.S. public universities seem to fall in the range of 75 or higher, particularly when considering the most hierarchical divisions, which suggests that the BMI could be a tool for measuring and reducing university bureaucracy.

4.2 Calculate the Time Burden for Stakeholders

Most university faculty and staff face significant paperwork burdens, often led by good intentions. One helpful tip here comes from the U.S. federal government's 1980 Paperwork Reduction Act, designed to reduce the paperwork burden on private business and citizens, by requiring that the Office of Management and Budget (OMB) preapprove any information-collection burden on the general public such as a paper form, website, survey, or electronic submission. The OMB then considers the amount of time (in minutes and hours) it takes to submit this paperwork. For example, the U.S. Government's student aid website (Federal Student Aid, 2021: https://studentaid.gov/help/collecting-info) notes the average time burden for the over 100 questions Free Application for Federal Student Aid (FAFSA) is an "average 50 to 55 min for applicants who use *FAFSA on the Web* to complete and submit the application, an average of 40 to 45 min for an applicant who has previously used *FAFSA on the Web* and completes a renewal FAFSA, and an average of 5–10 min to make FAFSA corrections." This logic could be applied to other processes such that university administrators could streamline operations by considering the burden for stakeholders. For example, if an internal university process requires that every faculty member's teaching be directly observed and documented by another department faculty member annually, and includes the planning, observing, documenting, and related administrative meetings, this action easily results in at least 20 additional hours of work per faculty member per year.

4.3 Implement Technology Solutions

There is a range of off-the-shelf and customized technologies that can streamline processes for universities. Some software can be deployed for multiple purposes; for example, Arizona State University deploys Salesforce across its four campuses,

online learning, and global entities to manage the end-to-end student experience from recruitment through advancement and corporate relationships (Salesforce, 2021). Universities such as MIT use blockchain technology to issue recipient-owned digital credentials (Durant & Trachy, 2017). Andersson et al.'s (2021) study of the entire population of Swedish university administrators reveals that administrative roles that can be automated then lead to a decline in the share of employees in these profession codes, and also in a corresponding decline in the share of wages over the 2001–2013 time period. As the number of administrators grew during this time period, Andersson et al.'s (2021) findings suggest that technological change helped universities to redistribute resources from automatable roles to higher-value work for administrators. One important feature is that technology should be able to talk to other systems, such that an individual does not have to use two different systems to complete the same activity. An illustration is the large suite of available research proposal software to universities: Some software is fully integrated and a researcher can enter detailed information for a grant proposal and submit automatically to a government or another grant-maker, while other software is only internal to a particular university, and does not interface with other programs, and thus the researcher must complete the paperwork twice to apply for the same grant.

Technical solutions can also involve automatic notifications for faculty and staff. One caution here is the potential for "robotic bureaucracy" defined as "automated systems generated by organizations, often lacking a human name as a sender, with the objective of streamlining work, reducing the administrative burden on employees or clients or customers, reducing the number of administrative employees required, and sometimes, saving money by shifting burden away from organizations to clients and customers" (Bozeman & Youtie, 2020, p. 158). Originally developed for online medical records and commercial airline check-in, robotic bureaucracy in a university consists broadly of meeting federal research regulatory guidelines. As noted by Bozeman and Gaughan (2011), university scientists spend twice as much time on grant proposals and research administration as on student-related activities such as teaching and advising, and an important solution is staff support and the standardization of automation across universities. Faculty can also employ solutions that support their own rubrics. For example, if a faculty member recognizes emails sent from certain members of an entity on campus, the faculty can use a mail filter to automatically direct those emails into a folder and then address those issues in bulk, rather than as the emails arrive, resulting frequently in one-off interruptions to the flow of one's work. Certainly, no technology solutions will solve all issues. As Nobel Laureate Robert Solow (1987) noted as a productivity paradox, "We see computers everywhere except in the productivity statistics."

There are a range of new technology solutions that address specific issues and create efficiencies in the system. Students' time to graduation is a key performance measure and is improved by placing students in classes that garner credits toward graduation. One of the greatest inefficiencies in higher education is that many universities use placement exams that lack validity and reliability, in order to determine which classes students should take. An unfortunate consequence of

these substandard screening tests is that many students, particularly those from underrepresented groups, are unnecessarily placed in remedial courses (Scott-Clayton et al., 2014). Bergman et al. (2021) developed a placement algorithm using predictive analytics to combine multiple measures and demographics into a placement instrument, which was tested on 12,544 students in seven community colleges. This new technological innovation led to substantially better placement rates, resulting in reduced costs for students while increasing college credits earned, and reducing costs for colleges.

4.4 Lead Change Management Efforts across all Levels

Change requires extensive communication and is unlikely to come from within. As noted by Hamel and Zanini (2016, p. 9), "those who've excelled at the game of bureaucracy are typically unenthusiastic about changing it. Someone who's invested 30 years in acquiring the powers and privileges of executive vice-president is unlikely to look favorably on a proposal to downgrade formal titles and abolish the connection between rank and compensation." Leaders will need to share credible examples of how other higher education institutions achieved the goals of bureaucracy (control, coordination, and consistency) while avoiding costs. One suggestion is that any meeting in which administrators or others propose new rules then provide for how these can be crafted without additional bureaucracy, and ideally while reducing current burdens. Another suggestion is that individuals who are directly impacted by the bureaucracy are actively consulted, and also requested to provide insights from the *coal face* around streamlining operations.

4.5 Make Better Decisions

Organizations, including higher education institutions, can be seen as "networks of decisions," and thus decision-making should be structured such that individuals can attain the highest possible goals for their organizations (Shrestha et al., 2019). In general, best practices in decision-making in traditional organizations translate to the higher education industry. For example, decisions should be made for the good of the organizations and its members, and not to help managers save their reputations from damage. As in traditional organizations, when a new leader joins an academic institution, there is often a tendency to implement decisions (e.g., reorganization) to demonstrate ideas rather than because the department will be more efficient or effective after the reorganization. Best practices from decision research frequently indicate that it is best to pass the decision to someone else who may be more appropriate, or even more commonly, to involve others in the decision. Lessons from corporate change management apply: Individuals will spend more time and effort on implementing a strategy that they had a role in creating. Decision-making

through consensus is key when quality is far more important than time spent. Consensus is distinct from consulting others; and when only consulting, an individual should communicate that purpose, such as by saying, "Hi Colleague, I am trying to decide whether to move this administrative task from Office A to Office B. As I make my decision, I'm asking any key players, like you, what the effect might be from your perspective" (Dittmer & McFarland, 2007, p. 28). Another take-away from top-performing organizations is to enable decision-making at the lowest level possible, such that front-line employees can spot problems and opportunities, and work toward solving them. Other critical advice is to avoid wasting time and energy thinking about simple decisions, and especially to limit time spent battling over small decisions in group decision-making. Good decision-makers tend to begin with the end in mind and picture future success.

4.6 Reduce Bureaucracy by Staying Close to Customers and Pursuing Open Innovation

Some organizations pioneer a number of promising practices that reduce bureaucracies and create higher-performing organizations and employees. Although revolutionary for many universities, many corporate practices spotlighted in *Humanocracy* (Hamel & Zanini, 2020) may be particularly promising in academic environments. One recommendation is to keep all employees close to customers in some way, as employees who are not close to customers end up insulated from market forces, and often become mediocre, inflexible, and inefficient. Within a university, this principle would require all administrators to have some customer-facing activity. One illustration here is that many college deans and even university presidents still teach a university course, and therefore stay close to their final customers so they are acutely aware of issues at the coal face. Another example is administrators who can mentor students. Other practical solutions identified from high-performing corporations such as steelmaker Nucor and appliance-maker Haier include developing targets based on the environment, not on the last year's performance. In high-performing anti-bureaucracy corporations, units within and across the firm are encouraged to pursue open innovation possibilities, internally and externally. For market-facing business units such as executive education, the world's top-ranked schools provide performance bonuses on a team basis and allow re-investment into the pool. Universities can also follow top-performing corporations by creating opportunities for social collaboration across the entire organization, and with customers, and by setting some standards but providing scope for creative solutions. A final suggestion is to reduce or eliminate internal offices that must be used for some processes, and instead allow a bidding process involving multiple units.

5 Conclusion and Future Research Directions

This chapter identifies some underlying causes of the growing bureaucratization in higher education and offers a range of solutions at individual, business unit, university, and other levels. Although higher education bureaucracy is most often identified by academics, researchers, and policymakers, a growing share of the public is becoming aware of the phenomenon, thanks in part to the new Netflix show *The Chair*, which follows a new academic chair for an English department facing the often bureaucratic demands inside her department, school, and university. The Twitter account Associate Deans (2021) has also noted a tendency for bureaucracy, with near daily tweets such as: "From my annual review: 'an almost savant-like aptitude for bureaucratic administration!' Finally, they are noticing my skill set!"

Many possibilities, such as calculating the present bureaucratic mass and administrative burdens of proposed changes, implementing technology solutions, leading change management, and employing best practices in decision-making, can be implemented and studied. There is incredible potential to research promising practices to reduce higher education bureaucracy and reclaim the entrepreneurial university. These future research directions can be categorized by theoretical, methodological, and phenomenological contributions.

Future enquiry can test existing management theories within the higher education context. For example, upper echelons theory (Hambrick & Mason, 1984) suggests that managers' background characteristics can lead to organizational outcomes in the form of strategic choices and performance. This theory could be tested, for example, to determine whether new university presidents with a background in leading businesses or business schools are able to improve their universities' financial performance, and whether new university trustees with particular expertise are able to help their universities expand on these capabilities. The attention-based view (ABV) (Ocasio, 1997) could be extended to higher education contexts to explore how decision-makers' concentration of time and effort results in certain organizational outcomes. This could examine university leaders who focus on particular metrics for development into distinct strategies that create value.

From a methodological standpoint, researchers can utilize an "action research" (McNiff, 2013) approach to simultaneously seek to research and transform their organizations. For example, researchers can create new programs in a skunkworks-like structure apart from the university bureaucracy, and directly test hypotheses about how to create knowledge and value through this new component. Future enquiry can utilize a variety of both quantitative and quantitative methodologies. Empirical researchers will be drawn to existing databases, particularly at federal and local levels, but also maintained by individual universities and colleges for internal and external reporting purposes. Qualitative methodologies such as case studies and ethnographies offer a unique opportunity to probe certain phenomena.

There are many new phenomena in higher education that merit future enquiry. I highlight future research directions for three key trends: long-term economic recession, new third-party players in the higher education industry, and corporate entries.

First, researchers could explore the effect of economic recessions on higher education outcomes. An economic recession typically leads organizations to pursue greater efficiency, often taking the form of cost-cutting and de-bureaucratization. For example, the 2008–2009 recession led to reduced bureaucracies in traditional organizations such as corporations (Hamel & Zanini, 2020), as well as to cost-cutting and redundancies in higher education (Friga, 2020). The most recent global economic slowdown resulted from lockdown policies regarding Covid-19 (Robinson et al., 2021). However, at least in the United States, the 2020 Coronavirus Aid, Relief, and Economic Security Act (CARES) Act and subsequent supplements provided $2.59 trillion in government relief (DataLab, 2021), including over $14 billion for higher education. The loss of only 650,000 higher education positions during the Covid-19 pandemic (Bauman, 2021) suggests that the extensive CARES funding limited the actual effect of the severe economic recession, and inevitably stalled many higher education institutions from further layoffs and permanent closures. Future research can explore universities' financial management during the COVID-19 era.

A second key trend is the entry of third parties into the university market. In the online graduate business education market, there are roughly three models that explore the classic make, buy, or ally decisions that traditional companies face when seeking growth in new markets. For business schools, the *make* choice involves the organic development of internally building activities which range from recruitment through the development of curriculum and pedagogy. Two examples of in-house development of highly ranked graduate and executive programs in business are Indiana University's Kelley School of Business and Florida Atlantic University's College of Business. The *buy* option is rarely used, but one example is the Shanghai-based China Europe International Business School's (CEIBS) purchase of the Lorange Institute of Business in Zurich to build a European footprint (Murray, 2019). The most common path is an alliance, whereby an external party conducts the majority of the marketing and other administrative activities and takes a share of the revenues, which typically range from 33–66% of gross tuition, as at American University's Kogod School of Business (with a 66% revenue share with 2 U) and at the University of Maryland's Smith School of Business (with a roughly 50% revenue share with Pearson, although select services can be bundled or unbundled). A promising line of future research explores the long-term sustainability of these third-party–run programs, and their effect on the universities' other offerings, as well as the overall market for graduate education.

Another important phenomenon is third-party actors which can contract with higher education institutions, but also develop their own non-university solutions. Corporations have noticed rapidly expanding academic costs and bureaucracy, and many have responded with their own education solutions. For example, Google publicly eschews university credentials when hiring new staff, and recently created its own education certifications (Dishman, 2020). This line of research could examine the effectiveness of third-party entries and universities' responses.

References

AACSB. (2021). *Accreditation*. https://www.aacsb.edu/accreditation/accredited-schools

ACTA. (2021). *How colleges spend money*. https://www.howcollegesspendmoney.com/

Andersson, F.W., Jordahl, H., & Karna, A. (2021, 7 June). Ballooning bureaucracy: Understanding internal administration growth within organizations. Working paper.

Andrews, R., Boyne, G., & Mostafa, A. M. S. (2017). When bureaucracy matters for organizational performance: Exploring the benefits of administrative intensity in big and complex organizations. *Public Administration, 95*(1), 115–139.

Associate Deans. (2021). https://twitter.com/ass_deans https://twitter.com/ass_deans/status/1439215965171077122?s=20

Bailey, J. B., & Thomas, D. W. (2017). Regulating away competition: The effect of regulation on entrepreneurship and employment. *Journal of Regulatory Economics, 52*(3), 237–254.

Battaglio, R. P., Jr., Belardinelli, P., Bellé, N., & Cantarelli, P. (2019). Behavioral public administration ad fontes: A synthesis of research on bounded rationality, cognitive biases, and nudging in public organizations. *Public Administration Review, 79*(3), 304–320.

Bauman, D. (2021, February 5). A brutal tally: Higher ed lost 650,000 jobs last year. *The Chronicle of Higher Education*. https://www.chronicle.com/article/a-brutal-tally-higher-ed-lost-650-000-jobs-last-year

Beech, B. M., Calles-Escandon, J., Hairston, K. G., Langdon, M. S. E., Latham-Sadler, B. A., & Bell, R. A. (2013). Mentoring programs for underrepresented minority faculty in academic medical centers: A systematic review of the literature. *Academic Medicine: Journal of the Association of American Medical Colleges, 88*(4), 541–549.

Bergman, P., Kopko, E., & Rodriguez, J.E. (2021). Using predictive analytics to track students: Evidence from a seven-college experiment. *National Bureau of Economic Research. Working paper 28948*.

Bozeman, B., & Gaughan, M. (2011). How do men and women differ in research collaborations? An analysis of the collaborative motives and strategies of academic researchers. *Research Policy, 40*(10), 1393–1402.

Bozeman, B., & Youtie, J. (2020). Robotic bureaucracy: Administrative burden and red tape in university research. *Public Administration Review, 80*(1), 157–162.

Bradley, S.W., Garven, J.R., Law, W.W., & West, J.E. (2018). The impact of chief diversity officers on diverse faculty hiring. *National Bureau of Economic Research Working Paper 24969.*

College Affordability and Transparency Center. (2021). *U.S. Department of Education: Institute for Education Sciences*. https://collegecost.ed.gov/

Crow, M. M., Whitman, K., & Anderson, D. M. (2020). Rethinking academic entrepreneurship: University governance and the emergence of the academic enterprise. *Public Administration Review, 80*(3), 511–515.

DataLab. (2021). *Federal Covid spending*. https://datalab.usaspending.gov/federal-covid-funding/

Dishman, L. (2020, July 13). No college degree required: Google expands certificate program for in-demand job skills. *Fast Company*. https://www.fastcompany.com/90527332/no-college-degree-required-google-expands-certificate-program-for-in-demand-job-skills

Dittmer, R. E., & McFarland, S. (2007). *151 quick ideas for delegating and decision making*. Career Oress.

Durant, E., & Trachy, A. (2017). Digital diploma debuts at MIT. *MIT News*. https://news.mit.edu/2017/mit-debuts-secure-digital-diploma-using-bitcoin-blockchain-technology-1017

Federal Student Aid. (2021). *U.S. Government*. https://studentaid.gov/help/collecting-info

Fini, R., Grimaldi, R., & Meoli, A. (2020). The effectiveness of university regulations to foster science-based entrepreneurship. *Research Policy, 49*(10), 1040–1048.

Fisher, A. J., Mendoza-Denton, R., Patt, C., Young, I., Eppig, A., Garrell, R. L., Rees, D. C., Nelson, T. W., & Richards, M. A. (2019). Structure and belonging: Pathways to success for underrepresented minority and women PhD students in STEM fields. *PLoS One, 14*(1), e0209279.

Florida Board of Governors. (2021, March 15). *Florida remains #1 in U.S. News and World Report rankings*. https://www.flbog.edu/2021/03/15/florida-remains-1-in-u-s-news-and-world-report-rankings-for-higher-education/

Friga, P. N. (2020, May 24). The great recession was bad for higher education. Coronavirus could be worse. *The Chronicle of Higher Education*.

Ginsberg, B. (2011). *The fall of the faculty: The rise of the all-administrative university and why it matters*. Oxford University Press.

Graeber, D. (2015). The utopia of rules: On technology, stupidity, and the secret joys of bureaucracy. .

Grant, A. M., & Sumanth, J. J. (2009). Mission possible? The performance of prosocially motivated employees depends on manager trustworthiness. *Journal of Applied Psychology, 94*(4), 927–944.

Hall, J. C. (2019). Accreditation: Market regulation or government regulation revisited? In T. J. Zywicki & N. P. McCluskey (Eds.), *Unprofitable schooling: Examining the causes of, and fixes for, America's broken ivory tower* (pp. 65–83). Cato Institute.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9*(2), 193–206.

Hamel, G., & Zanini, M. (2020). *Humanocracy: Creating organizations as amazing as the people inside them*. Harvard Business Press.

Hamel, G., & Zanini, M. (2016, September 5). Excess management is costing the US $3 trillion per year. *Harvard Business Review*.

Herman, A. J. (2014). Strategic thinking enrollment organizations. In D. Hossler & R. Bontrager (Eds.), *The handbook of strategic enrollment management*. Jossey-Bass.

Jung, C. S. (2013). Navigating a rough terrain of public management: Examining the relationship between organizational size and effectiveness. *Journal of Public Administration Research and Theory, 23*(3), 663–686.

Kallio, K. M., Kallio, T. J., Tienari, J., & Hyvönen, T. (2016). Ethos at stake: Performance management and academic work in universities. *Human Relations, 69*(3), 685–709.

Kelchen, R. (2018). *Higher education accountability*. Johns Hopkins University Press.

Maassen, P., & Stensaker, B. (2019). From organised anarchy to de-coupled bureaucracy: The transformation of university organisation. *Higher Education Quarterly, 73*(4), 456–468.

Madden, B. J. (2020). *Value creation principles: The pragmatic theory of the firm begins with purpose and ends with sustainable capitalism*. John Wiley & Sons.

Mazzucato, M. (2014). *The entrepreneurial state*. Anthem Press.

McNeely, B. L., & Meglino, B. M. (1994). The role of dispositional and situational antecedents in prosocial organizational behavior: An examination of the intended beneficiaries of prosocial behavior. *Journal of Applied Psychology, 79*(6), 836–844.

McNiff, J. (2013). *Action research: Principles and practice*. Routledge.

Murray, S. (2019, December 8). East meets west: China's business schools look to Europe. *Financial Times*. https://www.ft.com/content/a50a87b8-0c7c-11ea-8fb7-8fcec0c3b0f9

Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal, 18*(S1), 187–206.

Paine, T. (1776). *Common Sense.*

PASSHE (Pennsylvania's State System of Higher Education). (2021). System Redesign. https://www.passhe.edu/SystemRedesign/Pages/redesign.aspx

Perry, M. (2021). Price changes 2000 to 2021. *American Enterprise Institute*. https://www.aei.org/carpe-diem/chart-of-the-day-or-century-6/

Robinson, S., Levy, S., Hernández, V., Davies, R., Gabriel, S., Arndt, C., van Seventer, D., & Pleitez, M. (2021). *Covid-19 and lockdown policies: A structural simulation model of a bottom-up recession in four countries* (Vol. 2015). International Food Policy Research Institute.

Rothaermel, F. T., Agung, S. D., & Jiang, L. (2007). University entrepreneurship: A taxonomy of the literature. *Industrial and Corporate Change, 16*(4), 691–791.

Salesforce. (2021). *ASU drives innovation across campus with Salesforce*. https://www.salesforce.org/stories/arizona-state-university/

Scott-Clayton, J., Crosta, P. M., & Belfield, C. R. (2014). Improving the targeting of treatment: Evidence from college remediation. *Educational Evaluation and Policy Analysis, 36*(3), 371–393.

Shrestha, Y. R., Ben-Menahem, S. M., & Von Krogh, G. (2019). Organizational decision-making structures in the age of artificial intelligence. *California Management Review, 61*(4), 66–83.

Slade, C.P., Ribando, S., Fortner, C.K., & Walker, K.V. (2021). Mergers in higher education: it's not easy. Merger of two disparate institutions and the impact on faculty research productivity. *Studies in Higher Education*, pp. 1–12. https://doi.org/10.1080/03075079.2020.1870948.

Solow, R. M. (1987). We'd better watch out. *New York Times Book Review, 36*.

Whitford, E. (2021, April 27). Pennsylvania's plans to consolidate state universities. *Inside Higher Education*. https://www.insidehighered.com/news/2021/04/27/pennsylvania-higher-ed-system-releases-consolidation-plans

Zywicki, T. J., & Koopman, C. (2019). The changing of the guard: The political economy of administrative bloat in higher education. In T. J. Zywicki & N. P. McCluskey (Eds.), *Unprofitable schooling: Examining causes of, and fixes for, America's broken ivory tower*. Cato Institute.

Cultural Ideals in the Entrepreneurship Industry

Anna Brattström

Abstract As public and private organizations are spending resources fostering entrepreneurship, an industry around entrepreneurship has emerged. Using the entrepreneurship industry in Sweden as a case and example, this chapter provides an explorative analysis of the emergence, manifestations, and consequences of *cultural ideals* within this industry. The analysis reveals how the entrepreneurship industry is not only a producer of goods and services for opportunity discovery and development; but also a producer of entrepreneurship culture. Moreover, it reveals how the production and consumption of entrepreneurship culture can lead to problems of inefficiency and discrimination, problems which ultimately hamper the entrepreneurial output that the industry is supposed to produce.

Keywords Entrepreneurship culture · Entrepreneurship industry · Cultural ideals · Wantrepreneurs · Lifestyle entrepreneurship

1 Introduction

In research literature and the popular press, entrepreneurship is portrayed as a solution to the grand challenges of our time (Brattström & Wennberg, 2021). It is not surprising that governments and private organizations across the world are spending significant resources on promoting entrepreneurship. Paradoxically, this has led to an explosion in entrepreneurial activities—but not corresponded to an explosion in entrepreneurial outcomes. At the level of society, the number of new innovative firms has been in steady decline in both Europe and North America (Decker et al., 2016; Heyman et al., 2019) and innovation in the overall economy is stagnant (Bloom et al., 2020). At the organizational level, most new firms started—

A. Brattström (✉)
Lund University, School of Economics and Management, Lund, Sweden

Stockholm School of Economics, House of Innovation, Stockholm, Sweden
e-mail: anna.brattstrom@fek.lu.se

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_8

even in knowledge-intensive sectors—generate limited economic outcomes (Nightingale & Coad, 2014). At the individual level, working for new firms is a risky job that generally pays less than working for more established firms (Burton et al., 2018; Styhre, 2018).

Instead of generating entrepreneurial outcomes, many initiatives contribute to building an *entrepreneurship industry*—"goods and services explicitly intended for opportunity discovery and development by current and prospective entrepreneurs" (Hunt & Kiefer, 2017, p. 231). Recognizing the gap between the growth of an entrepreneurship industry and the lack of tangible outcomes that result from it, scholars have offered rich insights into the functional reasons for why support initiatives often fail to produce outcomes (e.g., Amezcua et al., 2013; Karlson et al., 2021; Malerba & McKelvey, 2020; Sandström et al., 2018). As a consequence, we know a lot about how financial support, networking support, as well as tools and methods, more or less efficiently support aspiring entrepreneurs. These functional analyses are important for understanding how to generate more entrepreneurial outcomes. They do not explain, however, why we currently witness such an explosion in entrepreneurial activities (Hartmann et al., 2020).

For example, functional reasons cannot explain why—on an average day in an average European urban hotspot—the number of entrepreneurial networking events, breakfast seminars, or virtual workshops can offer more support than any entrepreneur could acquire with full-time employment. They do not explain why corporations are swapping their sterile office environments and strict office dress codes in favor of more entrepreneurial attributes, such as bean bags, colorful post-it notes, and jeans-and-sneakers attire. Nor do they tell us why Helsingborgs Stad—a municipality in southern Sweden—has hired both a Head of Future; a Storyteller; and a Strategic Influencer (Påverkansstrateg), all with salary levels considerably higher than an average high school teacher in Sweden.

The present chapter posits that to understand these phenomena, all representing an increase in entrepreneurial activities but not necessarily outcomes, it is useful to address the entrepreneurship industry from a cultural perspective. I position entrepreneurship as a *cultural ideal*—a social institution to which everyone is supposed to adhere (Brandl & Bullinger, 2009; Hwang & Powell, 2005). Using the entrepreneurship industry in Sweden as a case and example, I seek to understand current ideals around entrepreneurship within the industry and how these ideals are shaping actors and their activities. My approach is explorative and inductive, based on interviews with actors in Sweden's entrepreneurship industry. The analysis reveals how this industry is not only a producer of goods and services for opportunity discovery and development; but also, a producer of entrepreneurship culture. Moreover, it reveals how the production and consumption of entrepreneurship culture can lead to problems of inefficiency and discrimination, problems which ultimately hamper the entrepreneurial output that the industry is supposed to produce.

2 Theoretical Background

2.1 The Entrepreneurship Industry from a Cultural Perspective

The entrepreneurship industry is "the goods and services explicitly intended for opportunity discovery and development by current and prospective entrepreneurs... Its raison d'être ... is to promote the belief that individuals who are motivated to develop opportunities through entrepreneurial action have the potential to harvest lucrative outcomes" (Hunt & Kiefer, 2017, p. 233). As implied by this definition, the entrepreneurship industry does not only encompass entrepreneurs, i.e., individuals engaged in the creation of new ventures; but also many other actors. This includes public and private incubators; accelerators; investors; matchmakers; policymakers; educators; inspirational speakers; consultants and coaches.

Sweden's entrepreneurship industry has previously been addressed in both academic (e.g., Elert et al., 2020; Karlson et al., 2021; Sandström et al., 2018) and public (e.g., Ejermo, 2016; Karlson et al., 2021; Sandström et al., 2018) reports. These studies provide important functional insights into the different private, public, and academic actors that participate in the entrepreneurship industry; what elements of the entrepreneurship industry are more or less efficient; as well as insightful policy recommendations for how to improve the functioning of the industry. In comparison, the present study is less functionalistic. My aim is not to suggest how we can increase the output of the entrepreneurship industry, but rather to understand its cultural underpinnings, in the hope of also understanding why entrepreneurial activities are increasing.

2.2 Cultural Ideals

As the entrepreneurship industry grows in size and significance (Hunt & Kiefer, 2017), it also undergoes a process of institutionalization (Brandl & Bullinger, 2009; Hwang & Powell, 2005). Processes of institutionalization do not only encompass the establishment of standards, professions, and formal rules (Hwang & Powell, 2005; Powell & DiMaggio, 2012). They also encompass cultural ideals, or implicit, taken-for-granted assumptions about what is desirable and appropriate (Berger & Luckmann, 1967). Cultural ideals are important if we acknowledge that entrepreneurship actors are social beings (Granovetter, 1985). They interact with others, collaborate with others, and spend their time in social communities within the entrepreneurship industry. In this way, entrepreneurship actors become "suspended in a web of values, norms, rules, beliefs, and taken-for-granted assumptions, that are at least partially of their own making" (Barley & Tolbert, 1997, p. 93). By adhering to cultural ideals, actors in the entrepreneurship industry gain legitimacy, while at the same time, they themselves contribute to a process of institutionalization. In this

way, the entrepreneurship industry not only produces economic value, such as in the form of new ventures. In addition, it produces cultural products (Hartmann et al., 2020) which its actors consume and reproduce. In this chapter, I seek to understand what the cultural ideals are within the entrepreneurship industry in Sweden, how they manifest themselves, and the consequences they have for actors and their activities.

3 Methods

Because of the lack of prior academic research on entrepreneurship as a cultural ideal in the entrepreneurship industry, I relied on an inductive, explorative approach (Edmondson & McManus, 2007). I collected data from two different sources: (1) interviews with actors in the entrepreneurship industry in Sweden; and (2) public documents from actors in this industry, in which they explain who they are and what they do. Informants are listed in Table 1, all names are pseudonyms.

My analysis follows standard procedures in inductive theorizing from qualitative data (Glaser & Strauss, 1967; Miles & Huberman, 1994). I started with an open coding of interview transcripts, seeking to identify manifestations of values, norms, rules, beliefs, and taken-for-granted assumptions related to the entrepreneurship industry in Sweden. An initial central theme to emerge from this open coding was the idea of entrepreneurship as a positive, cultural ideal—albeit one that was fuzzy and difficult to define. As one informant said,

Table 1 Informants

Name
A. Serial entrepreneur and entrepreneurship educator
C. Entrepreneurship scholar
D. Serial entrepreneur
E. Innovation policy scholar
F. Entrepreneurship scholar
H. Entrepreneurship coach
K: Founder, entrepreneur, and innovation manager
L. Entrepreneurship educator
M. Entrepreneurship support actor
N. Entrepreneurship scholar
P. Innovation scholar
R. Entrepreneurship and innovation scholar
S. Entrepreneurship support actor
T: Entrepreneurship coach
W. Entrepreneurship scholar
X. Entrepreneurship scholar
Z. Serial entrepreneur

> It is dangerous with terms where people do not see both the upside and the downside; terms that have these assumed, positive connotations. . .and there is a lot of that when it comes to *entrepreneurship and innovation. Because it is seen as the solution to all of the problems of humanity* (M. Entrepreneurship Scholar).

Because the idea of entrepreneurship as cultural ideal was salient in many interviews, I engaged in a more focused, thematic analysis of my interviews, trying to identify what that this ideal implied. This analysis centered around five core themes: Informants' descriptions of (1) core actors and their activities in the entrepreneurship industry in Sweden; (2) entrepreneurship as a cultural ideal being present in the entrepreneurship industry; (3) how this ideal emerges and becomes sustained; (4) how this ideal is visually manifested—here, language and looks emerged as two central categories; (5) the consequences of cultural ideals in the entrepreneurship industry. I systematically coded all interviews with respect to these five themes, creating first-order codes to capture individual opinions, observations, and anecdotes. Thereafter, I systematically analyzed these first-order codes, integrating them into a more systematic narrative, accounted for in the Sect. "Findings: Production of Entrepreneurship Culture in the Entrepreneurship Industry", below. Finally, in Sect. "Discussion", I synthesize these observations to outline the implications of entrepreneurship as a cultural ideal for the entrepreneurship industry.

4 Findings: Production of Entrepreneurship Culture in the Entrepreneurship Industry

In this section, I start with a description of the entrepreneurship industry in Sweden to illustrate how this industry was described by informants. Thereafter, I provide an empirical account of how actors in this industry perceived cultural ideals, their emergence, manifestations, and consequences.

4.1 The Entrepreneurship Industry in Sweden

In interviews, informants described the industry as fragmented, involving both public and private actors. P., for example, an entrepreneurship scholar and author of multiple reports about innovation policy support, described a system that involved participants at all different levels, from government to regional and private actors:

> Policy decisions are made by the *government. . .VINNOVA* have a lot of responsibility, but there are also other councils, like *Formas*, for example. And we have the semi-private institutions as well, that finance activities too. We have, for example, *Almi*, a semi-public organization. . .regional actors like *Region Skåne*. . . .And then we have the universities, that are working with their own innovation units. . .innovation offices and technology transfer offices. So *even at the university level, it is fragmented with different organizations that are*

> *engaged in innovation*. . .and then we have *the industry* that also finance a lot of innovation. (P. innovation scholar)

To illustrate the degree of fragmentation, Table 2 provides an overview of a subsample of the entrepreneurship industry in Sweden, listing public-funded actors in Skåne, southern Sweden. As illustrated in this table, this subcategory involves numerous actors ($n = 82$)—even though it does not include private companies or private investors.

Informants often struggled to grasp the full structure of the industry. Even though all informants were asked a similar question to describe the industry and its core actors, their answers to this question differed widely. At the same time, it was striking that even though informants provided different accounts of actors and their relationships, they provided similar accounts of the activities pursued by those actors. In particular, they emphasized terms such as innovation, scaling, growth, incubation, and facilitation. Below is an example of such a description, from *K*., an entrepreneur and innovation manager in a publicly owned, for-profit company in southern Sweden:

> I was just in a meeting with *Ideon Open*. . .but there are numerous groups to work with. *Sustainable Business Hub* and some other organizations in Malmö. And *Sustainable Innovation Hub*, or whatever their name is. . .in Helsingborg, we have *HEDGE, Helsingborg Tech House*, started just last year by a driven entrepreneur. . .they seek to *create a startup environment* where you can *incubate* and then, later on, *accelerate with angel investors*. Like a *non-profit organization*, run as an association. . .they collaborate with *SUP24 from Stockholm*. . .don't know if you heard about them, Sweden's largest *startup community*. They opened their first satellite office in Helsingborg. . .Other than that, you have something called *Get AI* in Helsingborg. . . focus on startups but most importantly, these are four *visionary* individuals that *want to help other get going with applied AI*. . . .we [i.e., the organization K. is working for] have also come together with four competitors to create a new company. A sort of *incubation unit*. Where we can *enter unchartered territory* and try to find *new ideas, services, startups, where we can co-invest, facilitate, develop. A mix of incubation and investment*. . .in Helsingborg, you also have *HBG Works*. A public accelerator seeking to bridge the private with the public. (K. entrepreneur and innovation manager)

Recognizing this industrial fragmentation and the somewhat vague understanding of what scaling, facilitation, incubation, and so forth really meant, several informants described a lack of efficiency in the industry. As S. laconically concluded,

> There *are a thousand different actors and no one understands what they are doing*. It all just costs a lot of money. This is something that has been talked about, an issue that has been on the table for a long time. But it is not as if anyone has a solution, saying "this is what we should do about it!" (S. entrepreneurship support actor).

4.2 Entrepreneurship as a Positive Cultural Ideal

In contemporary discourse, entrepreneurship is often portrayed as a process that contributes to economic growth (Wiklund & Shepherd, 2003) or the solution to societal challenges (George et al., 2021). This perspective was shared by all

Table 2 Southern Sweden, a subset of actors in the Swedish Entrepreneurship Industry

Actor type	Actor
Business Development/Financing	Almi Invest Syd AB
	ALMI Skåne
	Boost Hbg
	Business Sweden Skåne
	Connect Skåne
	Coompanion Skåne
	Drivhuset Malmö
	Enterprise Europé Network
	Exportkreditnämnden Skåne
	Forskarpatent i Syd AB
	Ideon Agro food
	Industrifonden
	Innovation Skåne ABN
	LU Innovation
	Lunds NyföretagarCentrum/Lift
	Malmö Startups
	NyföretagarCenter Syd
	NyföretagarCenter Bromölla
	NyföretagarCenter Hässleholm
	NyföretagarCenter Kristianstad
	NyföretagarCenter Osby
	NyföretagarCenter Skåne Nordväst
	NyföretagarCenter Ystad Österlenregionen
	NyföretagarCenter Öresund
	SLU Holding
	Tillväxt Malmö
	Ung Företagsamhet
	Uppstart Landskrona
	Uppstart Malmö
	Venture Cup Syd
Academia	ESS European Spallation Source
	Högskolan Kristianstad
	Innovationskon tor Syd
	Lunds Tekniska Högskola
	Lunds universitet
	Lunds universitet, campus Helsingborg
	Malmö Högskola
	MAX IV
	SLU
Cluster Initiatives	IUC Syd
	Livsmedelsakademin
	Media Evolution

(continued)

Table 2 (continued)

Actor type	Actor
	Medicon Valley Alliance
	Mobile Heights
	Packbridge
	Resilient Regions Association
	Sustainable Business Hub
	Svenskt Marintekniskt Forum
Marketing	Event in Skåne AB
	Film i Skåne AB
	Invest in Skåne AB
	Tourism in Skåne AB
Networking	Centrum för Publikt Entreprenörskap
	Future by Lund
	Good Malmö
	Herbert Felix Institutet
	Innovationcenter för landsbygden
	Malmö Cleantech City
	Malmö Innovationsarena
	Malmö Startups
	Malmö Uppfinnarförening
	Medicon Valley Alliance
	Miljöbron
	Mötesplats Social Innovation
	Nätverket idéburen sektor
	Sydsvenska industri- och handelskammaren
	Uppsök Malmö
	Öresundsinstitutet
Science Parks and Incubators	Region Skåne
	Ideon Innovation
	Ideon Science Park
	Krinova Incubator & Science Park
	Linc Landskrona
	Smile Incubator
	Medeon Incubator & Science Park
	Medicon Village
	MINC
	Science Village Scandinavia

informants. In interviews, they emphasized the importance of entrepreneurship for regional and societal development and they provided different insights into how the entrepreneurship industry could be structured to create the most appropriate conditions for such development to occur.

At the same time, most interviewees also described entrepreneurship as more than a vehicle for economic and societal progress. More profoundly, they described entrepreneurship as a positive cultural ideal. By a *positive* ideal, I mean an implicit assumption of entrepreneurship as something inherently beneficial for individuals and society, and as such, in need of support and stimulation. As a *cultural* ideal, I mean that they saw entrepreneurship as not only something that actors do (e.g., create new ventures) but something that more fundamentally relates to their way of being.

To exemplify how this positive cultural ideal was manifested in interviews, consider the following quote, from S. who represents a central actor in the entrepreneurship industry in southern Sweden. He advocated a more entrepreneurship-oriented education system, comparing Sweden to the USA and suggesting for entrepreneurship to become a topic taught in school already in third grade:

> We need to talk about entrepreneurship at a much earlier point in our educational system. . .compare with the U.S., they talk about entrepreneurship from third grade. . .it would be fantastic to *get [entrepreneurship] as a focus issue as early as possible; so that it comes natural already from the beginning*. Very often, it is too late to start talking about it in high school. . .*it needs to be planted in people's heads* much earlier. (S. entrepreneurship support actor)

Reflecting on this ideal, X., an entrepreneurship scholar, further concluded,

> It's the creational story of our times. And it *is about who is in power in contemporary society, making entrepreneurship hot, desired, and wanted*. And when that happens, there is less room for learning. (X. entrepreneurship scholar)

4.3 Emergence of Entrepreneurship as a Cultural Ideal

If entrepreneurship is not only a vehicle for growth but also a positive cultural ideal, it is relevant to understand how such an ideal has emerged and how it has been sustained in the entrepreneurship industry. Informants from this study described both bottom-up and top-down processes.

Bottom-Up Emergence From a bottom-up perspective, several informants described a cultural ideal, imported from pop culture and the U.S. West Coast. T, for example, works for a public support organization that connect aspiring entrepreneurs to other actors in the industry. He provided rich examples of what it could imply to *be* an entrepreneur. This was not necessarily something related to the venture, idea, or business case, but rather the personal aspiration, dreams, and identity of the entrepreneur:

> It is "American west-coast." A certain dress code that originates there, to be "relaxed" and "nice" . . . There are people here who just "are" entrepreneurs. They really do not have anything but their entrepreneurial dream. *They have read all the books and seen all the episodes of* Silicon Valley *[a TV-series] and they know exactly how it all works. They just lack a business idea*. They are looking for one. But their business cases are weak, even

> though they are really good at pitching and making power points. (T. entrepreneurship coach)

W., an entrepreneurship scholar, also described this ideal as something very tacit, imported from Silicon Valley, but difficult to define and capture. He said,

> Many *business leaders went to a Silicon Valley field-trip*. They went to visit fun tech companies and heard a lot of stories. And they read reports about technology shifts, about incumbents being left behind. And they are thinking: what to do now? We need to learn. These startups, they have something we lack. We have no idea of what that is, but it is something. Maybe there is a secret elixir or something? We need to lure them in. Look at them. Touch and feel. Look inside them when they sleep. *They [the incumbents] do not have a super clear understanding of the problem or what they are looking for. Just a general feeling of something being there, that is very attractive and that they lack.* Just a feeling. (W. entrepreneurship scholar)

Top-Down Influences Interestingly, several informants described how such bottom-up, cultural processes were being adopted by public actors in the entrepreneurship industry. This created a self-reinforcing pattern, whereby the bottom-up cultural processes were also promoted from a top-down perspective. One example was academia. All academic institutions in Sweden offer courses and programs in entrepreneurship. Informants with insights into such programs—educators as well as former students—emphasized the importance of these programs in reproducing cultural ideals and artifacts. Again, aspiring entrepreneurs are being trained in how to *be* an entrepreneur, over and beyond how to start a new venture. One informant, herself an academic, described educators as being caught in an entrepreneurship discourse. One that entailed a package deal, including certain tools and norms, which did not necessarily help entrepreneurs improve their ventures, only to be more entrepreneur-like. She called for more critical reflection on entrepreneurship education:

> *We are all caught in a discourse*. A discourse about effectuation and lean startup where we have just adopted certain taken-for-granted things... We have been *caught up in the idea that our students need to pitch*. We consider the pitch to be super important. But, you know, what really does the pitch represent? And what is the purpose of the pitch? Do we ever think about that? No, I do not think so. *We just consider it part of the package deal.* (X. entrepreneurship scholar)

In addition to universities, informants also emphasized the role of public support programs in enforcing a top-down cultural ideal of entrepreneurship. Take Skåne, the most southern region in Sweden, as an example. In 2017, Skåne in southern Sweden stated the ambition to "become the most innovative region in Europe by 2020" (RegionSkane, 2017). Numerous initiatives have been taken to support this initiative. For example, Helsingborg, one of the largest cities in the region, has launched Hbg Works, "a place for innovation work in the city of Helsingborg. Here, colleagues from all administrations and companies meet and collaborate in initiatives that deal with innovation" (HelsingborgsStad, 2021). Similar initiatives are being made in other municipalities as well, one of the more recent examples being

Level in Malmö, an incubator formed in collaboration with both private and public actors, supported mainly by public funding.

Reflecting on the purpose of such initiatives, informants described how they are not only taken to promote entrepreneurs—creating more and stronger new ventures. Over and beyond, these initiatives seek to infuse a more entrepreneurial mindset in the population, with the assumption that an entrepreneurial way of thinking is a fruitful road to efficiency:

> In my view, it is not startups, but *the logic of startups that they find attractive*. To do a lot out of a little. I believe this is influenced by pop-culture. You know, books and stuff that had a major breakthrough. (W. entrepreneurship scholar)

4.4 Language and Looks as Visual Attributes of the Entrepreneurship Ideal

Even though cultural ideals are tacit, ingrained in implicit understandings of what is good and beneficial, they often have visual representations. When trying to formulate how the entrepreneurship ideal was manifested, informants converged on two central attributes: language and looks.

Talking the Entrepreneurial Talk Language is an inherent element of all cultures. Through language, culture is produced and through language, culture manifests itself. This seems to hold for entrepreneurship culture as well. D. for example, said,

> When you talk to an investor, *language is super important*. They can immediately tell if you've got it. If you understand how an investor thinks. How much return he or she is looking for. How fast he or she expects that return. (D. serial entrepreneur)

As this quote illustrates, entrepreneurial lingo serves as a marker of legitimacy. By talking the talk, you are more likely to be perceived as credible. T., an actor in the entrepreneurial support system, recalled an experience of an entrepreneur who pitched at a major workshop. In her pitch, she meant to describe her "unique selling point" (USP)—i.e., the core characteristic of her business idea that differentiated it from competitors. Instead of USP, however, she used the term IP, which stands for Intellectual Property. T. remembered this as a disastrous pitch that completely undermined her credibility as an entrepreneur. Not because of what she had to say, but for the way she expressed it:

> We had this entrepreneur who consistently and frequently during a presentation used the word IP [intellectual property] when she meant USP [unique selling point]. [mimicking with a funny voice] 'Our IP is to do this.' *One does not take her very seriously as an entrepreneur.* One does not trust that she knows how to build a venture. Not because she could not separate the terms, but *because it was clear that she tried to present herself as something that she was not*. (T. entrepreneurship coach)

As in any subculture, the language of entrepreneurship helped actors in the entrepreneurship industry to distinguish between in-groups and out-groups, between

authentic actors and wannabes. Thus, an important role for actors in the entrepreneurship industry was to educate prospective entrepreneurs in this language. T, for example, said,

> *This lingo we learned at Lund University entrepreneurship program. It is really used.* Everyone is talking about MVPs and VC, pitch decks and all of those terms. (T. entrepreneurship coach)

To identify the central terms in this language of entrepreneurship, I asked an entrepreneurial team to make me a list of the most prominent need-to-know words. This team was led by a serial entrepreneur in his early 40s, about to make a successful exit from his second startup. At the time of the interview, he had recently spent 3 months at Antler in Stockholm,[1] being trained in the profession of entrepreneurship. Table 3 lists the terms his team put forward, adding also a few terms picked up in other interviews. A similar but more extensive list of words has also been put together by MIT Orbit, known as the Entrepreneurship Jargon Translator (2021).

Comparing the list of words that my informants spontaneously developed with the Entrepreneurship Jargon translator, it is apparent that the entrepreneurship culture as manifested in Sweden is an international import, closely linked to the U.S. West Coast. As also clear in Table 3, there is a great deal of Swenglish in entrepreneurship language, a blend of Swedish and English words used in everyday expressions. It is also interesting to note the military references in the entrepreneurship lingo, such as beach head (the first customers) or blitz scale (following the Blitz Krieg during World War Two).

A good example of military terms is manifested in one of the latest trends in the entrepreneurship industry: to organize traditional companies in terms of tribes and squads, instead of business lines and units. Take Danske Bank, for example, one of the main incumbent players in the Nordic banking industry. Danske Bank has recently implemented a major reorganization, following a template that is supposedly adopted from high-tech giants. Instead of the traditional business line structure, Danske Bank is now organized in terms of tribes and squads. These tribes operate in different habitats in the bank, in the hope that "it should be easier and more fun to work in Danske Bank" (2020).

Walking the Entrepreneurial (Cat)Walk In addition to knowing how to talk the entrepreneurial lingo, informants emphasized the importance of "the entrepreneurial look". As described by T,

> *There is a certain look*. To not be overdressed. To not be overly groomed. It is good to not be shaved, *signaling that one is too busy to have time to groom* [laughs]. (T. entrepreneurship coach)

[1] Antler is an investment company, entrepreneurship educator, and business accelerator. Antler accepts applicants with startup ambitions into a six-month program. In the first phase, participants form a team (or try out different teams), identify a business idea, and start to build a new venture. In the second phase, the new venture is accelerated with the aim of securing external investments.

Table 3 Central terms of the entrepreneurial vocabulary. The Swedish term originally provided by informants is in parenthesis to illustrate the blend of language (*Swenglish*)

Term	Definition
MRR	Monthly recurring revenue.
ARR	Annual recurring revenue.
To API (API:a)	To create a technical interface.
Automagic	A process carried out automatically in such a clever way that the result appears to be magic (*Wiktionary* definition).
Blitz scaling	"Blitzscaling is what you do when you need to grow really, really quickly. It's the science and art of rapidly building out a company to serve a large and usually global market, with the goal of becoming the first mover at scale." Reid Hoffman, entrepreneurship gury, interviewed in *Harvard Business Review* (Sullivan, 2016).
To bootstrap (bootstrappa)	A verb describing entrepreneurial activities that are financed by personal savings/revenue and not by external funding.
Beach head	The first customer
Burn rate	The pace at which a new company runs through its startup capital ahead of it generating any positive cash flow (*Investopedia*).
Build a pain killer instead of a vitamin	Vitamins refers to product features that are *nice to have*; painkillers refer to product features that solve a real problem for the consumer.
CAC	Customer acquisition cost.
CAGR	Rate of growth in a market.
Churn/churn rate	The number of customers who leave a product over a given period of time.
Committing code (committa kod)	Send code to GIT, the version control system where all code is stored.
Customer journey	The experiences a customer goes through when interacting with a product and a brand.
To deploy code (deploya kod)	Sending code to a server.
A hack	A fast-and-dirty solution.
Exponential growth	Fast growth.
Gamification	Adding game features to a product, website, operation, etc., to make consumers more engaged.
Hypergrowth	Fast growth.
Inbound or outbound	Inbounds—Externals actors who find the startup; Outbounds—External actors who are contacted by the startup.
Converting users	Convert users (e.g., getting them to pay for a service).
Run things agile	Conduct operations or solve a problem in a responsive, lightweight way.
Land and expand	Introduce a customer with a small deal and then expand over time.
LTV	Life time value.
Market automation	Automatic, directed marketing based on customer preferences.
Market fit	Indication of a product that responds to a customer need.
Mockups	A product demo used to demonstrate or evaluate an idea.
MVP	Minimun Viable Product, typically a beta-version of the end product that is launched in order to test customer viability.

(continued)

Table 3 (continued)

Term	Definition
Netflix manifesto	How to build a corporate culture.
Painstorming	A process for identifying customer needs (pains).
To pitch (pitcha)	A verbal presentation of a business idea in short format.
To pivot (pivotta)	A verb describing the process of making a change in a business model.
Referrals	To be introduced to a person by someone else.
Scale-up business vs. startup business	Scale-ups are per definition better than a startup, so you always want to be perceived as a scale-up.
Scrum	A framework for complex product development, originally developed for software but now used more widely. Emphasizes working iteratively toward time-bound goals in work packages, often referred to as sprints.
Get traction (skaffa traction)	Get attention.
Scale up (skala upp)	Increase size of operations.
To slack (Slacka)	Sending a message, term modified from the platform slack.
UAC	User acquisition cost.
Unicorn	An unusually fast-growing new venture.
User personas	Customer profiles.
USP	Unique Selling Point.
VCs	Venture Capitalists.
VCoef	A measure of virality.
Wantrepreneur	A person acting as an entrepreneur in a non-authentic way.
To wireframe (wireframe)	To create an image that describes the functional elements of a product or service; originally from website programing.
WOM	Word-of-mouth marketing.

In a Swedish context, Sebastian Siemiatkowski is a famous example of this entrepreneurial look. As a young CEO of the fintech company Klarna, Sebastian Siemiatkowski is known for his dressed-down look, wearing jeans, t-shirts, and hoodies in interviews and other public appearances. Interestingly, this look is a stark contrast to how he presented himself 10 years ago, when Klarna first launched. Presumably in a time when entrepreneurship as a cultural ideal was less outspoken, press pictures back then show a traditional outfit: the haircut slick; the tie arranged carefully; and the suit traditionally gray.

The dressed-down entrepreneurial look is not only apparent in individual dress codes, but also in office designs. A good example is MINC, the largest startup incubator/office space in Malmö, Sweden's third-largest city. The MINC webpage (2021) displays colorful pictures of post-its, pillows, and plywood, populated with entrepreneurs with a similarly unique, laid-back style. Reflecting on these looks, one informant saw them as central to entrepreneurship culture. Comparing the city of

Lund (a university city) to Malmö (18 km. from Lund), T. classified Malmö "more entrepreneurial," based on dress-code attributes:

> Malmö is much more entrepreneurial. Silicon Valley. Entrepreneurial archetype. For example, *if you walk around in a suit at MINC* [a local incubator]—you would be considered *weird*. Like, trying to be '*a business man, with a fax machine*' [laughs—a business man with a fax machine is apparently NOT what you want to be perceived as]. (T. entrepreneurship coach)

4.5 Consequences of the Entrepreneurship Ideal

As demonstrated in the prior sections, interview data supports the idea that activities within the entrepreneurship industry are not free of cultural connotations, but unfold according to a cultural ideal: a social institution to which actors in this industry are supposed to adhere. In addition to providing insight into how this ideal has emerged and how it manifests itself, informants also provided reflective discussions about its consequences.

The People that Get Lost in Translation Several informants acknowledged that the practices of the entrepreneurship industry were complex and tacit, making it difficult for newcomers to understand how to play the industry in their favor. As S. reflected,

> It is all about knowing which organizations that are out there, knowing where to turn to for help. . .for those of us already working in the industry, we do not always see that, but *for an entrepreneur that is not familiar with the system, it must be very confusing*. (S. entrepreneurship support actor)

Not all entrepreneurs understand how to play cultural ideals in their favor. And those who do not are less likely to be perceived as legitimate. In this way, the presence of cultural ideals in the entrepreneurship industry leads to problems of discrimination, whereby prospective entrepreneurs who fall outside the normative ideal are less likely to receive support. As T. reflected,

> *Say that you are a 70-year-old engineer* who just invented a new microinvector for solar panels that improves efficiency by 7.3%. And you come to pitch in this format that we run [i.e., in the support organization]: a sort of dragons' den. Then *you are an oddball*. And you will probably not be let in, but *you have to team up with someone who is a little more 'entrepreneurial'*. (T. entrepreneurship coach)

A similar point was furthered by Z., a serial entrepreneur engaged in social entrepreneurship. In her view, the entrepreneurship system in Sweden over-supports technical entrepreneurship, but under-supports social entrepreneurship. As this quote illustrates, the entrepreneurship industry does not necessarily foster a broad base of entrepreneurs, but targets the rather narrow crowd that fits the entrepreneurial ideals:

> There is an enormous amount of support in Skåne. But in the field where I work, *social entrepreneurship, there is not enough support*. . . social entrepreneurship is difficult in the

> entrepreneurial system, because the people themselves are not 'entrepreneurs.' (Z. serial entrepreneur)

The Ideas that Get Lost in Translation It is not only individuals that are lost in translation, but ideas too. As N. concluded, when there is a hype around high-tech entrepreneurship with strong Silicon Valley connotations, there is a risk of forgetting the plainer aspect of entrepreneurship:

> It is a pity that *we do not support plain, simple entrepreneurship*. . .the ordinary, the unsexy, is forgotten. (N. entrepreneurship scholar)

Advancing a similar point, X. reflected that with a cultural ideal that emphasizes speed, there is a risk that the value of more profound, slow thinking is lost. Instead of spending time understanding fundamental problems, there is a risk of jumping to solutions in an environment that is hot and fast paced:

> Because entrepreneurship is so hot, *we uncritically take in all of these terms, like the lean startup, effectuation, agile work processes*. And those tools are developed to speed up prototype development and solutions. And it becomes a problem that *we spend too little time on understanding the more fundamental problems* we seek to solve. We just have a hint of the problem, and then focus on the solution. (X. entrepreneurship scholar)

In all, this suggests that the prevalence of cultural ideals is not only enabling but also constraining for the individuals, ideas, and reflections that fall outside of the cultural norm.

Entrepreneurship as a Lifestyle Choice Several informants described how entrepreneurship is becoming a lifestyle choice, in addition to a means to make a living or grow a business. D. for instance:

> *It is becoming a lifestyle choice*. To be able to say: I have a startup. I went to Hyper Island [a private entrepreneurship education in Stockholm] and I know it all. (D. serial entrepreneur)

That individuals pursue a particular lifestyle is not problematic per se. It is a privilege of people in the richer world to be able to choose how to live their life for themselves. It becomes problematic, however, if taxpayers' money or private capital goes into supporting lifestyles, when it is meant to support the development of the economy. This was brought up by A.:

> I met a lady the other day, she has been around for a year, . . .creating a platform for yoga teaching. I asked "okay, how many yoga teachers do you have?" and she is like "10" and I'm like, "okay, how long have you been doing this?"—"for a year". And I look at this, it's a freaking website with 10 [users]. So, what have you been doing for a year of your life? *She is 27, 28 years old, probably has a degree from some top university here, paid by taxpayers' money, under the excuse of being an entrepreneur*. (A. serial entrepreneur and entrepreneurship educator)

In addition to deploying resources, informants also emphasized that lifestyle entrepreneurship floods the entrepreneurship industry with actors and activities that do not add substantial value. In short, cultural ideals contribute to an increase

in entrepreneurial activities, but not a corresponding increase in entrepreneurial outcomes. N. for example, said,

> There are a lot of different [support] actors, that *all chase the same entrepreneurs*. (N. entrepreneurship scholar)

D., himself a serial entrepreneur, said,

> *It is becoming a lifestyle*. . .but as the quality of events decrease, and the quality of the entrepreneurs accepted into incubators decrease, then you are just educating people in entrepreneurship. . .There are two-three startup events every night in Stockholm. . .and that dilutes quality. *You can go to an investor matchmaking event where there is just one registered participant—because no one else has time to go*. The quality of events has decreased, but even more the quality of participants. (D. serial entrepreneur)

Infused by Cultural Ideals, the Entrepreneurship Industry Becomes Self-Sustaining As the entrepreneurship industry has developed its own cultural ideals, these ideals have created a reinforcing pattern, institutionalizing the industry further. T., for example, emphasized the importance of name-dropping in the industry and how entrepreneurs, instead of working on the new venture, needed to spend time proving that they were in fact "an entrepreneur":

> *You need to know the right names*. There is a lot of name-dropping. Have you talked to this person? Do you know that person? A lot of *time [in meetings] is spent on the entrepreneur proving that he or she is an entrepreneur*, rather than on the company. (T. entrepreneurship coach)

Several informants described how this has led to a sustaining of the entrepreneurship industry. Representatives of the support system (coaches, incubator managers, matchmakers) recommended themselves and their peers as a way to maintain the industry, rather than necessarily to help the entrepreneurs. As one informant said,

> In one incubator, we received the advice: "you need to talk to Olof [pseudonym], he can help you grow." This means that we sat with *a former incubator member, who had a private consultancy company, and advised us to acquire services from their private company, using public funding*. That is completely unethical but it happened several times. To get the advice "this won't cost you anything, you can use the verification funding [i.e., public money]." There is a group of parasites that work as consultants and live out of the public support system. *They do not contribute to economic growth; they just live out of the entrepreneurship industry*. (D. serial entrepreneur)

W., an entrepreneurship scholar, offered a similar line of reasoning:

> There are a lot of people sitting and thinking about how they can help. But often, *it is more about how they can keep themselves busy*. By applying for funding from the E.U., or VINNOVA to create an idea about how to contribute to the ecosystem. (W. entrepreneurship scholar)

Z., a serial entrepreneur, had a similar reflection. In her view, the entrepreneurship industry is populated with support actors, who claim to support entrepreneurs but who are primarily supporting themselves:

> To be honest, and now I might not be 'politically correct,' but consider all these people in the "system". . .it is a small community, where everyone basically knows everyone. . .*there are a*

> *lot of people in the system that gain from the system being the way it is. . . .Had the system been more effective, these people would not have been needed*. We could have gotten rid of ourselves. (Z. serial entrepreneur)

She described a collegial culture, with support actors attending each other's events. This creates the perception of the entrepreneurship industry being a vibrant, growing industry, whereas in fact its population are *Tordenskjold Soldiers*; like extras on a T.V. production set to create the perception of a crowd.[2]

> We do not work to make things better. We just muddle around, patting each other's backs. Attending each other's events. . .We call it *Tordenskjold's Soldiers. . . It is the same people over and over again. Same people that attend the conferences. The same people working in the system. The same people supporting each other*. We do not change it because then we lose our own jobs. (Z. serial entrepreneur)

5 Discussion

Insights from interviewees support the idea of entrepreneurship as a cultural ideal, whereby actors in the entrepreneurship industry internalize and re-create taken-for-granted beliefs, assumptions, and norms about why entrepreneurship is important, what an entrepreneur is, and how one is to behave. In this way, the entrepreneurship industry in Sweden not only produces goods, services, and new ventures. It also produces culture (Hartmann et al., 2020). Looking at entrepreneurship in this way provides a deeper understanding of why we currently witness such an increase in entrepreneurial activities. This complements the more functionalistic understanding of how the entrepreneurship industry ought to be organized to maximize entrepreneurial outcomes. In the present study, I have explored what entrepreneurship ideals entail in the context of the entrepreneurship industry in Sweden; how these ideals emerge; how they manifest themselves in language and looks; as well as what consequences it fosters for actors and their activities. For entrepreneurship research and policy, the analysis comes with two core implications.

5.1 Alternative Investments if the Outcome Is Culture Not Profit

Entrepreneurship is a risky activity for the individuals involved. It takes many years for a new venture to become profitable and most new ventures do not even survive at

[2] *Tordensjkold Soldiers* is an expression that refers to the Danish general Tordenskjold as he entered the Swedish fortress in Marstrand 1719. According to legend, Tordenskjold had his soldiers dress up in different colors and uniforms, running from one place to the other to create the perception among the Swedes that their number was much greater than they actually were. In English, a similar expression would be a *Potemkin Village*: a fake display of power, wealth, and success.

all. The expected income is much higher from a regular job in an established firm (Åstebro, 2012) and those working for new ventures earn less than their counterparts in established organizations (Burton et al., 2018). Therefore, it is important that aspiring entrepreneurs enter the entrepreneurship industry with their eyes open. If activities in the industry are geared toward the creation of culture instead of profit, this needs to be clear at the outset.

Informants in this study provide several examples of how cultural attributes (language and looks) are being fostered and reproduced at the cost of more substantial content. Moreover, informants discuss how established actors in the industry work to sustain themselves and their entrepreneurial activities, not necessarily entrepreneurial outcomes. For the entrepreneurs who enter the industry without a thorough understanding of the production of culture, in addition to the production of entrepreneurship, this can lead to financial losses and broken dreams.

At the societal level, it is relevant to consider how investments of taxpayers' money can create benefits to the many, not only to those who consume cultural products inside the entrepreneurship industry. For example, there is clear evidence that entrepreneurs who are well educated are more likely to succeed than those who lack education (Hvide & Møen, 2010; Marinoni & Voorheis, 2019). At the same time, evidence in favor of incubators or entrepreneurial support structures is very weak (Amezcua et al., 2013; Schwartz, 2013). If activities in the entrepreneurship industry increase entrepreneurial activities instead of outcomes, it is relevant to consider whether resources are better spent on primary school teachers.

5.2 Problems of Discrimination and the Need for Evidence-Based Advice

Entrepreneurs are entirely dependent on outsiders' help to realize their ideas and need to be perceived as legitimate in the eyes of external stakeholders (Stinchcombe, 2000). In a field in which formal signs of legitimacy are few—new ventures typically do not have a strong brand, obvious assets, or preexisting track record—adhering to cultural ideals increase the legitimacy of the entrepreneur. For entrepreneurs themselves, understanding and playing along with the cultural ideals can be a strong asset (Aldrich & Fiol, 1994; Zott & Huy, 2007). For example, Zott and Huy (2007) demonstrated in a field study how British entrepreneurs engage in various symbolic actions to be perceived as more legitimate.

For entrepreneurs who fall outside of the norm, however, cultural ideals lead to problems of discrimination. This is also something that has been highlighted in prior research, in which scholars have shown that entrepreneurs that do not fit with gender stereotypes (Ahl & Marlow, 2012; Kanze et al., 2018), demographic stereotypes (Blanchflower et al., 2003), or who do not adhere to an accepted communication style (Gino et al., 2020) are less likely to receive external support. Insights presented here, however, show that it is not only individuals that become subject to

discrimination. In addition, informants testified to mundane ideas being discriminated against in favor of those that fits with a sexy-and-hot ideal; as well as of slow-paced, reflective thinking being discriminated against in favor of fast-paced, action-based approaches. Ultimately, this leads to a reductionist approach to entrepreneurship, whereby actors in the industry seek to follow what is assumed to be the one best practice.

This is problematic because entrepreneurship research has consistently demonstrated that there is not one best practice available. For example, that there is not one unifying personality trait that characterizes successful entrepreneurs (Kerr et al., 2019; Rauch & Frese, 2007), but they come with different cognitive abilities (Levine & Rubinstein, 2017) and different degrees of action-orientation (Yu et al., 2021). Contrary to the reductionist perspective, entrepreneurship is a process of equifinality, meaning that different starting points and different means can lead to similar outcomes. To better understand this process, theory that advances a mechanism-based approach (Kim et al., 2016) or design principles to entrepreneurship (Berglund et al., 2018) could be a useful starting point.

In all, it would be useful to establish a more evidence-based approach in the entrepreneurship industry. In particular, it is noteworthy that many of the researchers interviewed for this study were themselves critical of the lack of science-based evidence in their own teaching. As an analogy, consider the field of medicine. This field underwent a radical transformation in the nineteenth century, when science-based approaches to medicine radically replaced approaches based on common sense or practical experience. Perhaps it is now time for the entrepreneurship industry to make a similar leap, before unsubstantiated cultural ideals crowd out better-substantiated efforts.

6 Conclusion

In recent decades we have witnessed the growth of an entrepreneurship industry in Sweden and elsewhere. The present study leverages explorative interviews to understand implicit assumptions about entrepreneurship as a cultural ideal within the industry: what this ideal entails, how it is produced, as well as its consequences. Emerging from this analysis is a critical perspective of the entrepreneurship industry, identifying how cultural ideals lead to problems of efficiency and discrimination. Undoubtedly, entrepreneurship has positive consequences both for individuals and society, as it contributes to economic growth and positive societal change. Undoubtedly, many skillful actors in the entrepreneurship industry are engaged in important value-creating activities. With this book chapter, I hope to offer an interpretative lens that helps entrepreneurs and their supporters realize that potential more fully.

Acknowledgments The author is grateful to Sebastian Maric for excellent research assistance and to VINNOVA and Ragnar Söderbergs Stiftelse for funding.

References

Ahl, H., & Marlow, S. (2012). Exploring the dynamics of gender, feminism and entrepreneurship: Advancing debate to escape a dead end? *Organization, 19*(5), 543–562.

Aldrich, H. E., & Fiol, C. M. (1994). Fools rush in? The institutional context of industry creation. *Academy of Management Review, 19*(4), 645–670.

Amezcua, A. S., Grimes, M. G., Bradley, S. W., & Wiklund, J. (2013). Organizational sponsorship and founding environments: A contingency view on the survival of business-incubated firms, 1994–2007. *Academy of Management Journal, 56*(6), 1628–1654.

Åstebro, T. (2012). The returns to entrepreneurship. In D. Cumming (Ed.), *Oxford handbook of entrepreneurial finance* (pp. 45–108). Oxford University Press.

Barley, S. R., & Tolbert, P. S. (1997). Institutionalization and structuration: Studying the links between action and institution. *Organization Studies, 18*(1), 93–117.

Berger, P. L., & Luckmann, T. (1967). *The social construction of reality*. Middlesex. England.

Berglund, H., Dimov, D., & Wennberg, K. (2018). Beyond bridging rigor and relevance: The three-body problem in entrepreneurship. *Journal of Business Venturing Insights, 9*(5), 87–91.

Blanchflower, D. G., Levine, P. B., & Zimmerman, D. J. (2003). Discrimination in the small-business credit market. *Review of Economics and Statistics, 85*(4), 930–943.

Bloom, N., Jones, C. I., Van Reenen, J., & Webb, M. (2020). Are ideas getting harder to find? *American Economic Review, 110*(4), 1104–1144.

Brattström, A. and Wennberg, K., (2021). The entrepreneurial story and its implications for research. *Entrepreneurship theory and practice,*. in press.

Brandl, J., & Bullinger, B. (2009). Reflections on the societal conditions for the pervasiveness of entrepreneurial behavior in Western societies. *Journal of Management Inquiry, 18*(2), 159–173.

Burton, M. D., Dahl, M. S., & Sorenson, O. (2018). Do start-ups pay less? *Industrial & Labor Relations Review, 71*(5), 1179–1200.

Danske Bank. (2020, June 8). Press release. Accessed Sep 21, 2021, from https://danskebank.com/news-and-insights/news-archive/news/2020/08062020

Decker, R. A., Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2016). Declining business dynamism: What we know and the way forward. *American Economic Review, 106*(5), 203–207.

Edmondson, A. C., & McManus, S. E. (2007). Methodological fit in management field research. *Academy of Management Review, 32*(4), 1155–1179.

Ejermo, O. (2016). *Den svaga länken?–Inkubatorernas roll i det svenska innovationssystemet* (*Näringspolitisk Forum Rapport #14*). Entreprenörskapsforum.

Elert, N., Wennberg, K., & Sjöö, K. (2020). When less is more: Why limited entrepreneurship education may result in better entrepreneurial outcomes. *International Review of Entrepreneurship, forthcoming*.

George, G., Merrill, R. K., & Schillebeeckx, S. J. (2021). Digital sustainability and entrepreneurship: How digital innovations are helping tackle climate change and sustainable development. *Entrepreneurship Theory and Practice, 45*(5), 999–1027.

Gino, F., Sezer, O., & Huang, L. (2020). To be or not to be your authentic self? Catering to others' preferences hinders performance. *Organizational Behavior and Human Decision Processes, 158*, 83–100.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Taylor and Francis.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology, 91*, 481–510.

Hartmann, R. K., Krabbe, A. D., and Spicer, A. (2020). Towards an Untrepreneurial economy: The Entrepreneurship Industry and the Veblenian Entrepreneur. Academy of Management Proceedings.

HelsingborgsStad. (2021). Retrieved June 15 from https://innovation.helsingborg.se/en/hbgworks/

Heyman, F., Norbäck, P.-J., Persson, L., & Andersson, F. (2019). Has the Swedish business sector become more entrepreneurial than the US business sector? *Research Policy, 48*(7), 1809–1822.
Hunt, R. A., & Kiefer, K. (2017). The entrepreneurship industry: Influences of the goods and services marketed to entrepreneurs. *Journal of Small Business Management, 55*, 231–255.
Hvide, H. K., & Møen, J. (2010). Lean and hungry or fat and content? Entrepreneurs' wealth and start-up performance. *Management Science, 56*(8), 1242–1258.
Hwang, H., & Powell, W. W. (2005). Institutions and entrepreneurship. In S. A. Alvarez, R. Agarwal, & O. Sorenson (Eds.), *Handbook of entrepreneurship research* (pp. 201–232). *International Handbook Series on Entrepreneurship*). Springer.
Kanze, D., Huang, L., Conley, M. A., & Higgins, E. T. (2018). We ask men to win and women not to lose: Closing the gender gap in startup funding. *Academy of Management Journal, 61*(2), 586–614.
Karlson, N., Sandström, C., & Wennberg, K. (2021). Bureaucrats or Markets in Innovation Policy?–a critique of the entrepreneurial state. *The Review of Austrian Economics, 34*(1), 81–95.
Kerr, S. P., Kerr, W. R., & Dalton, M. (2019). Risk attitudes and personality traits of entrepreneurs and venture team members. *Proceedings of the National Academy of Sciences, 116*(36), 17712–17716.
Kim, P. H., Wennberg, K., & Croidieu, G. (2016). Untapped riches of meso-level applications in multilevel entrepreneurship mechanisms. *The Academy of Management Perspectives, 30*(3), 273–291.
Levine, R., & Rubinstein, Y. (2017). Smart and illicit: Who becomes an entrepreneur and do they earn more? *Quarterly Journal of Economics, 132*(2), 963–1018.
Malerba, F., & McKelvey, M. (2020). Knowledge-intensive innovative entrepreneurship integrating Schumpeter, evolutionary economics, and innovation systems. *Small Business Economics, 54*(2), 503–522.
Marinoni, A., & Voorheis, J. (2019). *Who gains from creative destruction?: Evidence from high-quality entrepreneurship in the United States*. U.S. Census Bureau, Center for Economic Studies.
Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis* (2nd ed.). Sage Publications.
MINC (2021). www.minc.se, accessed September 21, 2021.
MIT Orbit. (2021). *Entrepreneurship Jargon Translator*. Accessed Sep 21, 2021, from https://orbit-kb.mit.edu/hc/en-us/articles/204891336-Entrepreneurship-Jargon-Translator
Nightingale, P., & Coad, A. (2014). Muppets and gazelles: Political and methodological biases in entrepreneurship research. *Industrial and Corporate Change, 23*(1), 113–143.
Powell, W. W., & DiMaggio, P. J. (2012). *The new institutionalism in organizational analysis*. University of Chicago Press.
Rauch, A., & Frese, M. (2007). Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality traits, business creation, and success. *European Journal of Work and Organizational Psychology, 16*(4), 353–385.
RegionSkane. (2017). *Vagen mot Europas mest innovativa region* 2020.
Sandström, C., Wennberg, K., Wallin, M. W., & Zherlygina, Y. (2018). Public policy for academic entrepreneurship initiatives: A review and critical discussion. *The Journal of Technology Transfer, 43*(5), 1232–1256.
Schwartz, M. (2013). A control group study of incubators' impact to promote firm survival. *The Journal of Technology Transfer, 38*(3), 302–331.
Stinchcombe, A. L. (2000). Social structure and organizations. In A. C. Baum & F. Dobbin (Eds.), *Economics meets sociology in strategic management* (pp. 229–259). Emerald Group Publishing.
Styhre, A. (2018). *Venture work: Employees in thinly capitalized firms*. Palgrave Macmillan.

Sullivan, T. (2016). Blitzscaling. *Harvard Business Review, 94*(4), 44–50.
Wiklund, J., & Shepherd, D. (2003). Aspiring for, and achieving growth: The moderating role of resources and opportunities. *Journal of Management Studies, 40*(8), 1919–1941. https://doi.org/10.1046/j.1467-6486.2003.00406.x
Yu, W., Wiklund, J., & Pérez-Luño, A. (2021). ADHD symptoms, entrepreneurial orientation (EO), and firm performance. *Entrepreneurship Theory and Practice, 45*(1), 92–117.
Zott, C., & Huy, Q. N. (2007). How entrepreneurs use symbolic management to acquire resources. *Administrative Science Quarterly, 52*(1), 70–105.

Evaluating Evaluations of Innovation Policy: Exploring Reliability, Methods, and Conflicts of Interest

Elias Collin, Christian Sandström, and Karl Wennberg

Abstract Expansions of innovation policies have been paralleled with an increase in the evaluations of such policies. Yet, there are few systematic evaluations of how such evaluations are conducted, by whom, and their overall conclusions. We analyze 110 evaluations of innovation policy in Sweden from 2005 to 2019. Our findings show that the majority of these evaluations are positive, about one-third are neutral in their conclusions, and very few are negative. The majority of evaluations were conducted by consulting firms, close to one-third by expert government agencies, and around 10% by university researchers or as self-evaluations by the governmental agencies responsible for the policy themselves. Few evaluations employed causal methods to assess the potential effects of policies. We discuss conflicts of interest and question the reliability of evaluations of innovation policy.

Keywords Evaluation · Consultants · Evaluating practice · Meta-Evaluation · Sweden · Innovation policy

E. Collin (✉)
School of Economics and Management, Lund University, Lund, Sweden
e-mail: elias.collin@fek.lu.se

C. Sandström
Jönköping International Business School, Jönköping, Sweden

The Ratio Institute, Stockholm, Sweden
e-mail: christian.sandstrom@ju.se

K. Wennberg
Stockholm School of Economics, Stockholm, Sweden
e-mail: karl.wennberg@hhs.se

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_9

1 Introduction

Innovation policies have become increasingly popular over recent decades. The European Union, national governments, and regional agencies provide a collection of support systems and structures. Firms can apply for innovation grants, collaborative projects, training, and other types of public support. Billions of euros are made available for developing certain ex-ante chosen technologies, such as hydrogen gas or Artificial Intelligence applications. Inspired by scholars such as Mariana Mazzucato (2012, 2018), such public sector initiatives have grown in size and scope in recent years.

This expansion of interventionist innovation policies has been followed by an equal growth in the number of evaluations of innovation policies. Little is yet known regarding these evaluations: Who performs these evaluations? What methods are employed in order to make evaluations? What conclusions are generally drawn? How are results, methods, and the kind of evaluator interrelated? Are evaluations reliable?

With this chapter, we add a piece to the puzzle of innovation policy by analyzing a set of policy evaluations. Drawing upon a random sample of 110 innovation policy evaluations in Sweden from 2005 to 2019, we provide descriptive and multivariate statistics to answer the aforementioned questions. Our results show that the majority of evaluations are positive, many are neutral, and very few are negative. We also show that evaluations are often performed by private consulting firms. Based upon our results, we discuss issues concerning evaluators' independence and potential conflicts of interest.

Our study makes three contributions. First, our empirical analysis provides insights of relevance to both the innovation studies and program evaluation literatures by showing that policy evaluations may differ across different types of evaluative actors and across the distinct methods employed in their evaluations. Second, our focus on a whole body or corpus of evaluations in a specific policy domain provides a novel approach to studying evaluations in that previous studies have often offered commendable evaluations of specific policies or reforms, or meta-evaluations—assessing the quality of certain evaluative projects—but a holistic approach to the evaluation area has, to our knowledge, hitherto been lacking within the fields of evaluation research and innovation policy. By examining connections between different types of evaluative actors, their methods, and their conclusions, the study facilitates a more in-depth understanding of how evaluating actors' and their methods are related to results and recommendations from such evaluations. Third, our discussion regarding evaluators' independence and potential conflicts of interest provides insights of broader relevance to academic and policy discussions about the role of evaluations in public policy.

The remainder of this chapter is organized as follows: The next section provides an overview of innovation policy evaluations and literature on evaluations. Next, we present and discuss our empirical data. Latterly, a concluding remark is provided.

2 Background: Evaluation as a Practice

Evaluating public policy is a somewhat difficult operation. Any society will likely succumb to public waste without any evaluative elements making sure that public resources are not wasted or misused (Furubo et al., 2002). Yet, it is easy to imagine how too close and frequent control of public servants or policy quickly becomes absurd. Having a grade school teacher being monitored in detail during daily classes or having every agency's decision double-checked by another auditing agency would not only prove costly but also, most likely, quite futile. Hence, a balance between the two is necessary—societies need both trust and evaluation in order to work.

The term evaluation is often used in a rather general and arbitrary way. In a broader sense, evaluation is distinguished from similar practices like auditing or reviewing through the fact it features judgment. An evaluation is not just a display of numbers or opinions but includes some sort of judgment of the studied practice in relation to a predesignated norm or goal (Scriven, 1991; Pollitt, 2003; Knill & Tosun, 2012).

Based on this definition, a multitude of evaluation practices exist. Among these no specific practice can be distinguished as superior to the others. Different practices rather serve different purposes. As with scientific methodology in general, the choice of evaluation method and practice depends on the value or goals of interest to the evaluator.

The trend toward the large-scale evaluations we see today started in the United States in the 1950s and 1960s. Great hope was then invested in various social and political scientists, who, with the help of quantitative and objective methods, were to scientifically find the best ways to govern society. Subsequent evaluators would question this evaluation practice in favor of what can be described as a more constructivist approach. Greater emphasis was put on experiences from public officials and the people targeted by the studied political intervention. Today, both traditions live on and are present in many Western countries (Dahler-Larsen, 2007; Bovens et al., 2008).

Since the late 1900s, evaluation activities in society have increased exponentially, noted not least by Power (1997) in *The Audit Society*. The huge increase in public scrutiny can be attributed to an expanded public interest in such activities, an increased focus on goal and result management and several of the various governance practices that are referred to under the name *New Public Management* (NPM)—in part replacing the preceding Weberian public servant model predominating in Western democracies throughout the twentieth century.[1]

Other factors driving the trend toward more evaluation are organizations such as the European Union and the World Bank putting external pressure on countries to

[1] Named after the German sociologist Max Weber, *Weberian bureaucracy* is seen as a system of public administration in which bureaucrats in hierarchal organizations executed political decisions in accordance with predetermined and exact rules and equality before the law.

further their evaluative commitments, often as a condition for financial support or other benefits (Furubo et al., 2002).

2.1 Different Evaluators

Evaluations are conducted by a variety of different actors ranging from researchers who evaluate with research interests, to consulting firms, think tanks, agencies, ombudsmen, and specially appointed commissions or evaluation agencies; it is also common that executive agencies conduct self-evaluations. The same intervention or political effort can be evaluated multiple times by different actors. For example, the crash of a Dutch military cargo plane at Eindhoven Airport in 1996, and the subsequent crisis management, led to no less than 15 different evaluations from different actors (Goodin et al., 2008). While this event was extreme, it highlights the importance of evaluation in describing reality and providing recommendations for improvements of regulations, processes, and procedures, and also whether those regulations, processes, and procedures are effective in attaining the envisioned goals. The Eindhoven incident also highlights that different evaluators may reach different conclusions, a topic hitherto rarely attended to in the innovation literature. As our study will show, one of the aforementioned actors, the consultants, might be of special interest for those studying innovation policies.

During recent years, there has been a general trend in public administration toward an increased use of consultants. Although in many aspects it has been beneficial and efficient, the trend is also connected to several drawbacks. Scholars have pointed to reduced competence within public agencies, a confusion of responsibility between those contracted for a job and those ordering it, and a shift in values within the public sector: consultants bringing what can be referred to as instrumental rationality, a constant demand for efficiency, and evidence-based practices at the expense of normative judgments within the public sphere (van den Berg et al., 2019; Ylönen & Kuusela, 2019).

The field of evaluation is no exception to this trend. Although developing at different speeds in different countries, large organizations such as the AEA (American Evaluation Association) and the EES (European Evaluation Society) signify almost industry-sized evaluation markets connected to American and E.U. political reforms.

3 Empirical Setting: Innovation Policy in Sweden

In Sweden as in many other Western countries, evaluations are conducted throughout the entire public sector. Innovation policy presents no exception. Here, this policy area is amply funded as state grants only (not counting E.U., regional, and local investments) amount to more than €1 billion annually (Karlson et al., 2019). In

the United States, these figures have been gauged to be above $13 billion (Hunt & Kiefer, 2017).

As stated, evaluation can be conducted in several different ways, none of which is by default superior. However, once one has decided upon an evaluating policy and what to actually evaluate within each specific intervention, certain methods may be more preferred. Our initial premonition, supported, for instance, by an audit made by The Swedish National Audit Office (Swedish NAO) (2020), was that evaluative practices and judgment calls varied somewhat between evaluative actors. Here, the Audit Office states that *"there are considerable weaknesses in the effect evaluations of industrial policy that have been carried out by government agencies: only 2 out of 37 studied evaluations fulfill all three elementary criteria set up by the NAO regarding credible evaluations"* (2020, p. 4).

Apart from the report from the Swedish NAO, other studies provide initial concern. A few rather thorough research reports based on counter-factual methods contradict the otherwise quite favorable picture of the output of policies within the field and point to a lack of effects on firm turnover, number of employees, profits, or productivity (Daunfeldt et al., 2016; Gustavsson Tingvall & Deiaco, 2015).

4 Results

Innovation policy in Sweden is mainly organized through a few big, self-governing, state agencies, as is typical for Swedish public administration. Agencies such as Vinnova (the Swedish Innovation Agency), *Tillväxtverket* (the Swedish Agency for Economic and Regional Growth), and *Energimyndigheten* (the Swedish Energy Agency) are in charge of the lion's share of allocated resources.

Evaluations are also conducted by two independent agencies: *Tillväxtanalys* (The Swedish Agency for Growth Policy Analysis) and the previously mentioned Swedish NAO. Evaluation is also performed by researchers and by consultants, hired to evaluate specific tasks.

The empirical approach of the study involved reading and coding a total of 110 policy interventions from 2005 to 2019 with regard to the judgment calls made in the evaluations, the evaluative actor, the evaluative methods, the type of data used in the evaluation, as well as a few control variables. The results are presented below.

The study shows that evaluations of Swedish growth and innovation policies largely consist of positive reviews. Among the 110 evaluations examined, there are 67 positive, 37 neutral, and 6 negative evaluations. Figure 1 shows the frequencies of different results in the studied evaluations.

The low share of evaluations containing negative policy evaluations in Fig. 1 is noteworthy. One possible explanation based on these results is that Swedish growth and innovation policy overall shows quite remarkably effective and efficient results—rightfully resulting in positive evaluations. An alternative explanation would be that some actors embellish their evaluations and write evaluations that

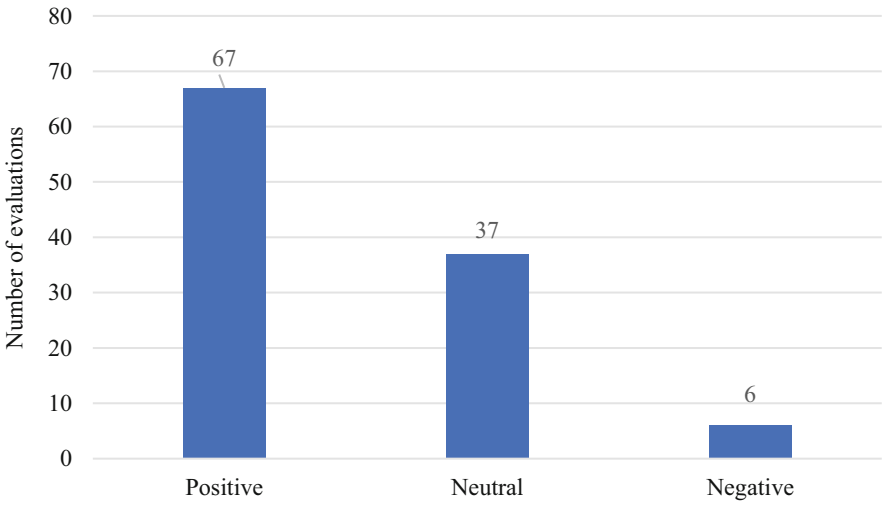

Fig. 1 Reviews given by evaluations of Swedish growth and innovation policies

give the impression that the policy seems to function better than it does. In the next section, we intend to probe various reasons behind the positive evaluations by analyzing the different actors responsible for the evaluations, as well as methods used in their evaluations.

4.1 Evaluators of Innovation Policy

Moving on to the different types of actors responsible for the evaluations of growth and innovation policies in Sweden, we see that most evaluations are carried out by consultants, either by self-employed consultants, larger firms, or several firms in constellation. Overall, slightly more than half (56 of 110) of all evaluations in our dataset are made by consultants. The second most frequent actor is evaluative agencies (31 out of 110 evaluations), followed by researchers or research groups (15 out of 110 evaluations). Public agencies evaluate themselves in the form of self-evaluations but such self-evaluations make up only 8 of the observed evaluations. In a few of the evaluations carried out by consultants and evaluative agencies, researchers have been invited to comment on the results, inform the evaluators about the evaluated field, or to carry out quantitative evaluations. In these cases, however, the researchers are not regarded as the evaluating actor because they only contribute to a small part of the work. Figure 2 shows the frequencies of different actors among the studied evaluations.

The fact that so many evaluations are carried out by consultants aligns with the general public administration trend pointing to a large and increasing use of consultants in public administration (van den Berg et al., 2019; Ylönen & Kuusela, 2019).

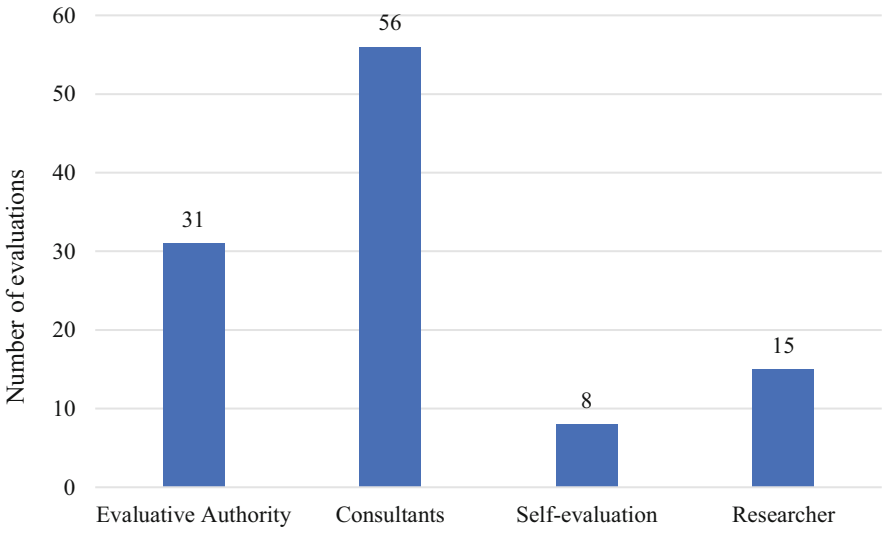

Fig. 2 Evaluative actors conducting evaluation of Swedish growth and innovation policies

4.2 Evaluation Methods and Data Sources

Regarding the methods used by evaluators, a few initial notes should be made: Evaluative practice could of course be studied and classified in different ways. One might, for instance, distinguish between methods focusing solely on goal accomplishment or on goal accomplishment as well as potential side effects. One could also focus on opinions from users or consumers of a certain policy, from the professionals implementing it or a larger society somehow affected by the policy (Vedung, 2009). Yet another way would be to evaluate the efficiency or effectiveness of the policy—focusing on the means spent to achieve a certain result (Vedung, 2009). Within each of these evaluative methods, more distinctions could of course be made.

In the current study, we have coded the methods as either *quantitative descriptive methods*, *qualitative methods*, *quantitative counterfactual (or experimental) methods*, or a *mix* of either the first two or all three of the methods.[2]

The study results show that qualitative methods are used to the greatest extent among the evaluations studied—qualitative methods occur in 61 of the cases. The second most common is that of mixed methods 1 (quantitative descriptive and qualitative methods), which occurs in 31 of the cases.

[2] Hence, the five categories of methods in the evaluations are: (1) *Quantitative descriptive methods*; (2) *Qualitative methods*; (3) *Quantitative contrafactual (or experimental) methods*; (4) *A mix of 1 and 2*; and (5) *A mix of 1, 2, and 3*.

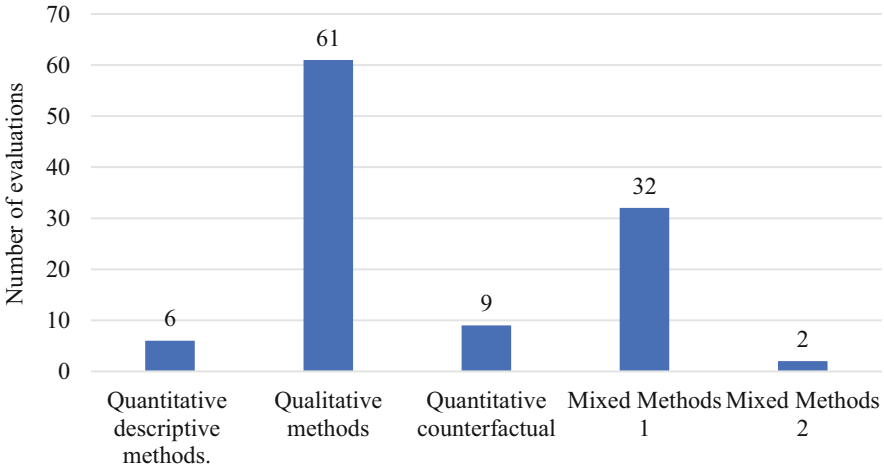

Fig. 3 Evaluative methods used in evaluations of Swedish growth and innovation policies

The quantitative counterfactual method was used in 9 of the cases and the qualitative descriptive method was used in 6. In 3 of the cases, mixed methods 2 (quantitative descriptive, qualitative, and quantitative counterfactual methods) were utilized. Figure 3 shows the frequencies of each method in the studied evaluations.

The fact that several of the evaluations utilize qualitative methods is an interesting observation. Several of the evaluations examined are not the type of goal and result evaluation usually associated with quantitative methods and the typical evaluation practice that characterizes New Public Management (NPM) (Hood, 1991). Rather, they are largely based on interpretation and understanding of user or stakeholder experiences. For example, in one of its reports, the public expert agency Growth Analysis examined how well state and regional business support responds to policy goals and the needs of entrepreneurs (Tynelius, 2016). This was done by comparing intentions and formulations in different documents with interview results and by interpreting and seeking an understanding of how entrepreneurs and prospective innovators perceive the support. Moreover, it should be mentioned that many of the evaluations studied are so-called mid-term evaluations, in which the evaluator examines whether established processes or application procedures match the goals of the policy. These mid-term evaluations are carried out when a project has begun or is half-finished and thus make it difficult to assess efficiency or effectiveness.

Finally, evaluators often base their reports on a mix of data sources. In our study, such data is defined as a combination of both objective data, defined as independent from the viewer and exemplified by, for instance, index data referring to company turnover, or gathered patents; and subjective data, like self-evaluations of people taking part in projects or other value statements from respondents. More than half of the evaluations studied, 67 of the 110, were based on mixed data. Twenty-three were based on subjective data (again, value statements from participants or beneficiaries)

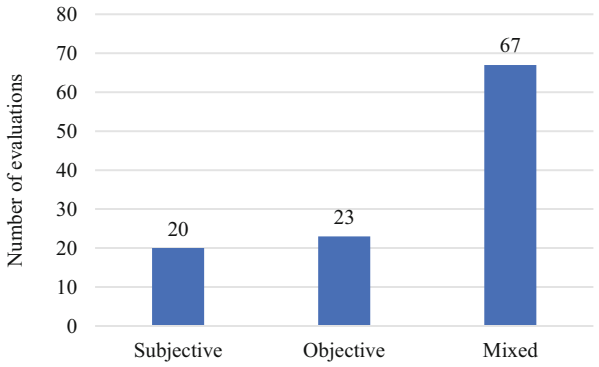

Fig. 4 Data used in evaluations of Swedish growth and innovation policies

and 20 on objective data (index data). Figure 4 shows the frequencies of each data type used in the studied evaluations.

Public policy programs such as innovation policies are often quite complex in nature and studying different types of data to evaluate effects from such a policy hence seems a plausible approach. Apart from the variables presented above, two additional control variables were studied: *type of intervention* evaluated and *whether the evaluated program was ongoing or completed*. *Type of intervention* was coded in accordance with three possible types of interventions: *Financing intervention*, for example, grants or subsidies; *Rule changes*, such as permission to research new materials or regulatory relieves; and *Information efforts*, such as training in patent application or entrepreneurship. The evaluations examined concerned both completed and ongoing initiatives, which were coded by the dummy coding *ongoing* or *completed intervention*.

4.3 Evaluating Actors and Employed Methods

The next step in the analysis was to study the variation in evaluation judgments shown when divided based on the different types of actors. Among the 56 evaluations carried out by consultants, 45 (80.4%) were positive, the remainder neutral. For other types of actors, the distribution was much more even between the judgments distributed. Among other agencies, 11 (35.5%) evaluations were positive, 15 (48.4%) neutral, and 5 (16.1%) negative. Among researchers, 7 were positive, 7 neutral, and 1 negative; and among self-evaluations, there are 4 positive and 4 neutral evaluations. The results thus show that consultants provide considerably more positive evaluations than other actors. Figure 5 shows the frequencies of each judgment based on the actor conducting the evaluation.

To probe whether this correlation is statistically significant, Fischer's exact test was performed on the *actor* and *judgments* of evaluation variables (p-value: 0.001).

The dataset shows no major variation in the evaluations depending on which methods or data type they utilized, but great variation depending on the evaluating

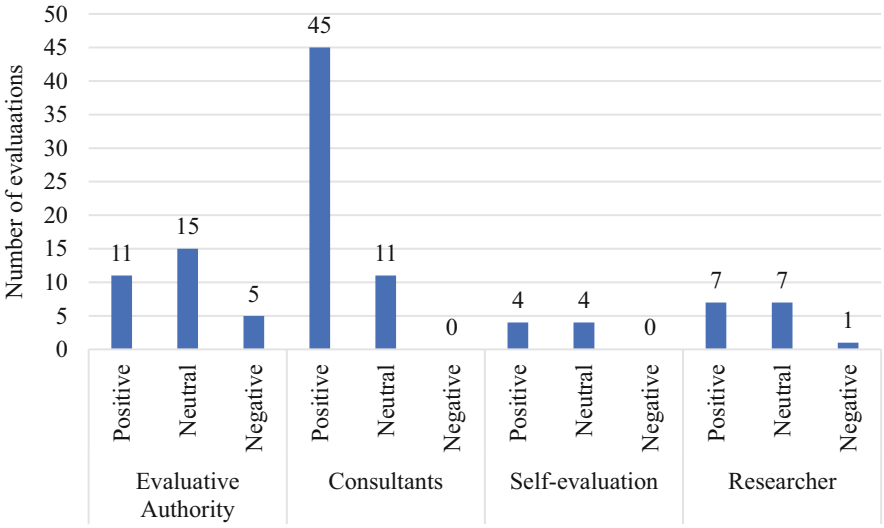

Fig. 5 Reviews of valuations of Swedish growth and innovation policies by evaluative actor

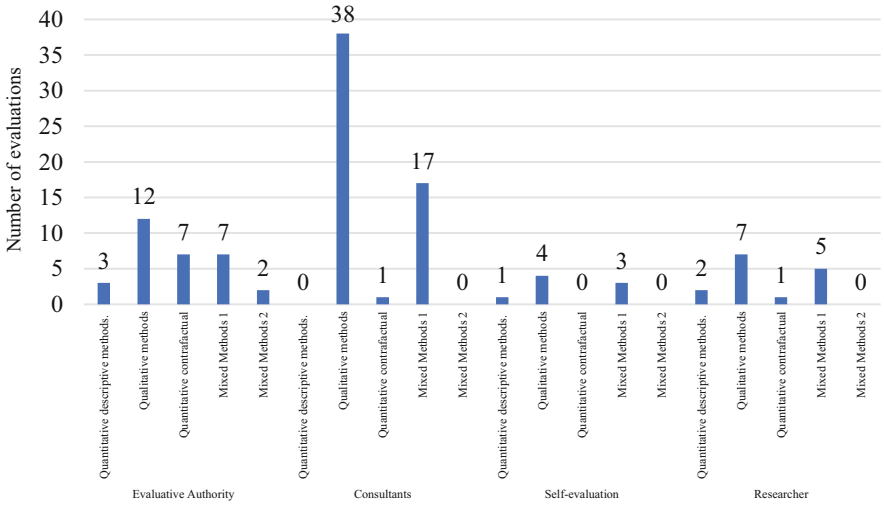

Fig. 6 Methods used in Swedish growth and innovation policy evaluation by evaluative actor

actor type. Figures 6 and 7 show frequencies of methods and data type based on the actor conducting the evaluation. The figures show a clear propensity among consultants to use qualitative and mixed methods while evaluative agencies have a slightly more even distribution between methods. The high number of qualitative methods could be attributed to the fact that a lot of the evaluations are conducted on ongoing projects, which makes quantitative approaches, often based on measuring effects

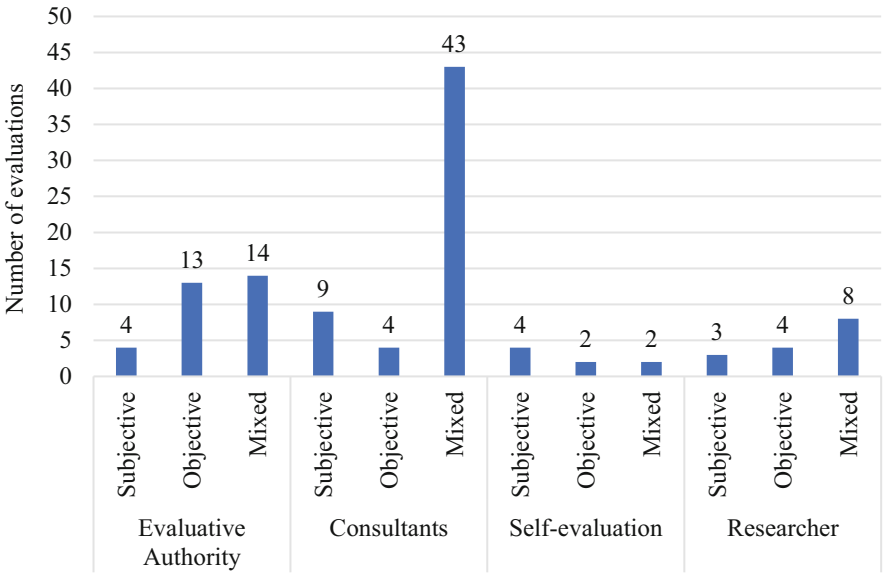

Fig. 7 Data used in Swedish growth and innovation policy evaluations by evaluative actor

through indicators such as employment, company turnover, or patents, somewhat difficult to perform.

To rule out other potential explanations and to map additional correlations, a logistical regression analysis was performed. The results, which are given in appendix 9.1, show high odds ratios and statistically significant *p*-values between a dummy for *positive judgment calls in the evaluations* and a dummy for the actor type *consultant*. We also observe a negative relationship between the method category qualitative methods and less positive evaluations, meaning that qualitative approaches are more like to result in positive evaluations. Notably, the "consultant effect" in terms of the strong correlation between the type of evaluating actor and their evaluations of policy remained statistically significant ($p = 0.02$), indicating that difference in, for instance, methods or data utilized in the evaluation, cannot explain the difference between different evaluators.

5 Discussion

Our results show that the vast majority of evaluations are positive, and few make use of quantitative evaluations in which real effects can actually be measured. Moreover, consultants are significantly more likely to conduct positive evaluations relative to the other evaluating actors. This does not seem to be due to the consultants using different methods, utilizing certain types of data material, or evaluating a certain type

of political intervention. What affects the results rather seems to be that it is specifically consultants that carry out the work.

The strong positive relationship between consultants as actors conducting evaluations and an evaluation being positive is the major finding of our study. Indeed, it is not a trivial finding. We have yet to confirm a causal relation between the two. In what follows, we, therefore, discuss possible explanations of the results and draw implications for future research.

5.1 What May Underlie Differences in Evaluations of Innovation Policy?

One plausible explanation could be found in public choice theory, according to which government agencies have an innate interest of looking out for themselves, partly through indicating positive results of their work (Niskanen Jr, 1994). Evaluated agencies can hence be expected to have strong incentives to choose evaluators they expect to give positive evaluations, since this gives them arguments for continued funding and support. Consulting companies are therefore likely, through competitive pressure, to become inclined to please their clients, which seems to mean that they come up with positive evaluations.

Vice versa, it can be argued that reviewing agencies such as the Swedish National Audit Office and Growth Analysis may have incentives to examine other agencies' efforts carefully and potentially more critically in order to identify problems and shortcomings and thereby justify their assignment as an examining agency.

Another explanation as to why consultants provide significantly more positive evaluations compared to other actors could be that they are hired to evaluate interventions that agencies already know have yielded positive results and therefore are considered easier to evaluate. Interventions that are more difficult to evaluate, and therefore often detect neutral or negative results, would, according to the same logic, be entrusted to evaluation agencies whose opinions should thus differ according to what we have observed. What speaks against such an interpretation would be that the positive evaluations studied often use methods that do not make it possible to draw conclusions on a scientific basis.

A potentially more reasonable interpretation of our results would be that evaluators are aware that the result affects the possibilities of obtaining further assignments from the agency in question. When a number of private, profit-maximizing companies compete with each other in a procurement procedure, significant sums are at stake. The winner of the procurement can hire additional staff at the next stage and charge by the hour in a way that benefits both superiors and shareholders. It would be strange if such an arrangement did not affect how evaluations are formulated, not least because this is a repetitive game in which the results from one evaluation can be expected to influence the outcome of the next procurement. The companies that carry out these evaluations are placed in an incentive structure in which it becomes very difficult to frame the results negatively.

Conversely, an evaluated agency is also in a challenging situation. With demands to be evaluated continuously and to report results to responsible politicians, the need for positive evaluations is apparent. As pointed out by the Swedish National Audit Office (2020), the government has, from time to time, presented results from evaluations to the Swedish parliament in more positive terms than are proportional to the results and methods of the evaluation. Such an observation also suggests that there is a demand for positive evaluations among responsible politicians. Thus, a pressure might exist on government agencies to generate positive results, as these are demanded by decision-making politicians.

Since the present study does not look at whether policies in the field actually work, it is not possible to determine exactly how these explanations should be judged. Further research in the field is hence important.

Every year, large sums are spent on innovation policies. Strictly speaking, results from the evaluation of any single policy can only be generalized to the specific policy intervention, and possibly similar ones carried out in the near future. Yet, there are well-articulated and important reasons for policy development and policy evaluation to "accumulate knowledge" and learn (Mazzucato, 2012). Hence, evaluating practices and quality remain central to any type of innovation policy that seeks to direct or enhance the sum, quality, or type of innovations in society.

The special nature of innovation policies, with limited funding in the form of often time-limited financial efforts, makes the results more difficult to directly apply to other policy areas. However, one area that is similar to innovation policy in this respect is foreign aid policy.

5.2 Future Research

Our novel approach to study a larger quantity of evaluations simultaneously has proven useful in exposing systematic differences between evaluators and could hence be beneficially utilized for similar future tasks. Future research could investigate incentives motivating evaluators, their relationships to the evaluated agencies, and their general evaluative competences.

One important thing to point out is that not every evaluation aims to measure both the *effectiveness* and *efficiency* of any single policy studied. Yet, a conceptual confusion exists between these concepts in the evaluations scrutinized. There are of course valid reasons to evaluate both of these concepts, by on the one hand evaluating the degree to which a policy is effective (i.e., whether it succeeds in meeting its goals), and on the other hand, evaluating its degree of efficiency (e.g., cost-effective vs expensive, simple vs cumbersome). Focusing on, for example, experiences of beneficiaries or the viewpoints of bureaucrats executing the policies provides valuable information that can help improve policy efficiency. However, and importantly: The latter type of more process-oriented evaluative methods should not, as is often done, be used to indicate *whether or not a policy is truly effective,* i.e., *accomplishing its designated results.*

From this perspective, it can be concluded that assessments of *effectiveness* seem to be almost completely absent among the studied evaluations, yet, many of the evaluations still contain phrases that can be interpreted as gauging policy effectiveness (i.e., goal accomplishment), even if that is not the explicit intention of the evaluation in question or if the methods employed do not enable assessment of policy effectiveness. It is one thing to evaluate whether or not one has achieved the expected goals but another to investigate whether one could have achieved the same with fewer resources, or achieved better effects with the same resources. If evaluations are to work as a safeguard of a society's common resources, such a perspective is truly warranted.

Moving from what can be said based on the study presented, an additional feature of the evaluative system operating close to the innovative policy field deserves to be mentioned: There are not that many agencies, firms, and people working with innovation policy (and likely other policy fields) and the evaluation of such policies in any smaller country. It is not uncommon that people start their career within an executive agency and then move to work for the evaluative branch of the complex, maintaining relationships with previous coworkers and the agency in question. In our pre-study, we came across examples of consultants winning procurements partly through such relationships or inside knowledge. While such relationships can of course provide good insight into how to evaluate, in quite a critical and efficient way they also demonstrate risks of—possibly unintentional—corruption. Studying the networks of people designing and executing policies, and those that evaluate the same policies, is therefore a pertinent area of study.

5.3 Policy Recommendations

Despite *evaluation* being a scientific field and higher education curriculum subject in economics, public policy, political sciences, psychology, and the educational sciences, there is no specific education or public certification for *evaluators* of public policy programs. Yet, evaluations of public policies proliferate, and today represent a large industry within and across countries. We have yet to discover if any specific common practice or ethos is present among evaluators but currently, few such indications have been found. An increased focus upon creating such an education or ensuring a common framework of evaluative practice could be an important step toward ensuring different types of evaluations are used and interpreted according to their separate purposes.

Another policy change to enhance evaluative practice could be to limit the type of evaluation allowed to be conducted (and financed) by executive agencies. It is important that such agencies are allowed to learn from and improve their implementation processes but to also assign the agencies the responsibility to evaluate their own policy efficiency or effectiveness is to create a system with distorted incentives. To solve this dilemma, such evaluations should be tasked to independent agencies and, in the case that private consultants are to be procured, such procurement should

involve criteria of both appropriate methods and independent practices. Such independence could potentially also be improved through some type of single-blinded system in which the agencies evaluated are unaware of who evaluated their policies.

6 Conclusion

In this chapter, we have explored evaluations of innovation policy. We add an important piece to the puzzle of innovation policy by studying a large sample of evaluations and looking for patterns across the data. Our results show that the overwhelming majority of evaluations are positive or neutral and that very few evaluations are negative. While this is the case across all categories of evaluators, we note that consulting firms stand out as particularly inclined to provide positive evaluations. The absence of negative or critical reports can be related to the fact that most of the studies do not rely upon methods that make it possible to discuss effects.

This discrepancy between so many positive evaluations on the one hand and comparatively weak evaluation methods, on the other hand, leads us to suspect that evaluators are not sufficiently independent. Consultants and scholars that are funded by a government agency in order to evaluate the agency's policies and programs are put in a position where it is difficult to maintain objectivity.

Our results indicate that further studies of how innovation policies are evaluated would be of interest, especially with regard to potential conflicts of interest.

Appendices

Fischer's Exact Test, Evaluating Actor and Evaluations of Public Innovation Policies

	Evaluations of Public Innovation Policies			
Actor Type	**Negative**	**Neutral**	**Positive**	**Total**
Evaluative agency	5	15	11	31
	(1.7)	(10.4)	(18.9)	(31.0)
Consultants	0	11	45	56
	(3.1)	(18.8)	(34.1)	(56.0)
Self-evaluation	0	4	4	8
	(0.4)	(2.7)	(4.9)	(8.0)
Researcher	1	7	7	15
	(0.8)	(5.0)	(9.1)	(15.0)
Total	6	37	67	110
	(6.0)	(37.0)	(67.0)	(110.0)
	$p = 0.000$			

Logistic Regression, Outcome Variable: Positive Policy Judgment

	Odds ratio	**P-value**
Evaluative agency	0.67	0.67
Consultant	9.00	0.02
Researcher	1.18	0.87
Quantitative descriptive methods	1.11	0.93
Qualitative descriptive methods	0.29	0.04
Quantitative Contrafactual methods	0.34	0.34
Subjective data	1.28	0.78
Mixed data	0.82	0.81
Financing policy[a]	5.91	0.00
Completed policy[b]	0.47	0.13
Constant	0.49	0.54
	n = 110	
	Pseudo $R^2 = 0.$ 2485	

[a] Indicating a policy substantially consisting of grants or funding of a specific project. Compared to policies consisting of information, such as educative efforts or efforts to create networks or relationships between key innovative actors

[b] Indicating policies which, by the time of evaluation, were finished compared to ongoing policies. A majority of the studied evaluations were conducted on such, ongoing, policies

References

Bovens, M., Hart, P., & Kuipers, S. (2008). The politics of policy evaluation. In R. E. Goodin, M. Moran, & M. Rein (Eds.), *The Oxford handbook of public policy*. Oxford University Press.

Dahler-Larsen, P. (2007). Evaluation and public management. In E. Ferlie, L. E. Lynn Jr., & C. Pollitt (Eds.), *The Oxford handbook of public management*. Oxford University Press.

Daunfeldt, S.-O., Tingvall, P. G., & Halvarsson, D. (2016). Statliga innovationsstöd till små och medelstora företag–har de någon effekt? *Ekonomisk Debatt, 44*(1), 6–19.

Furubo, J.-E., Rist, R. C., & Sandahl, R. (2002). *International atlas of evaluation (Vol. 2002)*. Transaction Publishers, cop.

Goodin, R. E., Moran, M., & Rein, M. (Eds.). (2008). *The Oxford handbook of public policy*. Oxford University Press.

Gustavsson Tingvall, P., & Deiaco, E. (2015). *Do selective industrial policies cause growth?* Tillväxtanalys.

Hood, C. (1991). A public Management for all Seasons? *Public Administration, 69*(1), 3–19.

Hunt, R. A., & Kiefer, K. (2017). The entrepreneurship industry: Influences of the goods and services marketed to entrepreneurs. *Journal of Small Business Management, 55*, 231–255.

Karlson, N., Sandström, C., & Wennberg, K. (2019). *Markets or bureaucrats in innovation policy*. Ratio.

Knill, C., & Tosun, J. (2012). *Public policy a new introduction*. Palgrave Macmillan.

Mazzucato, M. (2012). *Mission economy: A moonshot guide to changing capitalism*. Penguin.

Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities. *Industrial and Corporate Change, 27*(5), 803–815.
Niskanen, W. A., Jr. (1994). *Bureaucracy and public economics (2:Nd ed., Vol. 1994)*. Edward Elgar.
Pollitt, C. (2003). *The essential public manager*. McGraw-Hill Education.
Power, M. (1997). *The audit society–rituals of verification*. Oxford University Press.
The Swedish National Audit Office. (2020). *En granskningsrapport från riksrevisionen* (s. 59). Riksrevisionen.
Scriven, M. (1991). *Evaluation Thesaurus* (Fjärde Upplagan, Vol. 1991). SAGE.
Tynelius, U. (2016). *De regionala företagsstöden (2016:01; s. 106) [Regional firm support systems]*. Tillväxtanalys.
van den Berg, C., Howlett, M., Migone, A., Howard, M., Pemer, F., & Gunter, H. M. (2019). *Policy consultancy in comparative perspective: Patterns, nuances and implications of the contractor state*. Cambridge University Press. https://doi.org/10.1017/9781108634724
Vedung, E. (2009). *Utvärdering i politik och förvaltning [Evaluation in politics and administration]*. Studentlitteratur.
Ylönen, M., & Kuusela, H. (2019). Consultocracy and its discontents: A critical typology and a call for a research agenda. *Governance, 32*(2), 241–258. https://doi.org/10.1111/gove.12369

Do Targeted R&D Grants toward SMEs Increase Employment and Demand for High Human Capital Workers?

Sven-Olov Daunfeldt, Daniel Halvarsson, Patrik Gustavsson Tingvall, and Alexander McKelvie

Abstract Most previous studies on the employment effects of government R&D grants targeting SMEs are characterized by data-, measurement-, and selection problems, making it difficult to construct a relevant control group of firms that did not receive an R&D grant. We investigate the effects on employment and firm-level demand for high human capital workers of two Swedish programs targeted toward growth-oriented SMEs using Coarsened Exact Matching. Our most striking result is the absence of any statistically significant effects. We find no robust evidence that the targeted R&D grant programs had any positive and statistically significant effects on the number of employees recruited into these SMEs, or that the grants are associated with an increase in the demand for high human capital workers. The lack of statistically significant findings is troublesome considering that government support programs require a positive impact to cover the administrative costs associated with these programs.

Keywords Innovation policy · R&D grants · Statistical matching methods · High human capital · Firm growth · Outcome additionality

S.-O. Daunfeldt (✉)
Institute of Retail Economics, Stockholm, Sweden
e-mail: sven-olov.daunfeldt@huiresearch.se

D. Halvarsson
The Ratio Institute, Stockholm, Sweden
e-mail: daniel.halvarsson@ratio.se

P. G. Tingvall
Södertörn University, Södertörn, Sweden
e-mail: Patrik.Tingvall@kommerskollegium.se

A. McKelvie
Whitman School of Management, Syracuse University, Syracuse, NY, USA
e-mail: mckelvie@syr.edu

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_10

1 Background

A surprisingly small number of new ventures and innovative small- and medium-sized enterprises (SMEs) account for a large share of net job creation and productivity growth in the economy (Henrekson & Johansson, 2010). However, due to a lack of financial resources or competitive positions, many SMEs are not able to survive their first years of operations (Nightingale & Coad, 2014; Shane, 2009). As a consequence, targeted R&D grant programs were created as part of industrial policy for most governments in Europe (Becker, 2015). The main goal of these R&D grant programs is to alleviate financial and market pressures while R&D efforts are brought to fruition, thereby increasing the likelihood that these firms fulfill their growth potential.

Job growth tends to be one of the most important reasons why policymakers launch R&D grants toward growth-oriented SMEs, and it is widely regarded as a proxy for the social returns of such government support programs (Cantner & Kösters, 2015). Additional R&D activity is considered to best be captured by an increase in number of employees (Cantner & Kösters, 2015; Wallsten, 2000). A recent literature overview by Dvouletý et al. (2021) indicates that R&D grants toward SMEs in the European Union have been successful in promoting employment growth. However, these authors report significant differences depending on the length of the post-support period, firm size, region, industry, and size of the grant. This implies that we still need more knowledge about the effectiveness of such targeted R&D grant programs, and about whether they are effective in influencing the demand for labor among growth-oriented SMEs (Edler et al., 2013).

Another aim of R&D grants for growth-oriented SMEs is to spur innovative activities, which suggests that such targeted R&D grants should influence firms' demand for high human capital employees (see e.g., Wolff & Reinthaler, 2008). As noted by Himmelberg and Petersen (1994), R&D expenditures in small firms are generally spent on the salaries of scientists and engineers, or others with the human capital to drive innovation forward. However, as far as we know, few studies have investigated if R&D grants toward growth-oriented SMEs increase the share of highly educated employees among these firms.

We believe that this knowledge gap is based on data-, measurement-, and selection problems. Because selective grants are designed to target specific firms, any observed effects on the outcome of the targeted firms can equally well be a result of the selection process, rather than the effectiveness of the grant. In other words, if the selection of the grant recipients is based on known qualities or the potential of the firm, it is hard to objectively compare them to firms that did not receive a grant. Matching methods are typically used to overcome such selection issues, but they require longitudinal data on both treated (i.e., those firms that receive grants) and non-treated (i.e., those firms that do not receive grants) firms that enable scholars to construct appropriate comparison groups. Such longitudinal data on targeted R&D grants have until recently not been available.

Previous attempts to circumvent the issues of appropriate matching and evaluation of effectiveness include Söderblom et al. (2015), Autio and Rannikko (2016), and Howell (2017). Their studies utilize detailed information on SMEs that applied for R&D support programs, using the outcomes of firms that were rejected in the final evaluation stage to control for selection effects. Söderblom et al. (2015) found that a Swedish R&D grant targeting growth-oriented startups increased the firms' growth in terms of employees and sales. Further, the grant program made it easier for the firm to attract external financing and overcome "the liabilities of newness" (Stinchcombe, 1965), i.e., their struggle to develop routines, establish relationships with customers, and reach a more efficient scale of operation. Neither Autio and Rannikko (2016) nor Howell (2017) focused on employment growth, but their results provided indications that R&D grants toward growth-oriented SMEs spurred innovation and increased sales.

The strategy to identify the link between receiving a grant and firm-level outcomes relies on the appropriateness of using a comparison group composed of firms that were rejected in the final round of the selection process. The relevance of this identification strategy depends on whether the outcome in the last stage of the decision-making process can be considered as approximately random. Otherwise, the results can be a consequence of an omitted variable that is correlated with the outcome variable and the probability of receiving an R&D grant. However, whether the probability of receiving a grant in the last stage of the decision-making process can be considered as random is highly questionable, since grant-issuing agencies often rely on elaborate ranking processes, usually conducting lengthy interviews to decide which firms will receive an R&D grant.

We estimate the effects of two Swedish government R&D grant programs administered by Vinnova, a Swedish government agency under the Ministry of Enterprise and Innovation. These programs seek to promote the development of new products and processes that could bring about new innovations and promote the long-run growth of SMEs. The instruction from the government explicitly states that Vinnova must account for the change in the number of employees that has taken place in SMEs to which they distributed support during the period 2006–2009. This is important as it articulates the effects on employment as a societal aim of these programs (Ministry of Industry, 2013). Note that these programs explicitly aim to promote new innovations and new knowledge, implying that they should have a particular effect on the recruitment of employees with high human capital. Consequently, we study the effectiveness of these grant programs by investigating whether they have a positive effect on the number of employees and the share of highly educated (our measure of high human capital) workers in the targeted firms.

To circumvent the methodological issues discussed above, we use Coarsened Exact Matching to construct a control group from the full population of Swedish firms. Our analyses are based on a unique longitudinal dataset on targeted R&D grant programs in Sweden, which is linked with matched employer–employee data from Statistics Sweden. We find no evidence that the government support programs had any positive and statistically significant effects on the number of employees brought into the targeted firms. This includes a lack of effect during the short-term

period in which the firm received grant support, as well as up to 5 years after the support program ended. We also investigate the effect of the government support programs on the demand for employees with higher human capital (as captured by the share of employees that have completed higher education) in the targeted SMEs. This is important because targeted R&D grants might encourage SMEs to recruit workers with higher human capital and higher salaries, rather than increasing their total number of employees. However, we find no robust evidence of any impact of the targeted R&D grant programs on the share of highly educated workers either.

The absence of any statistically significant effects is troublesome considering that targeted R&D grants require a positive impact that at least covers the administrative costs associated with these programs. Our results thus question the relevance of implementing government support programs targeting SMEs with high-growth potential. We believe that our findings challenge the more established norms that are widely accepted in terms of providing government grants to highly innovative firms. In illustrating the potential lack of impact of these grant programs, we hope to raise potential issues that relate to the selection mechanisms involved in such grant processes and consider alternative measures and outcomes of these grants.

2 Effects of Targeted R&D Grant Programs on Labor Demand

There is an extensive literature evaluating different aspects of targeted R&D grant programs. Overall, this literature illustrates an equivocal state of affairs concerning the overall impact and effects of these R&D grants. For example, some support programs seem to yield positive results on innovation and growth, while the results from other programs are less clear, and some even demonstrating negative effects.

Dvouletý et al. (2021) provide a review of empirical studies that have investigated the effects of targeted R&D grants on firm performance in 28 European Union member countries. The authors only include studies that employ techniques to estimate the counterfactual outcome of the grants, such as propensity score matching (PSM) and regression discontinuity design (RDD). The review covers several different outcome variables, including employment growth but not demand for skilled labor. The results show that 20 studies have investigated the effects of targeted R&D grants on employment growth, and that 18 of these studies report positive employment effects. This indicates that R&D grants targeted toward SMEs can be successful in promoting employment growth. However, the results also reveal significant differences depending on the length of the post-support period, firm size, region, industry, and size of the grant.

Zúñiga-Vicente et al. (2014) offer another extensive overview of the impact of R&D grants, based on a compilation of 77 studies from different countries. Their main conclusion is that the results are rather mixed in terms of overall impact, but that there are four clear tendencies. First, the crowding-out effect of a support

scheme, i.e., the decline in private investments following a government grant, seems to be affected by the financial restrictions (e.g., bank contacts, ability to attract venture capital) faced by the individual firm. Second, the effect of support programs differs between basic research and development projects. Third, the impact of the grant is most likely larger for smaller R&D projects or when the grant is relatively large compared to firm sales. Finally, there is a time lag before any positive effects of a grant are realized.

Koski and Pajarinen (2013) argue that the time lag between a grant and its impact tends to be somewhere between one and three years. One problem with time lags is that the more time that passes between grant receipt and outcome, the greater the risk that the causal impact of the grant is contaminated by unobserved factors that take place during the post-treatment period (Mian & Sufi, 2012). However, when investigating the effects of R&D grants on firms' demand for labor, Koski and Pajarinen (2013) found that the R&D grant had a positive impact on employment during the time of the support program but diminished after the support program ended. Previous studies also indicate that the effects of targeted R&D grants seem to be larger for small firms as compared to large firms (see e.g., Bronzini & Iachini, 2014).

Söderblom et al. (2015) try to address the selection problem when analyzing the effects of a targeted R&D grant program among Swedish innovative startups by comparing data on firms that received support with those that applied for funding but were rejected at the last stage of the decision-making process. Their identification strategy is thus to compare the development of firms that received subsidies (treatment group) with firms that applied but were rejected in the last instance (control group). The logic is that those firms who were the *last out* offer the closest comparison to the firms that received grants. The final treatment group consists of 130 firms that received funding during 2002–2008, compared with 154 firms in the control group that were rejected at the last stage. The results indicate that the targeted R&D grants had a positive and statistically significant effect on employee and sales growth, implying that small startups grants can be an efficient way of promoting the growth of new innovative companies.

A similar comparison strategy was used by Autio and Rannikko (2016) when investigating the effects of a Finnish R&D program also focusing on growth-oriented new ventures. Although not focusing on employment effects per se, they found that firms participating in the R&D program increased sales by 120% compared to the control group of non-targeted firms. Howell (2017) analyzed data on ranked applicants to the US Department of Energy's SBIR grant program, finding a large positive effect of the R&D grant on revenues and patenting. However, this study does not focus on the effects of targeted R&D grants on employment nor on demand for skilled labor.

An implicit assumption behind the identification strategy described above is that there are great similarities between those firms that were supported, and those that *almost* received support from the program. This kind of identification strategy is thus only valid if the firms that received support were randomly chosen at the last stage of the selection process (Angrist & Pischke, 2008). However, government agencies tend to select those firms that receive support based on metrics and data from

personal interviews and expert group evaluations. It is thus likely that there is a systematic difference between the treatment and control group based on the subjective perceptions of these interviews and evaluations, and that those firms that received support would have performed better than the treatment group even in the absence of support.

Note also that the treatment and control groups might be different even if the firms are endowed with similar observable characteristics. The selection of the firms that received support might depend on factors that are unobservable to the researchers but are correlated with the future growth of the companies. If we believe that the decision-makers select and recommend firms that have a higher probability of success, then we would expect that these firms perform better over time regardless of whether they receive subsidies.

3 Data and Programs Analyzed

To estimate the average treatment effect of a targeted grants program (ATT), information is required about the targeted firms, the amount they received, and when they received it. We obtain this information from the Micro Database of Government Supports to Private Business (MISS), which is a comprehensive dataset on government support programs compiled by *Myndigheten för tillväxtpolitiska analyser och utvärderingar* (the Swedish Government Agency for Growth Policy Analysis). The dataset includes a unique firm identification number, which makes it possible for us to merge MISS data with a matched register-based employer–employee dataset from Statistics Sweden that covers all limited liability firms in Sweden. This dataset includes information on number of employees, investments, sales, value added, industry affiliation, and educational attainment of workers, among other variables.

We investigate the effects of two R&D grant programs included in MISS, *Vinn Nu* (Win Now) and *Forska & Väx* (Research & Grow). These programs were chosen because they both target growth-oriented innovative SMEs with the purpose of increasing innovative activities and job growth. The programs are administered by Vinnova, a Swedish government agency under the Ministry of Enterprise and Innovation.

Vinn Nu was initiated in 2002 with the logic that there was a lack of private funding for young R&D-intensive firms. This program targets innovative startup companies with the objective of improving their conditions for survival, helping the commercialization of innovations, and attracting external capital. The expectation is that this program will help these companies to grow and become more successful businesses. These grants do not require a firm cash match, but the firm must have developed a product, method, or service that has not yet reached the market in order

to qualify for the grant. The maximal amount that a firm could receive during the study period was 300,000 Swedish krona (SEK).[1]

Applications to *Vinn Nu* are first evaluated by an internal group of experts within Vinnova and the Swedish Energy Agency. Approximately half of the applications go to a second round, where they are judged by a panel of external experts. The final candidates are then called to an interview before Vinnova decides which firms will receive the grant (Samuelsson & Söderblom, 2012).

Forska & Väx was launched in 2006 and targets SMEs with existing R&D activities. The program seeks to stimulate innovation-driven growth for the targeted companies. In contrast to *Vinn Nu*, *Forska & Väx* is a matching grant that requires at least 50% co-financing of the R&D investments by the targeted firms. The applicants could apply for a maximum of five million SEK, and they were required to have at least one million SEK in sales (or in share capital) and no more than 250 employees to be eligible for funding. Firms also needed to demonstrate the potential to improve on or develop new products. Some firms also applied for a smaller grant to develop an implementation plan of the larger R&D project within the scope of the program. In this case, firms could apply for a maximum of 300,000 SEK without co-financing. This smaller grant only required applicants to have achieved 300,000 SEK in sales.[2]

According to the calls for submissions of these programs, they both seek to promote the development of new products and processes that could bring about new innovations and promote job growth among SMEs. This is also emphasized by the fact that the agency had to report "change in turnover, employment and value added" of the supported companies to the government (Ministry of Industry, 2013). The programs are thus designed to increase the demand for labor and the purpose is also to help companies run development projects. It is therefore reasonable to assume that the grants should facilitate the recruitment of key individuals with the skills and abilities to innovate and thereby increase the share of employees with higher human capital. Hence, if effective, these grants should have a positive effect on the number of employees and the share of skilled workers in the targeted SMEs.

In Table 1, we present the number of yearly grants along with average grant size (SEK) from *Vinn Nu* and *Forska & Väx*, respectively, during the period 2002–2010. Since a grant is sometimes paid out in parts, it is possible for individual grants to encompass multiple payouts. An average of 14 grants per year were made under *Vinn Nu*. Samuelsson and Söderblom (2012) noted that 1309 firms applied for support from *Vinn Nu* during 2002–2011, which means that approximately 10% of all applicants received a grant.

Forska & Väx has approximately ten times more grants per year compared to *Vinn Nu*. The average amount paid out is also almost four times higher under the *Forska & Väx* program. Targeted firms under *Vinn Nu* received, on average per year,

[1] This corresponds to approximately US$40,200 based on the average SEK/USD exchange rate (0.1340) during the period 2002–2010.

[2] These development grants represent a small share of the *Forska & Väx* program.

Table 1 Number of yearly grants and average grant size (SEK) for each program, 2002–2010

	Number of yearly grants		**Average grant size (SEK)**	
Year	*Vinn Nu*	*Forska & Väx*	*Vinn nu*	*Forska & Väx*
2002	5		300,000	
2003	16		193,977	
2004	5		125,000	
2005	19		211,111	
2006	18	150	180,000	904,341
2007	18	65	150,000	651,911
2008	12	45	123,103	378,016
2009	14	165	152,818	689,474
2010	18	121	174,194	359,554
Average, 2002–10	14	109	178,911	596,659

received 178,911 SEK during 2002–2010. This can be compared with 596,659 SEK, the average amount paid out under *Forska & Väx*, yearly, during the study period.

4 Empirical Method

4.1 Matching

The ideal goal when investigating the effects of targeted R&D grants toward SMEs is to get an estimate of the *counterfactual* outcome, i.e., to answer the "what would have happened to the treated firms if they not had received the R&D grant?" question.[3] Since firms are not randomly selected by the programs, it is central to identify a non-treated control group of firms that is as similar to the treated firms as possible across all relevant dimensions. Systematic differences between the control and treatment groups may otherwise bias the results. There are different ways to tackle this kind of selection issue, such as regression discontinuity design, instrumental variables, natural experiments, difference-in-difference, and various matching methods. Each alternative is associated with both advantages and disadvantages.

For a firm *i,* let $T_i = 1$ if it is treated, and $T_i = 0$ if it is not, the effect on some outcome variable Y_i can then be described as a function of T_i such that:

[3] Henceforth, we refer to firms that receive a grant from either *Vinn Nu* or *Forska & Väx* during the period as treated firms, and firms that do not receive support as non-treated firms. All results presented are for both programs. Results are qualitatively similar if we conduct separate estimations for each program. These results are not reported here, but are available from the authors upon request.

$$Y_i(T_i) = T_i Y_i(1) - (1 - T_i) Y_i(0)$$

For treated firms, the counterfactual is given by $Y_i(0)$. The most effective method (if there is one) often depends on the nature of the problem and the data available. We have detailed information about both the treated and non-treated firms, as well about the grants, which have led us to opt for a matching method to approximate $Y_i(0)$.

We let $\boldsymbol{X}$ be a vector of characteristics for N non-treated firms that explain Y_i along with the probability of receiving a grant. To approximate $Y_i(0)$, matching methods strive to limit the number of non-treated firms in the dataset to $M \leq N$ such that the characteristics between the limited set of matched firms ($\boldsymbol{X}^M$) become as similar as possible to the characteristics of the treated firms ($\boldsymbol{X}^T$). Given the distance function $d(\cdot, \cdot)$ we would like to have $d(\boldsymbol{X}^M, \boldsymbol{X}^T) \cong 0$ (Iacus et al., 2011). Ideally, we would want to have $d(\boldsymbol{X}^M, \boldsymbol{X}^T) = 0$, which corresponds to an exact matching between the treated and control firms with the same level in their covariates. Such ideal conditions, however, are rarely met in practice, especially for continuous covariates such as performance and profitability.

To identify the control group of firms whose covariates are as similar as possible to the treated firms, we rely on the matching methods of Coarsened Exact Matching (CEM) developed by Iacus et al. (2011, 2012). Since small differences between the covariates for treated and control firms do not necessarily reflect economically meaningful differences, CEM allows for a coarsening of the variables upon which an exact matching can be performed. Any imbalance between the covariates of the treated and control firms is thus decided upon beforehand. This implies that the maximum imbalance that may result after the matching is bounded by the width of the coarsening bins.

This type of matching has some advantages (Blackwell et al., 2009; Iacus et al., 2011, 2012), especially compared to the more commonly used Propensity Score Matching (PSM) (see King & Nielsen, 2015 for example). Most importantly, the CEM estimator satisfies the property of being monotonically imbalance bounding (MIB), which means that total balance can be improved by adjusting the balance of a single covariate. This property, for example, is not shared with PSM, where there is no way of knowing if the total balance in the matching has been improved by ameliorating the balance of a single covariate or by adding or removing covariates. The MIB property of CEM greatly facilitates our aim to, via matching, find a more appropriate control group consisting of untreated firms, contrary to PSM, which merely "works when it works, and when it does not work, it does not work (and when it does not work, keep working at it)" (Ho et al., 2007, p. 219).

We include different variables in $\boldsymbol{X}$ to accompany our two outcome variables. First, the number of employees corresponds to the firm's *demand for labor*. The basic model of labor demand can be derived from the firm's cost function as a function of the return to factors and value added (Hijzen & Swaim, 2008). In this case, we include wages and value added, measures of firm skill intensity and the profitability of the company. The latter can be seen as a *beauty contest* indicator that

Table 2 Treated firms, before and after grants

Variable	Treated before	Treated after	Ratiobefore/after
Employment	19.83	20.34	1.03
Value added	9363	10,447	1.11
Wage	5880	6580	1.12
Share higher education	0.55	0.57	1.04
Profit ratio	−12.1	−1.37	0.11
Wage share higher ed.	0.59	0.60	1.02
Sales	27,512	31,054	1.13
Ln(capital stock)	6.21	6.19	1.00
Wage premium	2.32	2.66	1.15

may influence the probability of being selected by the programs. Second, to choose the matching variables $\boldsymbol{X}$ for the number of employees with high skills, we rely on models of firms' *relative demand for skills*, which similarly can be derived from cost minimization under given factor prices and output (Hansson, 2000).

We present descriptive statistics for our outcome variables and the variables included in $\boldsymbol{X}$ in Table 2. The results show that the treated firms on average have approximately 20 employees and that about 55% of their employees had completed higher education during the pretreatment period. The corresponding average values for the post-treatment period suggest that the treated firms increased their number of employees by approximately 3% and that their share of workers with post-tertiary education increases by approximately 2 percentage points. Note also that the treated firms on average increase sales and value added by about 10% after receiving an R&D grant.

To decide upon the coarseness of the respective variable, we use the generic algorithm proposed by the CEM-program *cem* in Stata. This means that the matching process gives a relatively high weight to the best-matched control firms (Blackwell et al., 2009). Table 3 presents the univariate L1 distance before and after the *cem* matching for our treatment and control group of firms, respectively. As can be seen in Table 3 below, matching reduces the differences unilaterally, except for profits.

4.2 A Difference-in-Difference Analysis

After we constructed a control group using CEM, we turned our attention to estimating the average treatment effect of the treated firms. More formally, we want to investigate:

$$\widehat{ATT} = \frac{1}{\sum_{i=1}^{n} T_i} \sum_{i=1}^{n} T_i \mathbb{E}[Y_i(T_i = 1) - Y_i(T_i = 0) | \boldsymbol{X}]. \quad (1)$$

Table 3 Imbalance test

	Treated vs. all firms	Treated vs. control group
	L1 distance	L1 distance
Labor demand		
Value added (log)	0.45	0.24
Wage (log)	0.38	0.24
Skill	0.48	0.10
R&D skill	0.22	0.11
Profits	0.08	0.13
No. of matched treated	481	
Relative demand for skills		
Sales (log)	0.39	0.28
Capital (log)	0.30	0.19
Profits	0.11	0.15
R&D intensity	0.35	0.37
No. of matched treated	484	

The reason why we cannot simply compare the average performance between the control group and the treatment group is that we want to check for any differences between $\boldsymbol{X}^C$ and $\boldsymbol{X}^T$ that remain after matching. We therefore rely on a difference-in-difference model to investigate the effect of the government support programs on our outcome variables number of employees and share of employees that have completed a higher education. The estimated model can in our fixed-effect set-up be specified as follows:

$$Y_{it} = \alpha + \delta_t + \beta_1 Treat_{it} + \beta_2 Post\_treat_{i.} + \boldsymbol{X}'_{it}\beta_X + \gamma_t + \mu_i + \epsilon_{it}, \qquad (2)$$

where *Treat* is a dummy variable for the treatment (i.e., receiving a grant) or alternatively, the amount of money paid out to the firm. If the responses from the targeted firms are immediate, the effects of the grant should be captured first and foremost by this variable. *Post_treat* is a post-treatment indicator taking the value one in the years following a treatment and zero otherwise. Given that the impact of the grant comes with a delay, the impact of the grant is captured by this variable. The set of control variables are included in the vector $\boldsymbol{X}$, μ_i captures time-invariant firm effects, γ_t captures period-specific effect, and ε is white noise.

In the labor cost equation, it is standard to account for the cost of adjusting the number of employees. Adjustment costs introduce state dependence in the labor demand equation, which from a modeling perspective means that we fit a dynamic lag to the labor demand model in Eq. (2). The dynamic panel data model is estimated using a system GMM estimator (Blundell & Bond, 1998), while relative demand for skills is estimated using a fixed-effect model.

One critique of matching is that it can only account for selection to the extent it occurs through observed variables. In the basic model, we therefore include a parameter α_i that captures unobserved variation specific to the firms and the period

under study. This eliminates selection bias on unobserved variables that do not vary within firms over the period under study. However, bias might still arise from firm-specific time-variant characteristics that we are not able to control for in the empirical analysis.

We consider two extensions of the basic model. First, we investigate if the treatment effect of the grants is moderated by the size of the targeted firms. Second, to investigate dynamic aspects of grant programs, we estimate the effect of the targeted R&D grant up to 5 years after the support period ended.

5 Results

We present results for three different groups: (i) Treated firms only; (ii) Treated firms against a matched control group (which is our preferred estimator); and (iii) Treated firms against an unmatched control group of all non-treated firms. Differences between (ii) and (iii) can be seen as a signal of selection into the support programs and of how the treated firms deviate from the average firm. We also include an interaction effect to investigate how the effects of the targeted R&D grants vary with firm size.

5.1 Effects of Targeted R&D Grants on Number of Employees

Our results for the number of employees, i.e., labor demand, are presented in Table 4. Note that we estimate two specifications for each of the three models (i–iii). In the first, referred to as our basic specification (columns 1, 3, and 5), we estimate the DiD regression specification in Eq. (2), and in the second specification, we present an extended model in which we re-estimate the regression with the treatment effects interacted with firm size. This is of interest because previous studies (e.g., Bronzini & Iachini, 2014) have indicated that the effects of government support programs might be more pronounced for small firms.

Beginning with the basic results (columns 1–3), we find no indications that the support programs have increased employment, neither during the support period nor after the program has ended. When comparing treated firms with the population of all non-treated firms, the post-support effect of the programs is negative and statistically significantly different from zero. Thus, firms that receive support do not grow faster in terms of number of employees compared to the average firm. On the contrary, they grow slower than the average firm when the support program ends.

In the extended models, the marginal effect of the grants is a combined effect of the direct effect and the interaction term that allow the results to vary with respect to firm size. The treatment effect can therefore be seen as the impact of the grant on an

Table 4 Estimation results, labor demand

	Basic models			Interaction models		
	Treated only	Treated vs. ctrl.	Treated vs. all	Treated only	Treated vs. ctrl.	Treated vs. all
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(L)_{t-1}$	0.089(0.229)	0.909***(0.092)	0.909***(0.092)	0.242(0.210)	0.076(0.135)	0.081(0.244)
$(Grant)_t$	5.8–05(5.9–05)	0.021(0.017)	0.019(0.013)	−0.0004(7.7e-04)	0.035(0.228)	0.317(0.465)
$(Post\text{-}support)_t$	1.179(1.418)	−35.57**(17.2)	−3.037(7.780)	0.364(1.664)	−591.3**(293)	−455.1(518)
$\ln(Y)_t$*$(Grant/Y)_t$				7.6e-05(1.2e-04)	−0.008(0.036)	−0.055(0.078)
$\ln(Y)_t$*$(Post\text{-}support)_t$				0.086(0.057)	49.40**(25.2)	50.11(55.7)
$\ln(VA)_t$	0.756*(0.435)	0.050(0.109)	0.173***(0.052)	0.613(0.397)	0.896***(0.171)	1.044***(0.394)
$\ln(w)_t$	−0.137(0.847)	0.494(0.323)	0.028(0.111)	0.021(0.842)	−1.148**(0.505)	−0.809*(0.466)
$(Skill\ intensity)_{t-1}$	0.122(0.455)	−0.215**(0.090)	−0.103***(0.033)	−0.001(0.490)	−0.270(0.379)	−0.294(0.239)
$(Profit)_t$	−2.218**(1.130)	−0.0001(5.5e-04)	−9.0e-05(5.8e-04)	−2.055**(1.044)	−1.151*(0.633)	−2.602(1.866)
AR2 p-val	0.83	0.04	0.05	0.88	0.27	0.75
Hansen p-val	0.46	0.28	0.37	0.61	0.50	0.54
# instruments	28	21	28	28	28	28

Note: *, **, ***, corresponds to levels of significance of 10, 5, 1%, with robust standard errors in parenthesis. Estimated with system GMM with endogenous variables: employment, value added, wages. Collapsed IV-matrix, lag depth is set to two, see Hayakawa (2009). Estimation 2 and 5 weighted with CEM-matched weights. Firm- and period fixed effects included in all models

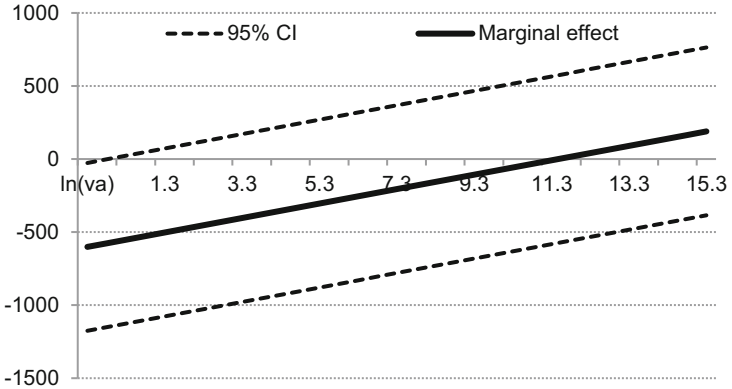

Fig. 1 Post-treatment effect of grant on labor demand over firm size

imaginary firm with zero employees, whereas the interaction term describes how the effect changes with firm size.

To interpret the interaction effect in the extended model with greater ease, we display the marginal effect and how it varies with firm size in Fig. 1. Firm size is measured as the natural logarithm of value added, ln(va). Here, we choose to only present the post-treatment effect of the grants from the interaction models in our preferred model, i.e., the matched DiD-model (i.e., column 5 in Table 4), over the observed range of firm sizes.

The plots show that the marginal post-treatment effect of the grants on the number of employees in general is not statistically significant regardless of firm size. There is a tendency that the effect of the grants increases with firm size and there is a negative and significant post-treatment effect for the smallest firms. These results deviate to some extent from the literature, where the most positive effects of firm support programs in general are found for small firms.[4]

5.2 Effects of Targeted R&D Grants on Employees with Higher Education

One aim of the programs under study is to help firms manage R&D projects. It is therefore expected that these grants should encourage firms to invest more in skilled labor, and thus increase their relative demand for workers with higher human capital. Hence, even without any impact on the total number of workers, it is possible that firms that are supported by the government programs would substitute less qualified workers for workers with higher human capital.

[4]The marginal effect of the grants during the duration of the program is not statistically significant anywhere and therefore not depicted in a figure.

Following Hansson (2000), we estimate how the demand for highly educated labor has been affected by the support programs. The results are presented in Table 5, showing no positive effect of the support programs on the relative demand for workers with post-secondary education in our main model specifications (columns 1–3). In fact, there are no estimates that are statistically significantly different from zero during the program period or after the program has ended. This implies that there is no effect in the short- or longer-term for these grants.

In the extended models (columns 4–6), we observe a negative post-treatment effect when comparing treated firms with their own growth pattern and with all other non-treated firms. The interaction term, however, loses its significance when we compare treated firms with the matched control group (column 5).

To capture the marginal effect of the grants on demand for skilled labor over the firm size distribution (as we did with labor demand in Fig. 1), we compare the treated firms with a matched control group. However, the results are not statistically significant, and we can therefore not conclude that the effects of the targeted R&D grant programs on the demand for employees with higher education are dependent on firm size.[5]

5.3 Post-Treatment Effects

So far, we have presented the results when estimating the averaged post-treatment effects of the support programs. The reported estimated effects thus display the average effect of the programs after the grants are no longer paid out to the companies. One concern is that there might be a non-linear response from the targeted firms that is not captured by these estimates. For example, the effects of the support programs on employment growth and demand for highly educated employees can, say, take off after some time. This means that significant results for individual years might be wiped out when aggregating the results over time. As a robustness check, we therefore also estimate yearly post-treatment effects.

The results from our year-by-year post-treatment analysis are presented in Fig. 2 (labor demand) and Fig. 3 (demand for highly educated employees). We choose to present the results from our preferred model specification, i.e., our DiD-estimations using a control group of matched firms. All point estimates and their corresponding 95% confidence intervals are displayed up to 5 years after the support programs have ended.

We find no tendencies of a positive post-treatment effect on demand for labor (Fig. 2) and, if anything, the results are on the negative side. Thus, our year-over-year analysis confirms the finding that R&D grants had no post-treatment effects on the targeted SMEs. However, when investigating the relative demand for skilled labor, the estimate is positive and significant at the 5% level during the first

[5] Results are available on request.

Table 5 Estimation results, relative demand for high human capital workers

	Basic models			Interaction models		
	Treated only	Treated vs. ctrl.	Treated vs. all	Treated only	Treated vs. ctrl.	Treated vs. all
	(1)	(2)	(3)	(4)	(5)	(6)
$(\text{Grant})_t$	1.4e-05(1.4e-05)	2.4e-05(1.6e-05)	1.4e-06(7.2e-08)***	−1.9e-08(8.8e-08)	1.1e-07(1.5e-07)	−9.6e-09(1.2e-07)
$(\text{Post-support})_t$	0.002(0.007)	0.009(0.007)	0.009(0.006)	−0.076***(0.027)	−0.041(0.032)	−0.057**(0.028)
$ln(Y)_t$*$(\text{Grant}/Y)_t$				−1.7e-07(1.3e-07)	−1.7e-07(2.0e-07)	5.4e-08(1.5e-07)
$ln(Y)_t$*$(\text{Post-support})_t$				0.008***(0.003)	0.004(0.003)	0.006**(0.003)
$ln(\text{wage premium})_t$	0.005(0.009)	0.006***(0.001)	0.007*(7.8e-04)	0.0037(0.006)	0.005***(0.001)	0.006***(4.6e-04)
$ln(Y)_t$	−0.016***(0.006)	−0.002(0.001)	−0.003***(6.9e-04)	−0.007*(0.004)	−0.002*(0.001)	−0.001**(5.5e-04)
$ln(K)_t$	0.004(0.005)	−0.001*(4.1e-04)	−0.0005*(2.7e-04)	−0.0039(0.004)	−8.4e-05(4.4.e05)	−4.4e-05(2.3e-04)
$\Delta(\text{R\&D-int.})_{t-1}$	−0.001(0.075)	0.014*(0.007)	0.010**(0.004)	0.003(0.019)	0.0174**(0.007)	0.016***(0.003)
$(\text{Profit})_t$	2.1e-05(1.4e-05)	1.1e-05(8.1e-06)	1.4e-04**(6.2e-06)	5.4e-05*(2.9e-05)	3.3e-05** (1.5e-05)	9.3e-06**(4.4e-06)
R^2-within	0.07	0.03	0.02	0.02	0.01	0.01

Note: *, **, ***, corresponds to levels of significance of 10, 5, 1%, with robust standard errors in parenthesis. Estimation 2 and 5 weighted with CEM-matched weights. Firm- and period fixed effects included in all models

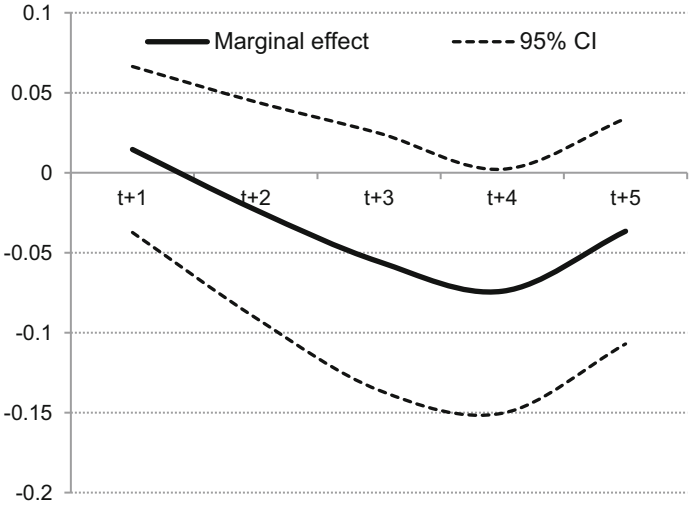

Fig. 2 Post-treatment effects of R&D grant on demand for labor, year-by-year, DiD-estimations

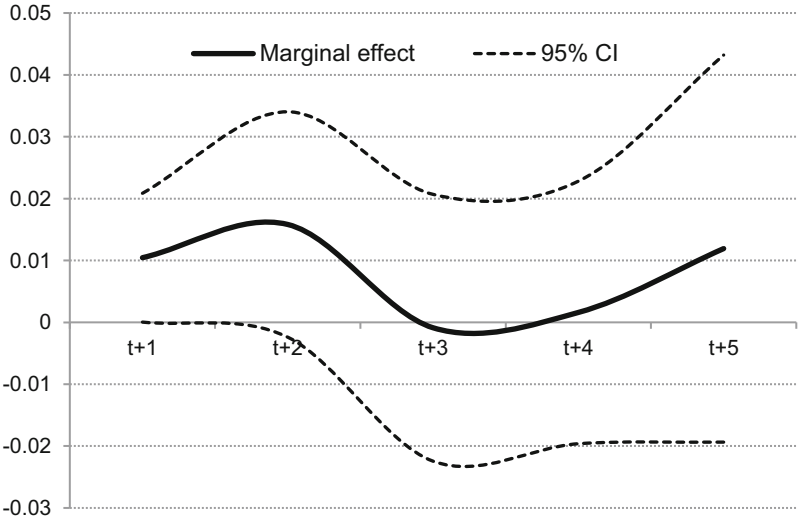

Fig. 3 Post-treatment effects of R&D grant on demand for high human capital labor, year-by-year, DiD-estimations

post-treatment year and remains positive at the 10% significance level during the following year.

There are thus some indications that the targeted R&D grants under study increased relative demand for high human capital labor during the first two post-treatment years. This implies that firms that receive targeted R&D grants increase their share of workers with higher education even though no effects on total

employment are detectable. However, the positive significance size ceases to exist after 3 years.

6 Discussion and Conclusions

Government support programs targeted toward innovative SMEs have become more common in recent years, and these programs are generally considered to be important in increasing innovative activities, and consequently employment growth, among growth-oriented SMEs (Bradley et al., 2021).

A challenge when evaluating these targeted R&D grant programs is how to estimate the counterfactual effect, i.e., the development of firms that were supported in the absence of receiving any government R&D grant. SMEs are not randomly selected by the programs; rather, R&D grants are often awarded to the most promising growth-oriented firms based on a combination of criteria. Hence, assessments might conclude that government support programs have been highly effective in increasing firms' labor demand, even though targeted SMEs would have increased their number of employees and workers with higher education regardless of whether they received the R&D grant or not.

This selection problem is often handled using a matching technique, thereby comparing firms that received support with similar firms that did not receive any targeted R&D grants. We rely on Coarsened Exact Matching to investigate the effects of two growth-oriented support programs in Sweden targeted toward innovative SMEs, making it possible to provide a more robust approach to matching. Our analyses are made possible due to access to a unique micro database on government firm support programs, compiled by the Swedish Government Agency for Growth Policy Analysis. This database alleviates the previous data acces-based concerns by finding appropriate matching firms.

The most striking result of our analyses is the absence of statistically significant effects. We find no robust evidence that the government support programs had any positive and statistically significant effects on the number of employees brought into these growth-oriented SMEs. Additionally, there is not any robust evidence of an impact of the grants on the skill composition of the labor force.

The lack of statistically significant findings is troublesome considering that government support programs require a positive impact to cover the administrative costs that are associated with these programs. When the expected return of engaging in nonproductive entrepreneurship is high, entrepreneurs might also use time and resources to apply for government firm support programs instead of developing their businesses (Baumol, 1990). Firm support programs can thus crowd out more productive investments.

Our findings complement recent papers (e.g., Autio & Rannikko, 2016; Howell, 2017; Stevenson et al., 2021; Söderblom et al., 2015) that found significant positive effects of government subsidies toward innovative SMEs. Their approach of using firms that applied for, but did not receive, funding as a control group has led to

varying outcomes. We cannot exclude that their results are due to an inherent selection bias in their analysis since the treatment group has been judged as more promising than the control group. This suggests that the treatment group would have performed better than the control group even without a grant.

The lack of significant employment effects of the government support programs that we investigate is troublesome considering that policymakers often justify targeted R&D grants with the need to correct market failures and promote job growth. We believe that the lack of significant results points toward the challenges involved in using targeted R&D grants as a way of promoting future growth among SMEs. Coad et al. (2014), for example, noted that it is very difficult to point out which firms are going to be fast growers in the future, suggesting that government support programs are unlikely to target potential high-growth firms that would not grow without support. This is consistent with previous evidence that firm growth, to a large extent, can be considered random (Coad et al., 2013), thereby making it extremely hard for policymakers to determine what characterizes SMEs that need an R&D grant to promote job growth and demand for highly skilled labor.

Our findings may also reflect the heterogeneous nature of SMEs, even highly innovative ones. Reflecting the variety of innovative firms may begin to lessen the randomness of the next stages of development, by including truly new ventures with their initial product offering, developing, or commercializing a new-to-the-world technology vs. leveraging innovation from elsewhere, younger ventures that are highly technical but which may not rely on traditional R&D functions, or even more established small firms looking to expand. One notion advanced by Mason and Brown (2013) is to focus on outcomes that help support retaining winners rather than simply picking winners. This approach would at a minimum remove some sources of variance among firms applying for these types of growth grants.

As an alternate explanation, it may be that the highly influential interviews and *expert* evaluations of those firms under consideration are ineffective. There is currently a dearth of empirical evidence that scrutinizes the questions asked, of whom they are asked, and how the answers are analyzed as part of the application process—or what objective metrics they employ to rate the attractiveness of these potential grant recipients. Even when professional investors have tremendous difficulties in predicting the future outcomes of high-potential but risky ventures, policymakers maybe even less equipped to make these evaluations or provide monitoring of the funding over time (Lerner, 2009). The opacity of this evaluation process and the inconclusive results of their benefit brings into question whether and how robust and objective decision rubrics can effectively be employed.

More broadly, the absence of positive results in our study brings into question whether government support programs toward SMEs can be justified, given that they are associated with high administrative costs, increased incentives for rent-seeking behavior among entrepreneurs, and crowding-out effects on alternative investments that could be more beneficial for society (Bradley et al., 2021). The incentive and ability for researchers to publish results that are statistically significant (Møen & Thorsen, 2017) might also have led to an overconfidence in policymakers' abilities

to influence the future growth and human capital of SMEs, when the non-findings of policy effects are rarely published.

Our study does not come without limitations, however. Even though we use a matching method that is at the research frontier, our results might still be biased if unmeasured variables are correlated with job growth and the likelihood of receiving a targeted R&D grant. We believe that the approach used by Söderblom et al. (2015) can provide more reliable estimates if the policymakers in the last stage of the decision-making process would randomize which firms receive an R&D grant. The advantage of using a randomized field experiment is that the outcome variable cannot affect the probability of receiving an intervention, which means that we know that it is not the intervention that affects the outcome variable. Randomization also implies that there is no systematic connection between the probability of belonging to the intervention group and observable and non-observable factors (Burtless, 1995).

Randomized control trials (RCT) have recently been used in the UK to evaluate the effects of targeted R&D grants (Bakhshi et al., 2015; Roper, 2020), and McKenzie (2017) provides fascinating evidence from an RCT in Nigeria on the effects of public grants following a national business program competition. We believe that more such studies are needed to provide more robust evidence on the effectiveness of government support programs, although we recognize that introducing randomization may be a challenge for policymakers to justify. But it may also potentially remove concerns regarding implicit bias (or *crony capitalism* at worst; Klein et al., 2021) from selecting from among a group of SMEs that otherwise meet or exceed the criteria for a grant.

Another fruitful area for future research is to more closely evaluate whether the effects of the grants are related to underlying unobservable or difficult-to-quantify factors, such as differences in how well companies are integrated into local business conditions, or the presence of positive spillovers from other companies. These factors are found to be important for growth among innovative firms but create potential challenges to identify and categorize a priori. More research is also needed on whether certain types of targeted R&D grants are more effective than others. Certainly, innovative activities among SMEs come in many shapes and sizes (McKelvie et al., 2017), where many of the most impactful aspects that lead to growth do not appear as formal R&D activity. As such, a heterogeneity analysis could deepen the understanding of the conditions under which the opportunities for positive effects of government support programs are greatest across different aspects of innovative activities beyond R&D.

Instead of focusing on a small group of growth-oriented R&D-intensive SMEs, it may also be more important to focus research and policy measures on what is needed to stimulate growth among SMEs that do not grow, or at best grow marginally. As noted by Bornhäll et al. (2015), the existence of growth barriers is likely to prevent these firms from growing, while potential high-growth firms might grow despite the existence of such growth barriers. General policy measures aimed at low-growth SMEs (e.g., simplification of rules, reduced labor costs, more liberal employment protection legislation, etc.) can thus be more effective in promoting job growth than

targeted R&D grants toward SMEs that are considered potential high-growth firms. This corresponds to the analogy in Coad et al. (2014, p. 92), in which tourists on safaris are focused on beautiful gazelles but fail to see the importance of the dung beetle in maintaining the health of the ecosystem.

Note also that we have been investigating the effects of two Swedish R&D grants that are administrated by Vinnova and targeted toward growth-oriented SMEs. The lack of significant effects does not mean that R&D grants never work. As noted in our literature review, there is substantial evidence that grants can indeed be helpful for SMEs when looking at different outcome variables. Other types of programs can also be successful in promoting employment growth, while similar R&D grants might be efficient under other institutional contexts (e.g., in other countries). The unique nature of growth-oriented ventures in Sweden has been noted in the literature (McKelvie et al., 2021).

Another possible interpretation of our non-significant results is that the R&D grants under study usually work, but that the government agency administering the programs is not designing or executing the programs adequately. The R&D grants might, for example, work better if they were given to larger firms or a smaller set of higher-quality applicants. Our study does not currently investigate these alternate models, but we do encourage others to take up this task. We have furthermore focused on the employment effects of targeted R&D grants; it is possible that such programs have a higher impact on other outcome variables (see e.g., Howell, 2017).[6] The external validity of our findings is thus low, and interpretations in other contexts should be made with care. This highlights the importance of gathering more robust evidence on the effects of government support programs that are targeted toward SMEs with growth potential.

While we fully accept that the development of growth-oriented SMEs is important to the economy, we also recognize that more transparent and methodologically sophisticated tools are needed to more fully evaluate the effectiveness of current practices, such as R&D grant programs. Our intent with this study is to illustrate two programs that are well-intended but that do not seem to have the desired impact, and to offer thoughts on the conditions through which we as scholars can better make these determinations of effectiveness. In doing so, we hope to contribute to a more robust and systematic understanding of how government policies further—or fail to further—entrepreneurship.

Acknowledgments We gratefully acknowledge funding from the Swedish Competition Authority (grant number 376/2016).

[6]Note that the authors have investigated the effects of these R&D grants on sales and labor productivity in a Swedish report for the Swedish Government Agency for Growth Policy Analysis (Daunfeldt et al., 2014). Their results indicate no statistically significant effects on labor productivity, while the government support programs increased sales by 20% during the first post-support year. The latter effect is, however, limited to firms with at most six employees. No positive and statistically significant effect is found for larger firms.

References

Angrist, J. D., & Pischke, J. S. (2008). *Mostly harmless econometrics*. Princeton University Press.

Autio, E., & Rannikko, H. (2016). Retaining winners: Can policy boost high-growth entrepreneurship? *Research Policy, 45*(1), 42–55.

Bakhshi, H., Edwards, J. S., Roper, S., Scully, J., Shaw, D., Morley, L., & Rathbone, N. (2015). Assessing an experimental approach to industrial policy evaluation: Applying RCT+ to the case of creative credits. *Research Policy, 44*(8), 1462–1472.

Baumol, W. J. (1990). Entrepreneurship: productive, unproductive and destructive. *Journal of Political Economy, 98*(5), 893–921.

Becker, L. (2015). Effectiveness of public innovation support in Europe. Does public support foster turnover. In *Employment and labour productivity? Discussion papers, Center for European Governance and Economic Development Research* (Vol. No. 236). University of Goettingen.

Blackwell, M., Iacus, S. M., King, G., & Porro, G. (2009). Cem: Coarsened exact matching Stata. *Stata Journal, 9*(4), 524–546.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115–143.

Bornhäll, A., Daunfeldt, S. O., & Rudholm, N. (2015). Sleeping gazelles: The unseen job creators? In A. C. Corbett, J. A. Katz, & A. McKelvie (Eds.), *Entrepreneurial growth: Individual, firm, and region*. Emerald Group Publishing Limited.

Bradley, S. W., Kim, P. H., Klein, P. G., McMullen, J. S., & Wennberg, K. (2021). Policy for innovative entrepreneurship: Institutions, interventions, and societal challenges. *Strategic Entrepreneurship Journal, 15*(2), 167–184.

Bronzini, R., & Iachini, E. (2014). Are incentives for R&D effective? Evidence from a regression discontinuity approach. *American Economic Journal: Economic Policy, 6*(4), 100–134.

Burtless, G. (1995). The case for randomized field trials in economic and policy research. *Journal of Economic Perspectives, 9*(2), 63–84.

Cantner, U., & Kösters, S. (2015). Public R&D support for newly founded firms–effects on patent activity and employment growth. *Journal of Innovation Economics Management, 1*(16), 7–37.

Coad, A., Frankish, J., Roberts, R. G., & Storey, D. J. (2013). Growth paths and survival chances: An application of Gambler's ruin theory. *Journal of Business Venturing, 28*(5), 615–632.

Coad, A., Daunfeldt, S. O., Hölzl, W., Johansson, D., & Nightingale, P. (2014). High-growth firms: Introduction to the special section. *Industrial and Corporate Change, 23*(1), 91–112.

Daunfeldt, S. O., Gustavsson Tingvall, P., & Halvarsson, D. (2014). Företagsstöd till innovativa små och medelstora företag: En kontrafaktisk effektutvärdering, report 2014:26, the Swedish Government Agency for Growth Policy Analysis.

Dvouletý, O., Srhoj, S., & Pantea, S. (2021). Public SME grants and firm performance in European Union: A systematic review of empirical evidence. *Small Business Economics, 57*(1), 243–263.

Edler, J., Cunningham, P., Gök, A., & Shapira, P. (2013). Impacts of innovation policy: Synthesis and conclusions–compendium of evidence on the effectiveness of innovation policy intervention project. Nesta, 2013, June. UK.

Hansson, P. (2000). Relative demand for skills in Swedish manufacturing: Technology or trade? *Review of International Economics, 8*(3), 533–555.

Hayakawa, K. (2009). First difference or forward orthogonal deviation-which transformation should be used in dynamic panel data models: A simulation study. *Economics Bulletin, 29*(3), 2008–2017.

Henrekson, M., & Johansson, D. (2010). Gazelles as job creators: A survey and interpretation of the evidence. *Small Business Economics, 35*(2), 227–244.

Hijzen, A., & Swaim, P. (2008). Offshoring, Labour Market Institutions and the Elasticity of Labour Demand.The University of Nottingham, Research paper series, No. 2008/05.

Himmelberg, C. P., & Petersen, B. C. (1994). R&D and internal finance: A panel study of small firms in high-tech industries. *The Review of Economics and Statistics, 76*(1), 38–51.

Ho, D. E., Imai, K., King, G., & Stuart, E. A. (2007). Matching as nonparametric preprocessing for reducing model dependence in parametric causal inference. *Political Analysis, 15*(3), 199–236.
Howell, S. T. (2017). Financing innovation: Evidence from R&D grants. *American Economic Review, 107*(4), 1136–1164.
Iacus, S. M., King, G., & Porro, G. (2011). Multivariate matching methods that are monotonic imbalance bounding. *Journal of the American Statistical Association, 106*(493), 345–361.
Iacus, S. M., King, G., & Porro, G. (2012). Causal inference without balance checking: Coarsened exact matching. *Political Analysis, 20*(1), 1–24.
King, G. & Nielsen, R. (2015). Why propensity scores should not be used for matching. Copy at http://j.mp/1sexgVw Export BibTex Tagged XML Download Paper, 481.
Klein, P., Holmes, R. M., Foss, N., Terjesen, S., & Pepe, J. (2021). Capitalism, cronyism, and management scholarship: A call for clarity. Academy of Management Perspectives, in print. https://doi.org/10.5465/amp.2019.0198.
Koski, H., & Pajarinen, M. (2013). The role of business subsidies in job creation of start-ups, gazelles and incumbents. *Small Business Economics, 41*(1), 195–214.
Lerner, J. (2009). *Boulevard of broken dreams*. Princeton University Press.
Mason, C., & Brown, R. (2013). Creating good public policy to support high-growth firms. *Small Business Economics, 40*(2), 211–225.
McKelvie, A., Brattström, A., & Wennberg, K. (2017). How young firms achieve growth: Reconciling the roles of growth motivation and innovative activities. *Small Business Economics, 49*(2), 273–293.
McKelvie, A., Brattström, A., & Dennis, W. J., Jr. (2021). What do they think and feel about growth? Examining small business managers' attitudes towards growth in the United States. *Journal of Business Venturing Insights, 15*, e00243.
McKenzie, D. (2017). Identifying and spurring high-growth entrepreneurship: Experimental evidence from a business plan competition. *American Economic Review, 107*(8), 2278–2307.
Mian, A., & Sufi, A. (2012). The effects of fiscal stimulus: Evidence from the 2009 cash for clunkers program. *The Quarterly Journal of Economics, 127*(3), 1107–1142.
Ministry of Industry. (2013). Regleringsbrev för budgetåret 2014 avseende Verket för innovationssystem inom utgiftsområde 24 Näringsliv, Regeringsbeslut 2013-12-12.
Møen, J., & Thorsen, H. S. (2017). Publication bias in the returns to R&D literature. *Journal of the Knowledge Economy, 8*(3), 987–1013.
Nightingale, P., & Coad, A. (2014). Muppets and gazelles: Political and methodological biases in entrepreneurship research. *Industrial and Corporate Change, 23*(1), 113–143.
Roper, S. (2020). Using RCTs as a research method for SME policy research: The UK experience. In G. In Saradakis & M. Cowling (Eds.), *Handbook of quantitative research methods in entrepreneurship*. Edward Elgar Publishing.
Samuelsson, M., & Söderblom, A. (2012). Statlig finansiering och dess påverkan på innovativa småföretag: En beskrivande studie av VINN NU-programmet, Rapport, Handelshögskolan i Stockholm.
Shane, S. (2009). Why encouraging more people to become entrepreneurs is bad public policy. *Small Business Economics, 33*, 141–149.
Stevenson, R., Kier, A. S., & Taylor, S. G. (2021). Do policy makers take grants for granted? The efficacy of public sponsorship for innovative entrepreneurship. *Strategic Entrepreneurship Journal, 15*(2), 231–253.
Stinchcombe, A. L. (1965). Social structure and organizations. In J. G. March (Ed.), *Handbook of organizations* (pp. 142–193). Rand McNally.

Söderblom, A., Samuelsson, M., Wiklund, J., & Sandberg, R. (2015). Inside the black box of outcome additionality: Effects of early-stage government subsidies on resource accumulation and new venture performance. *Research Policy, 44*(8), 1501–1512.

Wallsten, S. J. (2000). The effects of government-industry R&D programs on private R&D: The case of the Small Business Innovation Research program. *The Rand Journal of Economics, 31*(1), 82–100.

Wolff, G. B., & Reinthaler, V. (2008). The effectiveness of subsidies revisited: Accounting for wage and employment effects in business R&D. *Research Policy, 37*(8), 1403–1412.

Zúñiga-Vicente, J. Á., Alonso-Borrego, C., Forcadell, F. J., & Galán, J. I. (2014). Assessing the effect of public subsidies on firm R&D investment: A survey. *Journal of Economic Surveys, 28*(1), 36–67.

Part IV
The Entrepreneurial State and Sustainability Transitions

Third-Generation Innovation Policy: System Transformation or Reinforcing Business as Usual?

John-Erik Bergkvist, Jerker Moodysson, and Christian Sandström

Abstract There has been a shift in innovation policy in recent years toward more focus on systemic transformation and changed directionality. In this chapter, we describe a collection of challenges that such policies need to address. Based on a review of dominant frameworks regarding socio-technical transitions, we compare these theories with examples of innovation policy in different countries. Systemic transformation across an economy usually requires a process of creative destruction in which new competencies may be required, actors need to be connected in novel ways, and institutions may need to be changed. Our empirical illustrations show that support programs and initiatives across Europe do not always seem to result in such a process, as they include mechanisms favoring large, established firms and universities. These actors have often fine-tuned their activities and capabilities to the existing order, and therefore have few incentives to engage in renewal. As the incumbent actors also control superior financial and relational resources, there is a risk that they captivate innovation policies and thus reinforce established structures rather than contributing to systemic transformation.

Keywords Innovation policy · Third generation · System transformation · Institutions · Regulatory capture

J.-E. Bergkvist (✉)
Stockholm School of Economics, Stockholm, Sweden
e-mail: johnerik.bergkvist@phdstudent.hhs.se

J. Moodysson
Jönköping International Business School, Jönköping, Sweden
e-mail: Jerker.moodysson@ju.se

C. Sandström
Jönköping International Business School, Jönköping, Sweden

The Ratio Institute, Stockholm, Sweden
e-mail: christian.sandstrom@ju.se

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_11

1 Introduction

The past couple of decades have seen a shift in innovation policy toward increasingly addressing grand societal challenges. Policy agendas are no longer solely aimed at increasing the supply of Research and Development expenditure (R&D), generating more entrepreneurial ventures, or strengthening national competitiveness in certain sectors. Instead, policy programs are increasingly crafted to accomplish systemic transformation of the economy toward environmental and social sustainability. Initiatives with such ambitions are sometimes described as the third generation of innovation policy (Schot & Steinmueller, 2018). This chapter departs from the increased awareness of the need for systemic transformation in policy and focuses on the following questions:

- How can such policy programs be designed to facilitate the type of transformative change they are intended to accomplish?
- What are the intrinsic barriers to transformation they must handle?

To address these questions we take a closer look at dominant theories regarding socio-technical transitions that have inspired the third generation of innovation policy. We compare these theories to cases of such innovation policy programs in different countries. Our overview sheds light on some remaining challenges and shortcomings of contemporary innovation policy, given its ambition to facilitate systemic transformation.

We begin the chapter with a condensed review of the trends shaping the innovation policy literature over the past decades. Next, we turn to the more recent literature on socio-technical transitions, which has recently gained increased attention in the innovation policy literature. We pay special attention to the role of interest groups and the power struggles related to innovation and system transformation. Relatedly, we discuss the role of policy instruments and argue that innovation policies may end up supporting established technological regimes rather than favoring the emergence of competing solutions, unless the above challenges are acknowledged and properly addressed. We then turn to some empirical examples of innovation policies aimed at transformative change, which serve as illustrations of our arguments. The chapter ends with a concluding discussion.

2 Background

Innovation policy can be defined as initiatives by the public sector aimed at increasing the amount and impact of innovation in society (Edler & Fagerberg, 2017). While it is at times hard to apply such a broad definition to a system composed of interdependent actors (Nilsson & Moodysson, 2015), the definition is nevertheless useful within the scope of this chapter.

Innovation policy has its origins in research policy. The linear model of innovation originally developed and diffused following Vannevar Bush's work (1945) for President Franklin D. Roosevelt in *Science: the endless frontier*, laid the foundations for modern policies related to innovation. Bush argued that public investments in R&D would spill over to industry and in turn result in the development of new technologies that would subsequently benefit consumers and result in economic growth. This *linear* view of innovation remained dominant for more than half a century and is still very influential for governments aiming to support innovation and economic growth. Today, however, most research would refer to such efforts as R&D policies rather than innovation policies.

This *first generation of innovation policy* gained widespread acceptance and was used for many decades. It was eventually questioned in the 1980s by Kline and Rosenberg (1986), who proposed a different framework which they referred to as "the chain linked model." In this model, the innovation process was instead conceived of as non-linear, iterative, interactive, and hence more unpredictable than the linear model. One important implication of this model is the idea that the impulse for innovation may come from other places than the organizations in society that pursue basic science. There is in this sense less unilateral emphasis on universities, research institutes, and corporate R&D departments than the perceived change agents. Similar ideas were advanced by Nelson and Winter (1982), Freeman (1987), and Lundvall (1992) and paved the way for a stream of academic literature using the terms *innovation systems* or *systems of innovation*. Policies inspired by the innovation system approach are often thought of as the *second generation of innovation policy*. In contrast to the first generation, these policies were often designed to support the linkages between knowledge creation and commercialization, and more devoted to bringing actors together in novel network constellations. These policies also put increased emphasis on intermediaries and their role as facilitators for change and innovation by providing good conditions and support to networks involving both academia and industry. The triple helix approach can be considered a framework rooted in the same tradition (Etzkowitz & Leydesdorff, 2000).

The *third generation of innovation policy* is more aimed toward certain grand challenges and is in this sense more outcome oriented, whereas the preceding generations were more aimed at (1) generating an increased supply of R&D and (2) creating conditions for commercialization. Several scholars have paved the way for the emergence of this approach. Schot and Steinmueller (2018) used the term "transformative change," Borrás and Edler (2014) wrote about "socio-technical systems," and Geels (2004) introduced the notion of "system innovation." One important characteristic of these approaches, as well as the policies drawing on them, which distinguishes them from the first and second generations of innovation policy, is that they pay more careful attention to demand and adoption of innovation in society. Consequently, the networks, or "systems," that these scholars and policymakers define when analyzing and supporting innovation in society, become more complex by also including civil society and the consumer market. Thus, the outer boundaries of the system become less straightforward to define, and thereby so does the scope of actors shaping the target population of any policy initiative. One

way to handle this increased complexity is to focus less on single actors, networks, or aggregates of actors, and more on the universal norms and regulations that the literature refers to as institutions (Scott, 1995). The underlying assumption is that the institutional framework of a society defines the behavior of actors. These institutions are defined at different layers, and it is crucial for policymakers to understand the dynamics between these layers.

Although the third generation of innovation policy, as described above, draws on an eclectic set of related ideas, there are some central ideas upon which this policy rests. Below follows a review of these central ideas and their implications for transformation.

3 System Transformation

The idea that institutions of various type interplay at different layers in society, shaping and challenging collective action, has received widespread attention in the literature underpinning the third generation of innovation policy. Frank Geels (2004) coined this idea and his proposal of how to handle it in empirical research: the multi-level framework. The framework may be applied to specific industries or the economy as a whole. According to Geels, innovations are usually nurtured in what the framework refers to as *niches*, i.e. parts of the economy that are sheltered from direct opposition or competition. These may be R&D departments in a price-insensitive application such as within the military, within the public sector, or among universities. They may also be entrepreneurs subject to incubator programs or other constructions temporarily sheltering them from competition.

When technologies have been further developed within a niche, they subsequently enter various socio-technical *regimes*. A regime is an established and ordered part of the economy such as a specific industry. The regime is populated by other complementary and/or competing technologies; there are firms, customers, suppliers, and institutions maintaining power balance and order in the regime. Each actor in the regime posits capabilities and incentives making them more or less willing and able to accept a technology that comes from an alternative niche and tries to enter the regime. For this reason, regimes have intrinsic tendencies to foster stability and path dependence.

Lastly, we have the *landscape* level. Here, we have a collection of macro trends that affect the regime, but are beyond the direct control of actors and institutions in the regime. These include, for example, globalization, changes in demography, general technological advancements, alterations in policies, and external shocks such as wars or pandemics. While these macro trends and events cannot be influenced by the regime, they nevertheless influence the regime and the emergence of various innovations from different niches.

A system transformation, according to Geels, can be thought of as the successful emergence of an innovation from a niche, which survives and makes its way into an

established regime, which in turn is altered to such an extent that its directionality is fundamentally changed.

3.1 Technology Transitions as Creative Destruction

Based on Geels' (2004) framework and related literature, several barriers to successful system transformation can be identified. To any policymaker aiming to accomplish system transformation, these barriers and how policies relate to them are of critical importance. Below, we expand on some of these barriers as depicted in various literature concerning institutions and political economy. Thus, the following paragraphs should be read as an attempt to unpack and highlight some of the ideas underpinning the multi-level perspective, specifically with regard to its relevance for innovation policy.

Broadly speaking, the emergence of a significant innovation and efforts to penetrate a regime can be thought of as a Schumpeterian process of creative destruction. According to Schumpeter, innovation is the primary source of value creation in society as it enables the economy to transcend established trade-offs. This novel value is however created at the expense of established structures and industries that are to be displaced. The notion of creative destruction applies to a collection of factors, such as human capital, investments, and institutions. Similar arguments were advanced by Juma (2016) in *Innovation and its Enemies*. Through a collection of historical cases, Juma argues that the primary source of inertia related to innovation and renewal is resistance from established interest groups.

3.2 Institutions and the Role of Embedded Agency

As touched upon above, an established regime is governed by a collection of institutions, defined as formal and non-formal rules that structure the behavior of individuals and organizations (North, 1990; Scott, 1995). Institutions are crucial elements in any society since they lower transaction costs between agents, thereby by providing clarity and reducing ambiguities. At times, emerging technologies may not be compatible with existing institutions. Under such circumstances, institutions would either need to be altered or the (niche) innovation will be repelled by the regime.

Resistance to institutional change is often discussed under the paradox of embedded agency, which refers to the inherent paradox of how actors can change the very institutions they are themselves guided and controlled by. One strand of literature, referred to as institutional entrepreneurship, has looked at the various properties of actors and the environment that enable institutional change to come about (Battilana et al., 2009). Related literature makes use of the term institutional work in order to illustrate and explain how all actors in fact both influence and are influenced by

institutions on a more constant basis (e.g., Garud & Karnoe, 2003). Among the core ideas of this literature, relevant for this chapter, is the observation that change agency requires both a certain degree of power and influence, and a certain degree of dissatisfaction with the current situation. Therefore, we should not expect to find change agents at the top of a hierarchy in an industry (regime) because they have fewer incentives to challenge the current situation, and neither at the bottom of the same hierarchy, because they have limited influence. Thus, change agents are most likely found in the mid-level of hierarchies. Below is a condensed review of some of the core mechanisms upon which these ideas are based, adapted to the specific context of innovation and system transformation.

3.3 Resistance and Regulatory Capture

The emergence of a more significant innovation (and subsequent system transformation) is contingent upon the ability of actors to either influence institutions and thus function as institutional entrepreneurs or the ability of vested interests to stop such influence from taking place.

The political economy literature provides insight into the workings of such negotiation processes. Here, it is assumed that various interest groups exert pressure on both the political process and informal rules (Epstein, 1980). Models of rent-seeking behavior often assume that vested interests have stronger incentives than the general public to influence policymakers. With more financial and relational resources, larger incumbent organizations are, according to these theories, more likely to gain the upper hand in the policymaking process and consequently, smaller organizations introducing radical innovations that may distort the positions of established players are likely to be unsuccessful. The costs of such dysfunctions in the political system are distributed over time and over an entire population, and hence, resistance is likely to be limited. This pattern is also at times referred to as "regulatory capture," which suggests that established, resourceful interest groups can captivate the regulatory process and influence it in their favor at the expense of others (Mokyr, 1994). As a consequence of this unequal distribution of power and resources, policies may be captivated by established and dominant actors at the expense of those potential institutional entrepreneurs who intend to initiate change of a more divergent nature.

4 The Role of Policy in Technology Transitions: Empirical Illustrations

Innovation policies can be categorized as either a collection of support activities or various attempts to constructively deal with resistance and remove barriers. Traditionally, as briefly touched upon in the introduction, innovation policy has largely been a matter of various forms of R&D-related supporting activities (i.e., the first generation of innovation policy).

As stated in previous theory section on system transformation, there is an obvious risk that the policymaking process ends up captivate to the regime rather than supporting the emergence of radical innovation in a certain niche. In light of this, some scholars have argued that the political economy of innovation policy tends to generate an overemphasis on supporting activities and that insufficient attention is devoted to handling resistance from vested interest groups (Potts et al., 2016; Sandström et al., 2019). In other words, there is an apparent risk that policy measures intended to promote change and renewal instead end up supporting the continuation of an established regime. Looking into some of the most developed policies we have been able to identify, from different countries often recognized as forerunners in modern innovation policy, it is however not always obvious to what extent these policies actually differ from the traditional linear policies in their actual activities and outcomes. The remainder of this chapter addresses this problem.

In this section, we provide empirical illustrations of innovation policies aiming at system transformation across Western economies. We start with the Strategic Innovation Programs (SIP) in Sweden, continue with the SHOK programs in Finland, move on to the Top Sectors in the Netherlands, further toward the Austrian competence centers, and end with some illustrations from Canada.

4.1 The Strategic Innovation Programs (SIP) in Sweden

The Swedish Strategic innovation programs (SIP) are stated to be designed to create conditions for sustainable solutions to global challenges and to increase competitiveness in areas of high relevance to the Swedish economy. The program activities should be characterized by openness and transparency and implemented in public-private collaboration whereby problem formulation and program management are delegated to the program actors, while public agencies are responsible for the formal exercise of authority. Thus, the SIP programs appear as state-of-the-art examples of the third generation of innovation policy. The programs' main activities consist of research and innovation projects (R&D projects) that are carried out in collaboration with a multitude of actors. The programs also carry out complementary activities to take a holistic approach to innovation in the targeted areas. The programs are offered public funding for up to 12 years, divided into four stages with intermediate

Table 1 Strategic Innovation Programs (evaluated in 2020)

Innovation program	Innovation area
BioInnovation	Renewable biological resources.
SIO Grafen	Industrial graphene development
IoT Sweden	Internet of Things
Smarter Electronics Systems (SES)	Smarter electronic systems
Swelife	Life science
Innovair	Aeronautics

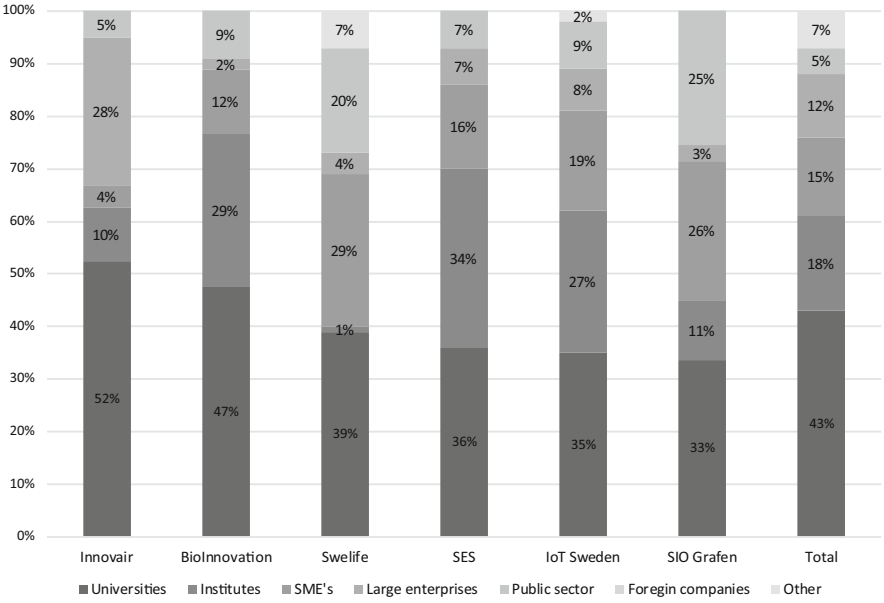

Fig. 1 Share of Public Funding by Actor Type (Projects Funded 2014–2019). Source: Technopolis (2020)

evaluations. Seventeen strategic innovation programs have been granted funding in four rounds. Six programs were evaluated in 2020. These are presented in Table 1.

The Swedish Innovation Agency (Vinnova) estimates that the total budget for all the SIP programs (over 12 years) will amount to approximately 16 billion Swedish Krona (SEK) (approximately US$1.9 billion). Of this, an estimated 5.9 billion SEK consists of public funding through the SIP instrument and an additional 1.3 billion SEK through collaboration programs. Additional funding is expected to come from the private sector and other societal actors. Figure 1 shows how public funding has been allocated among different types of actors.

Universities and large institutes have received most public funding. Small- and medium-sized enterprises (SMEs) participate to a high degree in the programs Swelife and SIO Grafen, and to a relatively large extent also in the programs IoT Sweden, SES, and BioInnovation, while SME participation in Innovair is small. It is

Table 2 Largest recipients of public funding in Swedish Strategic Innovation Programs

(A) Twenty largest recipients of public funding in projects 2014–2019, including coordination funding	(B) Twenty largest recipients of public funding in projects 2014–2019, excluding coordination funding
1. Research Institutes of Sweden	1. Research Institutes of Sweden
2. Chalmers University of Technology	2. Chalmers University of Technology
3. Lund University	3. Lund University
4. Linköping University	4. Linköping University
5. KTH Royal Institute of Technology	5. KTH Royal Institute of Technology
6. GKN Aerospace AB	6. GKN Aerospace AB
7. Luleå University of Technology	7. Luleå University of Technology
8. Saab AB	8. Saab AB
9. Uppsala University	9. Research Institutes of Sweden COMP
10. Research Institutes of Sweden COMP	10. Research Institutes of Sweden IVF
11. Research Institutes of Sweden IVF	11. Innventia
12. Innventia	12. Karolinska Institute
13. Karolinska Institute	13. Region Västra Götaland
14. Swedish Air Transport Society	14. Mid Sweden University
15. Chalmers Industriteknik	15. University West
16. Region Västra Götaland	16. Umeå University
17. Arbio	17. Uppsala university
18. Mid Sweden University	18. Swedish Environmental Research Institute
19. University West	19. Mälardalen University
20. Association of Swedish Engineering Industries	20. Swedish University of Agricultural Sciences

also noticeable that large companies receive relatively large volume of public funding.

Column A in Table 2 shows the 20 largest recipients of public funding in projects between 2014 and 2019, including coordination funds and by distribution of funding within individual recipient of public funding, followed by Chalmers University of Technology (CTH), LU, Linköping University (LIU), and the Royal Institute of Technology (KTH). GKN Aerospace (GKN) and Saab have received significant public funding, although most of this funding has been earmarked for specific demonstration projects. When we exclude funding for coordination of the different programs, there is little differences in the top 20 funding receivers, as shown in column B in Table 2. RISE remains the largest recipient of public funding and Chalmers University of Technology remains the second largest receiver.

As this analysis shows, when looking into the details of how funds are distributed and which activities are actually carried out, SIP appears somewhat detached from what theory says about the third generation of innovation policy in support of system transformation. Money is primarily transferred to larger organizations such as universities and large industrial firms. As these actors can be considered part of the established socio-technical regime, who are also collaborating with each other, we would expect these efforts to strengthen the current socio-technical regime rather than niche experiments.

4.2 Strategic Centers for Science, Technology, and Innovation (SHOK) in Finland

In 2008, the Strategic Centers for Science, Technology, and Innovation (SHOK) were launched in Finland. The initiative was financed by The Finnish Funding Agency for Technology and Innovation, TEKES. During the period 2008–2012, TEKES spent €343 million on the program, approximately 40% of the total funding for the program.

The Finnish concept was established around 2006 as a type of partnership between the public and private sectors. The stated purpose was to increase the pace of innovation and renew the Finnish business community by developing new skills and generating system-changing, radical innovations. This aim was, in turn, based on a report on Finland's competitiveness, which sought to explore how the Finnish economy could cope in a world characterized by increasing transformational pressure. Finland is a small and open economy, so the report advocated a need to niche and prioritize resources toward more knowledge-intensive industries. It also stated that there was a need to improve the commercialization of research and development. More cross-border cooperation, more venture capital, and new platforms would, in theory, lead to enhanced competitiveness. The predecessor to SHOK was the initiatives launched in Finland in the wake of the deep crisis in the early 1990s.

Once SHOK was initiated, its stated goal was to create research and clusters in Finland that are internationally competitive. The aim was that key actors in the innovation system were to dedicate their activities to stipulated goals, and that collaboration would increase at the regional level and at the same time attract human capital to Finland. The centers are declared to be founded to make a difference. The policy documents emphasize that resources need to be concentrated and focused on application in order to give Finland a comparative advantage in the targeted areas.

In the evaluation of SHOK, it is shown that SHOK has a natural focus on large companies, which is partly at the expense of smaller companies. Furthermore, large companies have had limited incentives to engage in research that goes beyond current operations. In addition to this, they have relatively great autonomy. It is also clear that the international elements have been limited. Thus, SHOK also seems to have suffered from a lack of attention to the potential of emerging niche experiments and the inherent tendency to conserve and strengthen existing regimes.

4.3 Top Sectors in the Netherlands

The Top Sectors initiative in the Netherlands' aims to strengthen cooperation between academia and the private sector in a total of nine sectors. Innovation policy in the Netherlands changed around 2012. Targeted subsidies and innovation support

were removed and instead focus on different sectors of the economy that would collaborate more with universities to become more innovative: agriculture and food, chemical industry, creative industries, high-tech materials, raw materials, life science and health, logistics, and water. Government, private sector, universities, and research centers work together in the Top Sector Alliance for Knowledge and Innovation (TKI) to make top sectors even stronger. The alliance looks for ways to get innovative products or services to the market.

One purpose of the top sector programs has been to combine academic and industrial research. Previously, large companies engaged in in-house research and did not work much with universities. At universities, there was a bias toward researching what was scientifically interesting but perhaps of limited interest to industry. A further aim has been to reduce the fragmentation of public support functions for innovation. A more holistic view of innovation has thus been the goal.

The setup can thus be seen as a form of self-organizing public-private partnership (PPP). In order to receive a grant, a university and a company must enter into a contract that shows that they will cooperate for a longer time period. The grant corresponds to 30% of the funds the company uses to support the university. Each top sector has a steering group with representatives from industry, academia, and the state. These consortiums arrange various activities linked to innovation, internationalization, and skills development (Technopolis., 2019).

The idea of the top sector programs is that the whole process begins with research. This is emphasized by Paul Merkus, innovation partnership manager at the University of Technology in Eindhoven: "The process starts out with pure science, the exploration of theories. After that, professors and engineers will look at whether or not an idea is feasible in practice. In the end, companies will market it" (Eindhoven University of Technology, 2019).

An evaluation carried out in 2017 pointed out that the top sector programs had reduced fragmentation and shifted the focus to collaborations rather than subsidies. One could also see some positive competence development and that the universities' research was linked more closely to the needs of the business community. However, the programs had not led to radical innovation, mainly because they were so focused on already established actors and technologies (Dialogic, 2017).

4.4 Competence Centers for Excellent Technologies in Austria

At first glance, the competence programs do not appear to be related to SIP, SHOK, or similar initiatives. However, there are some similarities. These programs were launched in the 1990s to increase the elements of research and development in industry by trying to combine academic research and private-sector R&D. The programs ran over a ten-year period, 1999–2009; the resources were distributed across sectors and with clear requirements for co-financing from industry. The

purpose was to stimulate academic scientists and industrial researchers and developers to work together on strategic and translational research projects, closer to industry than university groups would typically work, however concentrating on prototype research and not on products ready for the market.

In 2006, the programs were restructured and came to be known as COMET (Competence Centers for Excellent Technologies) and they were placed under the authority of the Austrian Research Promotion Agency. At that time, there were 18 active competence centers with a total of 270 partners in academia and 150 in industry. In 2012, there were 40 active centers with a total of 1500 researchers involved. The programs were divided into three categories based on budget and scope. K2 is the largest in scope and runs over 10 years, while K1 runs for 7 years and K projects receive funding for 3–5 years with the aim of potentially becoming a larger project in the future. Overall, the research within the COMET programs is applied in nature. Since the start in 2008, a total of 22 centers have been formed; in 2017, there were a total of more than 1600 employees and a total budget of more than €100 million.

According to the OECD, COMET has been successful in the sense that new skills have been developed. At the same time, it is noted that few new approaches to achieving innovation have been applied. The projects that aimed to create new working methods for innovation have often received limited resources and later been reduced in scope. "International comparisons suggest the success of the industry-led, co-operative research competence center model and its contribution to R&D, innovation skills and cluster growth. But effectively supporting scale-up businesses may require a different—more risk-tolerant—governance approach and a more entrepreneurial attitude towards center development" (OECD, 2018, p. 115).

4.5 Networks of Centers of Excellence (NCE) in Canada

This initiative can be traced back to the late 1980s and has had similar ambition to the competence programs in Austria. NCE programs aim to meet Canada's needs to focus on a critical mass of research resources on social and economic challenges, commercialize and apply more of its homegrown research breakthroughs, increase private-sector R&D, and train highly qualified people. As economic and social needs change, programs have evolved to address new challenges. The programs support large-scale academic research networks.

There is a clear multidisciplinary approach through which natural sciences, engineering, social sciences, and health sciences meet. In total, the resources invested by industry, academia, and the state amount to about $90 million per year. To acquire skills in specific areas also seems to be an important task. Today, the initiative has developed into a number of national programs: Networks of Centers of Excellence, Centers of Excellence for Commercialization of Research, and Business-Led Networks of Centers of Excellence. Some investments focus more on creating knowledge and others on research or commercialization. The programs

runs for anywhere from 4 years to more than 10 years and budgets vary between $1 million and up to $146 million (Government of Canada, 2021).

5 Discussion

The cases of third-generation innovation programs reviewed in this chapter show that many innovation programs across the European continent are mainly designed to build competencies. Several of the programs described appear to constitute various forms of continuations of industry-oriented public policies for competence development that were put in place in the 1990s. Some were implemented with the aim of enhancing the productivity of established industries after the recession in the early 1990s. An important objective seems to have been to transition established industries toward more knowledge-intense activities. Important to note, though, is that such renewal is not necessarily equivalent to the transition required to address the grand societal challenges.

A critical question regarding path renewal and the creation of a new directionality in the socio-technical regime concerns the formation of new competencies. Previous literature has pointed out that new technology can either build upon and enhance existing competencies or destroy the value of existing skill sets (Tushman & Anderson, 1986). For the emergence of a new regime—or new directionality within an existing regime—it is usually important to develop new skill sets that at least partially destroy established knowledge, hence calling for the formation of new competencies. This is one of the reasons why such transition meets resistance from actors in established regimes who thus find their current position in the regime fundamentally challenged.

As can be seen in the cases provided, many innovation programs appear to be directed toward large, established firms and universities that are supposed to collaborate with these large firms. Furthermore, these programs are often sector specific and country specific with limited participation of foreign actors. This observation indicates the strong preserving power of established regimes.

While the creation of new skill sets can take place by interacting with universities, our empirical cases point at a couple of delimitations. First, an explicit focus on large, established firms implies that entrepreneurial ventures are disregarded as sources of new capabilities. While path-breaking innovations may take place in large firms, however, previous research shows that small firms make up a significant portion of all innovation in an economy (Ejemo, 2011). Innovation may also take place via convergence of industries (Berglund & Sandström, 2017; Chandler, 1980). Traditional media outlets such as newspapers and T.V. channels are increasingly displaced by social media firms such as Facebook and Google. The explicit focus on industry boundaries and nationally oriented initiatives in many of these programs is, therefore, likely to inhibit rather than facilitate the emergence of new regimes.

Many of the policy programs described in this chapter are designed to increase collaboration, both between industry and universities and between different firms. In

this sense, policies seem to be inspired by innovation systems research emphasizing the importance of dealing with fragmentation and bringing actors together. This is evident in both the second- and third-generation innovation policy.

It is reasonable to assume that collaborations can increase the productivity of firms in an established regime. In the encouragement of collaborations across firms, there is an inherent assumption that innovation is primarily a matter of dealing with transaction costs, helping firms to understand each other, build trust, etc. An alternative, and complementary, point of view would however be to regard innovation as processes of creative destruction (Schumpeter, 1942) whereby values are created and distributed in novel ways. The Schumpeterian perspective implies that innovation is largely a matter of conflicts rather than mutual understanding (Juma, 2016). An illustration of this is Uber's entry into the taxi industry, which caused considerable turbulence across the world. The firm's efforts to circumvent, alter, or influence regulations in the industry have been highly controversial (Laurell & Sandström, 2017 and generated strikes in many countries. One can speculate as to what the effects of an innovation program for collaboration would have been in this case.

Previous research has identified a collection of factor conditions that are likely to contribute to institutional change (Battilana et al., 2009; Garud & Karnoe, 2003). Institutional change is often required for the successful emergence of a new technology (Geels, 2004) and actors pursuing such efforts are frequently referred to as institutional entrepreneurs. These are more likely to succeed when there is widespread discontent with the current order of things and when they operate at the intersection of different fields or industries.

Our illustrations above have in common that they provide various forms of support to an established industry. In this sense, the conditions for institutional entrepreneurship are reduced by these policies. Institutional entrepreneurs are likely to be left outside a collaboration program as these programs are built upon the idea of collaboration rather than confrontation. Through a process of regulatory capture, innovation programs will therefore in many cases be captivated by established interest groups and thereby sustain their power rather than paving the way for new directionality in the regime.

As pointed out earlier, innovation policies can broadly be categorized as either providing support or proactively dealing with resistance. The political and economic logic of these two categories would imply that supporting policies receive more attention. Supporting policies in the forms of various R&D-support and innovation grants are associated with a concentrated and comparatively visible utility, while the costs are distributed across the entire population. Conversely, it is usually politically costly to remove barriers and deal with resistance from vested interest groups. The benefits of doing so are increased levels of entrepreneurship, more new firms, and potentially also new technologies being developed. Generally speaking, lost opportunities are hard to quantify as they, by definition, never materialize (Sandström et al., 2019; Potts et al., 2016).

When looking at the examples described in this chapter, few policy documents or descriptions explicitly deal with resistance. On the contrary, it is assumed that the

main challenges to be addressed seem to be competence development and collaboration between established actors. There is, therefore, an apparent risk that these policies sustain an established socio-technical regime rather than paving way for the emergence of a new one.

The discussion above can be applied not only to national innovation efforts, but also to policies at the E.U. level. Large shifts in policy at the E.U. level are beyond the direct control of firms within a regime in a certain country. In Geels' (2004) model, these shifts can in this sense be conceived of as changes on the landscape level. Actors within a certain regime are, therefore, likely to accept these policies and align themselves with them rather than trying to influence them to their favor. As large, established firms are usually more resourceful, we would expect them to be more likely to benefit from such changes in policy.

6 Conclusions

In this chapter, we have explored how contemporary innovation policies may affect the economy's ability to achieve system transformation. Drawing upon Geels' (2004) model for socio-technical transitions and applied literature on institutional theory and political economy, we have highlighted some of the mechanisms that may lead innovation programs to sustain rather than displace an established socio-technical regime. Empirical illustrations of ongoing and recent innovation policy initiatives also point to some of these mechanisms.

Socio-technical transitions usually require a process of creative destruction across several parts of the economy. New competencies may be required, institutions need to be altered, and at times the industry giants may be toppled by entrant firms or by large firms in related industries. A focus on established industries and national borders along with efforts being directed primarily to large firms rather than entrepreneurial ventures implies that existing competencies may be refined with this model, but they are—in principle—less likely to be overthrown with such a setup.

A similar logic can be observed with regard to the need for institutional change. Actors that are in harmony with an established institutional setup are less likely to alter those institutions and hence, innovation policies directed toward supporting these actors may be more likely to reinforce established institutions and related vested interests than to alter them. Our illustrations from innovation policies in different countries show how these initiatives primarily target large, established firms, which indicates the risk for path dependence described above.

We build our arguments by drawing on theories from political economy, such as regulatory capture. Assuming that policies and programs are shaped by the interest groups that are affected by the policies, we highlight the risk that policymaking may end up as support for established interest groups rather than supporting the emergence of those who could act as institutional entrepreneurs or disruptors. Policies and programs may thus be captivated by dominant actors in the established regime, who have superior financial and relational resources. The result would then be that

innovation policies sustain the established socio-technical structures of industries rather than contributing to the emergence of new structures.

References

Battilana, J., Leca, B., & Boxenbaum, E. (2009). How actors change institutions: Towards a theory of institutional entrepreneurship. *Academy of Management Annals, 3*(1), 65–107.

Berglund, H., & Sandström, C. (2017). A new perspective on the innovator's dilemma – Exploring the role of entrepreneurship incentives. *International Journal of Technology Management, 75*(1–4), 142–156.

Borrás, S., & Edler, J. (2014). *The governance of socio-technical systems: Explaining change*. Edward Elgar Publishing.

Bush, V. (1945). *Science: The endless frontier*. Ayer Company Publishers.

Chandler, A. D. (1980). The growth of the transnational industrial firm in the United States and the United Kingdom: A comparative analysis. *Economic History Review, 33*(3), 396–410.

Dialogic. (2017). *Evaluation of topsector programs in the Netherlands*. Retrieved from https://www.dialogic.nl/en/projects/topsector-approach/

Edler, J., & Fagerberg, J. (2017). Innovation policy: What, why, and how. *Oxford Review of Economic Policy, 33*, 2–23.

Eindhoven University of Technology. (2019). *Dutch Top sector policy works*. Retrieved September 12, 2019, from https://www.tue.nl/en/news/news-overview/dutch-topsector-policy-works/#top

Ejemo, O. (2011). *Svenska uppfinnare – nytt datamaterial & ny inblick i innovationsprocessen*. Growth Analysis Working paper/PM, 14.

Epstein, E. M. (1980). Business political activity: Research approaches and analytical issues. *Research in Corporate Social Performance and Policy, 2*, 1–55.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From National Systems and "mode 2" to a Triple Helix of university–industry–government relations. *Research Policy, 29*(2), 109–123.

Freeman, C. (1987). *Technology, policy, and economic performance: Lessons from Japan*. Pinter Publishers Ltd.

Garud, R., & Karnoe, P. (2003). Bricolage versus breakthrough: Distributed and embedded agency in technology entrepreneurship. *Research Policy, 32*(2), 277–300.

Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Research Policy, 33*(6–7), 897–920.

Government of Canada. (2021). *Networks of Centers of Excellence*. Retrieved October 04, 2021, from https://www.ic.gc.ca/eic/site/063.nsf/eng/h_68597F8D.html

Juma, C. (2016). *Innovation and its enemies: Why people resist new technologies*. Oxford University Press.

Kline, S. J., & Rosenberg, N. (1986). An overview of innovation. The positive sum strategy: Harnessing technology for economic growth. In R. Landau & N. Rosenberg (Eds.), *The positive sum strategy: Harnessing technology for economic growth* (pp. 275–306). National Academy of Sciences.

Laurell, C., & Sandström, C. (2017). The sharing economy in social media – Analyzing tensions between market and non-market logics. *Technological Forecasting and Social Change, 125*, 58–65.

Lundvall, B. A. (1992). *National systems of innovation: Towards a theory of innovation and interactive learning*. Printer Publishers.

Mokyr, J. (1994). Cardwell's law and the political economy of technological progress. *Research Policy, 23*(5), 561–574.

Nelson, R. R., & Winter, S. G. (1982) *An evolutionary theory of economic change*. Harvard University Press.
Nilsson, M., & Moodysson, J. (2015). Regional innovation policy and coordination: Illustrations from southern Sweden. *Science and Public Policy, 42*(2), 147–161.
North, D. (1990). *Institutions, economic theory and economic performance. Institutions, institutional change and economic performance*. Cambridge University Press.
OECD. (2018). *Reviews of innovation policy: Austria 2018*.
Potts, J., Allen, D.W., & MacDonald, T.J. (2016, September 7). *Keep your friends close, your enemies closer: The case for inclusive innovation policy*.
Sandström, C., Jörnmark, J., Björklund, M., & Hvarfner, K. (2019). Innovationspolitik – ett överutbud av stöd & hinder? *Ekonomisk Debatt, 47*(7), 67–70.
Schot, J., & Steinmueller, E. (2018). *Framing innovation policy for transformative change: Innovation policy 3.0*. SPRU Science Policy Research Unit, University of Sussex.
Schumpeter, J. A. (1942). *Socialism, capitalism and democracy*. Harper and Brothers.
Scott, S. M. (1995). *Institutions and organizations*. Sage.
Technopolis. (2020). *Metautvärdering av andra omgången strategiska innovationsprogram efter sex år. VR 2020:19*. Vinnova.
Technopolis. (2019). *Sexårsutvärdering av det strategiska innovationsprogrammet för gruv- & metallutvinnande industri – STRIM, VR 2019:18*. Vinnova.
Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly, 31*(3), 439–465.

Less from More: China Built Wind Power, but Gained Little Electricity

Jonas Grafström

Abstract This chapter investigates Chinese wind power development and concludes that innovation cannot be pushed by the efforts of many, and that when the state clarifies directions and objectives, these can be achieved but with severe and unexpected side effects. Two topics are explored: wind curtailment and low technological development, both examples of unproductive entrepreneurship induced by government policies. The goal of wind power capacity expansion leads to construction (i.e., generation capacity) but little electricity. Examples of failures include low grid connectivity with, some years averaging 15% of generation capacity broken or unconnected to the grid. A key lesson for Europe is that forced innovation often amounts to little and that the old saying holds up: "no plan survives contact with reality."

Keywords Wind curtailment · Patents · Economic Planning · Entrepreneurship · Policy

1 . Introduction

There is an increasing interest in a global transition to green energy, and in several countries, policies promoting a transition are in effect (Nuñez-Jimenez et al., 2020). While China has become the largest installer of wind power in the world over the last two decades, the quality of the installed capacity has been lackluster (Dong et al., 2018; Zhu et al., 2019; IRENA, 2021). The installed wind capacity in China exceeds the United States by a factor of two (IRENA, 2018). Despite twice the installed capacity in 2016, China has produced less power.

How can more capacity produce less power? The short answer is that incentives matter, and that the Chinese wind power system has induced unproductive entrepreneurship. When studying the last decade's development, it is easy to find examples

J. Grafström (✉)
The Ratio Institute, Stockholm, Sweden
e-mail: jonas.grafstrom@ratio.se

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_12

of failure like low grid connectivity, with some years averaging 15% of generation capacity broken or unconnected to the grid (Zeng et al., 2015; Karltorp et al., 2017). Technological innovation has been marginal compared to Chinese industrial activity. Chinese firms have had few patents granted internationally, both in absolute terms and relative to the number of applications (Li, 2012; Lam et al., 2017). Exports are small due to quality issues, even though domestic production capacity far exceeds demand (Xingang et al., 2012; Sun et al., 2015; Zhang et al., 2017).

Mazzucato (2015) addressed Chinese green development, stating that green transformation leaders exist where the state plays an active role. To an extent, she is right about China, which has constructed a lot of wind power. However, quality has been low and little new technology has been internationally patented. Green development has been ineffective, and it would not be a surprise to discover the environment had suffered due to mass industrial activity, especially considering the alternative cost of malinvestment. Government action has actually stifled technological development rather than promoting it. As shown by McAfee (2019) and Grafström and Sandström (2020), the trend in Western economies is to extract much more from less. Economic development is not driven by more resources; resource-use actually decreases while economies have expanded. Chinese wind power has economized resources badly; resource-waste has been the result.

This chapter explores the recent history of Chinese wind power expansion, focusing on development since 2000. A literature review explores two main topics: wind curtailment and technological development, both examples of unproductive entrepreneurship induced by China's central government. During the highly likely global transition to green energy, it is important to understand what not to do.

It is important to emphasize that China is not the only country that has produced bad results when implementing industrial policies to promote renewable energy. In the early 1980s, wind power policies in the United States had similarly negative outcomes, but on a smaller scale (Keller & Negoita, 2013; Wiser & Millstein, 2020). The German *Energiewende* and the Spanish solar bubble also have received criticism (Del Río & Mir-Artigues, 2012; Nuñez-Jimenez et al., 2020).

This chapter, however, focuses on China because it is the largest producer of wind power. It is important to remember that drawing lessons from the Chinese example is perilous because what is true in China is not necessarily true for Western countries. Investment in wind power does not represent direct investment from the Chinese state, but rather from China's Central State-Owned Enterprises (CSOEs). One might assume some autonomy for the CSOEs but they answer to the state, in some capacity, at the end (Zhu et al., 2019). Wind power policy must be understood within the broader context of a highly regulated system in which prices are politically or administratively influenced, if not determined.

A cartoon in the Soviet satirical journal *Krokodil* in 1952 displays the downside of heavy state intervention in the economic system. A worker and a bureaucrat stand beneath a massive 2000-kilo nail. The worker asks about the need for such a big nail and the bureaucrat answers, "the month's plan fulfilled" (Nove, 1986, p. 94). The lesson is that incentives matter. When studying the Chinese wind power development of the last decade, it appears the production was, due to state goals, just as

quantity oriented as the useless 2000-kilo nail in *Krokodil*. State goals distorted entrepreneurship toward suboptimal solutions, low-energy production, and plentiful resource waste.

2 The Context: China's Historical Wind Power Development

Global installed wind capacity in 2020 reached 744 gigawatts, up from 597 gigawatts in 2018 (WWEA, 2019, 2020). Globally, 93 gigawatts were installed compared to 52.5 gigawatts in 2018. China's accumulated wind power capacity in 2020 was 290 gigawatts, which then produces energy when operational (WWEA, 2020).

China's early wind power development was gradual. In the 1970s, wind power development was limited to geographically remote, small, off-grid projects (Liu et al., 2002; Xu et al., 2010). In 1985, four grid-connected wind power plants were constructed using 55 kW Vestas turbines from Denmark (Zhengming et al., 2006). In 1994, The Ministry of Electric Power ordered a 100-fold increase in installed wind power capacity, from about 10 megawatts to 1000 megawatts for the year 2000. The plan was not fulfilled because only 350 megawatts were constructed. A remedy to the production failure was the Renewable Energy Law of 2006, which forced utilities to purchase (or produce) wind power (Gosens & Lu, 2013). The central government established a price guarantee that exceeded 15% of construction costs, which incentivized the construction of unprofitable plants (Lema & Ruby, 2007). Firms made unprofitable bids on construction sites paid by cash flow, from things like coal, to sustain wind projects.

In 2004, China's accumulated installed wind capacity reached 769 megawatts, the world's tenth-highest (Zhang et al., 2013). During China's *Eleventh Five-Year Plan* period (2006–2010), challenging goals were set. The installed capacity was doubled for 5 years in a row (Sun et al., 2015). In 2012, China bypassed U.-S. installed capacity (see Fig. 1). The installed capacity of a power system represents the maximum capacity that can be produced under good conditions. A plant with 1 MW of installed capacity can, under ideal conditions, produce a maximum of 1 MW at any one time. Measures of electricity generation describe the amount of electricity that is produced during a specific period, normally measured in megawatt-hours.

Although a large generation capacity was constructed in China, the output did not materialize at an equal rate. For example, electricity generation in the United States was initially significantly higher than China (see Fig. 2). Lu et al. (2016) found that differences in wind resources did not explain the U.S.-China difference in wind power output. Wind quality and resources explain a small part (−17.9% in 2012), but the main issues were related to turbine quality, curtailment, and connection to the grid.

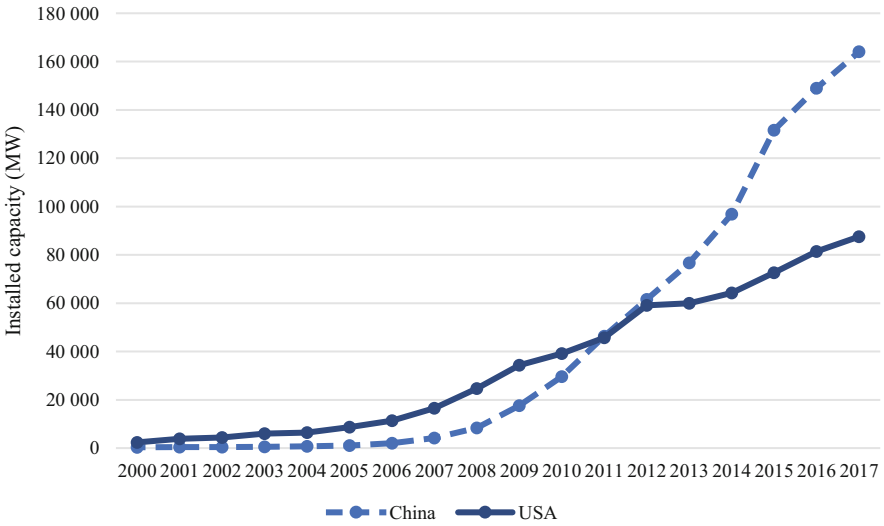

Fig. 1 Installed capacity (MW) in wind power by country from 2000 to 2016. Source: IRENA (2018), Renewable Energy Statistics 2018, The International Renewable Energy Agency, Abu Dhabi

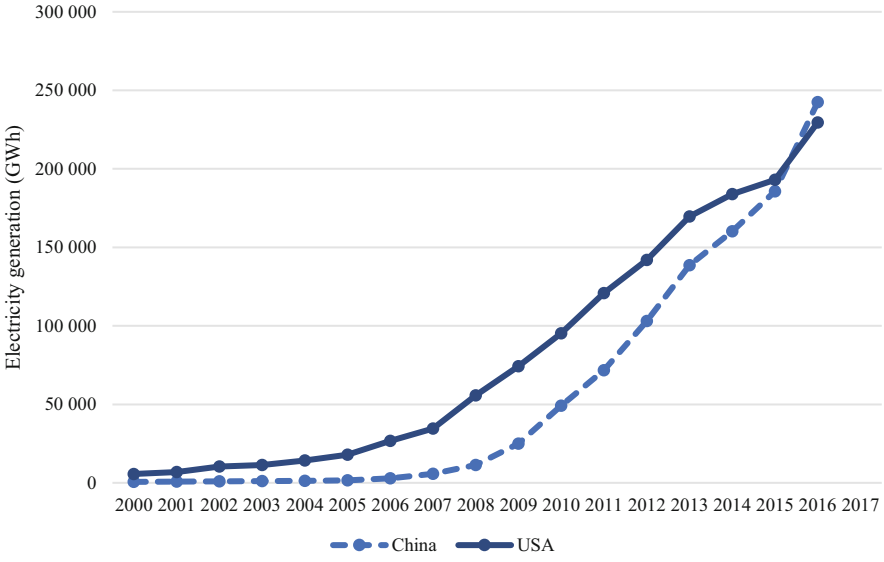

Fig. 2 Electricity generation (GWh) from wind power by country from 2000–2017. Source: IRENA (2018), Renewable Energy Statistics 2018, The International Renewable Energy Agency, Abu Dhabi

During the *Eleventh Five-Year Plan* (2006–2010), the domestic wind industry was prioritized (Feng et al., 2015). The production goal set in the plan generated supply problems. Overcapacity sent prices down in 2011: 30 gigawatts could be manufactured but annual demand was 18 gigawatts (Li, 2012; Zhang et al., 2015).

The *Eleventh Five-Year Plan*'s stipulations regarding foreign technology allowed in wind power drove foreign firms from China. The Chinese Power Purchase agreements stipulated that in wind turbines, 50% of content (and later 70%) should be local. The shift was significant: in 2000, almost 95% of installed Chinese turbines were imported and in 2005, around 70%. After the plan took effect, the proportion of foreign components dropped. In 2008, only 28% of turbine components were sourced abroad and by the end of 2013, it was less than 6% (Junfeng et al., 2010; Zhang et al., 2015).

3 Two Cases: Powerplants Without Output, and Low Technological Development

3.1 Technological Development: Patents at Home but Not Abroad

Patent data is a popular variable in technological innovation research and the variable is often used to compare countries' innovation activities. Although patents are a popular measure, they also suffer the curse, "What gets measured gets managed" (a summary of Ridgway, 1956). In China, an emphasis on patens as an output measure affected promotions and evaluations (Li, 2012). China's surge of patents up until 2006 can be attributed to governmental programs targeted at patent creation (Li, 2012). Patents were an evaluation criterion that could make or break a career for both researchers and public servants (Gosens & Lu, 2013, 2014). The Chinese legal system created several "junk" patents, because the separation of real innovations from false innovations was insufficiently executed (Lam et al., 2017).

Chinese inventors received numerous domestic wind power patents, but few international patents. As seen in Fig. 3, when considering only one patent office—in many cases the inventor's home office—China has a high share of global patents.

China's relative share of top countries' patent activity was highest in 2006. However, if a control for quality is applied, in this case looking at patents approved in at least four patent offices, then China is less visible, as seen in Fig. 4.

Chinese patents did not hit the mark internationally, even though Chinese firms tried to apply for them (Lam et al., 2017). Patent applications by Chinese firms to the European Patent Office were few (between 1980 and 2014). Envision made 38 applications and XEMC made 19, while only two and six patents, respectively, were granted them. Sinovel made 21 applications and all but one was either subsequently withdrawn or rejected. The normal rejection rate at the European Patent Office is around 50%, hence Chinese firms received a significantly higher rejection rate

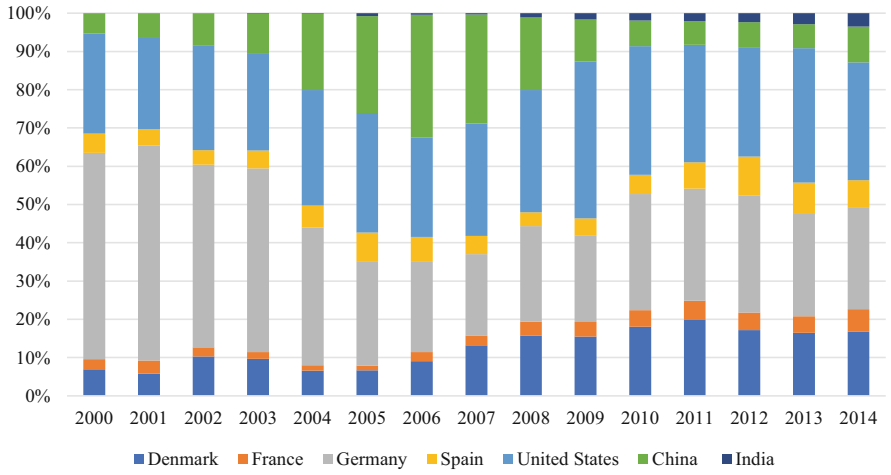

Fig. 3 Patents proportion by country awarded by one patent office or more. Source: OECD.stat Dataset: Patents - Technology development

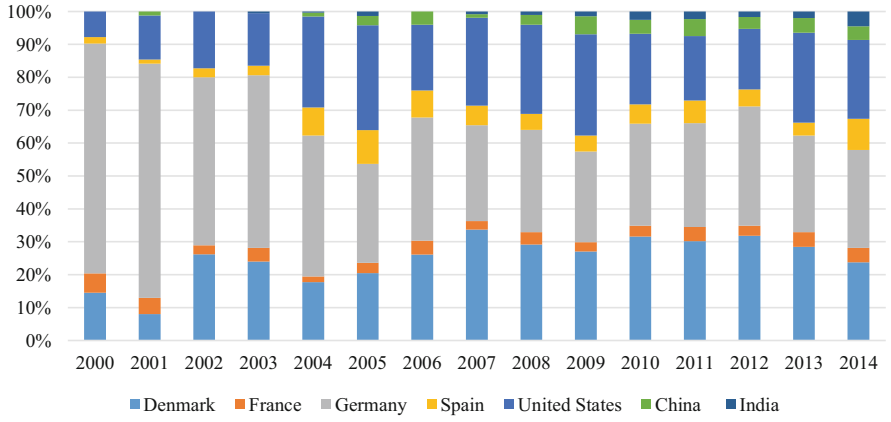

Fig. 4 Patents proportion by country awarded to four or more patent offices. Source: OECD.stat Dataset: Patents - Technology development

(Grafström, 2017). Of the top ten Chinese firms, seven obtained no patents and five recorded no applications with the European Patent Office. Results were similar at the United States Patent and Trademark Office.

In 2009, the Chinese government began to raise standards by modifying its patent law to demand absolute global novelty instead of "relative novelty" (SIPO, 2009). Tables 1 and 2 show the number of patent applications in the top inventive countries.

Table 1 Absolute number of patents registered at one or more patent offices (rounded to nearest whole number). Source: OECD.stat Dataset: Patents - Technology development

One office registration	China	Germany	U.S.	Denmark	Spain	France	India
Patents in 2000	12	121	59	15	11	6	0
Patents in 2009	174	361	652	247	70	59	26
Patents in 2014	96	270	313	171	74	61	35

Table 2 Absolute number of patents registered at four or more patent offices (rounded to nearest whole number). Source: OECD.stat Dataset: Patents - Technology development

Four office registration	China	Germany	U.S.	Denmark	Spain	France	India
Patents in 2000	0	36	4	7	1	3	0
Patents in 2009	12	123	108	122	22	13	6
Patents in 2014	8	60	48	48	19	9	9

3.2 Wind Curtailment: When a Power Plant Is Not Working or Unconnected

China had vast wind power curtailment and consequently low utilization rates over the last two decades (Sun et al., 2015; Zhu et al., 2019). Wind curtailment happens when the power grid disrupts the power connection of installed capacity (due to issues regarding safety, technology, grid access management, etc.). Since 2010, when installed capacity took off, the curtailment rate increased, i.e., power was generated but cut off from the grid, mainly by the State Grid Corporation of China, which decided to interrupt grid connections of installed wind capacity (Dong et al., 2018).

China's curtailment statistics exceeded the rest of the world's (Fan et al., 2015; Zeng et al., 2015; Luo et al., 2016). Curtailment between 2010 and 2013 was 3.9, 10, 20.8, and 16.2 TWh, respectively (Luo et al., 2016). Adding the findings in Zhu et al. (2019), the curtailment level was 12.6 TWh in 2014 (8%), 33.9 TWh in 2015 (15%), and 49.7 TWh in 2016 (19%).

As seen in Fig. 5, both the absolute level of curtailment and curtailment as a percentage of total production increased between 2010 and 2016. There have been indications in nonacademic reports that curtailment rates have fallen sharply since 2018, although trustworthy sources are lacking. It is plausible that the curtailment rate has fallen. Curtailments were growing and in the long run should be noticed and remedied. Grid development and connection in some years lagged installed capacity by over 30%, making wind power generation exceed the acceptance of the grid and creating abandonment and grid instability (Zeng et al., 2015; Zhang et al., 2017).

Curtailment levels exceeded those of other countries. For example, Chinese wind turbines produced 1787 full load hours on average in 2007, which was substantially below turbines in the United Kingdom (2628 h), Australia (2500 h), and the United States (2300 h) (Sahu, 2018). On average, Chinese wind power plants were shut down up to 15% of the time, whereas, in Germany, employees are laid off just under

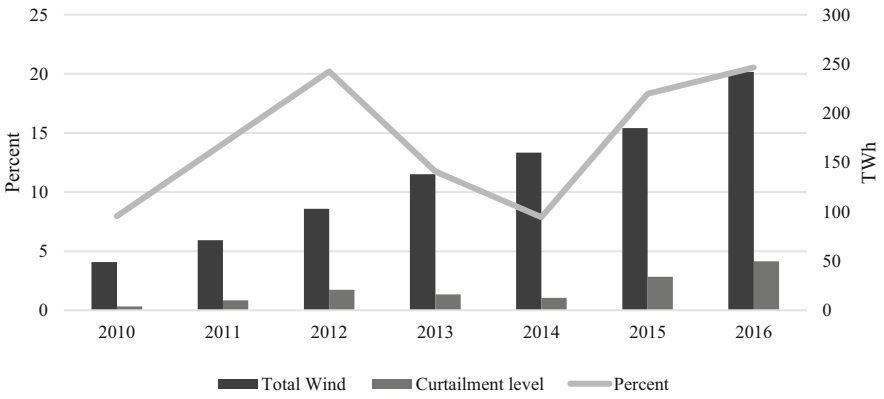

Fig. 5 Wind curtailment as share of production. Source: Own calculations based on calculations Luo et al. (2016), Zhu et al. (2019), and IRENA (2021)

0.5% of the time (Karltorp et al., 2017). If the average of 1787 full load hours in 2007 had remained, there would have been no economic surplus in 2013. An example from Zhu et al. (2019) indicates that to break even in Guazhou county of Gansu, windfarms needed to produce 1800 h, which they did in 2013 (1859 h), but in 2016 the utilization rate had fallen to 992 h.

4 Discussion

The Chinese state's intentions for wind power may have been good; however, state involvement led entrepreneurial activity astray. The incentives led to what Baumol (1990, 1996) would call unproductive entrepreneurship. Whether entrepreneurship adds value to society or is oriented toward rent-seeking or illegal activity depends on the relative payoffs (Baumol, 1996). Little economic activity in Chinese wind power added value; firms actually suffered losses that could have been avoided. For example, the decision to limit the presence of foreign components in turbines erased valuable international expertise and products left the market.

Most investments in Chinese wind power were made by Central State-Owned Enterprises (CSOEs). This partly explains why investments seem to have disregarded economic logic (Zhu et al., 2019). Because of the need to fulfill political goals, such investments suffer more political intervention than private firms, and performance varies (Fan et al., 2007; Du & Wang, 2013).

State firms must engage in "social" and "strategic" burdens like maintaining regional employment or engaging with sectors that are important to central government planning (Dong & Putterman, 2003). China's CSOEs neither enjoy the benefit of good investments nor do they endure responsibility for losses, since they have what Chow et al. (2010) call "soft budget constraints", which are government

transfers. When the central government controls economic activities and the decision-making price signals of firms are distorted, the basis of buying raw materials, and from whom, becomes politicized. Hence, the burdens laid on China's CSOEs make it hard to distinguish between policy-induced losses and business losses (Liao et al., 2009).

China's CSOEs differ from the private market logic of profit-maximization by following a political logic which, at first glance, is not economically rational (Wang, 2014). A downside of not following profit and price signals is that producers lose their main source of information. Profits indicate value for customers and that scarce resources are used efficiently. When price is absent as a market signal or planners disregard signals, they have to depend on other measures (de Soto, 1992/2010).

Entrepreneurs should be guided by price signals, but market-distorting interventions (such as subsidies, price floors or ceilings, and capacity targets) undercut the ability of entrepreneurs to be active drivers of the economy, relegating them to optimizers of government goals. In an ordinary market economy, it would be illogical to erect a wind power plant without a grid connection. In China, poor localization has been common because of construction goals: When spending somebody else's money, the cheapest means of goal fulfillment is to buy inferior products for inferior locations. Forced construction created questionable location choices, like the presence of plants in non-populated northern areas at end of the power grid and where the power grid structure was not appropriate for large-scale wind power (Han et al., 2009).

Entrepreneurs are products of the market institutions in which they find themselves. Institutions establish rules to promote behaviors by changing payoffs. Important institutions include (1) well-defined and enforceable private property rights; (2) the rule of law; and (3) a moral code of behavior that legitimizes and acknowledges these traditions (Hayek, 1968/2002). Policies affect outcomes, but good policy under bad institutions can create unintended consequences (Evans, 2016).

A fixed production goal can turn the entrepreneurial process on its head and lead to destructive creation rather than creative destruction. One problem with China's emphasis on setting quantitative goals is that quality becomes less of a sales point and intense price competition hurts both technological development and the quality of the goods sold (Hayashi et al., 2018). Usually, competition improves quality, but when quantity is optimized and the profit motive is distorted, an equilibrium with low price and low quality can materialize (Xingang et al., 2012; Luo et al., 2016).

A plan needs a goal, for example, an equilibrium state in which demand is satisfied. However, before reaching that rough equilibrium, market changes (individual preferences, the endowments of resources, and available technology) will make the plan obsolete, since even a small relative price change can make another option better (Kirzner, 1982, 1999). Information cannot be assembled beforehand by regulators and planners or an entrepreneurial state administrator. An energy system is a juggernaut that is not easily changed. The planning horizon will be decades-long, because that is how long it takes to initiate the construction of powerplants and to build them. Imagine planning the decade beyond 2007, when neither smartphones

nor electric cars would be have been part of the plan. In 2007, both the electric car and what we call smartphones today were largely unheard of.

It is no exaggeration to say the Chinese wind power sector was—and is, it seems from the research literature—deeply regulated by planning and administrative practices. Some policies have been counterproductive, due to several competing and uncoordinated government entities (Lema & Ruby, 2007). Liao (2016) analyzed 72 wind energy policies from 1995 to 2014 and observed over 20 actors who issued policies independently or together. Policy came largely from officials that regulated key economic and administrative issues, but not wind power.

5 Conclusion

This chapter has investigated Chinese wind power development in the twenty-first century. Its main conclusion is that innovation cannot be enforced by mass efforts and that when the state lays out directions and clarifies objectives, these can be achieved but with severe and unexpected side effects. A key lesson for Europe is that while renewable energy has great potential, its development should occur through price mechanisms: emissions like CO_2 should become more expensive, thus incentivizing innovation in other energy sources. As observed by Mazzucato (2015), the macro numbers looked good for Chinese wind power, but when investigating the micro-level data, the production aggregates were obviously a mirage. The production numbers presented in this chapter are a stark contrast to Mazzucato's (2015) notion that China's strategy of optimal economic development assured a win-win between the environment and profit. Of course, this can exist, but it is not what is revealed in Mazzucato's example. Just because wind power plants are built does not necessarily mean that electricity will be produced.

China emits a significant portion of the world's CO_2, so efforts to reduce emissions, like wind power construction, are necessary, but large inefficiencies in investments lead to problems. The Chinese wind power sector demonstrates substantial economic activity but less value creation. Political favors from the ruling politicians carry more weight than actual value creation, and market actors have varied project priorities. Wind power investment in China during the period under investigation was sizable; unfortunately, its benefits for consumers were questionable. The real achievement of the projects was to temporarily boost GDP statistics and other indicators decided in state plans. Genuinely sustainable growth, as opposed to debt-laden temporary activity, arises from the production of goods and services that people purchase voluntarily, ultimately facilitated by free competition and entrepreneurship.

Real entrepreneurship, whereby an entrepreneur creates a new business, assumes most of the risk, and enjoys most of the rewards, should be allowed to operate in the Chinese wind energy market. Forced construction, on the other hand, wastes both materials and time. It could be that Chinese investments have knowledge spillovers, but as seen in technological output spillovers, this seems uncertain. Even though

domestic patents are plentiful, Chinese firms have received few international patents protecting their *inventions*. Large monetary benefits act as incentives for patent protection in large markets like Europe and the U.S. One conclusion is that Chinese firms have failed to create any technology worth patenting.

The Chinese wind power sector has been deeply regulated by administrative practices. Planning was likely the underlying institutional reason for the challenges the sector has faced. Government command-and-control targets for installed capacity—or any target for that matter—may deliver to target but, as in all fairy tales, planners should be careful what they wish for: There may be unforeseen and unpleasant consequences. Capacity, as a goal, leads to construction (i.e., generation capacity) but not automatically to energy. China endorsed construction without due consideration of grid connectivity, thus creating economically unprofitable construction.

References

Baumol, W. J. (1990). Entrepreneurship: Productive, unproductive and destructive. *Journal of Political Economy, 98*(5), 893–921.

Baumol, W. J. (1996). Entrepreneurship: Productive, unproductive, and destructive. *Journal of Business Venturing, 11*(1), 3–22.

Chow, C. K., Song, F. M., & Wong, K. P. (2010). Investment and the soft budget constraint in China. *International Review of Economics & Finance, 19*(2), 219–227.

De Soto, J. H. (1992/2010). *Socialism, economic calculation and entrepreneurship*. Edward Elgar.

Del Río, P., & Mir-Artigues, P. (2012). Support for solar PV deployment in Spain: Some policy lessons. *Renewable and Sustainable Energy Reviews, 16*(8), 5557–5566.

Dong, X. Y., & Putterman, L. (2003). Soft budget constraints, social burdens, and labor redundancy in China's state industry. *Journal of Comparative Economics, 31*(1), 110–133.

Dong, C., Qi, Y., Dong, W., Lu, X., Liu, T., & Qian, S. (2018). Decomposing driving factors for wind curtailment under economic new normal in China. *Applied Energy, 217*, 178–188.

Du, J., & Wang, Y. (2013). Reforming SOEs under China's state capitalism. In J. Zhang (Ed.), *Unfinished reforms in the Chinese economy* (pp. 1–38). World Scientific Publishing.

Evans, A. J. (2016). The unintended consequences of easy money: How access to finance impedes entrepreneurship. *The Review of Austrian Economics, 29*(3), 233–252.

Fan, J. P., Wong, T. J., & Zhang, T. (2007). Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms. *Journal of Financial Economics, 84*(2), 330–357.

Fan, X. C., Wang, W. Q., Shi, R. J., & Li, F. T. (2015). Analysis and countermeasures of wind power curtailment in China. *Renewable and Sustainable Energy Reviews, 52*, 1429–1436.

Feng, Y., Lin, H., Ho, S. L., Yan, J., Dong, J., Fang, S., & Huang, Y. (2015). Overview of wind power generation in China: Status and development. *Renewable and Sustainable Energy Reviews, 50*, 847–858.

Gosens, J., & Lu, Y. (2013). From lagging to leading? Technological innovation systems in emerging economies and the case of Chinese wind power. *Energy Policy, 60*, 234–250.

Gosens, J., & Lu, Y. (2014). Prospects for global market expansion of China's wind turbine manufacturing industry. *Energy Policy, 67*, 301–318.

Grafström, J. (2017). *Technological change in the renewable energy sector: Essays on knowledge spillovers and convergence* (Doctoral dissertation, Luleå University of Technology).

Grafström, J., & Sandström, C. (2020). *Mer för mindre?: Tillväxt och hållbarhet i Sverige*. Ratio.

Han, J., Mol, A. P., Lu, Y., & Zhang, L. (2009). Onshore wind power development in China: Challenges behind a successful story. *Energy Policy, 37*(8), 2941–2951.
Hayashi, D., Huenteler, J., & Lewis, J. I. (2018). Gone with the wind: A learning curve analysis of China's wind power industry. *Energy Policy, 120*, 38–51.
IRENA. (2018). *Renewable energy statistics 2018*. The International Renewable Energy Agency.
IRENA. (2021). *Renewable capacity statistics 2021*. The International Renewable Energy Agency.
Junfeng, L., Pengfei, S., & Hu, G. (2010). *China wind power outlook 2010*. Global Wind Energy Council.
Karltorp, K., Guo, S., & Sandén, B. A. (2017). Handling financial resource mobilisation in technological innovation systems: The case of Chinese wind power. *Journal of Cleaner Production, 142*, 3872–3882.
Keller, M. R., & Negoita, M. (2013). Correcting network failures: The evolution of US innovation policy in the wind and advanced battery industries. *Competition & Change, 17*(4), 319–338.
Kirzner, I. M. (1982). Competition, regulation, and the market process: An "Austrian" perspective. *Cato institute policy analysis No. 18*.
Kirzner, I. M. (1999). Creativity and/or alertness: A reconsideration of the Schumpeterian entrepreneur. *The Review of Austrian Economics, 11*(1–2), 5–17.
Lam, L. T., Branstetter, L., & Azevedo, I. M. (2017). China's wind industry: Leading in deployment, lagging in innovation. *Energy Policy, 106*, 588–599.
Lema, A., & Ruby, K. (2007). Between fragmented authoritarianism and policy coordination: Creating a Chinese market for wind energy. *Energy Policy, 35*(7), 3879–3890.
Li, X. (2012). Behind the recent surge of Chinese patenting: An institutional view. *Research Policy, 41*(1), 236–249.
Liao, Z. (2016). The evolution of wind energy policies in China (1995–2014): An analysis based on policy instruments. *Renewable and Sustainable Energy Reviews, 56*, 464–472.
Liao, G., Chen, X., Jing, X., & Sun, J. (2009). Policy burdens, firm performance, and management turnover. *China Economic Review, 20*, 15–28.
Liu, W. Q., Gan, L., & Zhang, X. L. (2002). Cost-competitive incentives for wind energy development in China: Institutional dynamics and policy changes. *Energy Policy, 30*, 753–765.
Lu, X., McElroy, M. B., Peng, W., Liu, S., Nielsen, C. P., & Wang, H. (2016). Challenges faced by China compared with the US in developing wind power. *Nature Energy, 1*(6), 1–6.
Luo, G. L., Li, Y. L., Tang, W. J., & Wei, X. (2016). Wind curtailment of China's wind power operation: Evolution, causes and solutions. *Renewable and Sustainable Energy Reviews, 53*, 1190–1201.
Mazzucato, M. (2015). The green entrepreneurial state. In I. Scoones, M. Leach, & P. Newell (Eds.), *The politics of green transformations* (pp. 152–170). Routledge.
McAfee, A. (2019). *More from less: The surprising story of how we learned to prosper using fewer resources—And what happens next*. Scribner.
Nove, A. (1986). *The Soviet economic system*. Allen & Unwin.
Nuñez-Jimenez, A., Knoeri, C., Rottmann, F., & Hoffmann, V. H. (2020). The role of responsiveness in deployment policies: A quantitative, cross-country assessment using agent-based modelling. *Applied Energy, 275*, 115358.
Ridgway, V. F. (1956). Dysfunctional consequences of performance measurements. *Administrative Science Quarterly, 1*(2), 240–247.
Sahu, B. K. (2018). Wind energy developments and policies in China: A short review. *Renewable and Sustainable Energy Reviews, 81*, 1393–1405.
SIPO. (2009). *Amendment of Patent Law of P. R. China* (in Chinese). Retrieved from http://www.sipo.gov.cn/zxft/zlfxg/bjzl/200903/t20090312_444625.html
Sun, S., Liu, F., Xue, S., Zeng, M., & Zeng, F. (2015). Review on wind power development in China: Current situation and improvement strategies to realize future development. *Renewable and Sustainable Energy Reviews, 45*, 589–599.

von Hayek, F. A. (1968/2002). Competition as a discovery procedure. *Quarterly Journal of Austrian Economics*, *5*(3), 9–23. (translation from German of F.A. Hayek's "Der Wettbewerb als Entdeckungsverfahren," a 1968 lecture).

Wang, J. (2014). The political logic of corporate governance in China's state-owned enterprises. *Cornell International Law Journal, 47*, 631.

Wiser, R., & Millstein, D. (2020). Evaluating the economic return to public wind energy research and development in the United States. *Applied Energy, 261*, 114449.

WWEA (World Wind Energy Association). (2019). *Wind Power Capacity Worldwide Reaches 597 GW, 50,1 GW added in 2018*. Retrieved April 01, 2020, from https://wwindea.org/blog/2019/02/25/wind-power-capacity-worldwide-reaches-600-gw-539-gw-added-in-2018/

WWEA (World Wind Energy Association). (2020). Worldwide *Wind Capacity Reaches 744 Gigawatts – An Unprecedented 93 Gigawatts added in 2020*. Retrieved June 15, 2020, from https://wwindea.org/worldwide-wind-capacity-reaches-744-gigawatts/

Xingang, Z., Jieyu, W., Xiaomeng, L., & Pingkuo, L. (2012). China's wind, biomass and solar power generation: What the situation tells us? *Renewable and Sustainable Energy Reviews, 16*(8), 6173–6182.

Xu, J., He, D., & Zhao, X. (2010). Status and prospects of Chinese wind energy. *Energy, 35*(11), 4439–4444.

Zeng, M., Duan, J., Wang, L., Zhang, Y., & Xue, S. (2015). Orderly grid connection of renewable energy generation in China: Management mode, existing problems and solutions. *Renewable and Sustainable Energy Reviews, 41*, 14–28.

Zhang, S., Andrews-Speed, P., & Zhao, X. (2013). Political and institutional analysis of the successes and failures of China's wind power policy. *Energy Policy, 56*, 331–340.

Zhang, S., Wang, W., Wang, L., & Zhao, X. (2015). Review of China's wind power firms' internationalization: Status quo, determinants, prospects and policy implications. *Renewable and Sustainable Energy Reviews, 43*, 1333–1342.

Zhang, D., Wang, J., Lin, Y., Si, Y., Huang, C., Yang, J., Huang, B., & Li, W. (2017). Present situation and future prospect of renewable energy in China. *Renewable and Sustainable Energy Reviews, 76*, 865–871.

Zhengming, Z., Qingyi, W., Xing, Z., Hamrin, J., & Baruch, S. (2006). *Renewable energy development in China: The potential and the challenges*. Edited and produced by the Centre for Resource Solutions. Retrieved from http://www.efchina.org/documents/China_RE_Report_EN.pdf. European Commission EUR, 22346, 2006-118.

Zhu, M., Qi, Y., Belis, D., Lu, J., & Kerremans, B. (2019). The China wind paradox: The role of state-owned enterprises in wind power investment versus wind curtailment. *Energy Policy, 127*, 200–212.

The Failures of the Entrepreneurial State: Subsidies to Renewable Energies in Europe

Carlo Amenta and Carlo Stagnaro

Abstract Since the 1990s, the European Union has committed to gaining global leadership in clean energies such as solar photovoltaic and wind power. The joint amount of wind and solar capacity grew from 12.5 GW (or 2% of total installed electricity capacity) in 2000 to 261.2 GW in 2018 (or 28.1% of total installed electricity capacity). This came at a cost: In 2018 alone, the European Union (excluding the United Kingdom) spent €73 billion to subsidize green energy production. These financial aids were paid for by European energy consumers, mainly through levies charged on top of their power bills. According to proponents, these subsidies were needed to achieve sustainability while promoting the emergence of the European renewable industry. This chapter focuses on the European venture into renewable energies to answer the following three questions: (1) Was the subsidization of green electricity sources an effective environmental policy? (2) Was it an effective industrial policy? (3) Was it an effective social policy? The answer is: no, no, no.

Keywords Energy · Climate change · Green taxation · Subsidies · Competition · Regulation

C. Amenta (✉)
Università di Palermo, Palermo, PA, Italy

Istituto Bruno Leoni, Milan, Italy
e-mail: carlo.amenta@unipa.it

C. Stagnaro
Istituto Bruno Leoni, Milan, Italy
e-mail: carlo.stagnaro@brunoleoni.org

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_13

1 Introduction

Since the 1990s, the European Union has set the goal of gaining global leadership in clean energies. After joining the Kyoto Protocol and committing to cut emissions in 2008–2012 by 8% below the 1990 benchmark, the Union progressively raised its ambition by setting further goals of cutting emissions by 20% below 1990 levels in 2020, then by 40% (more recently raised to 55%) in 2030, and eventually to net-zero emissions in 2050.

In the light of these goals, both the European Union and the member states have adopted several policy tools, including high taxes on the use of fossil fuels, technical standards, renewable portfolio standards, a cap-and-trade scheme called the Emissions Trading System, subsidies to clean energies, and other regulations intended to curb carbon-based energies. Moreover, on top of the emissions reduction goals, Europe adopted binding targets concerning the share of renewable energies in final consumption and investments in energy efficiency. In order to meet the targets, member states introduced generous subsidies to renewable energy sources. Recent estimates indicate that subsidies to the production of green energies in 2018 amounted to about €73 billion, or some 0.5% of E.U. GDP (excluding the U.K.) (EC, 2020a). More financial aid was granted to energy consumers (€52 billion in 2018), energy efficiency (€15 billion), energy infrastructure (€1.45 billion), industry restructuring (€1.85 billion), R&D (€4.55 billion), and the production of non-green energy (€12 billion). Subsidies to renewable energies mainly took the form of direct financial transfers, such as feed-in tariffs or other forms of income or price support.

Subsidies to green energies fit with the idea of "mission-oriented innovation," which is frequently employed by the supporters of the entrepreneurial state. For example, in a report on behalf of the E.U. Commission, economist Mariana Mazzucato (2018, p. 4) cites carbon-neutral cities as a quintessential example of mission-oriented innovation and argues, "Mission-oriented policies can be defined as systemic public policies that draw on frontier knowledge to attain specific goals." According to the proponents of the entrepreneurial state, mission-oriented innovation can pursue three goals simultaneously, i.e., an environmental goal (cutting emissions), an industrial policy goal (promoting growth), and a social goal (promoting equality and fairness). In another influential paper, Mazzucato (2015) calls for a more interventionist role of the governments to drive—rather than pushing—the green transformation of the economy: She argues that the "green entrepreneurial state" should push the "green industrial revolution" by engaging in various forms of "entrepreneurial risk-taking" in order to "launch specific green technologies" such as "wind turbines and solar photovoltaic panels." Given the magnitude of the climate challenge, these proposals deserve scrutiny. All the broader criticisms of the entrepreneurial state hold (McCloskey & Mingardi, 2020). This chapter will try to develop a more specific argument that considers the peculiarities of climate policy, on one hand, and of energy systems and industries, on the other hand.

Mazzucato claims that some governments, including Germany, Denmark, and China, have already played this role. This may be true to an extent, as we shall see in

the following (and as chapter "Less from More: China Built Wind Power, but Gained Little Electricity" shows concerning China) (Grafström, 2022). The stated objective of Europe's green policy is to achieve global leadership in clean technologies, as Mazzucato suggests. This goes well beyond what a textbook-like environmental policy would look like: In fact, the latter would rely on carbon pricing to minimize the use of fossil and other polluting fuels, rather than employing subsidies and regulations aimed at maximizing the production of *clean* energy from selected technologies. It also goes beyond the mere and reasonable attempt to design environmental policy in a way that induces innovation. It reduces social costs (Porter & Van der Linde, 1995), rather than hampering European businesses' competitiveness and unintentionally accelerating the process of deindustrialization of the Old Continent.

If one takes the aims of green policies at face value, subsidies to the production of clean energies delivered: the joint amount of wind and solar capacity in the European Union grew from 12.5 GW (or 2% of total installed electricity capacity) in 2000 to 261.2 GW in 2018 (or 28.1% of total installed electricity capacity) (EC, 2020b). However, did it work? Was it the best way to meet the climate goals? This chapter focuses on the experience of green subsidies.[1] Moreover, it tries to answer the following questions:

- Was the support of renewable generators a cost-effective environmental policy?
- Did it work? Did Europe become a global powerhouse for renewable technologies manufacturing?
- Did European consumers and businesses benefit, on balance, from the push toward renewable energies?

The chapter is structured as follows. Section 2 after this introduction shows the progress in the penetration of Renewable Energy Source in Electricity (RES-E) and their direct and indirect costs, along with environmental benefits. Section 3 answers the first research question, i.e., whether—by subsidizing the deployment of renewable energies—the European Union was able to cost-effectively cut carbon emissions. Section 4 addresses the subsidization of green energies as a form of industrial policy. Section 5 addresses the social dimension of the policy, i.e., whether it promoted economic growth and fairness. Section 6 shows how the green entrepreneurial state is turning into a green central banker and discusses the underlying risks. Section 7 summarizes and concludes.

[1] Henceforth, when we speak about subsidies, green subsidies, renewable subsidies, and other similar expressions, we specifically refer to subsidies to the production of energy, unless otherwise specified.

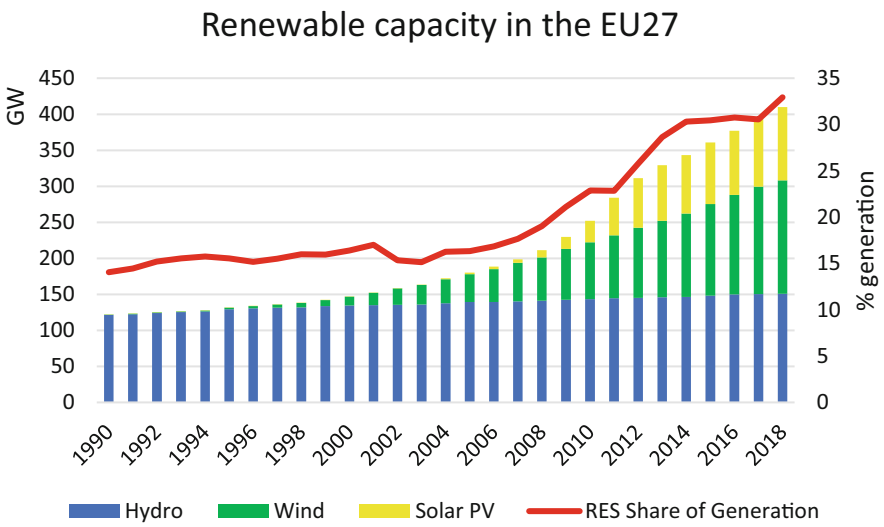

Fig. 1 Installed Generation Capacity From Hydro, Solar, and Wind (left axis) and RES-E Generation as a Share of Total Generation in the E.U.27 (right axis). Source: Author's elaboration on data from Eurostat

2 The Growth of Renewable Energy Sources of Electricity in the European Union

The support of renewable energies, particularly in electricity generation, has been the subject of several E.U. and national regulations.[2] The support has taken many different forms, both cross-country and over time, including renewable portfolio standards, green certificate schemes, and direct subsidies of various kinds (such as feed-in tariffs, feed-in premiums, contract for differences, etc.) on top of other subsidies to research and development, infrastructure, etc. (Stagnaro, 2015).

The installed renewable capacity and the share of electricity production (or consumption) from RES-E increased dramatically in Europe. Figure 1 shows the increase in electrical, renewable energy sources (RES-E) in terms of capacity and generation in 1990–2018.

Behind this dramatic increase stand many drivers, both market- and policy-driven. The former include the impressive reduction in the cost of renewable technologies, the evolving preferences of consumers, and more stringent environmental standards: The levelized cost of electricity from wind and solar photovoltaic (solar PV)—a standard estimate of the *average* cost of generating electricity from different sources—fell by 48–56% and 85%, respectively, in 2010–2020 (Irena, 2021). Nevertheless, political support for investment was crucial, too. Attributing

[2] Directives 2001/77/EC, 2009/28/EC, and 2018/2001/EU.

this expansion of renewable energies entirely to the subsidies would be naïve. However, it would be even more naïve to rule out subsidies as a cause, and possibly a major one, of the rapid growth of renewable installed capacity. In the first place, subsidies made any investment in renewable capacity almost risk-free. Secondly, as production costs declined, high subsidies attracted even more investments, looking for high-return, low-risk opportunities. Thirdly, this rush to investments created a demand large enough to allow for scale economies and fast learning curves, thereby providing low-cost technologies and, at least for some time, even higher returns (Kavlak et al., 2018). A counterproof of how substantial subsidies were in driving investments in new renewable capacity lies in the fact that—as subsidies were reduced, phased-out or eliminated for new installations—the capital flow toward the renewable sector slowed down.

According to CEER—the Council of European Energy Regulators—RES-E was awarded €60 billion worth of subsidies in 2018,[3] up from about €25 billion in 2010, with an average cost per unit of gross electricity of €19.12/MWh. The country that invested the most in public support of RES-E was Italy (€38.48/MWh of gross electricity), versus just €2.53/MWh of gross electricity in Sweden. In the same year, the average wholesale price of electricity in Europe was around €50/MWh. The average support varies across technologies, ranging from €6.92/MWh for offshore wind in Ireland to €501.07/MWh for solar photovoltaic in the Czech Republic (CEER, 2021).

As time passed and the amount of green installed capacity grew, the average level of *unit* subsidies decreased, following the average generating costs, but the overall expenditure increased. This trend was magnified by the falling rates of growth—or even reductions—in total energy consumption due to improvements in energy efficiency and the economic crises of 2009–2011 and 2020. In 2018, RES-E subsidization amounted to about 8% of the average yearly spending on electricity by households; but it was as high as 23% in Germany, 21% in the United Kingdom, and 22% in Portugal (Acer, 2020). These data should be taken with a pinch of salt, as some countries may subsidize RES-E through fiscal schemes that have little or no effect on the power bill. Moreover, other RES-E-related costs—such as higher costs for network connections or from imbalances in the power system due to the variability of green energies—cannot be easily disentangled from the overall price, but they are still there. Finally, some governments may shift the burden of subsidization almost entirely onto households (as is the case of Germany). In contrast, others may spread the costs over a more significant basis that includes small and medium-sized enterprises and households and, to a lesser extent, large enterprises (as happens in Italy).

[3] The estimate also includes North Macedonia, Norway, and the United Kingdom. The estimate partly differs from the one cited above because it is limited to renewable electricity and does not include other renewable energies such as biofuels or heat from solar thermal panels and renewable-powered district heating.

RES-E produced economic benefits, on top of the environmental ones. In particular, given the price-formation mechanisms in most E.U. power markets, greater RES-E penetration is associated with a significant reduction in the wholesale price of electricity. For example, based on Italian data, Clò et al. (2015) found 1 extra GWh from solar and wind power reduced prices by €2.3 and €4.2/MWh, respectively, albeit it also amplified volatility. However, the net effect on end-user prices points toward a net increase of electricity prices, given how large subsidies are—in the case of Italy, about one order of magnitude.

The policy of supporting RES-E had three stated goals:

- Reducing CO_2 emissions
- Promoting Europe's renewable industry
- Contributing to a fairer distribution of wealth and income

Most economists would agree that some policy intervention is required to address such a complex and global problem as climate change. They would also agree that pricing carbon—through a carbon tax, a cap-and-trade scheme, or a hybrid system—should be the cornerstone of an economically sound and cost-effective strategy (Nordhaus, 2018). Subsidizing renewables, instead of merely letting market forces find out the optimal energy mix given a specific carbon price or cap, is a much less obvious strategy from an economic point of view. It is, however, the preferred strategy of the proponents of the entrepreneurial state and mission-oriented innovation. In the following sections, we will check whether the strategy was delivered.

3 Are Green Subsidies an Efficient Environmental Policy?

Subsidized, carbon-free energy displaces conventional generators that emit CO_2. There is little doubt that subsidies made a fundamental contribution to the greening of the power grid in Europe, through one obvious channel (increasing the amount of emissions-free energy) and a less obvious one (higher energy prices result in reduced consumption, which in turn implies lower emissions; for a quantitative estimate of the size of this effect, see Faiella & Lavecchia, 2021a). The question is, at what cost? Was it the most effective *environmental* policy?

In the following, we will provide a back-of-the-envelope calculation about the implicit abatement cost of carbon, based on 2018 data. According to the Council of European Energy Regulators, in 2018, around one-fifth of Europe's gross electricity production, or 594.3 TWh, received the support of almost €60 billion worth of subsidies, equal to about €100.0/MWh.

In order to estimate the volume of emissions abated by green generators, one must figure out what kind of power plants are displaced: in most cases, it is reasonable to assume natural gas-fueled generators, whose emissions factor may be estimated at around 400 g CO_2/kWh. That is likely to underestimate the actual emissions abatement in the least carbon-efficient countries. However, it also overestimates the actual environmental outcome in countries such as France and Sweden, which

Table 1 Supported renewable generation, subsidy expenditure, unit support, and average CO_2 abatement cost in the European Union (2018)

Country	Supported energy [TWh]	Total support [M euro]	Unit support [euro/MWh]	CO_2 abatement cost (high) [euro/ton CO_2]	CO_2 abatement cost (low) [euro/ton CO_2]
Austria	9.8	671	68.6	171.5	85.8
Belgium	3.4	350	103.2	258.1	129.1
Croatia	2.1	153	74.6	186.6	93.3
Cyprus	0.4	67	176.3	440.8	220.4
Czech Republic	8.0	1710	213.0	532.4	266.2
Denmark	20.0	578	28.9	72.1	36.1
Estonia	1.5	83	53.9	134.7	67.4
Finland	0	0	–	–	–
France	51.6	4413	85.6	213.9	106.9
Germany	195.3	23,691	121.3	303.3	151.7
Greece	11.1	1197	107.7	269.4	134.7
Hungary	2.8	133	47.3	118.3	59.2
Ireland	8.0	87	10.9	27.3	13.7
Italy	63.3	11,147	176.2	440.4	220.2
Latvia	0.9	95	103.3	258.2	129.1
Lithuania	1.7	84	50.3	125.7	62.9
Luxembourg	0.0.5	52	98.1	245.3	122.6
Malta	0.2	17	113.3	283.3	141.7
Netherlands	15.8	1072	68.0	170.1	85.0
Portugal	17.1	827	48.4	121.1	60.6
Romania	9.1	412	45.4	113.4	56.7
Slovakia	2.7	301	113.2	282.9	141.4
Slovenia	0.6	101	162.9	407.3	203.6
Spain	56.2	5751	102.4	255.9	128.0
Sweden	23.3	413	17.7	44.2	22.1
United Kingdom	89.1	6556	73.6	184.0	92.0
E.U.	**594.3**	**59,991**	**100.9**	**226.4**	**113.2**

Source: Author's elaboration on data from CEER

rely primarily on carbon-free energy sources (nuclear and hydropower) already. At any rate, we will also consider an overly optimistic scenario in which coal plants, instead of natural gas, are displaced: In this case, each additional green MWh results in the abatement of about 800 g CO_2. Depending on the scenario, the unweighted average abatement cost is €113.2–226.4/ton CO_2. Table 1 summarizes.

Table 2 shows the support to renewable power by generation technology and the corresponding carbon abatement cost in the same optimistic and pessimistic scenarios discussed above.

Table 2 Support to renewable generation in the European Union by Technology (2018)

Technology	Min support euro/MWh]	Max support [euro/MWh]	CO_2 abatement cost (high) [euro/ton CO_2]	CO_2 abatement cost (low) [euro/ton CO_2]
Bioenergy	15.0	174.3	37.5–435.8	18.8–217.9
Geothermal energy	27.1	204.4	67.8–511.0	33.9–255.5
Hydropower	101.5	11.2	28.0–253.8	14.0–126.9
Solar PV	501.1	12.1	30.2–1252.7	15.1–626.3
Onshore wind	166.0	6.9	17.3–415.0	8.7–207.5
Offshore wind	148.6	15.0	37.5–371.5	18.8–185.8
Others	264.6	10.9	27.1–661.4	13.6–330.7

Source: Author's elaboration on data from CEER

The cost of subsidizing green power—and the implicit abatement cost of CO_2—varies substantially by technology and country. That is irrespective of the environmental benefit, which does not depend on the specific technology employed (while it may change according to the country, even though in the above calculations we have made a simplistic assumption that one unit of green power displaces either natural gas or coal). Hence, the cost of abating one ton of CO_2 may be as low as €8.7–17.3 (which is the case of onshore wind in Ireland) or as high as €626.3–1252.7 (as happens with solar PV in the Czech Republic).

From an environmental perspective, policy should maximize the amount of CO_2 abated for any given level of expenditure or minimize the cost, given the abatement target. Such a significant variance suggests that emissions could have been cut more aggressively had expenditure been better targeted. Of course, differences may also depend on site-specific circumstances: not all countries have places as windy as the North Sea or as sunny as Southern Europe. In 2018, the average price of emission allowances (EUAs) in the Emissions Trading System—Europe's cap-and-trade scheme—was €15.5/ton CO_2. That means that one ton of CO_2 could be cut, somewhere in Europe, at a cost that was one or even two orders of magnitude below what Europeans have paid so far in green subsidies. Even in 2021, when this chapter is being written, EUAs are traded at an all-time high of more than €60/ton CO_2, the average cost of cutting carbon via green electricity subsidies exceeds by far the cost of many alternatives such as energy efficiency.

Future subsidization policies may be better designed, but they have not been an effective environmental policy so far.

4 Are Green Subsidies an Effective Industrial Policy?

Reducing emissions was not the only objective of green subsidies: proponents of the entrepreneurial state argued that generous incentives would spur a new industry and create jobs.

Europe is the second-largest market for both wind and solar power after China. In 2019, total wind and solar capacity installed in the European Union was 203.5 GW and 146.7 GW, respectively, or 32.7% and 25.0% of the global installed capacity. Nevertheless, is Europe a *producer* or an *importer* of renewable technologies? From a more comprehensive economic perspective, this may be of relative relevance, but—if green subsidization is thought of as an industrial policy—it is the manufacturing of clean energies, not the installation, that matters. Most *permanent* jobs are created in the production of wind turbines and solar panels, while some *temporary* jobs are involved in their installation, and just a little in their operations and maintenance (Popp et al., 2020) and the overall employment impact is unclear (Aldieri et al., 2020; Bijnens et al., 2021).

Europe—particularly Denmark, Spain, and Germany—has traditionally been a powerhouse for wind power. This historical competitive advantage is well reflected by today's market shares of wind turbine producers: Vestas, a Danish company, ranked first globally in 2018 with a market share of 20.3%. Other European manufacturers include Spain's Gamesa (12.3% of the global market in 2018), and Germany's Enercom (5.5%), and Nordex Acciona (5%) (Statista, 2018). Green incentives have certainly supported the deployment and, indirectly, R&D activities in the European wind industry, thereby making it more competitive abroad as investments in other regions have taken off. However, it should be emphasized that the European wind industry was already at the forefront of innovation in this technology. One may well argue that it was precisely the *green entrepreneurial state* in Denmark, Germany, and elsewhere that created (or at least nourished) the wind industry. Still, this is a dog chasing its tail: From an industrial policy perspective, a case can be made for subsidizing (or protecting) infant industries. However, the European wind industry came of age quite a few years ago and is still the recipient of large subsidies.

Moreover, as the global market grows and lower-cost producers make their appearance—particularly in the Far East—it is ever-harder for Europe to defend its industrial leadership. As this chapter is being written, the E.U. Commission is pursuing an anti-dumping investigation concerning imports of steel wind towers from China (European Commission, 2020). On a trade basis, the investigation may or may not be founded; in fact, Chinese steel-makers are already subject to defensive measures in Europe because of the ongoing trade war with Beijing. This suggests that the competitive edge of Europe's wind industry may not be secured in the long run despite the very high spending that has supported domestic installations. The manufacturing of wind turbines, blades, and other components is a competitive industry and a relatively mature one, for which market shares can be hardly defended, and costs, prices, and margins are on a declining track.

Solar photovoltaics has also benefitted from substantial subsidies, higher than wind subsidies in terms of subsidy per unit of electricity. In this field, Europe has been a front runner, too, even though the take-off of installations started later than in the case of wind. In fact, in 2000, there was only 0.65 GW of solar capacity worldwide, of which about one-third was in Europe. In 2010, Europe had about three-quarters of global solar capacity (30.9 GW out of 40.1 GW globally). Ten years later, solar capacity in Europe had grown about five-fold, whereas global capacity had skyrocketed by more than 14-times to 586.5 GW. Unfortunately, Europe's solar industry benefited only marginally from this spectacular growth. Of the 12 largest solar module manufacturers (with a joint market share of about 61%), nine are from China. Only one is European (German), while the remaining two are from South Korea and the United States. The European Union reacted to the Chinese dominance by introducing trade duties on imported panels in 2013; duties were removed in 2018, provided that importers sell panels above a specific price (Blenkinsop, 2018). Some member states also awarded lower subsidies to imported panels. Still, a substantial share of the solar panels in Europe come from China or elsewhere. Moreover, according to the European Solar Manufacturing Council, the European industry has satisfied just 15% of global demand (Enkhardt, 2021).

In the case of solar PV—even more than in wind power—generous subsidies failed to breed a European industry. Of course, to some extent, they succeeded, but firms eventually appropriated much of the value paid by European energy consumers in third countries, particularly China. Subsidies to clean energy can hardly be regarded as a compelling example of industrial policy.

Another critical aspect of industrial policy is its impact on firms. In general, it can be said that when sectoral policies are targeted toward competitive sectors or allocated in such a way as to preserve or increase competition, then these policies increase productivity growth (Aghion et al., 2015). This does not seem the case with the intervention of the entrepreneurial state in the RES-E sector. The intervention created an incentive to produce and invest in these technologies, whatever the level of competition in the sector, thus giving way to rent-seeking and creating firms interested in getting subsidies.

Firms use resources and combine them to create specific competencies to enjoy a competitive advantage over their competitors. If a sector is flooded with subsidies, the firm's primary resource is state intervention. The firms in a subsidized sector develop competencies to understand the main changes in the industrial policies, the political scenario, and they try to develop political connections to protect their rents. They do not try to innovate to better satisfy consumer demand because they only need to produce or invest according to the prescription of the entrepreneurial state that is their only customer (Böhringer et al., 2017).

When the entrepreneurial state is invoked, the risk of going from the invisible-hand model to the helping-hand and finally to the grabbing-hand one (Frye & Shleifer, 1997) is very high, especially in sectors already regulated whereby subsidies and state intervention exacerbate price distortions.

When the firms are not capable of efficiently allocating factors and do not compete for the market but for rent-seeking, economic growth very often languishes,

since entrepreneurs and firms are a relevant determinant of economic growth. Subsidies can also favor big firms that often have extensive legal departments and can exert more lobbying capacity, thus favoring concentration in the sector. Moreover, when the state support fades out, or when low-cost competitors step in, the protected industry finds itself in trouble, if not on the brink of collapse, as has happened in France and Spain after generous solar subsidies were reduced (Del Río & Mir-Artigues, 2012; de La Tour et al., 2013).

5 Are Green Subsidies an Effective Social Policy?

All else being equal, subsidies to green energies increase the average price of electricity. While they may result in lower *wholesale* prices due to the price-formation mechanism in most E.U. power markets, they are generally funded by levies that build up onto the end price consumers pay to their energy suppliers. Figure 2 shows the composition of electricity prices in E.U. member states for households. The figure should also be taken with a pinch of salt: some member states fund clean energy incentives with tax revenues rather than tariff levies. Moreover, some member states, such as Germany, shift most of the burden onto households, while others, such as Italy, place a heavier toll on small and medium-sized enterprises. Still, the figure shows that one effect of green energy subsidies is to raise the price of energy for the average household.

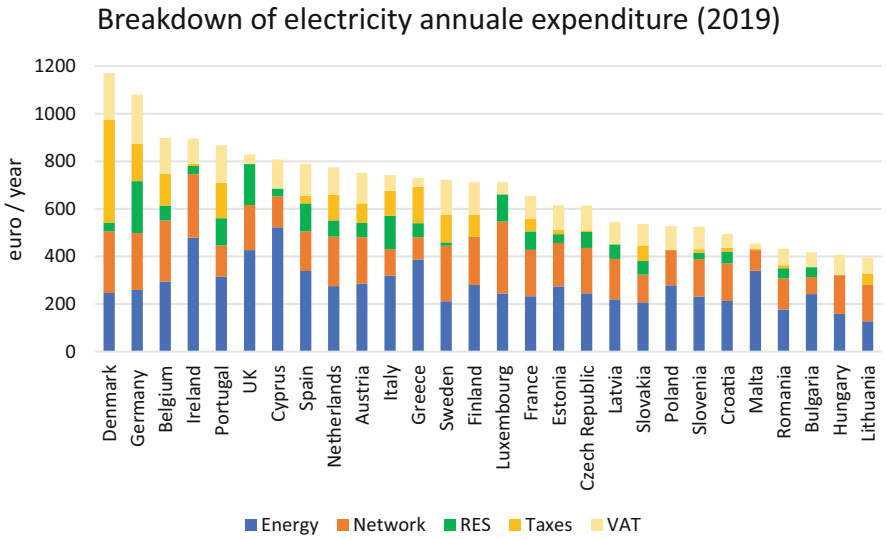

Fig. 2 Breakdown of Incumbents' Standard Electricity Offers for Households in Capital Cities – November/December 2019 (annual expenditure). Source: Author's elaboration on data from Acer

Electricity—and, more broadly, energy—expenditure tends to be regressive, meaning that poorer households spend a disproportionate share of their income on energy. Energy poverty—defined as the situation whereby a household fails to meet its own domestic energy needs—is a real and growing problem in Europe (Faiella & Lavecchia, 2021). According to the EU Energy Poverty Observatory, about 7.3% of European households could not keep their home warm in 2018 (Bouzarovski & Thomson, 2020). Electricity prices for household consumers in Europe, on average, grew faster than inflation, from 16.4 euro cents/kWh in 2009 to 21.6 euro cents/kWh in 2019. The European Agency for the Cooperation of Energy Regulators claims that the observed increase in the price of electricity for households "mainly reflects increases in non-contestable charges of the electricity consumers' bill." In particular, "the average share of RES charges in final electricity prices for households has more than doubled over the 2012–2019 period" (ACER, 2020, p. 18).

Both the European Union and member states have adopted, or are in the process of adopting, measures to address energy poverty, including conditional cash transfers, social tariffs, and means-tested energy efficiency incentives. Of course, the fight against energy poverty is part of the broader campaign against poverty, even though there may be differences in the affected groups. Moreover, energy poverty has many causes, including poverty, unemployment, high commodity prices, the failure of the less affluent households to retrofit their homes, and rising energy prices. However, the latter is peculiar insofar as it is an unintended consequence of policy decisions that are either *intended* to increase the price of energy (such as carbon taxes) or have price increases as an *unintended* consequence (such as green subsidies), or both. One obvious way to address energy poverty is to stop introducing policies that may exacerbate it.

Incidentally, while most economists agree that pricing carbon is a good policy for the environment and economic growth, many would suggest using the revenues from carbon taxes or other forms of carbon prices to mitigate their unintended consequences. This could be done by transferring the proceeds from carbon taxation to the low-income, such as reducing labor taxes or cutting the existing levies in the price of energy. As we write, our country, Italy, has decided to use some of the revenues from auctioning CO_2 allowances in the Emissions Trading System to mitigate increases in the cost of power. Austria is considering introducing a revenue-neutral carbon tax whose revenues would be recycled to cut taxes for middle-income earners, not just as a reaction to soaring energy prices in the short run but as a structural component of climate policy (Jones, 2021). That is a textbook example of market-based environmental policy (ARERA, 2021). On the contrary, green subsidies require funds to be extracted, either from tax-payers or from electricity consumers, and cannot be designed in a revenue-neutral guise.

The proponents of the entrepreneurial state and mission-oriented innovation would strongly disagree with the above statements and policies. They support carbon taxes and other forms of carbon prices not as a mere allocative instrument that helps internalize the external costs from using fossil fuels. Instead, they call for raising more revenues (from environmental and other taxes) to spend on the preferred technologies, such as solar and wind power. They advocate policies that may have

many merits but contribute to increasing the cost of energy and fall disproportionately on low-income households.

6 From the Entrepreneurial State to the Entrepreneurial Central Bank

As we have shown, the effort from the entrepreneurial state on climate change and the shift toward RES-E may be effective in cutting carbon emissions, but it is costly as well. Maybe this is the reason why proponents of the entrepreneurial state called the central banks to weigh in. Since the financial crisis of 2007–2008, central banks have adopted unconventional monetary policy tools such as quantitative easing to avert financial disaster and soften the consequences of the crisis. The Euro crisis immediately followed, and the use of unconventional monetary policy tools followed, becoming structural and almost *conventional* when the pandemic crisis hit. When purchasing assets in a quantitative easing program, central banks should be as neutral and independent as possible, trying not to distort capital allocation and the proper functioning of the market.

While Jerome Powell, the Federal Reserve chairman, declared that climate change is not something that the central bank considers in setting monetary policy (Derby, 2021), on July 8, 2021, the European Central Bank (ECB) presented an action plan to explicitly include climate change considerations in its monetary policy strategy (ECB, 2021). Both institutions properly act when they actively explore what climate implications are for their supervisory, regulatory, and financial stability responsibilities. However, the ECB upped its game by considering relevant climate change risks in its due diligence procedures for its corporate sector asset purchases by considering the alignment of issuers with, at a minimum, E.U. legislation implementing the Paris Agreement through climate change-related metrics or commitments of the issuers to such goals. The rationale for this intervention is that climate change supposedly affects price stability through its impact on relevant macroeconomic indicators. Carbon transition also affects the value and the risk profile of the assets held on the central bank's balance sheet with a potential undesirable accumulation of climate-related financial risks.

Climate change risks are relevant for the financial sector, and the ECB must support research, studies, and the disclosure of relevant information. We find it very dangerous to adopt strategies to force banks and private companies to defund fossil fuel industries and provide subsidized funding to *green* projects that are not easy to define. The energy transition from fossil fuels is a crucial process that calls both public and private stakeholders to contribute. However, setting the targets and the policies is an inherently political process that should be taken care of by governments, not by independent bodies such as central banks. What will the central banks do? Will they feel obliged to intervene with unconventional (now structural) monetary tools to tackle the next crisis? Maybe the choice to use unconventional

tools in exceptional circumstances to mitigate the effect of the financial crisis put in peril the independence of central banks, putting all the pressures on the shoulders of boards that must resist the calls by politicians to act. Nevertheless, now that these tools are used extensively, we need more neutrality and clear guidelines from central banks to avoid distortions in markets and capital allocation.

Central banks' independence, authority, and credibility have been essential features that have allowed us to enjoy a long period of low inflation and financial stability. Their boldness in using unconventional monetary tools when needed stems from their independence from political power. However, power corrupts, and absolute power corrupts absolutely. Unconventional and temporary interventions have become structural and permanent, and the desire to play God in deciding winners and losers on the markets is tempting but is also dangerous for financial stability and the proper functioning of the markets. The state already has enough power and through the democratic process, the legitimacy to intervene in the market, even if the results are very often disappointing. Imagine what could happen if its most powerful ally is a formally independent central bank that becomes an entrepreneur without the proper checks of a democratic process that appoint its representatives (Cochrane, 2020).

7 Conclusion

This chapter has reviewed one prominent example of the entrepreneurial state and so-called mission-oriented innovation in practice, i.e., Europe's policy of subsidizing renewable energy sources. The European Union and its member states have consistently pushed toward making investments in renewable energies as a flagship initiative to combat climate change while achieving global industrial leadership in clean energies. According to the narrative, this would have turned emissions reduction from a cost into an investment and, ultimately, an economic benefit: Europe would spur growth, promote innovation, and create jobs while curbing its environmental footprint. In order to meet these goals, Europe's environmental policy of setting emissions-reduction targets was accompanied by other targets concerning the penetration of renewables and energy efficiency. Did this deliver?

Data suggest that yes, it was a successful strategy to reduce emissions, but no, it was not an efficient one. In fact, by setting renewable and energy efficiency targets on top of the carbon reduction one, the European Union and member states redirected investments toward potentially less effective technologies and behavioral changes, increasing the implicit cost of CO_2 abatement—or, to put it another way, cutting emissions less could have been done with an optimal mix of interventions. In other words, Europe gave up—at least to some extent—environmental goals and policy in order to pursue other goals in the field of industrial policy.

Even from this point of view, though, the results are disappointing. As shown regarding the most important RES-E, i.e., wind power and solar photovoltaics, generous subsidies have only partially prompted European industry. In the case of wind, Europe was able to effectively breed its champions. However, it should be

noted that the industry was already there. Moreover, it is not clear that the economic benefits (in terms of investments, innovation, and employment) exceed the cost from energy subsidization, even factoring in the environmental benefit.

Moreover, as global markets for wind power grow thanks to subsidies from third countries and the increasing economic competitiveness of wind turbines, new actors emerge that may (and do) compete with European producers. The policy was much less effective in the case of solar PV: Europe is far from being a powerhouse for this technology. Most panels in the European Union are imported from China, despite trade duties in 2013–2018 and subsequently other trade measures that limit the ability of foreign producers to engage in price competition with their European counterparts.

The European Union does not seem to have fully learned from this experience, in any case. The Commission has launched a "battery strategy" aimed at "mak[ing] Europe a global leader in sustainable battery production and use" (European Commission, 2021a). The strategy allocates massive amounts of money to support Europe's battery manufacturers both in their R&D efforts and in increasing the volume of their production. While R&D subsidies may be seen as part of a broader strategy that falls outside the scope of this chapter, direct subsidies to the use or the production of batteries provide a good example of how the entrepreneurial state works and, in the light of previous experiences, how it can fail to reach its targets. And similar initiatives are seen in the fields of the circular economy (European Commission, 2021b), hydrogen (European Commission, 2021c), and other environment-related technologies.

Even more so, in the relief package from the Covid-19 crisis, the so-called Next Generation E.U. program, the European Union has directed a large share of the €750 billion recovery fund to investments in the "energy transition," whereby precise areas for investments have been identified top-down (including clean technologies and renewables; energy efficiency of buildings; sustainable transport, and charging stations) (Darvas et al., 2021). Of course, investing in green transformation is a legitimate and desirable goal of environmental policy. Climate change poses major threats to developed and developing countries alike, but developed countries have greater historical responsibility and more resources and know-how. However, *promoting* the ecological transition is not the same as *designing* the ecological transition. In the process, the European Union also started to put pressure on the European Central Bank which, contrary to what the Fed did, explicitly introduced climate change issues into its monetary policy strategies. This sets a dangerous path for the independence of central banks and for the financial stability and the proper functioning of markets in allocating capital. Climate change is a major threat that governments, not central banks, should address. Central banks should support research and the circulation of information about this threat and promote more precise definitions and taxonomies, thus helping investors have the information needed to choose on the market.

Until a few years ago, subsidies to the installation of RES-E and/or the production of renewable power was able to support a growing niche in European industry. From the perspective of free markets, they may have been questionable, but, in practice,

they entailed a limited amount of money and did not affect capital allocation beyond a certain limit. A few years after, though, green subsidies represent perhaps the greatest example of industrial policy in Europe, with a committed expenditure of dozens of billions of euros over 15 or 20 years. Before more resources are committed to the same or other technologies, a serious assessment of the program's outcomes is much needed.

Environmental policy and climate change are serious issues. They require significant changes in the way energy is produced and consumed. Nearly everybody would agree that pricing carbon is both necessary and long overdue. However, the European Union has adopted a policy of pricing carbon and directly subsidizing specific technologies. By so doing, it is messing up competition in electricity and other markets, profoundly distorting the allocation of capital and labor, and possibly negatively impacting GDP growth. That is, again, a legitimate policy choice if it reflects social preferences. Nevertheless, more transparency of the costs of such a policy is needed, and a better understanding of market-based alternatives—such as pure carbon pricing—would greatly benefit the public debate and a sound decision-making process.

In designing future climate and monetary policies, the European experience may provide helpful hints. We have reviewed the policy of subsidizing the production of green electricity, particularly from wind power and solar photovoltaics, and asked three research questions: (1) was it an effective environmental policy? (2) was it an effective industrial policy? (3) was it an effective social policy? The answer is: no, no, no.

References

ACER. (2020). *ACER market monitoring report 2019 – Energy retail and consumer protection volume*. Retrieved from https://extranet.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Market%20Monitoring%20Report%202019%20-%20Energy%20Retail%20and%20Consumer%20Protection%20Volume.pdf

Aghion, P., Dewatripont, M., Du, L., Harrison, A., & Legros, P. (2015). Industrial policy and competition. *American Economic Journal, 7*(4), 1–32.

Aldieri, L., Grafström, J., Sundström, K., & Vinci, C. P. (2020). Wind power and job creation. *Sustainability, 12*(1), 45.

ARERA (2021). *l'aggiornamento delle condizioni di tutela III trimestre 2021 nel dettaglio*. Retrieved from https://www.arera.it/allegati/schede/210701agg.pdf

Bijnens, G., Hutchinson, J., Konings, J., & Saint Guilhem, A. (2021). The interplay between Green policy, electricity prices, financial constraints and jobs: Firm-level evidence. *ECB Working Paper, 2021/2537*.

Blenkinsop, P. (2018, August 31). EU ends trade controls on Chinese solar panels. *Reuters*. Retrieved from https://www.reuters.com/article/us-eu-china-trade-idUSKCN1LG1QM

Böhringer, C., Cuntz, A., Harhoff, D., & Asane-Otoo, E. (2017). The impact of the German feed-in tariff scheme on innovation: Evidence-based on patent filings in renewable energy technologies. *Energy Economics, 67*, 545–553.

Bouzarovski, S., & Thomson, H. (Eds.) (2020). *Towards an inclusive energy transition in the European Union: Confronting energy poverty amidst a global crisis*. EU Energy Poverty Observatory.

CEER. (2021). *Status review of renewable support schemes in Europe for 2018 and 2019*. Retrieved from https://www.ceer.eu/documents/104400/-/-/ffe624d4-8fbb-ff3b-7b4b-1f637f42070a

Clò, S., Cataldi, A., & Zoppoli, P. (2015). The merit-order effect in the Italian power market: The impact of solar and wind generation on national wholesale electricity prices. *Energy Policy, 77*, 79–88.

Cochrane, J. (2020). *Central banks and climate: A case of mission creep*. Hoover Institution.

Darvas, Z., Domínguez-Jiménez, M., Idé Devins, A., Grzegorczyk, M., Guetta-Jeanrenaud, L., Hendry, S., Hoffmann, M., Lenaerts, K., Schraepen, T., Tzaras, A., Vorsatz, V., & Weil, P. (2021). *European Union countries' recovery and resilience plans*. Bruegel. Retrieved from https://www.bruegel.org/publications/datasets/european-union-countries-recovery-and-resilience-plans/

De La Tour, A., Glachant, M., & Ménière, Y. (2013). Predicting the costs of photovoltaic solar modules in 2020 using experience curve models. *Energy, 62*, 341–348.

Del Río, P., & Mir-Artigues, P. (2012). Support for solar PV deployment in Spain: Some policy lessons. *Renewable and Sustainable Energy Reviews, 16*(8), 5557–5566.

Derby, M. (2021, June 4). Powell says climate change poses 'profound' challenges but plays down Fed role. *Wall Street Journal*. Retrieved from https://www.wsj.com/articles/powell-says-climate-change-poses-profound-challenges-but-plays-down-feds-role-11622814261

EC. (2020a, October 2020). *Energy costs, taxes and the impact of government interventions on investments. Final report: Energy subsidies*.

EC. (2020b). EU energy in figures. Statistical Pocketbook 2020. *Energy and Buildings, 233*, 110692.

ECB (European Central Bank). (2021, July 8). *ECB presents action plan to include climate change considerations in its monetary policy strategy*. Press Release. Retrieved from https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708_1~f104919225.en.html

Enkhardt, S. (2021, April 4). European PV organization requests €20bn to support manufacturing. *pv magazine*. Retrieved from https://www.pv-magazine.com/2021/04/14/european-pv-organization-requests-e20bn-to-support-manufacturing/

European Commission. (2020). *History of proceedings: Anti-dumping*. Retrieved from https://trade.ec.europa.eu/tdi/case_history.cfm?id=2488&init=2488

European Commission. (2021a). European Battery Alliance. Retrieved from https://ec.europa.eu/growth/industry/strategy/industrial-alliances/european-battery-alliance_en

European Commission. (2021b). *Circular plastics alliance*. Retrieved from https://ec.europa.eu/growth/industry/strategy/industrial-alliances/circular-plastics-alliance_en

European Commission. (2021c). *European clean hydrogen alliance*. Retrieved from https://ec.europa.eu/growth/industry/strategy/industrial-alliances/european-clean-hydrogen-alliance_en

Faiella, I., & Lavecchia, L. (2021). Energy poverty. How can you fight it, if you can't measure it? *Energy & Buildings, 233*, 110692.

Faiella, I., & Lavecchia, L. (2021a). Households' energy demand and the effects of carbon pricing in Italy. Bank of Italy *Occasional Papers, 614*.

Frye, T., & Shleifer, A. (1997). The invisible hand and the grabbing hand. *The American Economic Review, 87*(2), 354–358.

Grafström, J. (2022). Less from more: China built wind power, but gained little electricity. In K. Wennberg & C. Sandström (Eds.), *Questioning the entrepreneurial state: Status-quo, pitfalls, and the need for credible innovation policy*. Springer.

IRENA. (2021). *Renewable power generation costs in 2020*. Retrieved from https://www.irena.org/publications/2021/Jun/Renewable-Power-Costs-in-2020

Jones, S. (2021, October 5). Austria seeks to combine carbon tax and tax cuts for the middle class. *Financial Times*.

Kavlak, G., McNerney, J., & Trancik, J. E. (2018). Evaluating the causes of cost reduction in photovoltaic modules. *Energy Policy, 123*, 700–710.

Mazzucato, M. (2015). The Green Entrepreneurial State. University of Sussex, *SPRU Working Paper*, *SWPS 2015-28*.

Mazzucato, M. (2018). *Mission-Oriented Research & Innovation in the European Union. Report to the European Commission Directorate-General for Research and Innovation*. Retrieved from https://ec.europa.eu/info/sites/default/files/mazzucato_report_2018.pdf

McCloskey, D., & Mingardi, A. (2020). *The myth of the entrepreneurial state*. American Institute for Economic Research.

Nordhaus, W. D. (2018). *Climate change: The ultimate challenge for economics*. Nobel Prize Lecture. Retrieved from https://www.nobelprize.org/uploads/2018/10/nordhaus-lecture.pdf

Popp, D., Vona, F., Marin, G., & Chen, Z. (2020). The employment impact of Green Fiscal Push: Evidence from the American Recovery Act. *NBER Working Papers, 27321*.

Porter, M. E., & Van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives, 9*(4), 97–118.

Stagnaro, C. (2015). *Power cut? How the EU is pulling the plug on electricity markets*. Institute of Economic Affairs.

Statista. (2018). *Global market share of the world's leading wind turbine manufacturers in 2018, based on sales*. Retrieved from https://www.statista.com/statistics/272813/market-share-of-the-leading-wind-turbine-manufacturers-worldwide/

Directionality in Innovation Policy and the Ongoing Failure of Green Deals: Evidence from Biogas, Bio-ethanol, and *Fossil-Free* Steel

Christian Sandström and Carl Alm

Abstract Environmental policy is no longer only about imposing regulations on industry. It is increasingly regarded as industrial policy. Both the European Union and national governments are taking more active roles in initiating *green deal*s and various technologies aiming at sustainable development. In this chapter, we describe and discuss some recent experiences of green innovation policies. Historical examples concerning efforts in both biogas and ethanol are combined with a more contemporary description of *fossil-free* steel, i.e., steel made using hydrogen instead of coal. We argue that the presence of large public funds from different funding bodies such as the European Union, various government agencies, and municipalities has distorted incentives, making it rational for firms to pursue technologies without long-term potential. The result has been an absence of sustainable development, mounting debt, and financial problems for the actors involved. We explain these results and draw policy conclusions concerning the risks related to green deals. Relatedly, we argue that the European Union's current efforts in hydrogen gas face similar challenges.

Keywords Green deal · Biogas · Policy failure · Entrepreneurial state · Directionality

C. Sandström (✉)
Jönköping International Business School, Jönköping, Sweden

The Ratio Institute, Stockholm, Sweden
e-mail: christian.sandstrom@ju.se

C. Alm
The Ratio Institute, Stockholm, Sweden

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_14

1 Introduction

A shift has taken place within environmental policies over the past decade. Environmental policy used to be primarily concerned with imposing various controls upon the emission of harmful substances. Inspired by economist Mariana Mazzucato (2015), many governments, as well as the European Union, have taken industrial policies on a new, considerably more interventionist path, sometimes referred to as *innovation policy 3.0*. For example, the EU Green Deal aims to mobilize €1000 billion over the coming decade in order to accomplish a transition to sustainability. A large portion of these resources will be allocated to specific technologies such as hydrogen gas. This shift toward interventionist policies stands in stark contrast to conventional wisdom concerning the state's inability to "pick winners" (e.g., Lerner, 2009; Karlson et al., 2021) and deserves to be scrutinized in further detail.

In this chapter, we provide a critical discussion of this policy shift by raising a couple of cases of policy failure. The first two are historical yet fairly recent examples from the 2000s and concern biogas and ethanol from cellulose. They can both be regarded as policy failures as (1) they have not resulted in a transition to a more sustainable use of resources, and (2) taxpayers and publicly owned businesses have incurred significant costs and accumulated large amounts of debt. These two cases help us identify a couple of factors that together point out the downside of active industrial policies. The chapter suggests that large amounts of public money in the form of technology-specific R&D support programs, soft loans, and directed, supposedly *free* money distort incentives result in malinvestments, i.e., poorly allocated investments. We end the chapter with a concluding remark regarding potential risks and hazards related to interventionist industrial policies.

The insights developed from the first two cases are subsequently applied to the ongoing developments concerning the European Union's efforts related to hydrogen gas and the evolution of supposedly fossil-free steel. We argue that fossil-free steel is in fact not fossil free, and we point out the risks of these ventures and argue they will harm both the environment and the economy.

2 Theoretical Background

An emerging consensus in society is that economic growth needs to be combined with sustainable development. Historically, these two goals have primarily been accomplished by imposing taxes, subsidies, and complete bans on certain emissions. The interplay between technology development and regulation has resulted in considerable advances (Porter & van der Linde, 1995). In industrialized countries like Sweden, 24 out of 26 harmful substances have been reduced since 1990, despite a GDP increase of 85%. For Sweden, carbon dioxide is down 28% since 1990; adjusted for GDP growth, the decline is 60% (Grafström & Sandström, 2020).

In recent years, we have witnessed the emergence of an alternative, much more interventionist approach to accomplishing economic growth and sustainability. Derived from theories on both market failure and system failure, literature on innovation systems and technological systems has argued that collective action problems may inhibit technology development (Jacobsson & Bergek, 2004). Uncertainties are initially high, huge investments are required, free rider problems may exist, and benefits may be distant. At the same time, investments in new knowledge may benefit the economy in the long term due to positive externalities.

Based on these theoretical arguments, scholars such as Mariana Mazzucato have advocated that the state take on a more active role in advancing societal goals such as sustainability (Mazzucato, 2015; Mazzucato et al., 2020). The term *directionality* is increasingly used among scholars in order to emphasize the role of innovation policies in directing society toward addressing grand challenges (Schot & Steinmueller, 2018). This new idea is at times referred to as innovation policy 3.0 and stands in contrast to previous innovation policy because it is explicitly concerned with making use of science, technology development, and entrepreneurship in order to address large societal challenges (Grillitsch et al., 2019). These recommendations stand in contrast to the perspectives brought forward, for example, by Josh Lerner's *Boulevard of Broken Dreams* (2009). In his book, Lerner describes how innovation and entrepreneurship policies have been largely unsuccessful across both developed and developing countries. Generally, calls for increased directionality are made without considerations of the limitations of policy or policymaking (Mazzucato, 2015, 2018). Evidence of policy failure is scarcely reviewed, yet there are, by now, many studies pointing out the limited effects of more interventionist policy approaches and support structures aiming to raise innovation (Bennett, 2008; Ejermo, 2018; Karlson et al., 2021). Lerner (2009, p. 5) summarized extant evidence on government interventions for innovation: "for each effective government intervention, there have been dozens, even hundreds, of failures, where substantial public expenditures bore no fruit."

Economic theory can explain the evidence described by Lerner and other researchers. First, theories on market failure regarding innovation and technology development were derived in the 1960s and 1970s (Arrow, 1962). Empirically, it is very difficult to quantify and locate a *market failure*, which means that attempts to correct a market failure face the risk of being miscalculated in terms of size and scope. Second, it is difficult for the state or any other single actor *to know beforehand* what technology is more likely to prevail. Selection of technologies happens through *trial and error* over time, and capitalist competition can in that sense be regarded as a discovery procedure (Hayek, 1945). If the state decides which technology should be chosen, it is very likely that such a decision will in hindsight be regarded as incorrect. Third, the presence of interventionist policies such as targeted support structures and large amounts of public money devoted to certain technologies easily *distort incentives* in the marketplace and result in opportunistic adaptation by firms such as subsidy entrepreneurship (Gustafsson et al., 2020) or corruption. These three mechanisms shed light on the risks of active interventionist policies and help to explain some contemporary cases of failed industrial policies, like solar photovoltaics in

Spain (Del Río & Mir-Artigues, 2012) and targeted innovation support schemes (Daunfeldt et al., 2016). In the coming section, we provide further empirical evidence on how these factors have applied to two contemporary cases of industrial policies in Sweden: biogas and ethanol from cellulose.

3 Two Historical Cases of Policy Failure: Biogas and Ethanol

We here describe and discuss how efforts related to technological development and sustainability have failed. We first look at biogas in Sweden and next turn to ethanol.

3.1 Investments in Biogas

Throughout Sweden, there are many cases of large-scale attempts and failures to develop and manufacture biogas—i.e., gas and energy from waste—over the past two decades. In 1998, a national public investigation into the technology and economics of biogas had identified a collection of limitations related to biogas, including limited economies of scale because new sites need to be built locally. The transport of manure requires an expensive infrastructure of pipes. The idea is to make use of biogas as fuel, so these public companies are really competing with gasoline and diesel, fuels that are presently very competitive and subject to considerable price variations. Attempts to introduce and sell biogas are therefore a form of speculation over an increase in oil prices over time.

In the *Västerås* case in the city of Västerås, 100 kilometers west of Stockholm, a couple of municipalities joined forces in the late 1990s and formed a public company named Vafab Miljö, meaning Vafab Environment. It started with the idea of a *steel cow*, i.e., an industrial plant that would use fertilizers from cows to make energy, a concept originally developed by two farmers and two professors at Sweden's University of Agriculture (SLU) in the 1990s. Vafab now took part in the formation of Svensk Växtkraft AB, which can be translated as *Swedish Growth*. In this business 40% was owned by Vafab, 20% by the Swedish farmers association, 20% by the public energy company Mälarenergi, and the remaining 20% by 17 farmers. Early on, this initiative managed to obtain 20 million SEK (roughly €2 million) in the form of an EU grant. Over the coming years, attempts to obtain EU grants became an integral part of the business. In the next phase, a market for the biogas needed to be identified and targeted. It started with the region's public transportation company, Västerås Lokaltrafik (VL). In 2006–2007, VL removed 40 diesel buses and replaced them with biogas buses. As these buses were not mass manufactured, economies of scale were limited and hence the buses were very expensive. Biogas buses cost an additional 14 million SEK for modifications

over the coming years. VL agreed that the price they paid for the biogas would not follow the price for diesel, and it was expected that diesel prices would increase 7% annually and they would break in 2017 as the relative price gap increased over time.

In reality, this meant investments in biogas could be regarded as large-scale speculation in oil price fluctuations. Optimism was high, and VL made forecasts in 2011 that 90% of their buses would run on biogas in 2016 and 100% in 2020. The CEO of Vafab, Eva Myrinsa, argued that Vafab faced a "huge challenge" in meeting demand in the following years, when production would have to increase 150% per year. Thanks to an agreement with Swedish Biogas, the creation of another facility was initiated in 2011. The "huge challenge" turned out to become the reverse form of a challenge. As oil prices declined sharply instead of going up 7% annually, volumes of biogas sold became much smaller than expected. In 2016, production had been reduced to 1.9 million cubic meters, about 25% of the volumes that had been planned for. With a large infrastructure built for much larger volumes, mounting costs, debt, and write-offs started to accumulate. Instead of doubling sales over 5 years, sales had declined substantially.

In the *Göteborg* case in the late 1990s, the publicly owned energy company Göteborg Energi started investing in biogas. A collection of biogas initiatives were gathered under the name Biogas West and were funded by several municipal energy companies including Göteborg Energi. Investments continued despite mounting technological challenges. One important reason for the little attention paid to this is the opportunity to apply for and obtain public funding in the form of various targeted support programs, regarding both agriculture and climate change. Public funds from the European Union were combined with national public grants and provided a continuous flow of funding over the years.

In the Göteborg case of biogas development, losses were progressively accumulated over more than a decade, but were initially hidden through various accounting practices. As the oil price declined sharply in 2014, large write-offs became inevitable. At some point along the way, policymakers considered halting the project, but continued because they had "Klimp funds that should not be wasted." Klimp funding was part of a national government agency-funded program for climate initiatives such as biogas, and the presence of these and other funds seem to have made it rational to continue, despite a lack of potential.

3.2 Ethanol from Cellulose

In Örnsköldsvik in northern Sweden, the municipality accumulated billions of SEK in debt due to failed investments into the making of ethanol from cellulose, i.e., from the forest. It all started in 1994 when the municipality inaugurated an ethanol gas station. After continued small investments over the years, efforts gained momentum in the early 2000s. In 2004, Prime Minister Göran Persson took part in the formation of an industrial plant aiming to create car fuel from cellulose. The ambition was to

create an environmentally friendly substitute to gasoline, which in turn would result in new jobs and a resurgence of northern Sweden in terms of competitiveness.

This vision would be driven and developed by Sekab, a firm owned by three municipal energy companies in northern Sweden. Its CEO, Per Carstedt, would at times be referred to as *ethanol-Jesus*. His charisma and ability to attract public funds and formulate vision implied that he became a very strong leader. One former Sekab employee describes his leadership in the following way:

> Carstedt was surrounded by a group of people who were not inclined to question his decisions. During long speeches, he would present completely unrealistic plans concerning how Sekab, a small publicly owned company in northern Sweden, virtually on its own would address 'peak-oil' and climate change. Later on, we would also end poverty in Africa. That very few questioned him was really a worrying indication.

For many decades, the rural north of Sweden has been subject to deindustrialization, a loss of jobs, depopulation, and declining welfare. Carstedt's vision of an environmentally friendly reindustrialization, falling unemployment rates, and a widened tax base was hard to resist. The same employee cited above also described the internal culture at Sekab:

> In Sekab's distorted reality, Sweden would make use of ethanol made out of trees instead of gasoline. Internally, people who questioned this idea or raised potential challenges were often subject to ridicule by their superiors. Such voices were assumed to be bribed by big oil companies.

Sweden's Energy Agency (SEA), Energimyndigheten, had a special role in the government's enactment of its industrial policies, in this case with a special emphasis on energy and sustainability. In 2001, SEA provided Sekab with a 112 million SEK grant in order to build a pilot plant to make ethanol out of cellulose. Municipalities also took part in funding the building of this plant, as did several local universities. Considerable efforts were made to build capabilities, doctoral student projects were initiated at universities throughout Sweden, and many subsequently started working at Sekab. A former employee at Energimyndigheten made the following observation: "We used to have cake and celebrate every time we managed to spend money on a project." This quote may seem strange from an economic perspective; why should authorities celebrate when they hand out money? It should be emphasized here that a government agency has a certain amount of resources that it is assigned to spend. The interviewee explains: "If a credible application was sent to us, it would get funding, if we do not receive anything credible, we would give money to the most credible one that can be found."

The process of extracting ethanol from cellulose turned out to be much more difficult than expected. A former engineer at Sekab described the situation:

> It became increasingly obvious to us how immature the technology was, our results were in fact very poor. Carstedt made it sound like the technology was ready, but we were nowhere near the level of technological advances that would have been necessary. Calculations were unrealistic and plain wishful thinking. Climate change, the peak-oil hype, and dreams of reindustrialization and new jobs however implied that nobody wanted to question our forecasts.

As a technological breakthrough appeared distant, Sekab increasingly tried to create ethanol supplies abroad. These operations soon ended up far away from Sweden. Sekab started to import ethanol from Brazil, initiated the building of a plant in Poland, planned for four factories in Hungary, and tried to grow sugar cane in Tanzania. Losses kept increasing and often amounted to hundreds of millions. Toward the end of 2006, the municipalities had to invest an additional 170 million SEK, primarily for international expansion. Land was acquired in Tanzania, consultants were hired in Mozambique, and large sums were spent in Ghana and Togo to build production capabilities. The efforts in Hungary cost 85 million SEK, with no results at all.

In September 2007, a meeting was held in Örnsköldsvik at which top municipal politicians formally admitted they are aware of all these activities. In Sweden, it is illegal to spend a municipality's money abroad, and thus the situation became politically controversial.

Once the great recession hit in 2008, both oil and ethanol prices fell sharply. Ethanol became less and less competitive over the coming years. Despite this fact, the SEA chose to provide an additional 33.8 million SEK over the coming years to develop the plant in Örnsköldsvik. A former SEA employee described the agency's reasoning: "We never asked whether Sekab could become commercially viable."

The primary reason for not questioning Sekab's commercial viability was that the SEA's mission was to fund basic and applied research. Commercialization was never part of its mission. Over the coming years, more public money was poured into Sekab as losses accumulated. Despite an economic catastrophe and the absence of a technological breakthrough, investments have continued. In 2018, an additional €4 million were received from the European Union over the coming 3 years. In the midst of this turmoil, Sekab has also received a lot of positive PR. In 2009, the firm received the international Sustainable Bioethanol Award prize, and Robert Silverman from the US embassy visited Sekab, primarily because President Barack Obama was interested in green technologies. In 2015, Sekab received the Örnsköldsvik municipality's annual award for green business "for its efforts to supply society with sustainable chemicals and biofuels."

4 The European Union, Hydrogen Gas, and *Fossil-Free* Steel

As the European Union rolls out its Green Deal across member countries, new projects and initiatives take shape. New policies and support structures are currently implemented across the continent, and it is important to gain insights into this process at the national level. *One* such example can be seen in Sweden, where steel manufacturer SSAB joined forces with electricity giant Vattenfall and the mining company LKAB to develop what they refer to as fossil-free steel.

Below, we provide a critical discussion of these policies in general and of Hybrit and the Swedish experience in particular. We argue that the supposedly green steel is actually not good for the environment and explain why it presents a real danger to the economy, because it may result in electricity shortages across the country. The primary reason for this idea's emergence relates to the massive EU funds that have been made available for such projects. Together, these funds result in distorted incentives, making it rational for firms to pursue irrational technological ventures because someone else is paying for a large portion of the resources.

4.1 Hybrit and Green Steel

Hybrit is an attempt by three firms to jointly develop *green steel*. This refers to steel made using hydrogen gas instead of coal. Today, steel accounts for a considerable portion of Sweden's carbon dioxide emissions, and if Hybrit succeeds with its plans, they calculate that the savings will amount to 10% of Sweden's total carbon dioxide emissions per year (Hybrit, n.d.).

Hybrit has ambitions to have large-scale industrial production ready in 2045. Their demonstration plant will be able to produce half a million tonnes per year and will start in 2026 (Nohrstedt, 2018; SSAB, 2021). Their competitor H2 Green Steel (H2GS) has plans for industrial production as early as 2024, with increased production until 2030, when they will be able to produce five million tonnes per year (H2GS, 2021). Although these ambitious plans are set to be achieved in the near future, major uncertainties surround the overcoming of technical obstacles like hydrogen storage, hydrogen production, and not least electricity supply (SVT, 2021).

4.2 Hydrogen Production

In terms of hydrogen production, there are currently three approaches: Gray hydrogen gas, blue hydrogen gas, and green hydrogen gas. Gray hydrogen gas uses methane to separate hydrogen and oxygen from water and thus produce hydrogen gas. The by-product, finally, is carbon dioxide. Although this method is worse for the climate, today it is the cheaper method and accounts for about 95% of the world's total hydrogen production (My Fuel Cell, 2015; Jensen, 2021). In fact, to produce 1 tonne of hydrogen requires two tonnes of methane, forming as much as five tonnes of carbon dioxide in this process. Blue hydrogen, like gray hydrogen, uses non-renewable sources to produce the hydrogen. The difference here is that emissions are reduced with CCS (geological storage of carbon dioxide), which can reduce emissions in the process by up to 95%. However, CCS, like fossil-free steel, is a new and expensive technology that is not yet commercially available (Stensvold, 2018).

Green hydrogen is, as the name suggests, kinder to the climate. Through electrolysis, only water and supplied electricity are used to produce the hydrogen gas. The residual product becomes oxygen and instead of using coke in the iron production, the residual product becomes water instead of carbon dioxide (The Agility Effect, 2020a; Hybrit, n.d.). For the hydrogen gas to be completely green, however, the electricity supplied during the electrolysis is also required to come from renewable sources.

Both the production of hydrogen by electrolysis and long transport distances for electricity are associated with energy losses. For example, it is estimated that approximately 30–40% of the energy used in electrolysis is lost (My Fuel Cell, 2015). Transmission losses are seen as a problem with large amounts of energy, which is why the need for expansion of new high-voltage networks is considered to be large (SSAB, 2021). In both areas, technology is being developed to overcome these energy losses, but this means that technology is expensive (My Fuel Cell, 2015; Alpman, 2020).

Green hydrogen gas is little used today and the primary reason is that it is expensive. Producing one kilogram of green hydrogen currently costs €5, which is comparable to the price of gray hydrogen at €1.5 per kilogram (The Agility Effect, 2020b). Alpman (2020) explains, for example, that green hydrogen gas today is far too expensive to produce and that it is not adapted for large-scale production. Problems such as the cost of electricity varying with the weather and the need for new types of membranes and catalysts must be overcome in order to reduce prices. The industry organization Jernkontoret also describes the production and storage of green hydrogen as the biggest technological obstacle for projects such as Hybrit at present (Jernkontoret, 2020).

Hydrogen has been praised by many. For example, the then Bush administration invested US$1.2 billion, in 2003 dollars, in research to develop hydrogen-powered cars with the ambition of replacing fossil fuels (Macfie, 2003). They were convinced that the new technology with fuel cells would be cheap enough to use commercially in cars by 2010. Reality proved otherwise, due to energy losses and expensive costs, but the hope lives on. Today, the European Union has taken over the dream and has now invested €430 billion up to 2030 in its EU Hydrogen strategy (Vätgas Sverige, 2020).

4.3 Hydrogen Steel and Electricity Consumption

Hybrit and H2GS are estimated to consume 67–72 TWh in 2045, unless H2GS expands its production from 2030 (Dickson & Törnwall, 2021). To put this in context, Sweden's electricity consumption in 2020 was 134 TWh (Swedish Energy Agency, 2020). That is, all other things being equal, these two projects alone would account for an increase of just over 50% in 2020 consumption.

Today, Sweden has a surplus of electricity almost every day of the year. In 2020, 159 TWh was produced, and after consumption, this left 25 TWh in surplus, which

was exported to neighboring countries (Swedish Energy Agency, 2020). Note that exports are measured as net volumes; exports and imports occur all the time due to transmission losses over long distances. Furthermore, there is an opportunity cost, in terms of emissions, of using the otherwise exported electricity.

To some extent, the otherwise exported electricity can be used to supply these projects with electricity, but for the remaining portion of the projects' energy needs, production needs to be developed. This raises a potential problem in the form of new high-voltage networks having to be built. Svenska Kraftnät explains that these new high-voltage networks take about 12 years to complete and that they often involve delays (SVT, 2021). We ask whether this is compatible with H2GS being up and running with industrial production in less than 3 years.

5 Analysis and Discussion

Both the biogas and the Sekab ethanol experience can be regarded as contemporary illustrations of the ongoing shift toward a different form of environmental policy. Sustainability is no longer about legislation, taxes on emissions, or subsidies for certain technologies. It is also about the state taking on an active, interventionist role, providing considerable financial and educational resources for the formation of new technologies and related firms. In this sense, the state has acted in line with arguments advanced by Mazzucato (2015), taking on genuine Knightian risk and increasing levels of directionality. The case descriptions above, however, stand in contrast to the positive effects of such an "entrepreneurial state" (Mazzucato, 2015) and rather seem like additional examples of Josh Lerner's *Boulevard of Broken Dreams* (2009). Lerner (2009) points out the combination of information and incentive problems in innovation policy and explains why government efforts in technology are often misguided. Despite high expectations, billions of SEK in public money, and considerable investments in new technologies, no widespread diffusion of a more efficient and environmentally friendly use of resources can be observed. At the same time, taxpayers have incurred large costs; these resources could have been used for other purposes.

As cases of failed interventionist policies, the biogas and Sekab experiences provide an opportunity to identify important insights into the mechanisms of interventionist policies and how the *entrepreneurial state* can fail. Below, we elaborate on these insights.

5.1 Public Funds and the Economics of Incentive Distortion

As seen in both the biogas and ethanol cases, the presence of large public funds for specific technological efforts seems to have paved the way for the persistence of

these efforts, despite the facts that technological breakthroughs and commercial viability seemed rather hopeless.

Public money seems to have made these firms immune to risk. The biogas initiatives were built on a business case in which oil prices were assumed to rise 7% annually. Effectively, these municipal companies were using billions of taxpayer money to speculate over oil price fluctuations. Speculating over natural resources is inherently risky, but nobody seems to have questioned these efforts. The combined presence of large, public funds available both regionally, nationally, and at the EU level seems to have created an environment in which it is not only possible, but also rational, to allocate vast resources to risky and technologically impossible ventures. Consider the following hypothetical example: If someone gave you €1 million but asked you to destroy something in return, what would be the total value of goods and services that you would be willing to destroy? The hypothetical answer would be €999,999, because then you would theoretically earn €1.

The ever-present demands for co-financing in EU projects, along with the presence of government funds, make it rational to destroy capital in reality. Elementary economics teaches that firms will produce as long as their marginal revenue is higher than their marginal cost. Put differently, if the next unit a firm considers making does not generate revenues that match the marginal cost, the firm will not make it. Applying such elementary microeconomic logic helps to understand why destruction of capital is likely to prevail. Marginal revenues equal at least the public funds received for investing in biogas, and municipalities can almost invest a similar amount of money as their marginal cost and the efforts would still make sense. Put differently, the presence of large external, public funds, and the demand for co-financing makes it rational to destroy capital.

This argument may seem like an overly cynical theoretical construction. Unfortunately, it has significant applicability and explanatory power. Revisiting the case of biogas above, the quote concerning "Klimp funds that should not be wasted" indicates precisely such a logic. At the point it becomes clear that the project is futile and needs to be shut down, there are still strong incentives to continue, because doing so is connected with a marginal revenue, in terms of obtaining more public money.

The story of Sekab and cellulose from the forest further illustrates this pattern. Despite the technology appearing to be underdeveloped and lacking potential, investments continued and became increasingly esoteric. The fact that Sekab still continues to attract millions of euros in EU money many years after it has broken municipal laws, created debt for taxpayers, and not made any economic advances indicates how the presence of large public funds make it very difficult to shut initiatives down.

5.2 Indirect and Hidden Costs

Organizations applying for public money may obtain large funds, yet at the same time they face an opportunity cost. The time and effort spent in order to search for, apply for, obtain, administrate, and report cannot be neglected. These efforts can be quantified but are rarely considered. It is harder to estimate the effects of lost opportunities, as these opportunities by definition will never be realized. Time and attention are scarce resources; if spent on one activity, they cannot be spent on another.

In rural Sweden, the sum of all public funds from the state and from the European Union amount to at least €100 per inhabitant. As such vast resources trickle down into the local economy, a considerable portion of the economy will be devoted to dealing with these funds instead of building other ventures. While the need for real, significant reforms is pressing in most European economies, such efforts are halted when entire regions become dependent on external funds.

5.3 Public Sector Inefficiencies and the Risk of Corruption

The two cases described above also illustrate how the financial logic of public funds tends to be focused on cost rather than value. A government agency has a certain amount of money assigned to distribute over a year. If they do not spend that money in any given year, there is an apparent risk that they will miss out on that money the next year. The quote concerning "celebrating by having cake together" at one government agency illustrates this effect.

Questions related to corruption need to be addressed within the scope of this chapter. The Sekab case covered how a firm owned by municipalities was in fact spending its money in illegal ways as it conducted business abroad. Moreover, it is impossible to assess how resources have been spent. For example, the consultant fees in Mozambique or the 85 million SEK spent building a plant in Hungary. Some observers argue that there are plenty of traces of corruption in the biogas cases as well.

Again, the effects of public funds on incentive structures need to be discussed. When receiving a public grant, the funding agency imposes certain demands concerning things like accounting and co-financing. If an organization receives grants from several different funding bodies at different levels, the level of administration and volume of reporting procedures increase exponentially. Dealing with all these layers of money naturally leads to the creation of different subsidiaries and a variety of different organizational forms. An internal bureaucracy of large proportions has been created. The fertile soil for creative accounting and corruption has also been created.

The Sekab case illustrates how political and commercial priorities may conflict and that when public funds are present, the former tend to gain the upper hand.

Despite being an economic catastrophe that has received a lot of attention in Swedish press, Sekab kept receiving positive media coverage. Sekab received various awards, both locally and internationally, and was visited by people from the US embassy. For the politicians involved, Sekab might have been a success story. Policymakers may have appeared as visionary and decisive, combating climate change with initiatives that resulted in new pilot plants and new jobs in the short run.

5.4 *Hydrogen Steel: A Risk for Both the Environment and the Economy*

As stated above, hydrogen steel requires large amounts of electricity. The supposedly fossil-free steel will make use of 67–72 TWh of electricity, totaling more than 50% of Sweden's annual electricity production today.

The opportunity cost for such volumes of electricity cannot be neglected. According to Professor Björn Karlsson at the University of Gävle, 15 TWh could be used to transfer electricity to countries like Poland or Germany, where coal plants emit a lot of greenhouse gas. Making use of 15 TWh in this way would mean that 15 million tonnes of carbon dioxide could be removed. As *fossil-free* steel will make use of 67–72 TWh, we estimate that at least ten times more carbon dioxide emissions could be removed by making use of electricity in this alternative way.

Although this calculation may seem theoretical, the opportunity cost nevertheless needs to be considered. Referring to green steel as green or fossil free is only correct as long as there is no better alternative use of green electricity. In the foreseeable future, there are many much more efficient ways to cut emissions. Moreover, according to Tobias Persson at Tillväxtanalys, there is already considerable competition from recycled steel, which amounts to 40% of all steel consumption today and makes use of 75–95% less energy than conventional steel (FTI, 2009).

Making use of hydrogen gas is also associated with substantial losses of energy throughout the process. About 30–40% of all energy is lost in the process of electrolysis (My Fuel Cell, 2015). If so, large amounts of energy are lost along the way and the total amount used is 70 TWh, about 21–28 TWh will disappear. This volume corresponds to 15% of Sweden's electricity production and all energy that is used by the Skåne region, with its 1.4 million inhabitants and 600,000 jobs. How can it be sustainable to implement a process which effectively wastes 30–40% of all green electricity in Sweden?

5.5 A Threat to the Economy and Free Competition?

Presently, the Swedish electricity system sometimes runs at maximum capacity. In southern Sweden, electricity prices are already high, and their concern is mounting over the long-term supply of electricity.

When looking at the Swedish electricity system, it is clearly unprepared for an expansion of more than 50% over the coming decades. Creating such an increase in the need for electricity without any serious plans regarding how this can be accomplished is clearly a gamble with the country's economy.

As described above, the Hybrit initiative has already received considerable public support. Not only billions of cheap loans, EU funds, and funds from the Swedish Energy Agency, but Hybrit also requests access to the vast amounts of green electricity mentioned above. All these benefits raise important questions concerning effects on competition. Can competition be fair and on equal terms when one actor receives so many billions of state support?

So far, European Union's novel approach to sustainability, with its €1000 billion that are largely borrowed, targeted hydrogen gas money, taxonomies, and emerging carbon dioxide tariffs, has not been discussed regarding its effects on the market economy and the notion of free enterprise.

The presence of large public funds in the form of cheap credits, conditioned loans, and research funding also results in an indirect yet significant steering of the economy. In Sweden, steel manufacturer SSAB is increasingly controlled by the state and other state-owned companies. The other two firms involved in Hybrit (Vattenfall and LKAB) are completely owned by the state already. This is not a coincidence.

About 75% of the *private* and *entrepreneurial* venture H2GS is funded through *green project credits*, a form of unconditioned loan that can be written off. Out of 25 billion SEK that will be raised, 17.5 billion will be such green project credits. Is it therefore meaningful to speak of H2GS as a private initiative at all?

The past century of worldwide economic development strongly suggests that high levels of state involvement in the economy are not compatible with development or freedom. Large interventions have large effects on free enterprise and the dynamics of a market economy. The shift that has taken place is alarming and deserves to be discussed more seriously.

5.6 Repeating the Mistakes of Biogas and Ethanol

The biogas and ethanol cases covered in this chapter provided insights into how public funds distort the incentives of firms. The cases both illustrate how billions were wasted by publicly owned firms in a process through which their own resources could be matched with public funds, effectively making it rational to destroy capital. On numerous occasions it was clear how these firms were realizing the futility of

continuing their efforts but chose to do so anyway, for the simple reason that they could obtain public grants for doing so. Hence, the presence of a multitude of different public funds for different purposes creates an environment in which organizations effectively become immune to risk.

We argue that a similar form of distortion, albeit on a larger scale, has been created by the EU Green Deal and that the Hybrit case constitutes an alarming illustration of this pattern. Investments are huge, and the technological risks regarding steel production using hydrogen and the storage of hydrogen are considerable. Positive effects on the environment are questionable, and the indirect effects on the Swedish economy must not be underestimated, bearing in mind the risks of an electricity shortage in the coming years.

The discrepancy between this reality and the public debate in Sweden concerning Hybrit is striking. Despite the issues raised above, no one within the political or economic establishment, beyond the authors, has raised any concerns. On the contrary, the Hybrit firms are heralded as environmental heroes by the media; the Swedish prime minister inaugurated Hybrit's pilot plant in 2018 and stated: "I am very happy and proud to be here today. In Sweden we show the way forward as we are pursuing what can become the greatest technology transition in 1000 years" (Affärer i Norr, 2018).

When €320 billion of EU money is up for grabs for making use of hydrogen gas, and when funds can be matched, combined, and recombined into a pseudo-economy in which economic laws of scarcity no longer exist, no one has any incentives to question the process. Risky and reckless ventures are perceived and discussed as *opportunities* for the simple reason that someone else is bearing all the risk. These funds result in large-scale subsidy entrepreneurship that make destruction of capital rational because it is much easier to put up your own money if you obtain public funds for doing so. In this sense, the Hybrit case and the large-scale experimentation with hydrogen gas that is currently taking place in Europe resemble the painful and expensive experiences regarding biogas and ethanol from cellulose described previously. There are many examples of how such policies have turned into veritable disasters. We hope that our concerns are exaggerated and that we will be proven wrong.

5.7 EU Funds Result in Environmental Nationalism

Ironically, the presence of large EU funds for innovation and sustainability seems to result in a form of environmental nationalism. Hybrit and similar initiatives in Sweden state boldly that their aim is to contribute to Sweden becoming an economy that is completely free of fossil fuels. While this may sound like a noble cause, most environmental problems, including air pollution and climate change, are after all global problems that require coordination between different countries. If one country lowers its emissions at the expense of a substantially lower cut in emissions elsewhere, the net contribution of such an initiative is in fact negative. We may

end up with a form of environmental nationalism through which countries pride themselves in optimizing emissions at the local or national level while the overarching effect is negative.

The funds available from the European Union for different member states and firms to apply for result in precisely this form of suboptimization. Ironically, the presence of pan-European support structures leads to a form of environmental nationalism that leads to the absence of sustainable development.

6 Conclusion

This chapter has reviewed and discussed two historical examples in which interventionist innovation policies have failed: biogas in Sweden and ethanol from cellulose (Sekab). These cases stand in stark contrast to ideas about an *entrepreneurial state* successfully taking on Knightian risk and pursuing new opportunities.

While it is clear from the descriptions above that the presence of public funds has initiated risk-taking and ventures into new technologies, it has clearly also been unsuccessful. Interestingly, an important reason for this seems to be that the studied cases in fact contained *too much risk*. A combination of large, public funds seems to have made these organizations immune to risk. Biogas and ethanol from cellulose were, in reality, poorly calculated speculations over oil price fluctuations using hundreds of millions of taxpayer's money. Once it became clear that potential was in fact limited, activities were not closed down. On the contrary, investments continued more than a decade later as public money could still be obtained for doing so.

Public funds create a peculiar incentive structure that in reality makes it rational to destroy one's own resources. Elementary microeconomics teaches that investments continue as long as marginal revenues exceed marginal costs. This investment rule is distorted by public funds that provide a marginal revenue that effectively nullifies the costs and risks. The hidden costs, however, are very real, as we see the crowding out of other economic activities. Also, the presence of multiple, large public funds to apply for at the local, regional, national, and EU levels creates a fertile ground for corruption in the long run.

The combined effect of multiple funds available at different levels and for different ends (social, regional, environmental, and economic) needs to be discussed among both scholars and policymakers. The evidence furnished in this chapter provides insight into mechanisms that are alarming. As the European Union has moved further toward interventionist policies with regard to sustainability, there is great risk that the failures described in this chapter will increase in magnitude over the coming years.

Having observed and described the government failures related to biogas and bio-ethanol from cellulose, we have subsequently taken these insights and applied them to the contemporary case of hydrogen steel and the European Union's current efforts related to hydrogen gas. Our case descriptions and discussion conclude that

hydrogen-based steel is not good for the environment and that it has potentially detrimental effects on the economy.

Green electricity has a considerable opportunity cost, as estimations indicate that up to ten times more carbon dioxide can be saved by making use of green electricity in other ways. Hydrogen gas is associated with 30–40% losses in pure energy waste. Combining this with large technological uncertainties would arguably imply that when adjusting for risks, the net environmental benefits are questionable.

The effects on the Swedish economy may turn out to be disastrous. Expanding Sweden's use of electricity by 50% in the coming 20 years requires a huge expansion of the country's energy production. As there are both operational and political bottlenecks related to doing so, we see large risks of an electricity shortage if Hybrit is scaled up. H2GS alone wants to take 15 TWh into use for its potential 1500 jobs created in northern Sweden. This amount of electricity is enough to satisfy the needs of the entire Skåne region, with 600,000 jobs and 1.4 million inhabitants. In sum, these efforts seem to be poorly thought through, but they have nevertheless been met with a remarkably positive consensus among both industrialists and policymakers in Sweden. An important explanation for this discrepancy is most likely that the European Union has made billions of euros available as *free money*. These public funds related to hydrogen are part of the European Union's Green Deal.

References

Affärer i Norr. (2018, June 20). *Löfven tog första spadtaget för Hybrit*.

Alpman, M. (2020). *Grön vätgas ska rädda klimatet*. Forskning & Framsteg.

Arrow, K. (1962). Economic welfare and the allocation of resources for invention. In *The rate and direction of inventive activity: Economic and social factors* (pp. 609–626). Princeton.

Bennett, R. (2008). SME policy support in Britain since the 1990s: what have we learnt? *Environment and Planning C: Government and Policy, 26*(2), 375–397.

Daunfeldt, S. O., Halvarsson, D., & Tingvall Gustavsson, P. (2016). Statliga innovationsstöd till små och medelstora företag–har de någon effekt? *Ekonomisk debatt, 44*(1), 6–19.

Del Río, P., & Mir-Artigues, P. (2012). Support for solar PV deployment in Spain: Some policy lessons. *Renewable and Sustainable Energy Reviews, 16*(8), 5557–5566.

Dickson, S., & Törnwall, M. (2021, February 28). Elutmaningen: Gröna projekten slukar energi. *Svenska Dagbladet*.

Ejermo, O. (2018). Does incubation lead to innovation? Evidence from the Swedish incubation program. *Tillväxtanalys*.

FTI. (2009). *Visste du att...* Förpacknings & tidnings insamlingen.

Grafström, J., & Sandström, C. (2020). *Mer för Mindre? Tillväxt och hållbarhet i Sverige*. Ratio.

Grillitsch, M., Hansen, T., Coenen, L., Miörner, J., & Moodysson, J. (2019). Innovation policy for system-wide transformation: The case of strategic innovation programs (SIPs) in Sweden. *Research Policy, 48*(4), 1048–1061.

Gustafsson, A., Tingvall, P. G., & Halvarsson, D. (2020). Subsidy entrepreneurs: An inquiry into firms seeking public grants. *Journal of Industry, Competition and Trade, 20*(3), 439–478.

H2GS. (2021). *Introducing H2 Green Steel.* H2 Green Steel. Retrieved from https://www.h2greensteel.com/green-steel

Hayek, F. A. (1945). The use of knowledge in society. *The American Economic Review, 35*(4), 519–530.

Hybrit. (n.d.). *A fossil-free future.* Hybrit development. Retrieved from https://www.hybritdevelopment.se/en/a-fossil-free-future/

Jacobsson, S., & Bergek, A. (2004). Transforming the energy sector: The evolution of technological systems in renewable energy technology. *Industrial and Corporate Change, 13*(5), 815–849.

Jensen, M. (2021, February 5). Kan universums rikligaste ämne lösa klimatkrisen? *Energi nyheter*. Retrieved from https://www.energinyheter.se/20210205/23354/kan-universums-rikligaste-amne-losa-klimatkrisen

Jernkontoret. (2020). *HYBRIT – Toward fossil-free steel production*. Retrieved from https://www.jernkontoret.se/sv/vision-2050/koldioxidfri-stalproduktion/

Karlson, N., Sandström, C., & Wennberg, K. (2021). Bureaucrats or Markets in Innovation Policy?–a critique of the entrepreneurial state. *The Review of Austrian Economics, 34*(1), 81–95.

Lerner, J. (2009). *Boulevard of broken dreams: Why public efforts to boost entrepreneurship and venture capital have failed--and what to do about it*. Princeton University Press.

Macfie, D. (2003, February 24). Bush vill byta ut oljan mot vätgas. *Svenska Dagbladet*.

Mazzucato, M. (2015). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press.

Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities. *Industrial and Corporate Change, 27*(5), 803–815.

Mazzucato, M., Kattel, R., & Ryan-Collins, J. (2020). Challenge-driven innovation policy: Towards a new policy toolkit. *Journal of Industry, Competition and Trade, 20*(2), 421–437.

My Fuel Cell. (2015). *Framställning av vätgas*. Retrieved from https://www.myfuelcell.se/framställning-av-vätgas

Nohrstedt, L. (2018, February 1). Svenska storbolagens stålsatsning kostar miljarder. *Ny Teknik*. Retrieved from https://www.nyteknik.se/industri/svenska-storbolagens-stalsatsning-kostar-miljarder-6896365

Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives, 9*(4), 97–118.

Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy, 47*(9), 1554–1567.

SSAB. (2021). *Först med fossilfritt stål med Hybrit-teknik*. Retrieved from https://www.ssab.se/system/demos/hallbarhet/hallbar-verksamhet/hybrit/

Stensvold, T. (2018, January 18). Nya fabriken ska tillverka vätgas utan koldioxidutsläpp. *Ny Teknik.* Retrieved from https://www.nyteknik.se/miljo/nya-fabriken-ska-tillverka-vatgas-utan-koldioxidutslapp-6893704

SVT. (2021). Stålbadet (Säsong 3, Del 10) [Del I TV-serie]. *Ekonomibyrån*.

Swedish Energy Agency. (2020). *Energiläget 2020*. Energimyndigheten.

The Agility Effect. (2020a). *Green hydrogen – Accelerating the energy transition*. Retrieved from https://www.theagilityeffect.com/en/article/green-hydrogen-accelerating-the-energy-transition/

The Agility Effect. (2020b). *Grön vätgas är snart konkurrenskraftig*. Retrieved from https://www.theagilityeffect.com/sv/article/gron-vatgas-ar-snart-konkurrenskraftig/

Vätgas Sverige. (2020). *EU-kommisionen satsar 430 miljarder euro på vätgas*. Retrieved from https://www.vatgas.se/2020/07/08/eu-kommissionen-satsar-430-miljarder-euro-pa-vatgas/

Part V
From the Entrepreneurial State Towards Evidence-Based Innovation Policy

Policy Instruments for High-Growth Enterprises

Alex Coad, Péter Harasztosi, Rozália Pál, and Mercedes Teruel

Abstract High-Growth Enterprises (HGEs) have received growing interest from entrepreneurship scholars, the business press, and of course policymakers. HGEs can potentially make large contributions to economic growth, which has led to various policy initiatives. This chapter discusses the main topics surrounding policy interventions for HGEs, including a discussion of the various rationales for policy interventions. We next discuss the many areas that relate to possible HGE policy instruments. We then evaluate some previous HGE policy instruments, discuss some that have been successful, and possible areas for improvement. Our main policy suggestions are *critical listening* to stakeholders by policymakers, identifying the decision points (e.g., growth trigger points) to leverage the impact of growth stimuli, designing incentives in the spirit of *up or out* dynamics, and enhancing the coordination of HGE policies.

Keywords High-growth enterprises · Entrepreneurship policy · SME policy · Firm growth · High-growth firms

1 Introduction

National governments and international organizations are showing increasing interest in High-Growth Enterprises (HGEs) as a source of economic dynamism and growth (Grover Goswami et al., 2019; Flachenecker et al., 2020; Benedetti Fasil et al., 2021) as well as innovation (Veugelers et al., 2018) and the creation of

A. Coad (✉)
Waseda Business School, Waseda University, Shinjuku, Tokyo, Japan

P. Harasztosi · R. Pál
European Investment Bank, Luxembourg, Luxembourg

M. Teruel
GRIT & ECO-SOS, Department of Economics, Universitat Rovira i Virgili, Reus, Spain

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_15

high-skill jobs (Reypens et al., 2020). Scholars have suggested that the state could take an "entrepreneurial" role with regard to investing in emerging HGEs in order to stimulate innovation and entrepreneurship (Link & Scott, 2010; Mazzucato, 2011). This chapter contributes to this area by discussing which policy instruments are appropriate for HGE policy. As we will see, a large number of policy areas should be taken into account when considering HGE policy. As a consequence, a challenge for HGE policy is to coordinate the many existing initiatives from small- and medium-sized enterprise (SME) policy and entrepreneurship policy such that they can be evaluated accurately and implemented more effectively.

This chapter begins by setting out some stylized facts on HGEs and discussing the key issues and rationales surrounding HGE policy (Sect. 2). We then discuss the various areas relating to HGE policy instruments, ranging from areas such as finance, innovation, skills to labor market regulation. HGE policies have had varying levels of success, and in Sect. 3 we try to identify some success stories as well as areas for improvement, and suggest some explanations for what works well and what does not. Our main policy suggestions (Sect. 4) are that policymakers should engage in *critical listening* to stakeholders, that HGE policy should identify the decision points (e.g., growth trigger points) to leverage the impact of growth stimuli, that HGE policies require incentives that are set up consistent with *up or out* dynamics, and that HGE policies should be coordinated across government departments to reach a common goal.

2 HGE Policy Instruments

2.1 Stylized Facts on HGEs

Policy discussions about providing support for HGEs need to take into account a number of stylized facts and basic considerations about the nature of HGEs, which are presented here.

- *A small number of HGEs create a large share of new jobs.* This is a classic finding from research into firm growth, with for example 4% of firms being observed to create 50% of the jobs (Storey, 1994; Bravo-Biosca et al., 2013; Bravo-Biosca, 2016; Hallak & Harasztosi, 2019).
- *HGEs tend to be young but are not necessarily small.* The first 5 years of a firm's life correspond to a period of unusually rapid growth (Haltiwanger et al., 2013; Coad et al., 2018). For this reason, HGE policies in various E.U. member states have focused specifically on young firms (Flachenecker et al., 2020, p. 43). HGEs are particularly uncommon among old micro firms (Coad & Karlsson, 2022).
- *HGEs are found in all industries* (Henrekson & Johansson, 2010) and are, if anything, less common in research and development (R&D)-intensive

manufacturing industries (Daunfeldt et al., 2016), although they are over-represented in knowledge-intensive service industries (i.e., service industries with a high share of human capital, Daunfeldt et al., 2016). HGE policy should therefore avoid focusing too much on high-tech sectors (Mason & Brown, 2013), and instead focus on innovative activity more broadly defined, which extends beyond high-tech manufacturing sectors to include knowledge-intensive industries.

- *Rapid growth is not persistent for individual firms.* Therefore observing which firms grew fast in the past will not give useful insights about their future HGE status. In this sense, it is better to think of high-growth episodes rather than high-growth firms (Grover Goswami et al., 2019). The low persistence of high-growth status is a difficult challenge for policymakers seeking to target HGEs (Grover Goswami et al., 2019).
- *Rapid growth may be persistent at the regional level*, in the sense that regions with above-average HGE shares in one period may be expected to have above-average proportions of HGEs in the next period (Friesenbichler & Hölzl, 2020). This persistence of HGEs at the regional level contrasts with the *lack of persistence* at the firm level, and suggests there could be a role for locally embedded culture and entrepreneurial institutions in facilitating HGEs.
- *HGEs are heterogeneous.* A plethora of different HGE definitions can be found in the literature.[1] Findings from one sample cannot easily be generalized to others. For example, findings of entrepreneurial learning among a sample of venture capital recipients (Gompers et al., 2010) may not be very relevant for discussions of entrepreneurial learning among entrepreneurs escaping unemployment.
- *HGEs are difficult to predict*, both for government policymakers and also for venture capitalists. The approach taken by venture capitalists is to inspect a large number of detailed applications, from which they select a broad portfolio, in the hope that one or two firms receiving investments will become blockbuster hits that can cross-subsidize the losses of the other portfolio firms. Therefore, we argue that the responsibility should not be on policymakers to identify HGEs (in the context of a targeted HGE policy), but instead potential HGEs should be able to self-select into the *fast track* (if they believe that is where they should be), where the fast track is an up-or-out type of policy environment that can give a valuable boost to ambitious growth-oriented firms although it is not a comfortable place to linger for less ambitious firms.

[1] For example, firm growth can be defined in terms of absolute growth (total *amount*) vs relative growth (proportional rate of growth), employment growth vs sales growth, top 1% or top 5% or a time-varying proportion of firms with growth above a certain threshold (e.g., 20% growth threshold), growth measured over different timescales (e.g., 1- or 3- or 5-year growth periods), whether or not to include micro firms in the relevant sample, or whether to define high-growth entrepreneurs in terms of billionaires only.

2.2 *Rationales for Policy Intervention*

Rationales for policy intervention include the improvement of existing institutions and infrastructure to support businesses (including HGEs), as well as interventions that are targeted more toward removing barriers and providing assistance to certain subgroups of HGEs (e.g., young HGEs or HGEs from certain technological sectors), and another category of policies that seeks to awaken in potential HGEs ambitions for rapid growth.

Improving the infrastructure and institutions for business can improve the conditions for HGEs (and for business more generally). This could include upgrading existing infrastructure and the labor force's skill base (e.g., transport, broadband in rural areas, education), removing barriers to growth, such as streamlining and simplifying bureaucratic procedures, and facilitating growth such as through export assistance or the removal of export barriers (e.g., in the case of the E.U. single market and the E.U. single digital market). We can also mention here attempts to alleviate information asymmetries that affect the financial sector and may disproportionately affect new small firms.

Deregulation is often heralded as a way of improving the business environment, although we should remember that regulations were often set up with good reasons in mind (a better world would perhaps have fewer rules, but better rules).

Beyond the provision of universal infrastructure are policy interventions that target specific categories of firms. An example is the case of young firms: Many policy measures to support HGEs give privileged treatment to young firms (Flachenecker et al., 2020, see their Table 5 on p. 42). HGEs may also be targeted to promote emerging technologies (Flachenecker et al., 2020, p. 43), although targeting HGEs here would be less effective if targeted at specific sectors than if focused instead on firm-level innovation capabilities (because many HGEs are not in high-tech sectors, Mason & Brown, 2013; Daunfeldt et al., 2016).

A final, and more controversial, category of policy interventions consists of providing highly targeted relationship-based support to potential HGEs ("relational" support in Brown & Mawson, 2016), which could require large investments of policymakers' attention, and also be ineffective if HGEs cannot be predicted in advance. Similarly, we can mention efforts to awaken in potential entrepreneurs' growth ambitions that they did not previously have, for example through entrepreneurship education programs that seek to teach entrepreneurial skills to a broad audience. While it has been observed that some firms are *sleeping gazelles* (i.e., potential HGEs) in the sense that they have high profits but are not engaging in employment growth (Bornhäll et al., 2015), nevertheless it is not clear whether a policy intervention could be set up to turn these sleeping gazelles towards rapid growth.

2.3 Key Issues Regarding HGE Policy Instruments

Four main issues are discussed in this subsection regarding HGE policy instruments.

First, HGEs have urgent needs. Rapid growth is accompanied by higher costs. For example, HGEs are more likely to have their loan applications refused, and face higher interest rates for loans than slower-growing firms (Rostamkalaei & Freel, 2016). Rapid-growth firms may also have lower survival rates (Zhou & van der Zwan, 2019; Coad et al., 2020). Therefore, policy interventions need to act fast. Policy instruments such as tax credits may be more suitable for mature established firms, which can afford to wait until the end of the tax year to receive the benefits (Brown et al., 2017). Instead, grants or targeted support schemes through loans guarantees may be more effective for HGEs.[2] Furthermore, faster payment for SMEs (e.g., the "quickpay reform" that is evaluated in Barrot & Nanda, 2020) could be especially valuable for HGEs. Also, policy efforts to create a venture ecosystem via capital market, venture capital but also diverse debt financing sources such as venture debt are crucial for the fast growing scale-ups. Venture debt in particular helps scale-ups to meet financing needs and reduce equity dilution concerns.

Second, creating a culture of dependency should be avoided. Large amounts of public investment in supporting potential HGEs could result in a culture of dependency, whereby low-quality firms could strategically invest in building networks and connections, and honing their skills in making applications. Brown and Mawson (2016, p. 827) discuss the case of business incubators for science-based firms that generate a "dependency culture" but do not help these firms to prepare for the challenges of facing the market. A culture of dependency would distort incentives, such that low-quality firms overinvest in perfecting their grant applications, while high-quality firms are (temporarily) overtaken.

Third, regulatory change may breed HGEs, even if it is just a change for change's sake: any regulatory change opens up new opportunities that fast-movers can exploit. When the U.S. government passed the Public Utility Regulatory Policy Act of 1978, for example, independent energy firms became able to sell electricity to the grid, which generated considerable growth opportunities that were snatched up by entrepreneurs (Sine & David, 2003).

Fourth, decisions regarding the selection of which firms actually receive the policy support involve a mix of (1) *picking winners*; (2) self-selection; (3) milestones; and perhaps (4) randomization.

1. *Picking winners* refers to the selection of applications and business plans by government officials and/or external experts, often using quantitative performance assessment or subjective assessments of growth ambitions (Roper & Hart, 2013). Possible drawbacks of a picking-winners approach could be that

[2] Dvouletý et al. (2021) review the evidence on grants for E.U. SMEs, and observe that grants are generally accompanied by improvements in survival, employment, tangible or fixed asset stocks, and sales, while the evidence regarding productivity is mixed.

applications take time for applicants to prepare, capabilities in writing an engaging proposal may be different from capabilities required for entrepreneurial success,[3] and also the individuals making the selection may make imperfect decisions amid uncertainty. Picking winners can be a useful preselection tool to winnow down the pool of applicants, separating out the lower-quality applicants, while not attempting the finer distinctions between higher-quality applicants (McKenzie, 2017).

2. Self-selection can potentially avoid problems of asymmetric information regarding business quality, by letting promising entrepreneurs use their background knowledge of the firm to select into support programs that are of little interest to less-promising entrepreneurs. Important here is clarity and transparency regarding the costs, commitments, and benefits of policy support schemes, to facilitate the cost-benefit analysis for potential applicants (Roper & Hart, 2013). Self-selection schemes should involve a *hurdle* that is only worth overcoming for high-potential entrepreneurs. This hurdle can refer to the time costs of preparing an application and dealing with bureaucracy,[4] participation fees, or perhaps options or convertible fees that have negligible cost in the case of full compliance, but that entail costs in the case of incomplete compliance. An example of the latter type of *option* would be fines for non-participation.[5]
3. Milestones can be useful devices in situations of investments under uncertainty, according to Real Options theory (Klingebiel & Adner, 2015). Milestones make the availability of successive rounds of support conditional on satisfying certain requirements, and shift the problem from *picking winners* to *retaining winners*. Milestones can be effective ways of reducing uncertainty as well as motivating participants to keep making progress, and may even help to provide timely support across growth stages (Autio & Rannikko, 2016).
4. Random allocation of support can help when a limited number of places must be allocated to a large number of applicants of almost-equal quality. Another advantage of randomization is that it facilitates the ex-post evaluation of the overall causal effect of the policy (McKenzie, 2017).

[3] For example, older firms with previous application experience and better political connections might be able to prepare better grant applications.

[4] Regarding the self-selection hurdle, financial costs are probably preferable to time costs of bureaucracy, because high-potential entrepreneurs can be expected to have higher opportunity costs of time than low-potential entrepreneurs.

[5] An example would be the LEAD program: "individuals had to commit themselves to 2 days a month for 10 months. Following a series of interviews, 65 SMEs were selected to take part in the program on the understanding that nonparticipation would result in a £15,000 forfeit" (Roper & Hart, 2013, p. 20).

2.4 An Overview of Areas Relating to HGE Policy Instruments

Table 1 provides an overview of the previous literature on public policy to support HGEs, which is the literature to which we seek to contribute. It shows that the number of areas relating to possible HGE policy instruments is large, and includes a number of policy areas with potentially conflicting priorities (Bradley et al., 2021) and whose links to HGEs may not be immediately obvious (Acs et al., 2016). We begin with the more obvious policy areas, before discussing some that may be, at first glance, less obviously related to HGE policy.

Finance Access to finance for SMEs, young firms, and HGEs is a classic area for HGE policy. A fundamental problem for HGE finance arises from asymmetric information: Investors may deem HGEs to be poor investments using traditional indicators, and HGEs may not be able to convince investors of the merit of their business idea. Relevant to our discussion of reducing information asymmetries for (innovative) HGEs, Brown et al. (2017) observed that more R&D investment in high-tech industries is observed in countries that have stronger accounting standards and better contract enforcement. Information asymmetries presumably are a heavier burden for younger firms, which could be why HGE policies in various E.U. member states have focused specifically on supporting young firms (Flachenecker et al., 2020, p. 43).

Bank financing for HGEs is not ideal, because banks would not share in the HGEs' upside gains in cases of success (banks would receive a fixed interest rate), although banks would bear the brunt of an HGE's failure (in terms of not recovering the loan). Hence, finance via equity rather than bank loans is more appropriate for risky high-potential ventures. The financial sector now includes a variety of actors that can play a role in supporting the financing needs of HGEs: incubators, accelerators, grants from research councils for basic research, business angels, venture capital (VC) and corporate venture capital, and the relatively recent emergence of crowdfunding. In addition, there are many government initiatives to provide funding to SMEs, young firms, and potential HGEs (such as grants, guaranteed loans, government VC funds, government co-funding, and government certification).

The multiplicity of available options for HGE financing has a number of advantages. HGEs have financing needs that exceed the available bank loans, and therefore they are more likely to apply for equity financing (Ferrando et al., 2019). After reaching a certain leverage ratio, equity type financing helps to improve the balance sheet structure and this way opening up also for new rounds of debt financing. Also, there is evidence that firms that use several financing instruments are more likely to invest in R&D and software activities, and more likely to develop new products (Ferrando & Lekpek, 2018). Crowdfunding and venture capital complement each other (Sorenson et al., 2016), and bank loans and capital markets complement each other (Ferrando & Lekpek, 2018). Private finance is more developed in the United States than in Europe, as highlighted by recent evidence that European startups

Table 1 Some previous literature on public policy to support HGEs

References	Perspective	Main recommendations
Smallbone et al. (2002)	U.K. HGEs.	Develop regional models to encourage widespread participation by private sector organizations; boost access to finance for HGEs; integrate universities into regional ecosystems; ensure that support programs are tuned to the needs of the target group.
Shane (2009)	Most SMEs and startups are of a low quality.	Focus on supporting high-growth entrepreneurship, not generic entrepreneurship. Reduce the incentives for low-quality entrepreneurs to start businesses (i.e., aim for a lower quantity of startups with a higher average quality). Financial incentives for small firms to undertake R&D (e.g., R&D tax credits).
Mason and Brown (2013)	Public policy for HGEs.	Most HGE support focuses on innovation and access to finance. However, many HGEs are outside of high-tech sectors. Policy should provide support for internationalization and developing sales/marketing skills.
OECD (2013)	Examining 13 initiatives to support HGEs, six of which are detailed (Denmark, Scotland, Netherlands, Flanders, Germany, and Australia).	Business expansion requires external finance as well as improved management practices and skills. HGE programs should have quantitative objectives to facilitate ex-post evaluation. There are concerns that HGE policies tend to concentrate around richer regions.
Roper and Hart (2013)	Discussing cases in OECD (2013).	Five cross-cutting themes: Firm selection; timing of support; business and leadership development; peer group or shared learning; and evaluation.
Stam and Bosma (2015)	Local policies for HGEs.	Education policy should stimulate entrepreneurial ambitions; labor markets should be flexible.
Acs et al. (2016)	There are too many low-quality entrepreneurs; policy should focus on HGEs.	Decoupling provision of healthcare with employment (U.S.), greater STEM education to boost innovative entrepreneurship; facilitate the hiring of skilled immigrants.
Brown and Mawson (2016)	Targeted support for HGEs, growth accelerators.	Offering substantial resources to early-stage firms could have detrimental unintended consequences, because of a *dependency culture* and because growth-oriented firms need mentoring and management development. HGEs come from all sectors.

(continued)

Table 1 (continued)

References	Perspective	Main recommendations
Elert et al. (2017)	Institutional reform for innovation and entrepreneurship in Europe.	Taxation (simplicity, and tax neutrality across owner categories); pension funds should invest in entrepreneurial firms; portable pension plans; liberalization to empower private production of healthcare and schooling; second chances for bankrupt entrepreneurs; U.S.-style university system; need for trust, cooperation, and interpersonal exchange.
Ferrando et al. (2019)	Financing of HGEs.	HGEs are more often financially constrained. Focus on type of financing needed and improving the framework conditions for innovation and skills development. HGEs would benefit from equity markets and private equity funds.
Grover Goswami et al. (2019)	Relatively large emphasis on developing countries.	HGE policy options for emerging economies. ABC approach: *Allocative* efficiency, encouraging *business-to-business* spillovers, and strengthening firm *capabilities*.
Audretsch et al. (2020)	Introduction to a special issue on innovative startups. Analysis of 39 policies for innovative entrepreneurship.	There may be a role for policy at each stage of the process framework for innovative startups: (1) the antecedents of the creation of innovative startups; (2) their founding characteristics; (3) their behavior; and finally (4) the outputs and impacts generated.
Flachenecker et al. (2020)	Demographics, financing, and policy measures for European HGEs.	R&D grants, especially for young firms. R&D grants should be linked to milestones and combined with coaching. Tax credit measures for scale-up companies. Equity financing instruments, loan guarantee instruments.
Reypens et al. (2020)	European HGEs.	Encourage corporate startup collaboration to boost private investments; expand the government's toolbox to engage with startups through innovative procurement and co-development; promote enterprise education.
Bradley et al. (2021)	Introduction to a special issue on HGEs.	HGE policies can sometimes have unintended consequences, and *doing less* is an option that policymakers should not overlook.
This chapter	Discussion of HGE policy successes and failures.	Principles of critical listening to stakeholders, identifying key decision points, getting the incentives right (*up or out*), and the need for coordinated policy.

(compared to U.S. startups) attract 54% less private funding 9 years after foundation (Reypens et al., 2020). Therefore, there is scope in Europe to improve the variety and also the intensity of activity of the various actors in the ecosystem for financing HGEs, perhaps seeking to strengthen in particular the larger later-stage "scale-up" funding rounds as opposed to the smaller early-stage "start-up" funding rounds (Duruflé et al., 2017).

Innovation According to the Schumpeterian storyline, HGEs are revolutionary movements that begin with a moment resembling spiritual enlightenment, as an entrepreneur suddenly perceives an opportunity to improve the existing economic order, and then brings this innovative idea forward, through a charismatic social movement that gains momentum and eventually replaces the existing socioeconomic order (Nightingale, 2015). In reality, however, most *opportunities* beheld by entrepreneurs turn out to be mistakes, and many HGEs are not very innovative. Many HGEs are found outside of high-tech sectors, and in fact HGEs are overall less common in R & D-intensive sectors, which are often dominated by large capital-intensive firms (Daunfeldt et al., 2016) although HGEs seem to be more common in knowledge-intensive service industries in which human capital features prominently (Daunfeldt et al., 2016; Ferrando et al., 2019). However, HGEs in sectors that are traditionally considered to be low-tech or medium-tech could thrive through innovative activities such as developing new products and applying high-tech routines and logistics in their sectors (e.g., Walmart in retail, Ikea in furniture, Starbucks in coffee). Therefore, authors such as Mason and Brown (2013) suggest that HGE policies should avoid focusing too much on high-tech sectors.

That said, there is a special interest in HGEs that are innovative, because HGEs play a unique role in bringing forward innovations that could benefit the economy and lead to widespread productivity growth. HGEs represent one of the ways for countries to quickly develop large-scale capabilities and production capacity in an emerging technological area of strategic importance, such as IT, Artificial Intelligence (AI), biotechnology, and autonomous cars. Reypens et al. (2020) find that many European high-growth startups are new-to-the-world innovators, with many adopting innovative technologies (e.g., big data, artificial intelligence) into their businesses. They also find that a large share of high-growth startups expect to increase their demand for high-skilled workers and are expected to prioritize growth over short-term profits. Several HGE support initiatives focus specifically on high-tech HGEs (e.g., Germany's High-Tech Startup Fund, and Sweden's National Incubator Program for supporting university spinouts; OECD, 2013).

Innovation policy has a number of instruments that, while not targeted exclusively at HGEs, could provide assistance to HGEs. R & D tax credits are considered to be effective tools for innovation policy (Bloom et al., 2019), although R & D tax credits are more appropriate for mature incumbents than HGEs, because of the delays in receiving the funds (Brown et al., 2017). In the case of HGEs, R & D grants (rather than tax credits) could be more appropriate, whereby the funds are received by firms in advance rather than afterwards. R & D grants could be

especially effective if their disbursement is conditional on passing certain project milestones (Flachenecker et al., 2020, p. 48).

Another group of policy instruments relates to the protection of intellectual property rights (IPR), such as the strength of IPR protection, regulations for patents (including expedited patenting, Kuhn & Teodorescu, 2021), technology licensing, technology standards, and so on. Brown et al. (2017) observe that countries with stronger Intellectual Property (IP) protections have higher R & D levels in high-tech industries (whereas the effects of R & D tax credits are mainly confined to mature rather than high-tech industries). There is empirical evidence that higher taxes reduce the quantity and quality of innovations through reduction of R & D investments and patenting (Mukherjee et al., 2017; Akcigit et al., 2022).

Another area for policy intervention relates to science policy and universities. One potential source of high-tech or knowledge-intensive potential HGEs could be academic entrepreneurship (university spinoffs), although the incentives for faculty to leave their stable university jobs depend on whether they possess the IPR over their inventions. Hvide and Jones (2018) show that the abolition of the "professor's privilege" in Norway (such that university researchers no longer have full rights over their IP) led to a 50% decline in both entrepreneurship and patenting rates by university researchers after the reform. In contrast, the lifting of a ban on businesses run by professors at national universities in Japan is considered to be a success story in terms of high-tech entrepreneurship (OECD, 2019, p. 67).

Business incubators may play a role in HGE policy, although the number of HGEs emerging from business incubators and science parks is generally rather modest, perhaps because many high-tech science-based ventures find their growth constrained by factors such as severe technical and commercial difficulties, lack of educated consumers, and a shortage of high-skilled employees. Lukeš et al. (2019) observed that incubator tenancy had a negligible effect on startup job creation, which casts doubt on the effectiveness of public spending on business incubators. Arauzo-Carod et al. (2018) found that being located in a science and technology park is risky in the sense that it is associated with higher growth for HGEs, but that it is associated with accelerated decline for firms in the lowest growth quantiles. Pena (2004) observes that while some firms in business incubators manage to grow, nevertheless the existence of new firms being supported in business incubation centers may cause the exit of more efficient incumbent firms not receiving such policy support, hence leading to negative externalities for non-recipients.

Skills and Capabilities Education and skills may also be areas worth considering for HGE policy. At a basic level, a better-educated workforce can be expected to have better skills and capabilities for founding firms that become global leaders. In particular, investments in the STEM (Science, Technology, Engineering, and Medicine) sector could be especially worthy of interest from the perspective of HGE policy (Acs et al., 2016). HGEs often report that a constraint on their growth is the availability of a skilled labor force (Ferrando et al., 2019; Reypens et al., 2020).

Besides investment in a country's education sector, the skills and capabilities of entrepreneurs and the workforce could be enhanced in many areas through

mentoring. Mentoring relates to various domains: entrepreneurial skills, management skills, financial skills (e.g., regarding how to access external financing), sales/marketing capabilities, technical assistance regarding planning and implementing investment projects, and so on. González-Uribe and Reyes (2021) present evidence from a causal framework to show that mentors with high business and industry experience can boost the sales growth of mentored startups. Another strategy for boosting entrepreneurial skills could be peer learning that takes place at organized networking events. Cai and Szeidl (2018) present causal evidence that such peer learning boosts firm performance. A problem for HGE policy, however, is that there are no direct policy levers that can boost skills: "no one is in charge of the ecosystem's skill structure, which limits what can be achieved through top-down reform" (Elert et al., 2017, p. ix). Furthermore, local and national governments should not try to provide training and mentoring if there are already such solutions being provided by the private sector or by the existing entrepreneurial ecosystem.

A "soft instrument" (Borrás & Edquist, 2013) of HGE policy could be to try to influence the informal institutions and public attitudes (Elert et al., 2017; Bradley et al., 2021) in a way that encourages entrepreneurship, in the hope that public attitudes consider self-employment to be an attractive lifestyle, which may potentially lead to the emergence of HGEs. This policy is rather indirect and difficult to evaluate, therefore it should probably not receive large dedicated budgets, although appropriate support and *lessons*, as well as giving successful entrepreneurs awards and visibility on platforms, could help to gently reorient popular views in a favorable direction.

Labor Market Regulation Labor market regulation can influence HGEs in a variety of ways, many of which are discussed in Elert et al. (2017). First, Employment Protection Legislation (EPL, i.e., the rules concerning hiring and firing) can reduce the dynamism of labor markets if employers are reluctant to hire new employees (because of the liabilities that this entails), and if employees become accustomed to staying with their existing employers. Second, labor market regulations that start to apply after certain size thresholds (e.g., 50+ employees in the case of France, see Garicano et al., 2016) could cause firms to remain at a small size just beneath the threshold and thus deter HGEs. Third, no-compete agreements could reduce the mobility of employees (especially in high-tech/knowledge-intensive sectors), which could lead to short-term gains from lower leakages of proprietary knowledge on the part of employers, although it also leads to less dynamic labor markets, a possible misallocation of labor (if employees cannot move to exploit new opportunities), and also perhaps a smaller number of corporate spinoffs. It has been claimed that Silicon Valley's emergence was greatly facilitated by the fact that no-compete agreements are not enforced in California, leading to a vibrant and dynamic labor market (Fallick et al., 2006). Fourth, active labor market policies sometimes provide considerable support to individuals seeking to escape unemployment by becoming an entrepreneur (e.g., Caliendo et al., 2020). However, such entrepreneurs rarely set up HGEs, and it is possible that over-entry of low-quality entrepreneurs crowds out other more promising ventures and causes negative

externalities for other entrepreneurs, for example by lowering the average quality of firms in credit markets (De Meza, 2002). Indeed, across countries, there seems to be a "quantity versus quality" type of negative relationship overall between the self-employment rate and various indicators of entrepreneurial performance (Henrekson & Sanandaji, 2014).

Various Other Areas Relating to HGE Policy Immigration policy is related to the emergence of HGEs (Audretsch et al., 2020), in line with conjectures that individuals who leave their homeland to pursue new opportunities abroad may be more entrepreneurial. Acs et al. (2016) highlight that immigration policy is one of the most important areas for boosting high-quality entrepreneurship.

Tax policy can be relevant for HGE policy because taxes affect the incentives for entrepreneurial and economic choices (Elert et al., 2017). Tax incentives to support HGEs can be broad-based or targeted. An example of the latter is a Romanian initiative that introduced a targeted tax policy initiative to develop capabilities in the IT industry. Employees involved in software programming in Romania were exempt from salary tax. This helped grow a dynamic cluster that included dynamic entrepreneurial firms. Since 2017, the exemption from salary tax was also introduced for R & D employees in Romanian entities (Sincu, 2017).

International trade policy can play a role in supporting HGEs as they plan to grow in new export markets. Indeed, most countries allocate public funds to export promotion (Munch & Schaur, 2018), resulting in many policies to provide export assistance to potential HGEs (Srhoj et al., 2020). HGEs that grow through internationalization may be more competitive (higher productivity, world-class capabilities) and also they do not threaten to displace the economic activity of local firms. There is evidence that HGEs are more internationalized, regardless of whether they export or invest directly in foreign markets, as firms growing rapidly will have more incentives to go abroad (Teruel et al., 2021). Moreover, internationalized companies with new digital technologies may have more capacity to become HGEs. This can be explained by the fact that new digital technologies can generate not only entry opportunities (such as online sales) but also internal capabilities that strengthen firms' international positioning in competitive international markets (Teruel et al., 2021). Besides growth through exports, HGEs may arise through integrating imports into their production processes (Cruz et al., 2021).

Bankruptcy law could also play a role for HGE policy, according to various scholars (e.g., Elert et al., 2017). There is a danger that capable entrepreneurs may be harshly punished for engaging in what may initially seem like high-risk, high-return entrepreneurial opportunities that are worthwhile bets, but what eventually turn out to be (unlucky) failures. However, there is also a danger that an excessively lenient bankruptcy law could lead to negligence and fraud by entrepreneurs who have little incentive to avoid bankruptcy (Elert et al., 2017). Discussions of bankruptcy law relate to the issue of whether entrepreneurs can learn from failure to become high achievers after a previous bankruptcy. The evidence on this matter, however, often suggests that previously failed entrepreneurs do not learn from their experience in

terms of having superior performance with their subsequent venture (Rocha et al., 2015; Nielsen & Sarasvathy, 2016; Gottschalk et al., 2017).

Antitrust policy can support HGEs, by ruling against anticompetitive takeovers and enhancing overall competition, thus lowering the barriers to entry and growth of HGEs.

Government administrative offices could also support HGEs by helping to reduce, wherever possible, the burden of submitting official paperwork. This does not necessarily mean that SMEs and HGEs should give less information on their operations, but that they can do so in a more efficient way (e.g., by secure internet or email or by post rather than appearing in person).

Finally, it is worth mentioning that HGE policy is not only the domain of national policy, but is also influenced by local and regional economic policy (Stam & Bosma, 2015). Within countries, there are considerable disparities across regions in terms of HGE shares, which can be explained in terms of regional concentrations of specific industries often referred to as clusters and competence blocs. Given that some regions have higher shares of HGEs than others, therefore, HGE policy implemented at a local or regional level could be more effective than HGE policy at the national level (Stam & Bosma, 2015).

Reflections on the Many Areas Relating to HGE Policy Our overview of HGE policy instruments has connected to a variety of areas (education policy, innovation policy, immigration policy, labor market policy, etc.), such that "the interventions required are likely not to sound like entrepreneurship policy" (Acs et al., 2016, p. 49). Another consideration is that many of the policy instruments in the preceding subsections vary from micro-level (e.g., training and mentoring individual entrepreneurs) to macro-level (e.g., reforming national institutions such as tax rates and labor market regulations) (Bradley et al., 2021). Furthermore, the various policy instruments relate to different areas of the economy and society, and are implemented by different government departments and actors (Lundström et al., 2014), with potentially differing considerations, priorities, and trade-offs in mind (Bradley et al., 2021). Effective HGE policy will recognize this complexity.

In sum, there are many areas relevant for HGE policy. As such, various authors have recommended a systemic approach to HGE policy, such that problems affecting HGEs (e.g., access to finance, availability of skilled labor, access to international markets) should not be tackled in isolation, but embedded in a systemic policy framework (Veugelers et al., 2018).

Some good news regarding the effectiveness of HGE policy is that European high-growth startups are more likely than their low-growth counterparts to make use of several forms of public support, and in particular seem to benefit from startup grants/investments (Reypens et al., 2020). This is good news because it suggests that policy support to HGEs might be taken up effectively by HGEs.

3 Best Practices and Areas for Improvement

This section presents some cases of successful HGE policies and contrasts them with less successful HGE policies.

3.1 HGE Policy Instruments that Have Been Successful

Policymakers around the world dream of being able to recreate a Silicon Valley in their countries. An important factor behind the rise of Silicon Valley is the fact that no-compete agreements are not enforced in the state of California,[6] although they are enforced all over the rest of the United States (Gilson, 1999, 2003; Fallick et al., 2006). As a consequence, disgruntled workers (perhaps high-ability workers who disagreed with their superiors) who left their employers elsewhere in the United States were unable to continue their careers in their home states, but could move to California instead, where no-compete agreements were not enforced.[7] California therefore benefitted from a large inflow of highly skilled human capital, and furthermore firms in California were able to benefit from a dynamic labor market whereby promising employees were reallocated to top firms. The emergence of Silicon Valley was not due to deliberate government planning (Gilson, 2003), but was largely due to institutional rules (nullifying no-compete agreements) that essentially prevented firms from acting in their short-term interests (Fallick et al., 2006). This also underscores the broad web of institutions and rules that may support the emergence of high-growth entrepreneurship, because the link between no-compete agreements and high-growth entrepreneurship is not especially obvious or direct.

On the European level, several products are offered by the European Investment Fund (EIF) and the European Investment Bank (EIB). The EIF provides risk capital for innovative SMEs in their early stages and expansion phase. It mainly provides financing by partnering with national institutions, through advising, sponsoring, or managing a number of equity Funds-of-Funds and guarantee/debt funds.[8] Third-party investors include national and regional governments as well as private strategic

[6] No-compete agreements, also known as covenants not to compete, refer here to clauses in employment contracts that firms use to prevent individuals from working for a competitor, with the purpose of protecting their trade secrets, and guarding against knowledge spillovers to rivals.

[7] California is even known to invalidate no-compete agreements in employment contracts that explicitly designate the law of another state (Gilson, 1999, p. 608).

[8] Evidence on the success of EIF's venture capital operations is presented by Pavlova and Signore (2021): Startups supported by the EIF experience higher IPO and M&A rates compared to similar, non-VC-backed firms. Moreover, they experienced a doubling of their patenting rate, compared to counterfactuals, likely due to the mitigation of financial obstacles to invest in R&D. Pavlova and Signore (2019) also document that startups supported by the EIF experience faster growth (in terms of assets) compared to non-VC-backed firms. This leads to higher capitalization levels, higher revenues, and higher job creation in the first 5 years following the VC investment.

investors. The objective is to provide a wide choice of financial solutions tailored to complement existing national schemes.[9] The EIB provides also venture debt as a next step for firms that have already raised venture capital and need additional financing to accelerate growth. Typical use cases include scale-up from pilot to mass manufacturing, further development of products or services through research and development, and international expansion. Also, the European Scale-Up Action for Risk Capital (ESCALAR) pilot program was launched in 2020 by the EIF, specifically for scale-up companies. Developing the venture debt market is a key element of closing the gap of E.U. scale-up funding relative to the United States.[10] All these instruments are very much in line with those needed by HGEs and several European unicorns (startups that have reached a market valuation of over $1 billion) have emerged from EIF financing programs.[11]

Another modern success story is the development of the venture capital industry in Israel (Avnimelech & Teubal, 2006). Israel's VC industry is now the global leader on a share-of-GDP basis, and was developed by a government-targeted program. The government set up the industry, overcoming market failures (such as critical mass and asymmetric information), and then withdrew once the VC industry had developed momentum of its own.[12] An important feature of this success story is that the government got the incentives right for investors: strong upside incentives (with a five-year option to buy the government's share at cost), although there were no guarantees against downside losses.

Regarding grants for high-growth firms, McKenzie (2017) describes the YouWIN! scheme in Nigeria, according to which grants for high-growth entrepreneurs were randomly allocated to entrepreneurs who had passed some initial preselection stages. Randomization of grants is a simple and powerful tool for distributing grants, that recognizes that the differences between preselected candidates may be small compared to the decision costs (and fees for committees), and also that grant awards may be subject to favoritism or corrupt decision-making. Instead of government bureaucrats picking winners, randomization could provide a fast and transparent method for allocating grants. An added bonus is that randomization makes it easier to identify the causal effects of treatment in the subsequent stage of program evaluation.

[9] For the list of EIF's partnership with leading national institutions see Country and sector-specific initiatives (Funds-of Funds and Guarantee Debt funds) at eif.org.

[10] The European Investment Bank had signed €2.1 billion worth of transactions as of 2019, being the largest venture debt provider in the European Union (EIB, 2019). During 2020, the EIB tripled the direct venture-debt financing to biotech and life sciences companies, as a Covid-19 support (EIB, 2021).

[11] Europe now counts 52 venture-backed high-tech unicorns and 28 of them are supported by the EIF. This year, 17 were born and 34 raised more than €6 billion in total (EIF, 2021)

[12] This touches upon another important point: "policy liberalization as a long-term goal" (Elert et al., 2017, p. 5). The goal is not for policy to stay forever, but to pull out once the market failures are overcome and the activities are set up and sustained by market forces.

3.2 HGE Policy Instruments: Areas for Improvement

Various authors have suggested that boosting the overall rates of entry will lead to more high-growth enterprises, as if increasing the *pipeline* of entrants will mechanistically lead to a higher number of HGEs (assuming that the conversion rate of entrants to HGEs remains constant). This has resulted in policies seeking to enable entrepreneurs to start their business in a cheap and fast way (Branstetter et al., 2014). However, lowering the barriers to entry will probably only lead to a higher number of lower-quality firms entering (Branstetter et al., 2014; Conti & Roche, 2021). Relevant here is the observation that the better-performing startups tend to choose the legal form of being "incorporated," which is more expensive than other legal forms such as "sole trader" (Åstebro & Tåg, 2017)—hence making entry cheaper could simply lead to more low-quality sole-trader-type entrants. In general, there is a trade-off between quantity and quality. Countries with higher self-employment rates have lower GDP per capita (Henrekson & Sanandaji, 2014).

In the area of high-growth entrepreneurship, it is crucially important to get the incentives right. Government venture capital funds therefore need to avoid overprotecting investors from the risks of VC investment, even if these investors ask for protection. If losses are heavily guaranteed, while upside incentives are capped at a moderate level, then venture capital schemes can be expected to perform poorly (Gilson, 2003). Also, examples of negative outcomes have been documented in which the VC portfolio firms were managed in a passive rather than active way, with fund managers engaging in minority investments without important control rights, and without provision of mentoring or technological or managerial assistance (Gilson, 2003; Avnimelech & Teubal, 2006; Avnimelech et al., 2010).

While entrepreneurs may request lower tax rates, nevertheless lowering tax rates will not necessarily lead to more HGEs. Tax cuts for capital gains, for example, are unlikely to stimulate additional entrepreneurial activity in a cost-effective way when they are mainly claimed by retiring entrepreneurs who were largely unaware of the scheme when they originally invested (Corlett, 2018). In addition, favorable tax treatment (e.g., inheritance tax relief) for family firms has been identified as a way of allowing low-productivity family firms to continue operations as "zombie firms" even if they earn below-market returns (Bloom & Van Reenen, 2010; also Bloom et al., 2012).

Some other areas for improvement can also be mentioned (OECD, 2013). First, if a program changes its objectives too frequently (e.g., regarding the technological focus of portfolio companies), this can be an obstacle for stakeholders' development of skills and capabilities. Second, support programs that are perceived as being excessively bureaucratic and slow, with long waiting times for startups from first contact to actually receiving support, could deter high-quality startups. Another bureaucratic hurdle could be that, as a business evolves and pivots and redefines its activities, administrative tracking of these businesses should give them space to maneuver flexibly without requiring excessive official authorization and bureaucratic red tape.

4 Conclusion

We conclude with a discussion of broad themes that cut across various policy instruments and policy areas.

4.1 Critical Listening

Public policy is not as easy as giving stakeholders what they want. Instead, stakeholders should be given what they need to contribute more effectively to the economy and society. Hence, policymakers should be wary of focus groups, communications from industry associations and lobby groups, and survey responses. For example, entrepreneurs and investors may want guarantees against downside losses, or tax cuts, but these have not always been effective ways to encourage investments in high-ambition entrepreneurship. Lowering tax rates for entrepreneurs has not always led to an increase in entrepreneurial performance in the past, and continuing a policy of further tax cuts in our current low-tax era will probably (due to the law of diminishing marginal returns) be even less effective. When Bill Gates started Microsoft in 1975, the top tax rate on income was 70%, and tax rates on capital gains and corporate income were much higher than they are now (The New York Times, 2019). No doubt his calculus for starting Microsoft was not beholden to speculation about the evolution of tax rates. We might even suggest that, in the life cycle of entrepreneurs, initial investments and decisions are made early, and lobbying and grumbling about tax rates are done late in the day (e.g., at the time of retirement and trade-sale), at a stage when changes in tax rates have a weaker effect on incentives or entrepreneurial commitment.

Firms may be keen to see the enforcement of no-compete agreements, but this kind of rational (at the firm-level) yet short-sighted and self-interested (at the ecosystem level) stance may well have stifled the emergence of Silicon Valley (Gilson, 2003; Fallick et al., 2006). Investors may ask the government for downside protection and guarantees against losses, but this risk gives the wrong signals to investors—the danger of losing money if they fail to monitor their investments keeps them sharp and hence adds value (Gilson, 2003). A number of studies of the barriers perceived by firms have shown that barriers include factors such as *high levels of competition*—but clearly this is not a mandate for policymakers to seek to remove competition. Entrepreneurs often ask for less regulation (e.g., Ferrando et al., 2019), but regulations are often there for good reason. Entrepreneurs want lower taxes, but this is not effective in stimulating HGEs.

Instead, soliciting an audience with certain actors could provide valuable insights. This could involve interviewing not only the success stories, but also the *near misses* or the dissatisfied. For example, seeking out interviews with firms that left the European Union for later-stage funding in the United States could provide unique insights into the gaps and problems in the E.U. funding landscape.

Therefore, the policymaker needs to have a deeper understanding of the motivations and causal relationships underlying entrepreneurial ecosystems than is visible at a superficial level from self-reported preferences from entrepreneurs.

4.2 Identify the Decision Points

Growth is not a smooth linear expansion but takes place in leaps and jumps, in line with theoretical intuitions that firms are composed of lumpy discrete resources that cannot be combined in perfectly matching multiples (Penrose, 1959). As a result, firms occasionally reach critical trigger points (Brown & Mawson, 2013) at which they may face a decision to either invest in broad-based expansion, or to shrink back to stay within existing capacity limits (Coad et al., 2021). These trigger points include discontinuities in the growth path such as the hiring of the first employee (which corresponds to a doubling of size), crossing critical size thresholds (e.g., regarding Employment Protection Legislation obligations), setting up a second production plant, launching a second product, taking first steps into export markets, and so on. Identifying the trigger points in firms' growth paths could lead to policy initiatives that effectively *nudge* firms onto a high-growth trajectory. In this spirit, BPI France launched a scheme to co-finance the investment of firms specifically in the area of game-changing next-generation capital investments (e.g., nanotechnology, 3D-printing, industrial robots, digitalization, and virtual reality applications).[13]

4.3 Up or Out: Get the Incentives Right

Stimulating high-growth entrepreneurship and its supporting institutions (e.g., venture capital firms) requires careful thinking about incentives for the various actors. Getting the incentives right for HGEs requires more than just tax cuts and deregulation. It requires adjusting the balance between upside gains and downside losses. In the case of university spinoffs, for example, restrictions on the commercialization of intellectual property that was developed by faculty in their universities had a dramatic effect of a 50% reduction in university startups and also in patenting rates (Hvide & Jones, 2018). Getting the incentives right also involves broader thinking about incentives and trade-offs surrounding the decision to become an entrepreneur, such as the portability of health insurance (Acs et al., 2016) and pension plans (Elert et al., 2017). No-compete agreements are another area where incentives for corporate spinoffs can be either stifled or unleashed, depending on the incentives facing the would-be entrepreneur.

[13] The initiative was known as *Prêt Industrie du Futur – Technologies et usages du futur*. See for example, OECD (2018, p. 244).

The logic of ambitious entrepreneurship is not slow accumulation, but rather an *up or out* dynamic by which entrepreneurs are uncomfortably positioned between the promise of upside gains and the threat of downside losses. HGE policy should not seek to make applicants comfortable with their current performance, but to give them a temporary springboard into growth. HGE initiatives such as science parks, incubators, and accelerators should not allow ventures to persist for long periods of time if they are not showing any signs of progress—instead the logic is *up or out*. Autio and Rannikko (2016) highlight the importance to HGE policy that ventures are able to meet ambitious milestones before being able to receive further HGE support. Biancalani et al. (2021, p. 18) suggest that startup support programs should be designed to reduce the extent of loan guarantees and to expand the income tax breaks, in order to adjust the incentives facing investors away from protecting downside losses and toward enhancing upside gains. In contrast, Brown and Mawson (2016) discuss the "dependency culture" that may arise in environments set up to support potential HGEs and that end up "killing them with kindness" (Brown & Mawson, 2016, p. 828).

In line with the logic of *up or out*, young firms should be privileged, because firms in their first five–seven years are much more likely to grow fast (Haltiwanger et al., 2013; Coad et al., 2018). Old SMEs, and particularly old micro firms, are especially unlikely to grow (Coad & Karlsson, 2022).

Relevant here is the commendable design of the Dutch "Growth Accelerator Programme" (OECD, 2013, Chap. 7), a sophisticated program for training and supporting firms which was heavily subsidized by public funds, although joining the program was not entirely costless. Participants were required to commit to paying a matching contribution (€75,000 over a five-year period), which would only be a rational choice for entrepreneurs who have genuine growth aspirations. If the program had been free, then it might have been taken up by curious firms with no serious growth ambitions.

HGE policy could potentially be set up to allow firms to self-select to buy a *growth option* or a *derivative* such that they would only benefit if they grew, and if they do not grow they will have the costs but not the benefits. This way, firms can manipulate their incentive structure (in terms of the balance between upside gains and downside losses) to find themselves in a fast-track environment. For example, firms could be able to self-select into a program whereby they pay reduced employment tax on their next five hires, but there is a fixed cost involved (payable mainly at the end of the period), such that firms that select into this program but do not grow will pay a fixed cost but have no benefits.[14] Another idea could be a loan to potential HGEs that no longer needs to be repaid if the firm actually demonstrates genuine job creation. Therefore, firms will use their private information to self-select into a

[14] Perhaps the fixed cost could take the form of compulsory training using an online asynchronous education program set up to develop some relevant entrepreneurial skills. Another possibility could be that training or mentoring is billed 12 months later, but the bill is waived if the firm has actually hired or started exporting. In a similar spirit, perhaps personalized business advice is available but not *free*; instead it is only available after completion of a relevant online learning module.

regime of enhanced incentives, which would only make sense for firms that are convinced of their growth potential.

4.4 The Need for Coordinated Policy

There has been a dramatic growth of SME policy and entrepreneurship policy in the United Kingdom, European Union, and elsewhere since the onset of the Thatcher-Reagan neoliberal turn.[15] The sudden appearance of thousands of entrepreneurship support programs has taken place in the context of an uncoordinated proliferation that has largely escaped evaluation. Nevertheless, Storey (2006), Shane (2009), and Lundström et al. (2014) document the uncoordinated nature of the expenditure from many different government departments, and the lack of awareness (by the public, and even among experts) of the sheer scale of government support for SMEs and entrepreneurs.

There is therefore a need for synergies and sometimes fewer HGE support programs, which should be coordinated across government departments and across the various levels of aggregation (local, regional, national), with these programs having explicit goals (job creation, creation of tax revenue, innovation, unemployment reduction, rural development, etc.), and also rigorous evaluations to see if the initiatives meet their stated goals.

Acknowledgments We are grateful to Sofia Amaral-Garcia, Peter Bauer, Andrea Crisanti, Clemens Domnick, Helmut Kraemer-Eis, Pavlova Elitsa, Debora Revoltella, Sebastian Schich, and Wouter van der Wielen for many helpful discussions and comments. We are also grateful to Karl Wennberg and Christian Sandström (the editors) and an anonymous reviewer for helpful feedback. Any remaining errors are ours alone. The views expressed in this publication are those of the authors and do not necessarily reflect the position of the European Investment Bank.

References

Acs, Z., Åstebro, T., Audretsch, D., & Robinson, D. T. (2016). Public policy to promote entrepreneurship: A call to arms. *Small Business Economics, 47*(1), 35–51.

Akcigit, U., Grigsby J., Nicholas T., & Stantcheva S. (2022). Taxation and innovation in the 20th century. *Quarterly Journal of Economics*.

Arauzo-Carod, J. M., Segarra-Blasco, A., & Teruel, M. (2018). The role of science and technology parks as firm growth boosters: An empirical analysis in Catalonia. *Regional Studies, 52*(5), 645–658.

[15] "The last four decades have seen a considerable increase in the scale and diversity of such policies across developed countries. An early developer, by EU standards, was the UK although, even here, SMEP [SME policy] during the 1970s comprised a mere handful of programs, and EP [Entrepreneurship policy] was nonexistent. Yet within three decades, the UK had more than a thousand such programs" (Lundström et al., 2014, p. 942).

Åstebro, T., & Tåg, J. (2017). Gross, net, and new job creation by entrepreneurs. *Journal of Business Venturing Insights, 8*, 64–70.

Audretsch, D., Colombelli, A., Grilli, L., Minola, T., & Rasmussen, E. (2020). Innovative start-ups and policy initiatives. *Research Policy, 49*(10), 104027.

Autio, E., & Rannikko, H. (2016). Retaining winners: Can policy boost high-growth entrepreneurship? *Research Policy, 45*, 42–55.

Avnimelech, G., & Teubal, M. (2006). Creating venture capital industries that co-evolve with high tech: Insights from an extended industry life cycle perspective of the Israeli experience. *Research Policy, 35*, 1477–1498.

Avnimelech, G., Rosiello, A., & Teubal, M. (2010). Evolutionary interpretation of venture capital policy in Israel, Germany, UK and Scotland. *Science and Public Policy, 37*(2), 101–112.

Barrot, J. N., & Nanda, R. (2020). The employment effects of faster payment: Evidence from the federal quickpay reform. *Journal of Finance, 75*(6), 3139–3173.

Benedetti Fasil, C., Domnick, C., del Rio, J.-C., Fákó, P., Flachenecker, F., Gavigan, J. P., Janiri, M. L., Stamenov, B., & Testa, G. (2021). *High growth enterprises in the COVID-19 crisis context demographics, environmental innovations, digitalization, finance and policy measures*. EUR 30686 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-37269-1. https://doi.org/10.2760/63402, JRC124469. Retrieved from https://op.europa.eu/en/publication-detail/-/publication/a2be487d-b202-11eb-8aca-01aa75ed71a1/language-en

Biancalani, F., Czarnitzki, D., & Riccaboni, M. (2021). The Italian start up act: A microeconometric program evaluation. *Small Business Economics*. https://doi.org/10.1007/s11187-021-00468-7

Bloom, N., & Van Reenen, J. (2010). Why do management practices differ across firms and countries? *Journal of Economic Perspectives, 24*(1), 203–224.

Bloom, N., Genakos, C., Sadun, R., & Van Reenen, J. (2012). Management practices across firms and countries. *Academy of Management Perspectives, 26*(1), 12–33.

Bloom, N., Van Reenen, J., & Williams, H. (2019). A toolkit of policies to promote innovation. *Journal of Economic Perspectives, 33*(3), 163–184.

Bornhäll, A., Daunfeldt, S. O., & Rudholm, N. (2015). Sleeping gazelles: The unseen job creators? In A. C. Corbett, J. Katz, & A. McKelvie (Eds.), *Entrepreneurial growth: Individual, firm, and region. Advances in entrepreneurship, firm emergence, and growth* (Vol. 17, pp. 161–185). Emerald Publishers. https://doi.org/10.1108/S1074-754020150000017013

Borrás, S., & Edquist, C. (2013). The choice of innovation policy instruments. *Technological Forecasting and Social Change, 80*(8), 1513–1522.

Bradley, S. W., Kim, P. H., Klein, P. G., McMullen, J. S., & Wennberg, K. (2021). Policy for innovative entrepreneurship: Institutions, interventions, and societal challenges. *Strategic Entrepreneurship Journal, 15*, 167–184. https://doi.org/10.1002/sej.1395

Branstetter, L., Lima, F., Taylor, L. J., & Venâncio, A. (2014). Do entry regulations deter entrepreneurship and job creation? Evidence from recent reforms in Portugal. *Economic Journal, 124*(577), 805–832.

Bravo-Biosca, A. (2016). Firm growth dynamics across countries: Evidence from a new database. *NESTA Working Paper 16/03*, NESTA.

Bravo-Biosca, A., Menon, C., & Criscuolo, C. (2013). What drives the dynamics of business growth? OECD Science, *Technology and Industry Policy Papers 1*.

Brown, R., & Mawson, S. (2013). Trigger points and high-growth firms. *Journal of Small Business and Enterprise Development, 20*(2), 279–295.

Brown, R., & Mawson, S. (2016). Targeted support for high growth firms: Theoretical constraints, unintended consequences and future policy challenges. *Environment and Planning C: Government and Policy, 34*(5), 816–836.

Brown, J. R., Martinsson, G., & Petersen, B. C. (2017). What promotes R&D? Comparative evidence from around the world. *Research Policy, 46*(2), 447–462.

Cai, J., & Szeidl, A. (2018). Interfirm relationships and business performance. *Quarterly Journal of Economics, 133*(3), 1229–1282.

Caliendo, M., Künn, S., & Weissenberger, M. (2020). Catching up or lagging behind? The long-term business and innovation potential of subsidized start-ups out of unemployment. *Research Policy, 49*(10), 104053.

Coad, A., Daunfeldt, S. O., & Halvarsson, D. (2018). Bursting into life: Firm growth and growth persistence by age. *Small Business Economics, 50*(1), 55–75.

Coad, A., Domnick, C., Flachenecker, F., Harasztosi, P., Janiri, M. L., Pal, R., & Teruel, M. (2021). Capacity constraints as a trigger for high growth. *Small Business Economics*.

Coad, A., Frankish, J. S., & Storey, D. J. (2020). Too fast to live? Effects of growth on survival across the growth distribution. *Journal of Small Business Management, 58*(3), 544–571. https://doi.org/10.1080/00472778.2019.1662265

Coad, A., & Karlsson, J. (2022). A field guide for gazelle hunters: Small, old firms are unlikely to become high-growth firms. *Journal of Business Venturing Insights, 17*, e00286.

Conti, A., & Roche, M. P. (2021). Lowering the bar? External conditions, opportunity costs, and high-tech start-up outcomes. *Organization Science*. https://doi.org/10.1287/orsc.2020.1411

Corlett, A. (2018). *Entrepreneurs' relief has cost £22 billion over the past 10 years. Was it worth it?'*. Resolution Foundation. Retrieved from https://www.resolutionfoundation.org/comment/entrepreneurs-relief-has-cost-22-billion-over-the-past-10-years-was-it-worth-it/

Cruz, M., Baghdadi, L., & Arouri, H. (2021). High growth firms and trade linkages: Imports do matter. *Small Business Economics*. https://doi.org/10.1007/s11187-021-00538-w

Daunfeldt, S. O., Elert, N., & Johansson, D. (2016). Are high-growth firms overrepresented in high-tech industries? *Industrial and Corporate Change, 25*(1), 1–21. https://doi.org/10.1093/icc/dtv035

De Meza, D. (2002). Overlending? *Economic Journal, 112*(477), F17–F31.

Duruflé, G., Hellmann, T. F., & Wilson, K. E. (2017). From start-up to scale-up: Examining public policies for the financing of high-growth ventures. *Bruegel Working Paper, No. 2017/04*. Bruegel.

Dvouletý, O., Srhoj, S., & Pantea, S. (2021). Public SME Grants and firm performance in European Union: A systematic review of empirical evidence. *Small Business Economics, 57*(1), 243–263. https://doi.org/10.1007/s11187-019-00306-x

EIB. (2019). EIB Venture Debt as Growth Capital. Retrieved from https://www.eib.org/attachments/general/events/eib-venture-debt-oct-19.pdf

EIB. (2021). *European Investment Bank Activity Report 2020*. Retrieved from https://www.eib.org/en/publications/activity-report-2020

EIF. (2021). *EIF Annual Report 2020*. Retrieved from https://www.eif.org/news_centre/publications/eif-annual-report-2020.htm

Elert, N., Henrekson, M., & Stenkula, M. (2017). *Institutional reform for innovation and entrepreneurship: An agenda for Europe*. Springer Nature.

Fallick, B., Fleischman, C. A., & Rebitzer, J. B. (2006). Job-hopping in Silicon Valley: Some evidence concerning the microfoundations of a high-technology cluster. *Review of Economics and Statistics, 88*(3), 472–481.

Ferrando, A., & Lekpek, S. (2018). Access to finance and innovative activity of EU firms: A cluster analysis (no. 2018/02). *EIB Working Papers.*

Ferrando, A., Pal, R., and Durante, E. (2019). Financing and obstacles for high growth enterprises: The European case (no. 2019/03). *EIB Working Papers*.

Flachenecker, F., Gavigan, J. P., Goenaga, X., Pasi, G., Preziosi, N., Stamenov, B., & Testa, G. (2020). *High growth enterprises: Demographics, financing & policy measures. JRC technical report*. Joint Research Centre. Retrieved from https://ec.europa.eu/jrc/en/publication/high-growth-enterprises-demographics-finance-policy-measures

Friesenbichler, K., & Hölzl, W. (2020). High-growth firm shares in Austrian regions: The role of economic structures. *Regional Studies, 54*(11), 1585–1595.

Garicano, L., Lelarge, C., & Van Reenen, J. (2016). Firm size distortions and the productivity distribution: Evidence from France. *American Economic Review, 106*(11), 3439–3479.

Gilson, R. (1999). The legal infrastructure of high technology industrial districts: Silicon Valley, route 128, and covenants not to compete. *New York University Law Review, 74*(3), 575–629.

Gilson, R. J. (2003). Engineering a venture capital market: Lessons from the American experience. *Stanford Law Review, 55*(4), 1067–1103.

Gompers, P., Kovner, A., Lerner, J., & Scharfstein, D. (2010). Performance persistence in entrepreneurship. *Journal of Financial Economics, 96*(1), 18–32.

González-Uribe, J., & Reyes, S. (2021). Identifying and boosting "Gazelles": Evidence from business accelerators. *Journal of Financial Economics, 139*(1), 260–287.

Gottschalk, S., Greene, F. J., & Müller, B. (2017). The impact of habitual entrepreneurial experience on new firm closure outcomes. *Small Business Economics, 48*(2), 303–321.

Grover Goswami, A., Medvedev, D., & Olafsen, E. (2019). *High-growth firms: Facts, fiction, and policy options for emerging economies*. World Bank.

Hallak, I., & Harasztosi, P. (2019*). Job creation in Europe: A firm-level analysis. European Commission*. JRC Science for Policy Report.

Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2013). Who creates jobs? Small versus large versus young. *Review of Economics and Statistics, 95*(2), 347–361. https://doi.org/10.1162/REST_a_00288

Henrekson, M., & Johansson, D. (2010). Gazelles as job creators: A survey and interpretation of the evidence. *Small Business Economics, 35*, 227–244.

Henrekson, M., & Sanandaji, T. (2014). Small business activity does not measure entrepreneurship. *Proceedings of the National Academy of Sciences, 111*(5), 1760–1765.

Hvide, H. K., & Jones, B. F. (2018). University innovation and the professor's privilege. *American Economic Review, 108*(7), 1860–1898.

Klingebiel, R., & Adner, R. (2015). Real options logic revisited: The performance effects of alternative resource allocation regimes. *Academy of Management Journal, 58*(1), 221–241.

Kuhn, J. M., & Teodorescu, M. H. (2021). The track one pilot program: Who benefits from prioritized patent examination? *Strategic Entrepreneurship Journal, 15*(2), 185–208. https://doi.org/10.1002/sej.1387

Link, A. N., & Scott, J. T. (2010). Government as entrepreneur: Evaluating the commercialization success of SBIR projects. *Research Policy, 39*(5), 589–601.

Lukeš, M., Longo, M. C., & Zouhar, J. (2019). Do business incubators really enhance entrepreneurial growth? Evidence from a large sample of innovative Italian start-ups. *Technovation, 82*, 25–34.

Lundström, A., Vikström, P., Fink, M., Meuleman, M., Glodek, P., Storey, D. J., & Kroksgard, A. (2014). Measuring the costs and coverage of SME and entrepreneurship policy: A pioneering study. *Entrepreneurship Theory and Practice, 38*(4), 941–957.

Mason, C., & Brown, R. (2013). Creating good public policy to support high-growth firms. *Small Business Economics, 40*(2), 211–225.

Mazzucato, M. (2011). *The entrepreneurial state*. DEMOS.

McKenzie, D. (2017). Identifying and spurring high-growth entrepreneurship: Experimental evidence from a business plan competition. *American Economic Review, 107*(8), 2278–2307.

Mitchell, J., Testa, G., Sanchez Martinez, M., Cunningham, P. N., & Szkuta, K. (2020). Tax incentives for R&D: Supporting innovative scale-ups? *Research Evaluation, 29*(2), 121–134.

Mukherjee, A., Singh, M., & Zaldokas, A. (2017). Do corporate taxes hinder innovation? *Journal of Financial Economics, 124*(1), 195–221.

Munch, J., & Schaur, G. (2018). The effect of export promotion on firm-level performance. *American Economic Journal: Economic Policy, 10*(1), 357–387.

Nielsen, K., & Sarasvathy, S. D. (2016). A market for lemons in serial entrepreneurship? Exploring type I and type II errors in the restart decision. *Academy of Management Discoveries, 2*(3), 247–271.

Nightingale, P. (2015). Schumpeter's theological roots? Harnack and the origins of creative destruction. *Journal of Evolutionary Economics, 25*(1), 69–75.

OECD. (2013, March). *An international benchmarking analysis of public Programmes for high-growth firms*. Final report prepared by the OECD Local Economic and Employment Development Programme in collaboration with the Danish Business Authority.

OECD. (2018). *OECD economic surveys: Ireland 2018*. OECD. https://doi.org/10.1787/eco_surveys-irl-2018-en

OECD. (2019). *OECD economic surveys: Japan 2019*. OECD. https://doi.org/10.1787/fd63f374-en

Pavlova, E., & Signore, S. (2019). The European venture capital landscape: An EIF perspective. Volume V: The economic impact of VC investments supported by the EIF. E*IF working paper 2019/55.*

Pavlova, E., & Signore, S. (2021). The European venture capital landscape: An EIF perspective. Volume VI: The impact of VC on the exit and innovation outcomes of EIF-backed start-ups. *EIF Working Paper 2021/70*.

Pena, I. (2004). Business incubation centers and new firm growth in the Basque Country. *Small Business Economics, 22*, 223–236. https://doi.org/10.1023/B:SBEJ.0000022221.03667.82

Penrose, E. T. (1959). *The theory of the growth of the firm*. Basil Blackwell.

Reypens, C., Delanote, J., & Ruckert, D. (2020). From starting to scaling: How to foster startup growth in Europe. *European Investment Bank.* https://doi.org/10.2867/42527

Rocha, V., Carneiro, A., & Varum, C. A. (2015). Serial entrepreneurship, learning by doing and self-selection. *International Journal of Industrial Organization, 40*, 91–106.

Roper, S., & Hart, M. (2013). Supporting sustained growth among SMEs–policy models and guidelines. *ERC White Paper, 7*, 1–68.

Rostamkalaei, A., & Freel, M. (2016). The cost of growth: Small firms and the pricing of bank loans. *Small Business Economics, 46*(2), 255–272.

Shane, S. (2009). Why encouraging more people to become entrepreneurs is bad public policy. *Small Business Economics, 33*, 141–149.

Sincu, G. (2017, May 30). Romania: Tax incentives for companies performing research and development activities. *International Tax Review*. Retrieved from https://www.internationaltaxreview.com/article/b1f7n76m3z099b/romania-tax-incentives-for-companies-performing-research-and-development-activities

Sine, W. D., & David, R. (2003). Environmental jolts, institutional change, and the creation of entrepreneurial opportunity in the U.S. electric power industry. *Research Policy, 32*(2), 185–207.

Smallbone, D., Baldock, R., & Burgess, S. (2002). Targeted support for high-growth start-ups: Some policy issues. *Environment and Planning C: Government and Policy, 20*(2), 195–209.

Sorenson, O., Assenova, V., Li, G. C., Boada, J., & Fleming, L. (2016). Expand innovation finance via crowdfunding. *Science, 354*(6319), 1526–1528.

Srhoj, S., Vitezic, V., & Wagner, J. (2020). Export boosting policies and firm behaviour: Review of empirical evidence around the world. In *MPRA paper 104330*. University Library of Munich.

Stam, E., & Bosma, N. (2015). Local policies for high-growth firms. In D. B. Audretsch, A. N. Link, & M. L. Walshok (Eds.), *The Oxford handbook of local competitiveness* (pp. 286–305). Oxford University Press.

Storey, D. J. (1994). *Understanding the small business sector*. Routledge.

Storey, D. J. (2006). Evaluating SME policies and programmes: Technical and political dimensions. In M. Casson, B. Yeung, A. Basu, & N. Wadeson (Eds.), *The Oxford handbook of entrepreneurship* (pp. 248–278). Oxford University Press.

Teruel, M., Coad, A., Domnick, C., Flachenecker, F., Harasztozi, P., Janiria, M.L., & Pal, R. (2021). The birth of new HGEs: Internationalization through new digital technologies. *Journal of Technological Transfer*.

Testa, G., Szkuta, K., & Cunningham, P. N. (2019). Improving access to finance for young innovative enterprises with growth potential: Evidence of the impact of R&D grant schemes on firms' outputs. *Research Evaluation*. https://doi.org/10.1093/reseval/rvz016

The New York Times. (2019, November 8). The billionaires are getting nervous. Retrieved from https://www.nytimes.com/2019/11/08/opinion/sunday/bill-gates-warren-tax.html

Veugelers, R., Ferrando, A., Lekpek, S., & Weiss, C. T. (2018). Young SMEs: Driving innovation in Europe? (No. 2018/07). *EIB Working Papers*.

Zhou, H., & van der Zwan, P. (2019). Is there a risk of growing fast? The relationship between organic employment growth and firm exit. *Industrial and Corporate Change, 28*(5), 1297–1320.

Public-Steering and Private-Performing Sectors: Success and Failures in the Swedish Finance, Telecoms, and City Planning Sectors

Klas A. M. Eriksson and Rasmus Nykvist

Abstract Mariana Mazzucato embraces state-directed public/private investment in innovation to achieve goals that society as a whole would benefit from. The idea is that the state should *direct* and the private sphere *perform* the innovation needed. We argue that this view is biased toward successful examples of innovation created by public sector steering and the private sector performing. Generally, vested interests are created by these kinds of public-steering–private-performing innovations, which hinder or malinvest resources through their interests or information problems when market forces are put out of play. We present examples that explore the process of two *successful* deregulation cases and one *failed* case to highlight differences in the processes leading to the different outcomes; the most important being the existence of institutional entrepreneurs acting as typical change agents in the successful cases and the lack thereof in the failed example. These cases highlight the importance of both passive incumbents and proactive entrants for enabling institutional change. We contrast these examples with the public-steering and private-performing framework.

Keywords Innovation · Deregulation · Institutional change · Industrial policy · Entrant incumbent

K. A. M. Eriksson (✉)
Department of Economic History and International Relations, Stockholm University, Stockholm, Sweden

Hoover Institution, Stanford University, Stanford, CA, USA

The Ratio Institute, Stockholm, Sweden

R. Nykvist
House of Innovation, Stockholm School of Economics, Stockholm, Sweden

The Ratio Institute, Stockholm, Sweden
e-mail: rasmus.nykvist@hhs.se

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_16

1 Introduction

History has shown that mature economies with entrenched incumbents and fixed regulated conditions *can* change. Karlson (2018) claims that a "central zone" of relatively few but powerful, well-organized, and integrated actors from politics, business, academia, and interest groups are crucial for fundamental system changes to occur. Discussions in both organization studies and business history have also emphasized entrepreneurs leveraging technology to help push such successful policy change (Alvarez et al., 2015; Garud et al., 2018; Mokyr, 1998). Together with a successful technological shift and a favorable zeitgeist,[1] this forms the fundamental enabling conditions for regulatory change (Stigler, 1942).

In this chapter, we explore the successful deregulation process of telecommunications and finance in Sweden during the late twentieth century and describe how the *institutional entrepreneur* (cf. Battilana et al., 2009) engaged in several *corporate political activities* (cf. Hadani et al., 2017). We explore how successful entrepreneurs managed to overcome resistance to changes in policies and help enact new regulatory regimes in their respective markets. In addition, we juxtapose the success stories of these entrepreneurs with a failed example in the same national context—an example in which institutional change and deregulation have not occurred and where the public sector is steering, and the private sector is performing—namely the case of Sweden's planning and building sector. In this case, we apply a legal history approach to examine how a sector deeply characterized by public funding and public–private cooperation has, in contrast to the deregulated sectors, fallen into severe inertia and destructive outcomes. Using these cases, we contrast what went on with the ideas advanced by Mariana Mazzucato (2013, 2020, 2021). In doing so, we show how *public steering and private performing* create vested interests and information problems that hinder investments or steer investments in the wrong direction—something that could have catastrophic consequences. Using our cases, we also question the relationship between correlation and causation in Mazzucato's analysis. Apart from contrasting these examples to those Mazzucato uses, the aim of this chapter is also to explore what distinguishes these two cases, in which deregulation happened, from the cases where—to date—it has not, given the fact that they all shared the same general political zeitgeist and had similar technological influences.

The rest of the chapter evolves as follows. We start by introducing and comparing the two successful cases of deregulation and the unsuccessful case of the planning and building sector. Then we proceed to a discussion with a focus on the role of entrepreneurship in further policy change, before concluding.

[1] Zeitgeist is a term that refers to the public opinion, mood, and/or belief of a certain period in time.

1.1 Reforms in Sweden in the 1980s: Success and Failure

During the middle of the twentieth century, Sweden's economic policy was sometimes referred to as a *middle way* between socialism and capitalism. Even though the concepts of compromise and negotiation are highly valued within Swedish culture, one can also describe Sweden as a land of extremes in terms of economic and innovation policy. Relative to other Western democracies, Sweden went further than most other countries in the centralization of welfare capitalism between 1932 and 1976, a period which, from a Western perspective, marked a uniquely long period of government power for one political party, the Social Democrats. The active state policies, which are often associated with the ideas of John Maynard Keynes, were already well represented in mainstream Swedish economic thinking from the early 1930s through the influential *Stockholm School* economists like Gunnar Myrdal, Bertil Ohlin, and Erik Lundberg. The centralized state and business relations dominated the labor market and housing policy during this period. At the same time, old monopolies in telecommunications and finance were seldom questioned. Housing and city development was (and still are) regulated by a municipal planning monopoly, housing costs and rents were (and largely still are) regulated for dwellers, and the salaries of workers were (and largely still are) regulated by unions and employer organizations. The monopolies and oligopolies were mostly government supported and this caused a decline in competition. Although Sweden was more state-interventionist than many other Western countries, this trend of government-supported monopolies was present all over the Western world. In 1942, the famous monopoly expert and later Nobel laureate George Stigler noted that "the major factor in the decline of competition has been governmental support of monopoly" (Stigler, 1942, p. 20).

However, the Swedish neoliberal policy in the 1980s, which leaned toward decentralization and market policies, was *also* considered extreme from a Western perspective. Much of the deregulation across the world was pioneered by Swedish sectors that were often more far-reaching than other Western democracies. One striking example is the deregulation of the stock exchange monopoly. In 1980, the de facto monopoly of the Stockholm Stock Exchange over financial equity was also granted *de jure*. In the wake of digitalization, institutional entrepreneurship and neoliberal ideas swept across society. This monopoly was soon supplemented by a digital-born options exchange—a successful institutional entrepreneur who managed to outgrow and overturn the monopolist in just 10 years (Blomé, 1990).

Other examples of relatively extreme or pioneering deregulation processes in Sweden include school choice and public transport. These processes constituted the Swedish neoliberal period of the 1980s and 1990s, alongside more mainstream deregulation—from an international perspective—in television, radio, telecommunications, credit, and currency restrictions.[2] However, a sector that has remained

[2] An often-forgotten reform with the same neoliberal character had already occurred in 1965, namely Sweden's student funding of higher education using loans and support, which is still intact

largely intact from the era of welfare capitalism in 1947 to today is the planning and building sector of Swedish cities, for which the municipal planning monopoly is a central characteristic. Hence, whereas large portions of the economy have been deregulated, this sector has remained at the opposite extreme of Swedish policy. There are problematic consequences to this combination of monopoly sectors and deregulated markets, which we will address. These coexisting extremes make Sweden an interesting case study for the processes and outcomes of different policies. Sweden was characterized by public–private cooperation in both innovation and technological developments during the era of welfare capitalism, but also earlier; one example is the cooperation between state agency Televerket and private company Ericsson in developing telecommunications throughout the twentieth century. This example largely supports the arguments of Mazzucato (2013) regarding the public sector's role in innovation and risk-taking. However, this came to an end with the deregulation and abolishment of Televerket and its monopoly in the early 1990s. An expansion of innovation in telecommunications followed this policy change. In Sweden's city planning and building sector, similar public–private innovation and risk-taking have occurred throughout most of the twentieth century and all of the twenty-first century so far. No fundamental policy change has taken place since the era of welfare capitalism and municipalities still hold monopolies over city planning procedures. A great deal of problems in city planning and housing are associated with this policy, for instance:

1. Inertia in the planning and building process—probably an important reason for housing shortages.
2. A centrality of decision-making regarding city development. This may account for the many malinvestments in city development that lead to urban and housing environments that consumers and the public do not value (Hayek, 1945, 1978, pp. 340–58; Lindbeck, 2012, pp. 121–131).

In our comparative case, in which an old monopolistic system was kept in place, striking negative effects on innovation, entrepreneurship, and the economy followed. In fact, the planning and building monopoly is often viewed as ineffective, causing higher prices for land, real estate, and housing, as well as inertia in the sector that may benefit a few actors but is detrimental for society. Telecommunications and finance, on the contrary, have arguably been among the Swedish economy's more innovative and dynamic sectors since deregulation. A clear picture emerging from our comparison is that besides new technology and a positive zeitgeist, *strong institutional entrepreneurs* within the sector are needed for deregulation to happen. Rather than being a process pushed purely from the policy sphere, the deregulation of the telecommunications and stock exchange monopolies showcases the importance of specific conditions and interest-group dynamics, coupled with strong

today. The system was designed by economist Ingemar Ståhl with inspiration from the Chicago School of Milton Friedman and Gary Becker, and introduced by the social democrat Olof Palme who called himself a "democratic socialist."

institutional entrepreneurs from the sector itself. While many of the necessary conditions for such changes were the same, institutional entrepreneurs were not present in the planning and building sector that remained highly regulated and partly monopolized. The actual opening of old monopolized markets still happens in the policy sphere, so this kind of interaction is necessary for a smooth transition, overcoming vested interests, to reforms in mature economies. Among these cases, power coupled with strong entrepreneurs driving the change from the corporate sphere were present in both the telecommunications and the finance sectors. We explore these cases in more detail below.

2 The Three Cases

In this section, we describe the three cases in accordance with different activities and structures affecting outcomes of renewal or conservation of regulatory frameworks. Given the general zeitgeist in the mid-1980s, the overhaul of the old policies and—in the two successful cases—the implementation of new policies for these markets meant a general deregulation and opening up. The explanations of the two successful cases build on data previously collected as part of a large collaborative project that has been digitized and structured in a relational database. The failed example of the planning and housing market builds on data from all the planning and building legal documents from 1874 to 2020. This data is to be used in a future dissertation (Eriksson, 2022).

2.1 The Case of Televerket Versus Comvik

In the 1980s, several enabling conditions for the deregulation of numerous sectors—including telecommunications and finance—were present (Eriksson et al., 2019; Geissinger et al., 2019). Formerly state-supported monopoly markets or otherwise highly regulated markets now began to legally open up for competition. New technology in the form of digitalization was transforming the sectors; strong and gritty institutional entrepreneurs within the sector were working hard on deregulation through proactive strategies and pressure toward key institutional actors; and a zeitgeist favoring market solutions accompanied a negative perspective on bureaucracy in general and toward Televerket's lack of customer service in particular. The key actors in this deregulation process were the incumbent government monopoly on telecommunications, Televerket, and the entrant, the private for-profit firm Comvik, which was part of the Kinnevik Group, a large and resourceful family enterprise.

The seeds of deregulation in telecommunications had already been planted in the 1970s. On one hand, this was due to new investments in mobile technology; on the

other, it was due to new pro-markets ideas. Such ideas gradually entered mainstream thought, not least through the 1974 and 1976 Nobel Prizes in Economic Sciences, awarded Friedrich Hayek and Milton Friedman, respectively. These two economists helped the neoliberal avantgarde of the 1970s find mainstream acceptance for its ideas during the 1980s (Offer & Söderberg, 2016; Westerberg, 2020). In the 1970s, the future head of the Kinnevik group, Jan Stenbäck, was working in the United States and inspired by neoliberal ideas. One of Kinnevik's enterprises was the telecommunications company Comvik, which despite a de facto monopoly over telecommunications by Televerket, had been given permission to deliver telephone services to private companies in the 1950s. The company was then named Företagstelefon. In the early 1980s, Comvik launched its first automatic net for mobile telephony 3 months before Televerket launched its own. This led to the first of three battles between Comvik and Televerket regarding equal rights to compete on the market for mobile telephone communication. This subsequently resulted in the opening up of the Swedish telecommunications market.

Battle 1: Automatic Versus Manual Switches Televerket had a de facto monopoly over the telecommunications market. The launching of Företagstelefon in the 1950s had been an exception to monopoly policy. At that time, Företagstelefon (later Comvik) was given permission to use the kind of manual switches that were available at the time. In the 1980s, Televerket claimed that Comvik could only use the manual switches of the 1950s since the deal had been about using those switches. Comvik, which wanted to use the new and more effective automatic switches that Televerket also used, claimed this was a way of ostracizing Comvik from a market Televerket wanted for itself. Comvik solved the problem temporarily by using an automatic switch but with a person manually pushing a button every time a switch was to be made. Televerket, however, was not happy with this solution and claimed Comvik should use purely manual switches or it would be stripped of permission to use the telephone net. Comvik now began a proactive institutional campaign at many levels of society—including politicians, state officials, and media—to lobby for its right to use automatic switches. Articles were written in media; letters were sent to politicians and officials, and a request to resolve the case through court was also made. In late 1981, after an intense and proactive nonmarket activity at many levels, the government granted Comvik permission to use automatic switches. Televerket had been relatively inactive in terms of nonmarket activity during the battle, mostly evolving in defensive activity toward Comvik's proactive attacks.

Battle 2: More Frequencies In the mid-1980s, Comvik requested more frequencies in the public telephone net to expand its service. At the time, it had 36 frequencies and wanted 60. The request was sent to Televerket since it was the official market regulator. However, Televerket, which itself had 180 frequencies, considered itself biased and thus delegated the decision to the government. Televerket did, however, recommend that the government not give Comvik more frequencies since it claimed the public net would not be able to handle more frequencies. Comvik disagreed and claimed that Televerket's advice to the government was just another way of restricting Comvik's ability to compete in the telecommunications market.

After another round of Comvik initiating nonmarket activity toward key institutional actors at all levels of society including media, politicians, public officials, academics, and the legal profession, it was granted 14 more frequencies in 1987 and hence ended up with 50 frequencies in total. Televerket remained passive and defensive in its nonmarket activity because it was content with the status quo and therefore did not have as much incentive as Comvik to be proactive, or even present, in this debate.

Battle 3: AIX-Switches In the early 1990s, Comvik wanted to buy the new advanced AIX switches from Televerket's long-time collaborator Ericsson. Ericsson was a pioneer in telecommunications technology and had closely collaborated with Televerket since the early twentieth century. Since Ericsson was a private company operating on the market, Comvik was surprised that it denied its request to buy AIX switches and immediately suspected Televerket of pressuring Ericsson not to sell to its competitor Comvik. Again, intense and proactive nonmarket activity at all levels of society was initiated by Comvik, eventually leading to a court decision that obligated Ericsson to sell its product to Comvik.

In 1993, shortly after the third battle between Televerket and Comvik, the telecommunications monopoly was dismantled. Televerket was transformed from a monopoly and state agency into a state enterprise, with the new name Telia, operating in competition with private actors on an open telecommunications market. Even though many factors contributed to this result, it is likely that Comvik's successful nonmarket activity over the course of these three battles contributed to the abolishment of the monopoly.

2.2 Overcoming Vested Interests in Finance: Optionsmäklarna and the Stockholm Stock Exchange

Financial exchanges provide an example of an industry in which vested interests have blocked progress on a large scale. Despite evidence piling up in favor of fully digitalizing the exchanges, not least from within the brokerage firms already active on the exchanges in the late 1960s (Wells, 2000), years passed between the emergence of the first digital trading system and the full digitalization of the New York Stock Exchange (Gorham & Singh, 2009). Surprisingly, it was in Sweden and the Nordic context that change first came to financial exchanges and then spread across the world. This was the case in terms of both technological adoptions leading to the removal of the trading floors, and the emergence of the for-profit organizational form as the primary way of organizing such operations (Cheung et al., 2021). For both the technological and organizational *innovations* to happen, the regulation that gave the Stockholm Stock Exchange a monopoly needed to be overturned, despite strong interest groups and political forces being in favor of the status quo. A key player in this process was the entrant-born-digital-options-exchange Optionsmäklarna (OM), which began operations in 1985.

Aspect 1, Despite a Regulated Monopoly: The Emergence of an Entrant Options Exchange OM could only be created due to a contingency in the regulatory process leading to the Stock Exchange law of 1980, which regulated the incumbent Stockholm Stock Exchange. As it came to pass, the law not only gave the Stockholm Stock Exchange a monopoly on equity trading, but it also created a list of financial instruments that could be traded at the exchange. Stock options were not included on this list, which meant that with help from the head lawyer of the Wallenberg group, OM was able to launch in 1985 (Blomé, 1990).

The entrepreneur responsible for creating OM, Olof Stenhammar, was initially driven by the business opportunity and was certain that an options market was necessary in Sweden. As he continued to work with the idea, however, circumstances forced him and his company into a position in which their business activity was supplemented by a rich array of proactive nonmarket activities (Ernkvist, 2015). Stenhammar had a background as an options trader in the United States and would gather information about how regulation worked at the Chicago Board Options Exchange (CBOE) and then influence the regulators with this information to gain the first option to act. He would also garner support for his venture—both financial and political—from one of the main Swedish industrial groups, run by the Wallenberg family.

Following these initial activities, OM would be the main agent to influence the inquiry into the Swedish financial markets that subsequently led to the opening of the financial exchanges market. Its successful business model and technological solutions played an important role in the passing of this regulation. In terms of the organization of the market, technological change, and the lack of activity from the incumbent Stockholm Stock Exchange were also important factors.

Aspect 2, A Lack of Response From the Incumbent Stock Exchange As with the telecommunications industry, the monopolist played an integral role in facilitating the policy changes. This was the case in both technological development and efforts to deregulate the financial markets. Testimonies from interviews with members from the board and management highlighted how the organization went through a big change as a new CEO was appointed in 1985. With a background of working with politicians and business leaders alike as the old CEO of SNS, a research-based organization with the goal of facilitating discussion between Swedish industry and politicians, Bengt Rydén moved the exchange away from being old *gentlemen's club* to being a more modern organization striving for efficiency for its members and with core goal of creating benefit for society. While part of the stock exchange organization was strongly against reforming financial exchange regulation and allowing new entrants, Bengt Rydén did not have a clear position on the issue. This was partly due to his background as an economist and view of the financial markets as a societal good but also because the Stock Exchange board would not give him the mandate to interfere in the regulatory process. This in turn was because the board was split over whether or not it would act in favor of OM as a separate organization from the Stock Exchange. As this split manifested in an inconclusive inquiry into how the options

market should be organized, the hands of the CEO were tied until the new regulation was put in place.

As the new regulation was decided, the former monopoly needed to decide what its role in a free market would be. Following long internal discussions involving the board and management of the stock exchange, the result—as the new regulation came into effect on January 1, 1993—was that the Stockholm Stock Exchange became the first for-profit, publicly traded national exchange in the world. The technological developments and market structure of both OM and the Stockholm Stock Exchange became integral to the subsequent emergence of the internationally successful Swedish fintech sector.

2.3 The Case of the Municipal Planning Monopoly

The Swedish Planning and Building Law, with its municipal planning monopoly, is another example of Sweden's relatively far-reaching—from a Western perspective—politicization, centralization, and monopolization during the welfare capitalism era. We argue that this sector went further than the other centralized sectors in Sweden during this era. There are several reasons for this long-lasting centralization, but the core goes back to the very identity of welfare capitalism in general and the social-democratic movement in particular. Sweden was a very poor and unequal society during the nineteenth century and early twentieth century. Stockholm was known as one of the dirtiest cities in Europe with small, damp, and unhygienic homes for most of its expanding working class and their families. Ten people living in one room was common. Tuberculosis, cholera, and alcoholism spread rapidly in these environments. From the early twentieth century, a gradual shift toward more public involvement in city-building and housing emerged with relatively strong consensus across the political spectrum. In 1907, the first municipal city planning monopoly was launched. It was very limited compared to today's far-reaching authority but with the gradual growth of the Social Democrat party, this planning monopoly expanded to almost every part of building activity and city development. Many of the central early Social Democrats had grown up in the slums of Stockholm and had a strong political drive to literally *build* a new society with centralized public means and authority standing above private property (Blücher, 2006). This drive was formulated in Social Democrat leader and later Prime Minister Per Albin Hansson's famous *Home of the people* speech in 1928.

– *On solemn and, incidentally, sometimes even on everyday occasions, we like to talk about society—the state, the municipality—as the common home for all of us, the people's home, the citizens' home. After the last great constitutional reform this reflection has perhaps been used more frequently than before, but even during the time of oligarchy it was used by those in power, especially when it came to imprinting on the masses the feeling of obligation to the public, the obligation to bear burdens and make sacrifices. (. . . .)*

– Per Albin Hansson, *Home of the People* speech; Swedish parliament January 18, 1928.

From 1932 to 1976—when the Social Democrats held near-uninterrupted government power—Hansson's vision was realized through large-scale government-initiated, governments-funded, and government-planned, urban and housing projects in coalition with selected material suppliers, building contractors, and building developers from the private sphere. Instead of renovating and modernizing the old historical housing districts of the city-center Klara neighborhood in Stockholm, large-scale demolition of the area was launched. These projects—which were grounded in the *home of the people* ideology and identity—had to be realized through a strong and centralized municipal planning and building monopoly. In 1947, this system was largely formed through the Planning and Building Law, the fundamental structure, aim, and scope of which is largely intact today.[3] Over the next three decades, private land and real estate were harshly regulated or expropriated to serve the purposes of large-scale city developments like the Norrmalm regulation,[4] and the Million program.[5] Twenty-four hectares of Stockholm's historical inner city was demolished and rebuilt according to modern architectural and city planning ideals. The city aimed to demolish 54 hectares but ran out of money before completion (Lundevall, 2021). Critics of the city transformation used to say that Sweden, which was not bombed during World War Two, *bombed itself* through this large-scale city demolition. The new modern city structure resulted in very harsh criticism and many of its city districts have been unpopular and characterized by social problems.

This large, activist municipal planning monopoly and state-funded housing and city development politics has resulted in a strong, centralized coalition between the public sector, selected private companies, including public-private cooperatives,[6] and special interest groups. Meyerson et al. (1990) called this coalition the *iron triangle*. These are large, powerful organizations that receive *rents* through this

[3] New versions of this law were launched in 1987 and 2010 but the fundamentals of the 1947 version remain.

[4] The Norrmalm regulation was an instance of public–private cooperation for modernization of the city center in Stockholm during the 1950s, 1960s, and 1970s. The larger part of the old city center stemming from the seventeenth, eighteenth, and nineteenth centuries in lower Norrmalm was demolished and replaced by modern and functionalistic architecture.

[5] The Million Program was a building project aiming to create one million new dwellings within a 10-year period, 1965–1974. The project was arranged as public–private cooperation and has been severely criticized for creating neighborhoods that most people do not what to live in. Swedish areas labeled socially troubled (high crime rate, unemployment, etc.) are dominated by areas built within the Million Program.

[6] Note the differences between the word "cooperative" and "cooperation." Cooperative is a company owned by the members including workers, CEOs and sometimes politicians. "Cooperation" is simply cooperation between actors—in this paper it mainly regards cooperation between private companies and government on certain projects.

centralized system and hence have an interest in its survival.[7] A relatively small number of large private companies, public–private cooperatives, and special interest groups have managed to become business partners with the public sector and thus take enormous market shares and avoid competition from other actors. This is probably a key reason why this monopoly sector was not deregulated during the liberalizing reforms of the 1980s. Despite technology and the political zeitgeist, there were no *powerful insiders* who engaged in corporate political activity to fundamentally transform the institutional settings of the sector from a centralized monopoly into a system of free competition. A small group aiming for deregulation—which Karlson (2018) calls the "central zone"—with members from different influential spheres in a society aiming for the same institutional change was lacking members from the sector itself. The favoring of the status quo by the iron triangle still dominates to the extent that reform is impossible. The planning and building sector in Sweden is an example of *public steering and private performing* policy that Mazzucato would embrace for innovation policy.

In the academic architectural and city planning discipline, ideas and policy proposals for deregulation and the abolishment of the monopoly have been made, although they are very rare, even in the academic literature. An exception is the so-called libertarian planning theory that proposes that state municipalities and real-estate owners develop plans within a judicial system framework and then have them approved or denied by an independent legal authority; hence an abolishment of the municipal monopoly (Strömgren, 2007). However, ideas like these have had little practical influence. New versions of the Planning and Building Law were launched in 1987 and 2010 which largely build on the same structure as the 1947 version,[8] even though problems of inertia, information, and corruption have been linked to this system. Problems that relate to the current planning system include:

- A housing shortage in 80% of Swedish municipalities.
- Incentives from municipalities to plan very small parts of land in order to retain its value.
- An average of 7 years from idea to practical building activity in Stockholm.
- Rent control (which is arguably a necessary evil during a housing shortage) creates welfare losses of 10 billion SEK (about US$ 1.2 billion) a year (Boverket, 2013).
- Public discontent with architecture has been palpable for more than half a century.

However, there are slow but significant signs of eventual change in the Planning and Building Law. Even though changes have been marginal since 1947, there has been a tendency to slowly diminish centralization in the sector. This is seen with the planning monopoly, through the power of *citizen involvement*, but also with its subsectors, like the diminished subsidies to housing and attempts to deregulate the

[7] *Rents* are undeserved profits.

[8] The Planning and Building Law (often abbreviated PBL) is the most fundamental law for regulating planning and building activity in Sweden.

first and secondhand market for rental apartments. These slow, step-by-step policy changes also characterized telecommunications and the stock exchange.

A way forward for deregulation could be if a large actor primarily active in other sectors wanted to engage in these issues and work toward deregulation and competition in the housing and real estate sector with a relatively small real-estate business that could afford to make losses over several years. Together with academics, politicians, and pro-market organizations, this actor could be a key figure in what Karlson (2018) calls the "central zone" of influential people changing an old and inefficient system. This was essentially what happened in the Televerket case.

3 Discussion

In this section, we will provide a general understanding and comparison of the three cases. We discuss the commonalities and look into what was lacking in the failed case; see the list of points in Table 1.

In this chapter, we have showcased some of the key characteristics of three cases in which change was imminent in Sweden in the late 1980s. While the technological changes, a general zeitgeist of the time, and the industrial dynamics in the respective cases were all highly complicated matters, we were able to distinguish key similarities in the successful cases that set them apart from the failed reform of the Swedish city planning monopoly. Theoretically, the centrality of powerful actors as key drivers of organizational and industrial change resonates with previous literature on institutional entrepreneurship that states that successful change is often dependent on such actors being able to leverage their sociopolitical environment, including both technologies and interest groups (Fligstein & McAdam, 2011).

In both the telecommunications and the financial exchange examples, entrant actors managed to change institutions and regulatory frameworks and launch immensely successful ventures. Historically speaking, these examples have been the anomaly rather than the rule. Perhaps what is more informative is the failed example of the city planning monopoly as a representation of all the other sectors in the Swedish economy where driven, skillful entrepreneurial change agents (Battilana et al., 2009; DiMaggio, 1988) with the financial backing of old industrial groups and capital were not present. In both successful cases, the factors that needed to be in place for the change agents to succeed can be likened to a perfect storm, with the key factor being their "political skill" (Fligstein, 2001) in evading concurrent regulatory conditions (Elert & Henrekson, 2016) through nonmarket strategies rather than only their ability to run a successful business (Hadani et al., 2017). Based on the cases, reducing the sheer amount of nonmarket strategies needed from actors who are supposed to be focused on creating value through entrepreneurial efforts is certainly something that should be a key focus of a successful innovation policy for mature economies.

In the 1980s, the Swedish economy went through a phase of increasing alignment with the British and American models of free-market capitalism at the expense of its

Table 1 Outline of the three processes

	Telecommunications	Financial exchanges	Planning monopoly
Process	Entrant mobile telecommunications provider challenging state monopoly.	Entrant options exchange challenging the stock exchange monopoly in a regulatory process.	None
Main driver	Digital technology, a positive zeitgeist, and a resourceful entrant that was part of old industrial corporation/group Kinnevik. (Institutional-) entrepreneur Jan Stenbäck challenging old policies where possible.	Digital technology, a positive zeitgeist, and a resourceful entrant with the financial backing of the Wallenberg family and industrial group. (Institutional-) entrepreneur Olof Stenhammar and OM challenging old policies in regulatory process.	Digital technology, a positive zeitgeist, but no resourceful entrant or incumbent in the sector willing to engage in institutional entrepreneurship.
Main resistance	Entrenched monopolist that was also a government agency with political interests represented in the board.	*De jure* and de facto monopolist with political interests represented in the board.	Municipalities, incumbent private actors (including cooperatives), and special interest groups.
Main forum	Entrant Comviq challenging the incumbent through *non-market activities and institutional entrepreneurship.*	Entrant OM challenging the old regulation by influencing the *policy process.*	None.
Incumbent position	Rhetoric in favor of more competition, but trying to hinder Comvik in practice.	Passive in the regulatory process. Due to diverse interests in the board, partly in favor of removing its own monopoly.	Keeping the municipal planning monopoly and only marginally reforming the PBL.
Outcome	Privatization of monopoly; opening up of the market.	Privatization of monopoly; opening up of the market.	Municipal planning monopoly still intact and PBL changing marginally since 1947.

traditional Nordic capitalism (Sjögren, 2008). In both successful cases, the background of the entrepreneurs allowed them to create a strong connection between this general liberal zeitgeist and their particular business models, something which affected the respective policy processes. It was the translations of these ideas that came to affect how the new market conditions would be outlined and pave the way for the privatization of the (then former) state monopolies in both industries. Common in these two cases was also the support garnered from resourceful actors within the sector, which helped in both the market and the nonmarket arenas. At the same time, free-market ideas had begun to take hold in both incumbent monopolies, leading to a passivity in terms of corporate political activities, but also a gradual adaption by the organizations in order to survive in a potentially deregulated market. In terms of positive impact for the industries as a whole, this gradual adaption and

lack of resistance toward subsequent reforms were very important. Perhaps most illuminating of this fact was how the background of the CEO of the stock exchange helped him realign the incumbent monopoly as a hybrid organization talking to both the political sphere and the *common good of society* as well as its actual stakeholders trading at the exchange.

In both the telecommunications and the financial sectors, these actors were present and very proactive in changing the institutional system toward more free competition. Together with new technology and a favorable political zeitgeist during the 1980s and 1990s, a few resourceful actors played a key role in making the deregulation of these monopolies happen. In the planning and building sector, both technology and the zeitgeist had the potential to abolish the municipal planning monopoly. However, the lack of resourceful actors within the sectors made the change impossible. Nevertheless, many small steps were taken toward a more competitive environment in terms of both policy and industrial renewal and adoption. This highlights the fact that for iterative incumbent change to result in an overhaul of policies within a field, resourceful entrants such as those existing in the two successful cases can help spur change. Fundamentally, the change of a centralized, politized, and ineffective monopoly sector is possible.

Our examples show the power of vested interest in *public-steering, private-performing* sectors, and how private entrepreneurs can change these sectors to a system that does not involve public steering. Policy changes correlate with innovation and market expansion in these sectors (telecommunications and finance). However, in the sector where the status quo of public steering, private performing prevailed, namely the city planning and development sector, vested interests are still a dominating force and malinvestment, housing shortages, corruption, and inertia are still legion. Successful innovations are relatively rare in this sector. Through these examples, we want to emphasize that the flaws in Mazzucato's analysis—for instance, biased examples and the confusion of correlation and causation—are common. When Mazzucato uses the Apollo project as an example, she should also show the *public-steering, private-performing* project that had a destructive public (and private) utility. There are many more examples than those emphasized in this paper. Examples that had destructive outcomes include the Manhattan Project and the public support of eugenics. This discussion is important because the possibility of private innovation is one of the few areas in which the West can compete with China, since China has more public-steering/private-performing policies. A private innovation sector free of political and public steering is worth defending for economic reasons, but maybe even more so for the sake of human freedom and ethics.

4 Conclusion

In this chapter, we have provided three cases that partly counteract Mazzucato's claim that public-steering and private-performing policy are advantageous for the creation of successful innovation and solving future societal challenges. Even

though the system of public steering and private performing has created valuable innovation, the opposite is also common. Furthermore, there is a correlation between de-monopolization and innovation in the cases of telecommunications and finance; as well as a correlation between malinvestment, stagnation, and inertia in the planning and building sector, which has long been characterized by the public-steering and private-performing system that Mazzucato embraces.

We have also shown how processes of deregulation and de-monopolization have taken place in telecommunications and finance and what has distinguished these processes from the status quo of the planning and building sector. Our conclusion is that strong actors from within the sector are often needed for deregulation and de-monopolization. In the cases we selected, this led to positive outcomes for innovation within the sectors and thus for the economy as a whole. In telecommunications and finance, the policy has gone from public steering and private performing, in line with the Mazzucato ideal, to a relatively free market structure in which the public sets up the rules of the game but does not generally steer innovation or business operations on the whole. In contrast, in a sector in which public steering and private performing have prevailed, associated problems include malinvestment, destructive and costly projects that create social and economic problems, as well as inertia in the process.

In a summary, this chapter showcases something missing in Mazzucato's analysis; namely the dubious drivers of and sometimes destructive consequences of the public-steering and private-performing framework. We argue that recognizing this is an important part of the policy discussion on the future role of the state in entrepreneurial activities, as this will have consequences for important economic, environmental, and political issues.

Acknowledgments This chapter could not have been made without the collective effort from the members of the digihist consortium (https://blogs.aalto.fi/digihist/). Robert Demir, Rikard Westerberg, Lukas Ma, and John-Erik Bergkvist also gave excellent feedback on the manuscript at different stages of development. The second author would also like to thank the Marianne and Marcus Wallenberg Foundation for a generous grant that made part of this research possible.

References

Alvarez, S. A., Young, S. L., & Woolley, J. L. (2015). Opportunities and institutions: A co-creation story of the king crab industry. *Journal of Business Venturing, 30*(1), 95–112. https://doi.org/10.1016/j.jbusvent.2014.07.011

Battilana, J., Leca, B., & Boxenbaum, E. (2009). How actors change institutions: Towards a theory of institutional entrepreneurship. *Academy of Management Annals, 3*, 65–107. https://doi.org/10.1080/19416520903053598

Blomé, G. (1990). *Tala om timing- : historien om OM*. SNS.

Blücher, G. (2006). 1900-talet - det kommunala planmonopolets århundrade. In G. Blücher & G. Graninger (Eds.), *Planering med nya förutsättningar : ny lagstiftning, nya värderingar 2006* (pp. 133–155). Stiftelsen Vadstena forum för samhällsbyggande.

Boverket. (2013). *Bostadsbristen och hyressättningssystemet: ett kunskapsunderlag: marknadsrapport*. Boverket.
Cheung, Z., Gustafsson, R., & Nykvist, R. (2021). Peer interaction and pioneering organizational form adoption: A tale of the first two for-profit stock exchanges. *Organization Studies*. https://doi.org/10.1177/01708406211024570
DiMaggio, P. (1988). Interest and agency in institutional theory. In L. G. Zucker (Ed.), *Institutional patterns and organizations: Culture and environment* (pp. 3–21). Ballinger Publishing.
Elert, N., & Henrekson, M. (2016). Evasive entrepreneurship. *Small Business Economics, 47*(1), 95–113. https://doi.org/10.1007/s11187-016-9725-x
Eriksson, K. (2022) *How the City has been Owned – Markets, property rights, and entrepreneurship in Stockholm, Sweden 1726–2020.* Forthcoming dissertation. Stockholms University, 2022.
Eriksson, K., Ernkvist, M., Lauren, C., Moodysson, J., Nykvist, R., & Sandstrom, C. (2019). A revised perspective on innovation policy for renewal of mature economies – Historical evidence from finance and telecommunications in Sweden 1980–1990. *Technological Forecasting and Social Change, 147*, 152–162. https://doi.org/10.1016/j.techfore.2019.07.001
Ernkvist, M. (2015). The double knot of technology and business-model innovation in the era of ferment of digital exchanges: The case of OM, a pioneer in electronic options exchanges. *Technological Forecasting and Social Change, 99*, 285–299. https://doi.org/10.1016/j.techfore.2015.02.001
Fligstein, N. (2001). Social skill and the theory of fields. *Sociological Theory, 19*(2), 105–125. https://doi.org/10.1111/0735-2751.00132
Fligstein, N., & McAdam, D. (2011). Toward a general theory of strategic action fields. *Sociological Theory, 29*(1), 1–26. https://doi.org/10.1111/j.1467-9558.2010.01385.x
Garud, R., Gehman, J., & Tharchen, T. (2018). Performativity as ongoing journeys: Implications for strategy, entrepreneurship, and innovation. *Long Range Planning, 51*(3), 500–509. https://doi.org/10.1016/j.lrp.2017.02.003
Geissinger, A., Laurell, C., Sandstrom, C., Eriksson, K., & Nykvist, R. (2019). Digital entrepreneurship and field conditions for institutional change: Investigating the enabling role of cities. *Technological Forecasting and Social Change, 146*, 877–886. https://doi.org/10.1016/j.techfore.2018.06.019
Gorham, M., & Singh, N. (2009). *Electronic exchanges: The global transformation from pits to bits*. Elsevier.
Hadani, M., Bonardi, J. P., & Dahan, N. M. (2017). Corporate political activity, public policy uncertainty, and firm outcomes: A meta-analysis. *Strategic Organization, 15*(3), 338–366. https://doi.org/10.1177/1476127016651001
Hansson, P. A. (1928). *Folkhemmet ('The People's home')* [Speech at the lower chamber of Swedish parliament, January 18, 1928].
Hayek, F. A. (1945). The use of knowledge in society. *The American Economic Review, 35*(4), 519–530.
Hayek, F.A. (1978). *The constitution of liberty* (New ed.). University of Chicago Press.
Karlson, N. (2018). *Statecraft and liberal reform in advanced democracies*. Palgrave Macmillan.
Lindbeck, A. (2012). *Ekonomi är att välja: memoarer*. Bonnier.
Lundevall, P. (2021). *Att bygga en stad: Stockholm under 800 år*. Carlsson bokförlag.
Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press.
Mazzucato, M. (2020 [2018]). *The value of everything: Making and taking in the global economy*. (First trade paperback edition.) New York: Public Affairs, an imprint of Perseus Books a subsidiary of Hachette Book Group.
Mazzucato, M. (2021). *Mission economy: a moonshot guide to changing capitalism*. Allen Lane, an imprint of Penguin Books.
Meyerson, P.-M., Wickman, K., & Ståhl, I. (1990). *Makten över bostaden*. SNS.
Mokyr, J. (1998). The political economy of technological change. In M. Berg & K. Bruland (Eds.), *Technological revolutions in Europe* (pp. 39–64). Edward Elgar.

Offer, A., & Söderberg, G. (2016). *The Nobel factor: The prize in economics, social democracy, and the market turn*. Princeton University Press. Retrieved from https://EconPapers.repec.org/RePEc:pup:pbooks:10841

Sjögren, H. (2008). Welfare capitalism: The Swedish economy. In S. Fellman, M. J. Iversen, H. Sjögren, & L. Thue (Eds.), *Creating Nordic capitalism: The Business history of a competitive periphery* (pp. 1850–2005). Palgrave Macmillan.

Stigler, G. J. (1942). The extent and bases of monopoly. *The American Economic Review, 32*(2), 1–22.

Strömgren, A. (2007). *Samordning, hyfs och reda: stabilitet och förändring i svensk planpolitik 1945-2005* [Doctoral Dissertation, Acta Universitatis Upsaliensis; Uppsala universitetsbibliotek]. Uppsala. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-7817

Wells, W. (2000). Certificates and computers: The remaking of Wall Street, 1967 to 1971. *Business History Review, 74*(2), 193–235. https://doi.org/10.2307/3116692

Westerberg, R. (2020). *Socialists at the gate: Swedish Business and the Defense of Free Enterprise, 1940–1985* [Doctoral dissertation, Stockholm School of Economics]. Retrieved from https://www.hhs.se/contentassets/4950d58f3f4742639b331d2c96a3588b/sse-phd-diss_2020_rikard-westerberg.pdf

The Digital Platform Economy and the Entrepreneurial State: A European Dilemma

Zoltan J. Acs

Abstract The application of big data, new algorithms, and cloud computing is creating a digital platform economy (DPE) built around platform organizations and their platform-based ecosystem. We use the DPE Index to examine Europe's digital efficiency across countries and explain its global position by analyzing Brexit and the electric vehicle industry. We argue that the United Kingdom left the European Union because E.U. regulations were holding back the U.K.'s strong DPE and that a *weak* DPE is holding German back from being a leader in the electric vehicle industry. The problem for Europe's DPE is that the entrepreneurial state is strong and the private sector is weak.

Keywords Brexit · Entrepreneurship · Ecosystem · Governance · Multisided platforms · Platform economy · Competition · Users

1 Introduction

Hobijn and Jovanovic (2001) argued that the arrival of the information-technology revolution (ITR) in the 1970s created the need for new firms to emerge.[1] The technology breakthrough favored new firms for three reasons: awareness and skill; vintage capital; and vested interests. The stock market incumbents were not ready to implement the new technologies and it took new firms to bring the new technology to market. New capital flowed via venture capital to startups in the United States and Asia that built the new industries; but not in Europe (Gompers & Lerner, 2001).[2] Between 1980 and 2020, the U.S. stock market grew 30-fold. The five most valuable

[1] See also Greenwood and Jovanovic (1999).

[2] See Acs and Audretsch (1987, 1988, 1990), Audretsch (1991, 1995), Acs et al. (1992, 1994, 2002), Audretsch and Feldman (1995), and Anselin et al. (1997).

Z. J. Acs (✉)
George Mason University, Fairfax, VA, USA
e-mail: zacs@gmu.edu

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_17

companies in the United States in 2021—Apple, Amazon, Microsoft, Facebook, and Google—are valued at or near $2 trillion each (Berne, 2020; Yardeni & Abbott, 2021).

Two new *political economy* frameworks emerged in the 1990s to explain how the evolution of the ITR undermined Europe's approach to startups. The first was the *National Systems of Innovation* (Edquist & Johnson, 1997; Lundvall, 1992; Nelson, 1993) framework. Its main theoretical underpinnings were (1) that knowledge is a fundamental resource in the economy; and (2) that knowledge is produced and accumulated through an interactive and cumulative process of innovation that is embedded in a national institutional context. *National Systems* assumed this all took place in existing firms, so there was no need for new firms or entrepreneurship to bring the technology to market.

The second conceptual framework was the *Porter Diamond Theory of National Advantage* that identified an interactive system that propelled a country to prominence (Porter, 1990). The four facets of the Porter Diamond represented four interrelated determinates: firm strategy, structure, and rivalry; demand conditions; related and supporting industries; and factor conditions. Porter emphasized *factor conditions* because a country can create these for itself. They included but were not limited to knowledge, a large pool of talent, technological innovation, infrastructure, and capital, all embedded in regional clusters.[3]

The Theory of National Advantage and National Systems of Innovation had three assumptions in common: (1) they agreed that knowledge was a fundamental resource in the economy; (2) they agreed that knowledge is produced through an interactive process that is institutionally embedded; (3) they relied on existing firms to implement the new technologies! Both approaches had large theoretical literatures, empirical research, and policy recommendations. However, because they both excluded the role of new firms in their analysis—which was Jovanovic's great insight—their usefulness for understanding the new information technologies was limited because incumbent firms did not implement the new technologies (Jovanovic, 1982, 2001, 2019; Evans & Jovanovic, 1989).

The National Systems perspective was not without a role for entrepreneurs; the problem is rather that it contained everything and hence, it lacked explanatory or predictive value. In a corporatist environment, such a non-theory that contains all actors is bound to drift toward supporting the corporatist approach, with public private partnerships and large R&D programs to support industry. To overcome this lack of focus, Acs et al. "introduced a novel concept of National Systems of Entrepreneurship and provided an approach to characterizing them. National Systems of Entrepreneurship are fundamentally resource allocation systems that are driven by individual-level opportunity pursuit, through the erection of new ventures, with this activity and its outcomes regulated by country-specific institutional characteristics."

[3] These approaches were both underpinned by endogenous growth theory (Romer, 1990).

The entrepreneurship literature also missed the importance of entrepreneurs in bringing information technologies to market via new firms, as suggested by Hobijn and Jovanovic (2001), and by Joseph Schumpeter almost a century earlier (Lundstrom & Harirchi, 2018). To the extent that the entrepreneurship literature did study new firms, it focused on *self-employment,* both in terms of business ownership and sole traders. This was partly a result of industrial restructuring and the rise of unemployment (Parker, 2004). Job creation became the immediate focus of entrepreneurship research, especially in Europe (Birch, 1981).[4]

Sussan and Acs (2017) recognized this shortcoming and argued that a significant gap existed in the conceptualization of entrepreneurship in the digital age, precisely because it ignored the fundamental role of knowledge as a resource in the economy. To address this gap, Sussan and Acs proposed the Digital Entrepreneurial Ecosystem (DEE) framework, integrating two separate but related literatures on ecosystems: the digital ecosystem and the entrepreneurial ecosystem. This new framework situates digital entrepreneurship in the broader context of users, agents, infrastructure, and organizations, such that two biotic entities (users and agents) actuate individual agency, and two abiotic components (digital infrastructure and digital organizations) form the external environment.[5] Sussan and Acs integrated the DEE framework into the digital marketplace, including but not limited to e-government, e-transportation, e-education, e-commerce, and e-social networking-based businesses.[6]

Acs et al. (2021a, b) further develop the concept of the digital entrepreneurial ecosystem by introducing the global digital platform economy and measuring the firms that populate it (Kenney & Zysman, 2016). First, using a unique database of over five decades of surviving firms (Audretsch, 1991), they tested the Hobijn and Jovanovic (2001) thesis that the 1970s incumbents were unable to harness new technologies and that the entry of new firms was needed to create the DPE. Second, they developed a conceptual framework for the DPE that integrates (1) the platform-based organization; (2) their platform-based ecosystem; and (3) the digital technology infrastructure (Sussan & Acs, 2017; Song, 2019).[7] Applying the DPE framework to the global economy, Acs et al. (2021a, b) identified and measured platform economy firms that have publicly available data. They estimated that the global DPE consists of billions of supply-side and demand-side users, millions of app developers, thousands of digital infrastructure firms, and hundreds of multisided platform firms.[8]

This chapter examines the European Union's platform economy dilemma by using the new DPE Index to focus on Brexit and the electric car industry (Acs

[4] An exception to this was the Knowledge Spillover Theory of Entrepreneurship (Acs et al., 2009).

[5] Nambisan et al. (2019) approached the subject from the digital transformation side and discussed how it has transformed entrepreneurship and innovation.

[6] Malecki (2018) emphasized the regional aspect of entrepreneurial ecosystems and Cavallo et al. (2019) focused on present debates and future directions.

[7] See Nambisan (2017), Nambisan et al. (2018), and Sahut et al. (2021).

[8] For a comparison across countries.

et al., 2021a, b). The European lag in *platformisation* (the penetration of digital platforms into different economic sectors) stems from the facts that incumbent firms in Europe have not introduced new technologies in sufficient volume and startups have remained small and not scalable (Naudé, 2016). While most of the world has focused on a balanced approach to the digital revolution with the state playing a constructive role to promote the private sector, the European Union and Japan have chosen an unbalanced approach vis-à-vis public policy. Mazzucato (2013) suggests that U.S. success resulted not from entrepreneurship (a private initiative), but rather from the actions of the entrepreneurial state (a public effort). In her view, it is the state that drives entrepreneurship and not the solo entrepreneur or entrepreneurial team. No one would deny that state spending on R&D is important, always has been, and continues to be so. However, the state as entrepreneur is a necessary but not sufficient condition for economic growth (Acs et al., 2018; Lafuente et al., 2021). The European platform deficiency stems from a strong *entrepreneurial* state and a weak private sector. This precisely contradicts the Mazzucato argument.

The rest of this chapter is as follows: Section two outlines the evolution of managerial capitalism as it has existed from the twentieth century to the digital age in the twenty-first century. Section three presents the analysis of the DPE Index, and section four discusses why new firms are needed in light of the information technology revolution. The conclusion reports a strong correlation between the depth of the digital entrepreneurial ecosystem and economic development.

2 Background

What public policies promote economic growth? The question is as old as economics itself. An early answer was given by Adam Smith: Economic growth occurs when larger markets lead to higher income because of task specialization, leading to greater skills and proficiency of the workforce in each line of economic activity. Globalization promotes trade and specialization (Sachs, 2020). This invites us to examine a different question: What is the role of entrepreneurship in economic development in the twenty-first century?

Before the great recession in 2008, the U.S. economy had enjoyed remarkable economic success over several decades, as measured by the rate of productivity growth, which determines the long-term rate of advance in average living standards. After surging at an annual 2.6% rate from 1950 to 1973, productivity growth dropped to 1.4% from 1973 to 1995. Although the 1.2 percentage-point decline may seem trivial, compounded over time, it had enormous consequences. At the former rate, living standards would double every 28 years; at the latter rate, this doubling would take almost twice as long, or over 50 years. After 1995, the trend reversed again. What accounts for this reversal? Conventional economic wisdom has converged on the view that the "information technology revolution"—especially the rapidly falling prices of computer chips and the products in which they are

embedded—has been key. As measured by conventional statistics, there seems to be a lot of truth in this (Oliner & Sichel, 2002).

But a deeper change in the structure of the American economy itself—a decades-long transition from managerial to entrepreneurial capitalism—also seems to have played an important role in the acceleration of productivity growth. This transition was perhaps first articulated by Acs (1984), in saying that new markets, new technology, and entrepreneurship were at the heart of a transition from managerial to entrepreneurial capitalism. The full flowering of this process has recently been retold by David Audretsch (2007) and Carl Schramm (2006). Acs, Audretsch, and Schramm all push back against the notion of a managed economy.

Both Audretsch and Schramm describe the managed economy of the 1950s in detail, carefully documenting the interaction between labor, big business, and government. In a remarkable way, both Audretsch and Schramm come to similar conclusions about the nature of the new American society. However, they do not see its future in the same way. Audretsch believes that the rest of the world learned from the American model, thereby threatening its own comparative advantage. He notes (2007, p. 192),

> America had in ten years transformed itself from a self-doubting society to one of self-celebration. America had it, and the rest of the world did not. . . Having spent considerable time in Europe and Asia observing recent efforts to create their versions of an entrepreneurial society, I wondered, 'What will the United States do when the rest of the world catches up?'

Carl Schramm has an answer for Audretsch: Far from fearing an entrepreneurial transformation around the globe, the future of the American experiment actually depends on the rest of the world emulating it!

> For the United States to continue its global leadership, it must help the world see clearly the breadth and depth of our economic evolution. . . It is in America's interest to see our system replicated all over the world. We must believe that in flourishing entrepreneurial economies the widening distribution of wealth and the creation of new jobs will naturally help lead to the spread of democracy. . . *It is imperative that we—everyone everywhere—go into this entrepreneurial future together.* (Schramm, 2006, p. 176, emphasis added)

Entrepreneurial capitalism differs from managerial capitalism in several respects:

- Firm structure is more dynamic. Following World War Two, the U.S. economy was dominated by large firms, often in oligopolies (industries characterized by only a few firms). Turnover among the largest firms in the economy was limited; new firms played a minor role. In the last several decades, this has changed dramatically. New firms offering new products and services—in information technology, biotechnology, retailing, and foreign entrants in the traditional industries (e.g., car-making and steel)—have been a main, if not *the* main, drivers of economic growth.
- Markets and ecosystems are replacing bureaucracies (inside and outside the private sector). A hallmark of entrepreneurial firms is that they have relatively flat management structures that can rapidly change direction in response to market demands, in contrast to large firms, where management is hierarchal, more bureaucratic, and decision-making takes longer. In the managerial

economy, there was an implicit compact between "big labor, big business and big government" (Galbraith, 1952). That compact, if it ever existed, is clearly now gone. Labor's share of the workforce has fallen dramatically, big business is in flux (with constant changes in the rankings of America's leading firms), and government at all sectors is increasingly contracted out to the private sector.

- *Multisided markets* are replacing many traditional markets in the economy. Multisided markets or platforms are companies that help different groups of users find each other. Multisided platforms create value by reducing transaction costs and making markets more efficient. They also raise several *sorts of issues in antitrust, competition, and regulation.*
- Innovation is very different in managerial and entrepreneurial settings. New firms, led by risk-taking entrepreneurs, are disproportionately responsible for *radical* or *breakthrough* technologies, although larger, managerial firms are typically needed to refine, mass-produce, and market these breakthroughs. The innovations that now characterize contemporary life—the automobile, the telephone, the airplane, air conditioning, the personal computer, most computer software, and search engines for the internet—were all developed and commercialized by entrepreneurs. Because radical innovations tend to lead to faster overall growth than incremental improvements, it is no coincidence that the IT revolution—which has accounted statistically for the significant acceleration in U.S. productivity growth over the last decade—was largely sparked by entrepreneurial companies.
- Along with innovation, there was the revolution in information and communications technologies. The digital revolution began in the 1950s with the invention of the transistor and the microprocessor in the 1970s helped shape and transform the way much of the world works.

Over the years, the United States has developed laws and institutions that, for the most part, effectively encourage entrepreneurship. These laws and institutions include a legal system that protects rights of contract and property (including intellectual property); state and local registration systems that make it easy to start a business; a tax system that has generally moved to lower marginal tax rates (thus enhancing rewards from both employment and entrepreneurial activity); and laws to facilitate the growth of a financial system that generally backs the formation and growth of new ventures (Schramm, 2004).

Two different but related questions are important: What should entrepreneurship policy look like? and What does policy look like in an entrepreneurial economy?

For much of the managerial economy's existence, governments supported the small and medium sector of the economy. However, this was largely to promote democracy, not efficiency. In other words, SME policy was less about productivity growth and more about political pluralism (Ács & Audretsch, 2002).

During the 1990s, a string of initiatives focused attention on individuals instead of firms. The first careful treatment of the distinction between SME policy and entrepreneurship policy was by Lundstrom and Stevenson (2005). However, this all misses an essential point: There is *no such thing* as entrepreneurship policy per se,

only policy in an entrepreneurial economy. This overarching view was the subject of a Kauffman Foundation policy paper, *Roadmap for an Entrepreneurial Economy* (Kauffman, 2006), which included one key question: "How can policies makers maintain, and ideally accelerate, the continuing transition toward a more entrepreneurial economy?"

The world is now undergoing a global transformation. The evidence seems to support Hobijn and Jovanovic's (2001) conjecture that new firms were needed to introduce at least certain new technologies. Of the 167 publicly traded companies that make up the DPE, 86% were startups. Whereas during the 1970s, a mix of old and new firms introduced microprocessors, the key breakthroughs came from Intel and AMD, which were both started in 1968. By the 1980s, the computer industry was dominated again by old and new firms, but the gap had narrowed. During the 1990s, with the introduction of the internet and search engines, almost all the firms were startups. While the United States and Asia followed the Jovanovic model of relying on a mix of old and new firms, Europe rejected the importance of new firms and focused on knowledge-creation and existing firms. By looking to evidence of the platform economy, it is possible to better understand this evolution internationally and historically (Acs et al., 2021a, b).

3 The Platform Economy[9]

Song (2019) further refined the DEE framework and expanded it to multisided platforms. The concept of multisided platforms includes innovation platforms, transaction platforms, and hybrid platforms. Multisided platforms function as a digital marketplace, lowering five economic costs—search costs, replication costs, transportation costs, tracking costs, verification costs (Goldfarb & Tucker, 2019). Expanding the DEE framework from digital markets to platforms brings platform strategy to life and makes the connection between the platform organization's ecosystem and its value creation. The new configuration consists of: (1) Digital User Citizenship (DUC), which includes users on the demand-side *and* the supply-side; (2) Digital Technology Entrepreneurship (DTE), which includes app developers and various agents that contribute to entrepreneurial innovation, experimentation, and value creation on platforms; (3) Digital Multisided Platforms (DMP), which orchestrate social and economic activities between users and agents; and (4) Digital Infrastructure Governance (DIG), which pertains to all the regulations that govern the technical, social, and economic activities of digital infrastructure.[10]

The DPE Index lets us examine several key aspects of the platform economy in an integrated framework (Acs et al., 2021a, b). First and foremost, this means the new

[9]This section draws heavily on the Digital Platform Economy Index (Acs et al. 2021a, b).

[10]Nambisan (2017), Nambisan et al. (2018), and Sahut et al. (2021).

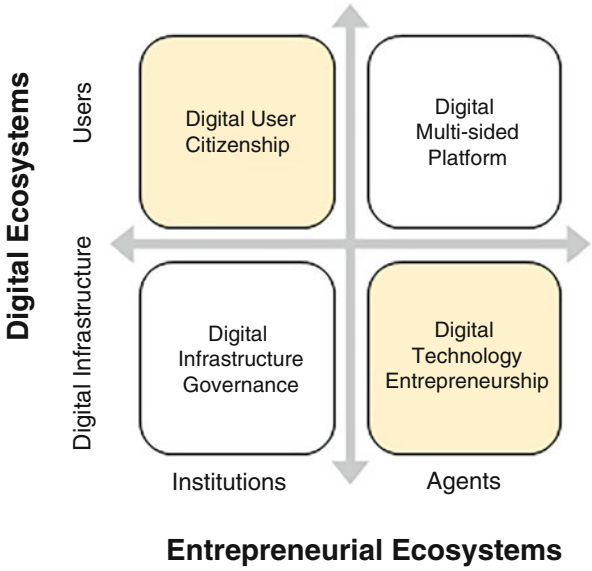

Fig. 1 The digital entrepreneurial ecosystem. Sections shaded in yellow are the two biotic entities, namely, digital users and agents

organizational form of the platform organization. The platform organization pulls together two sets of agents to create value. First, entrepreneurs innovate to build the technological core of platform companies. This is where the costs are. Second, users on both the demand and supply side form the other side of platform companies, where the money is. A thin layer represents the organizational and strategic part of the platform. The framework allows us to understand how both sets of agents are important and needed to create value in the platform economy.

The second aspect of the framework is infrastructure governance, without which the platforms could not operate. Digital infrastructure governance represents the technology of the digital age, along with the rules and regulations that govern its use through the nation-state. This technological infrastructure is crucial to the smooth working of the platform economy. It is also necessary for users and entrepreneurs to connect to platforms to be able to create the technological core of the platform. At its most basic level, it is the nation-state that is responsible for the smooth functioning of the platform economy.

Finally, the DPE framework allows us to examine the performance of economies and to compare why some countries do better than others and what policies can be used to improve platform performance. The DPE Index examines the interconnection of the four sub-indices of the platform economy through 12 pillars.

The two shaded areas in Fig. 1 represent the digital entrepreneurial ecosystem. Digital User Citizenship consists broadly of consumers (the demand side) and producers (the supply side) that are proficient in platform usage. Digital users connect to each other for economic and social activities through the internet and mobile devices on various digital platforms. The diffusion rates of these technologies attest to their utility and to users' willingness to adopt them. Online participation thus

requires a certain level of digital trust (e.g., user privacy) and digital proficiency (e.g., writing code, writing a movie review, rating a restaurant). Users should abide by the civic norms of the digital space and be discouraged from cybercrime (Terranova, 2000).

Digital technology entrepreneurs are third-party agents that partake in experimentation, innovation, and value creation and use hardware and software to build products that connect to innovation platforms, such as the Internet of Things (IoT). This reconfiguration combines technological entrepreneurship and digital entrepreneurship (Giones & Brem, 2017). The answer to the policy question in the previous section on accelerating the transition to a more entrepreneurial society is in part found in Lafuente et al. (2021). The authors employ a 'benefit of the doubt' approach to evaluate the entrepreneurial ecosystem. By examining the relative efficiency of countries' entrepreneurial ecosystem, the proposed analysis allows the computation of endogenous country specific weights that can be used for developing more informed policymaking. By analyzing the variation in economic and entrepreneurship outcomes over the seven-year period they found a significant correlation between quality improvements in the entrepreneurial ecosystem and venture capital investments.

3.1 Europe vs the World

The DPE Index allows us to examine European Entrepreneurial Ecosystem. Four conclusions can be drawn from Table 1, relating to the digital entrepreneurial ecosystem. First, the United States, the United Kingdom, and the Netherlands are virtually tied for first place. Second, Europe—especially its large countries, Germany, France, Italy, and Spain—is clearly in second place as a follower, not a leader. The Scandinavian countries, Sweden, Norway, Denmark, and Finland, as well as Switzerland, are stronger than the larger European countries. https://www.netzoekonom.de/plattform-oekonomie/ However, they are small in terms of population and output. Third, Asia is not really stronger than the European countries of Germany, France, Spain and Italy, which, however, lag behind the leaders. Fourth, China and India lag way behind the rest of Asia and Europe. Even if we account for measurement issues in large countries, the rankings are very helpful at the country level. The rest of the world tracks alongside other major indicators, including but not limited to the Global Entrepreneurship Index, the Ease of Doing Business, the Index of Economic Freedom, and the Human Development Index.[11]

Although the DPE score is useful to evaluate the digital entrepreneurship ecosystem of a country in comparison with other countries, this explains nothing about the strengths and weaknesses of any given country, for which the DPE Index must be

[11] The Ease of Doing Business has been discontinued by the World Bank. https://www.worldbank.org/en/news/statement/2021/09/16/world-bank-group-to-discontinue-doing-business-report

Table 1 DPE ranking of the countries, 2019

Rank	Country	DPE 2020	GDP 2017	Rank	Country	DPE 2020	GDP 2017	Rank	Country	DPE 2020	GDP 2017
1	United States	84.8	53445	40	Chile	38.4	22707	79	Ecuador	21.3	10424
2	United Kingdom	82.4	39255	41	Hungary	38.3	25664	80	Tunisia	21.0	10752
3	Netherlands	82.2	47270	42	Uruguay	36.2	20047	81	Albania	20.5	11359
4	Canada	78.2	43114	43	Greece	35.9	24224	82	Vietnam	20.3	5838
5	Sweden	76.6	46568	44	Bulgaria	35.0	17795	83	Jamaica	19.7	8180
6	Switzerland	76.1	57428	45	Croatia	34.7	21528	84	Iran	19.5	18498
7	Norway	74.1	64140	46	Costa Rica	34.3	15401	85	Egypt	19.5	10319
8	Denmark	71.1	45991	47	Romania	32.9	21615	86	Botswana	19.4	15723
9	Australia	69.3	44261	48	Russia	32.6	24417	87	Dominican Republic	19.4	14099
10	Finland	68.9	39522	49	Turkey	32.2	23756	88	Sri Lanka	18.2	11639
11	Ireland	66.0	63301	50	Mauritius	31.9	19567	89	Lebanon	17.6	13268
12	Luxembourg	65.5	94921	51	Brazil	31.2	14024	90	Namibia	17.5	9852
13	New Zealand	65.1	35268	52	Argentina	30.3	18489	91	Kenya	17.4	2926
14	Germany	64.3	44357	53	Mexico	29.4	16832	92	Mongolia	17.3	11361
15	France	63.5	38061	54	Ukraine	29.2	7668	93	El Salvador	16.4	7990
16	Iceland	62.6	45116	55	Saudi Arabia	29.2	50458	94	Paraguay	15.6	8871
17	Belgium	62.5	42095	56	Oman	28.7	40139	95	Guatemala	14.7	7367
18	Estonia	59.9	28110	57	Montenegro	28.4	15737	96	Senegal	14.3	2379
19	Hong Kong	58.4	54354	58	China	28.1	14399	97	Pakistan	14.0	4855
20	Austria	57.0	44439	59	Colombia	28.0	13124	98	Honduras	13.7	4392
21	Japan	56.8	38252	60	Panama	27.9	21335	99	Nigeria	13.7	5435
22	Korea	56.3	34986	61	Bahrain	27.6	43926	100	Zambia	13.4	3647
23	Israel	56.1	32688	62	Serbia	27.5	13721	101	Algeria	12.5	13921
24	Singapore	55.6	81443	63	Thailand	27.2	15683	102	Rwanda	11.9	1774

25	Spain	53.3	33320	64	Georgia	26.4	9277	103	Nepal	11.6	2298
26	Malta	53.2	35705	65	South Africa	26.4	12237	104	Kyrgyzstan	11.5	3294
27	Portugal	50.7	27103	66	Jordan	25.1	8390	105	Bangladesh	11.2	3319
28	Czech Republic	48.9	31339	67	Armenia	25.0	8190	106	Uganda	11.0	1687
29	Taiwan	47.0	49901	68	Macedonia	24.5	13055	107	Cameroon	10.8	3347
30	Italy	46.1	34700	69	Philippines	24.4	7236	108	Mali	10.2	1971
31	Slovenia	45.0	29930	70	Moldova	24.3	4944	109	Zimbabwe	10.0	1880
32	Lithuania	44.3	27944	71	Morocco	24.3	7286	110	Cambodia	9.8	3465
33	Cyprus	44.3	31331	72	Azerbaijan	23.9	16001	111	Tanzania	9.8	2584
34	United Arab Emirates	43.0	67133	73	India	23.8	6093	112	Malawi	9.6	1084
35	Latvia	42.8	23729	74	Peru	23.6	12072	113	Benin	9.5	2010
36	Malaysia	42.0	25669	75	Kazakhstan	23.5	23447	114	Madagascar	7.2	1397
37	Qatar	40.6	118207	76	Indonesia	23.2	10765	115	Burundi	6.8	721
38	Poland	40.5	26036	77	Kuwait	21.7	68862	116	Ethiopia	6.0	1608
39	Slovakia	40.4	29212	78	Bosnia and Herzegovina	21.5	11327				

DPE Index score, European Union countries are denoted by a light blue color; the per capita GDP of the country is in purchasing power parity. Source: the World Bank (2017)

Source: Acs, Z. J., Szerb, L., Song, A., Komlosi, E., Lafuente, E. (2021b). *The Digital Platform Economy Index: 2020,* The GEDI Institute, www.thegedi.org

broken down into its components. As seen in Table 2, the United Kingdom, the United States, and the Netherlands are strong in all four areas: governance, citizenship, platforms, and entrepreneurship. It is also clear that the large European countries are in a secondary position in all four areas. For example, Germany (in 14th position overall) ranks 23rd in platforms, behind France in 16th. Spain ranks 25th in three out of four areas and Italy is not even listed in the top 25 overall, occupying 30th position.

Table 2 also highlights that the United States leads in the digital multisided platform (DMSP) and digital technology entrepreneurship (DTE) sub-indices, but ranks third in digital user citizenship (DUC) and in digital infrastructure governance (DIG). The best sub-index score for the United States is 92.2 (DTE) and its worst is 79.0 (DUC). The United Kingdom's performance is also well-balanced, ranging from 1st (DUC, 83.5) to 4th (DIG, 80.1). Some countries show even higher variations. For example, Australia, ranked ninth overall, is fourth in DUC (77.3) but only 18th in DTE (56.9).

3.2 European Countries

Examining the global results initially helps to isolate the position of E.U. member countries. These results then show that the United Kingdom outperforms most other countries in the world. In fact, it is on par with the United States in terms of institutions, agents, digital infrastructure, and users. Large E.U. countries—Germany, France, Spain, and Italy—lag significantly behind. The argument of this chapter is that one benefit of the United Kingdom leaving the European Union is that the Union was probably holding it back through regulation. London is the world's leading center of knowledge-creation, human capital, financial capital, and entrepreneurial talent.

As Fig. 2 highlights, there is a close connection between per-capita GDP and DPE scores: The Pearson correlation coefficient is 0.66, without the oil-rich countries, and countries with higher than Int$65,000 per capita GDP. The third-degree trend line shows even closer connection, as pictured in Fig. 2.

The third-degree adjusted curve in Fig. 2 explains around 90% of the variation between per capita GDP and DPE. Examining a particular country's position, whether below or above the development-implied trend line, is more appropriate than simply comparing countries at different stages of development. For example, the United States has the highest DPE score, 84.8, and is above the trend line, as are the United Kingdom and the Netherlands. Germany, France, Spain, and Italy all have lower DPE scores and are on or below the trend line. Eastern European countries have much lower scores still.

Table 2 The four sub-index scores and ranking of the first 25 countries

DPE ranking	Country	Digital infrastructure governance score	Digital infrastructure governance ranking	Digital user citizenship score	Digital user citizenship ranking	Digital multi-sided platform score	Digital multi-sided platform ranking	Digital technology entrepreneurship score	Digital technology entrepreneurship ranking	Digital entrepreneurship ecosystem index	Ranking
1	United States	80.7	3	79.0	3	87.4	1	92.2	1	84.8	1
2	United Kingdom	80.1	4	83.5	1	84.8	3	81.3	3	82.4	2
3	Netherlands	89.5	1	74.3	7	86.3	2	78.6	4	82.2	3
4	Canada	75.4	8	81.3	2	78.8	5	77.1	5	78.2	4
5	Sweden	78.3	5	74.2	8	79.5	4	74.3	6	76.6	5
6	Switzerland	75.5	7	74.6	6	69.3	9	84.8	2	76.1	6
7	Norway	84.4	2	75.0	5	73.5	6	63.7	12	74.1	7
8	Denmark	78.2	6	68.4	11	73.3	7	64.3	11	71.1	8
9	Australia	73.7	9	77.3	4	69.2	10	56.9	18	69.3	9
10	Finland	71.5	11	70.9	9	67.1	11	66.0	8	68.9	10
11	Ireland	66.0	15	63.2	17	65.3	14	69.5	7	66.0	11
12	Luxembourg	73.6	10	65.5	14	60.3	17	62.9	14	65.5	12
13	New Zealand	69.4	13	66.0	13	70.3	8	54.9	23	65.1	13
14	Germany	67.6	14	70.3	10	56.3	23	63.1	13	64.3	14
15	France	63.5	18	64.9	15	60.3	16	65.3	9	63.5	15
16	Iceland	70.7	12	48.7	28	65.6	13	65.3	10	62.6	16
17	Belgium	65.8	16	59.8	18	64.9	15	59.5	17	62.5	17
18	Estonia	63.1	19	64.0	16	57.4	22	55.1	21	59.9	18
19	Hong Kong	62.0	20	56.1	20	58.7	20	56.9	19	58.4	19
20	Austria	63.7	17	57.6	19	50.0	28	56.6	20	57.0	20
21	Japan	61.0	21	68.2	12	44.2	34	53.7	24	56.8	21
22	Korea	57.9	22	54.6	22	59.5	18	53.2	26	56.3	22
23	Israel	48.2	31	48.5	29	66.9	12	60.9	16	56.1	23
24	Singapore	55.1	24	47.7	30	58.5	21	61.2	15	55.6	24
25	Spain	54.0	25	53.1	23	52.5	25	53.7	25	53.3	25

(continued)

Table 2 (continued)

DPE ranking	Country	Digital infrastructure governance score	Digital infrastructure governance ranking	Digital user citizenship score	Digital user citizenship ranking	Digital multi-sided platform score	Digital multi-sided platform ranking	Digital technology entrepreneurship score	Digital technology entrepreneurship ranking	Digital entrepreneurship ecosystem index	Ranking
26	Malta	55.3	23	43.3	34	59.3	19	55.1	22	53.2	26
27	Portugal	51.0	27	50.6	26	50.5	27	50.7	27	50.7	27
28	Czech Republic	51.6	26	54.9	21	45.8	32	43.1	31	48.9	28
29	Taiwan	49.0	30	51.3	25	54.0	24	33.6	48	47.0	29
30	Italy	40.7	41	50.3	27	46.1	31	47.3	28	46.1	30
31	Slovenia	49.2	29	45.8	31	42.7	37	42.3	32	45.0	31
32	Lithuania	47.1	32	45.5	32	46.2	30	38.3	35	44.3	32
33	Cyprus	50.1	28	37.1	39	43.5	36	46.3	29	44.3	33
34	United Arab Emirates	43.1	35	33.3	48	50.5	26	45.2	30	43.0	34
35	Latvia	46.7	33	41.9	36	44.6	33	38.0	36	42.8	35
36	Malaysia	42.0	38	41.5	37	44.0	35	40.5	33	42.0	36
37	Qatar	42.3	37	36.4	40	46.8	29	37.0	38	40.6	37
38	Poland	42.4	36	42.3	35	40.6	39	36.6	41	40.5	38
39	Slovakia	43.5	34	44.0	33	38.8	40	35.3	43	40.4	39
40	Chile	36.7	44	38.7	38	41.3	38	36.8	39	38.4	40
41	Hungary	41.8	39	35.9	42	38.0	41	37.8	37	38.3	41
42	Uruguay	29.8	56	51.9	24	32.4	48	30.7	55	36.2	42
43	Greece	37.7	42	35.4	44	31.7	50	38.8	34	35.9	43
44	Bulgaria	36.8	43	33.6	46	34.8	45	34.8	46	35.0	44
45	Croatia	41.4	40	34.7	45	33.9	46	29.0	62	34.7	45
46	Costa Rica	35.3	47	36.0	41	30.7	53	35.0	45	34.3	46
47	Romania	35.4	46	35.7	43	29.8	56	30.7	56	32.9	47
48	Russia	24.8	69	31.3	53	37.9	42	36.3	42	32.6	48
49	Turkey	33.2	50	27.5	59	35.4	44	32.7	49	32.2	49

50	Mauritius	35.9	45	33.4	47	28.5	61	29.6	60	31.9	50
51	Brazil	29.5	58	27.9	57	36.4	43	31.2	53	31.2	51
52	Argentina	31.8	51	33.1	49	28.4	62	28.0	65	30.3	52
53	Mexico	31.5	52	31.5	52	26.3	65	28.1	64	29.4	53
54	Ukraine	23.1	72	26.9	62	30.3	54	36.6	40	29.2	54
55	Saudi Arabia	28.1	63	22.8	73	30.9	52	35.1	44	29.2	55
56	Oman	33.3	49	31.8	51	29.2	58	20.5	81	28.7	56
57	Montenegro	28.6	60	26.6	63	26.7	64	31.8	50	28.4	57
58	China	19.2	83	28.4	55	29.9	55	34.8	47	28.1	58
59	Colombia	31.5	53	27.5	60	26.0	66	27.1	67	28.0	59
60	Panama	29.5	57	28.3	56	23.7	74	30.2	58	27.9	60
61	Bahrain	34.2	48	12.6	107	33.3	47	30.4	57	27.6	61
62	Serbia	27.7	64	28.7	54	28.8	60	24.7	71	27.5	62
63	Thailand	22.1	76	25.3	64	32.2	49	29.2	61	27.2	63
64	Georgia	26.2	67	32.2	50	25.2	70	22.2	75	26.4	64
65	South Africa	28.5	61	23.7	70	25.3	69	28.1	63	26.4	65
66	Jordan	22.7	73	22.5	75	23.7	73	31.5	52	25.1	66
67	Armenia	24.3	70	19.4	83	25.4	68	30.8	54	25.0	67
68	Macedonia	26.7	66	22.8	72	31.2	51	17.3	93	24.5	68
69	Philippines	22.5	74	22.8	74	24.8	71	27.3	66	24.4	69
70	Moldova	26.8	65	27.5	58	21.0	80	22.0	77	24.3	70
71	Morocco	30.0	55	21.8	78	25.6	67	19.9	84	24.3	71
72	Azerbaijan	25.3	68	27.1	61	17.1	89	26.1	68	23.9	72
73	India	19.8	80	23.1	71	20.8	81	31.7	51	23.8	73
74	Peru	24.3	71	24.5	65	20.4	82	25.3	70	23.6	74
75	Kazakhstan	28.2	62	24.3	67	20.2	83	21.4	78	23.5	75
76	Indonesia	18.6	84	19.9	81	24.7	72	29.6	59	23.2	76
77	Kuwait	19.6	81	13.9	100	27.8	63	25.6	69	21.7	77
78	Bosnia and Herzegovina	29.4	59	18.7	85	21.3	79	16.6	97	21.5	78
79	Ecuador	22.2	75	24.3	66	18.7	87	20.0	83	21.3	79
80	Tunisia	19.2	82	22.1	76	20.2	84	22.6	74	21.0	80

(continued)

Table 2 (continued)

DPE ranking	Country	Digital infrastructure governance score	Digital infrastructure governance ranking	Digital user citizenship score	Digital user citizenship ranking	Digital multi-sided platform score	Digital multi-sided platform ranking	Digital technology entrepreneurship score	Digital technology entrepreneurship ranking	Digital entrepreneurship ecosystem index	Ranking
81	Albania	21.3	78	20.2	80	21.5	78	19.1	87	20.5	81
82	Vietnam	12.3	91	18.0	86	29.8	57	21.2	79	20.3	82
83	Jamaica	18.2	85	20.7	79	22.4	76	17.5	91	19.7	83
84	Iran	10.6	97	16.5	91	28.8	59	22.1	76	19.5	84
85	Egypt	20.4	79	17.6	88	16.9	90	23.1	73	19.5	85
86	Botswana	21.6	77	21.9	77	15.8	93	18.4	90	19.4	86
87	Dominican Republic	30.9	54	14.6	98	16.1	92	16.0	99	19.4	87
88	Sri Lanka	9.1	100	16.7	90	23.3	75	23.7	72	18.2	88
89	Lebanon	5.6	111	24.1	68	20.1	85	20.8	80	17.6	89
90	Namibia	6.2	110	23.8	69	19.5	86	20.3	82	17.5	90
91	Kenya	16.0	86	17.5	89	16.6	91	19.8	86	17.4	91
92	Mongolia	7.5	104	19.9	82	21.9	77	19.9	85	17.3	92
93	El Salvador	15.5	87	16.1	94	17.4	88	16.8	95	16.4	93
94	Paraguay	15.0	88	17.7	87	13.3	96	16.4	98	15.6	94
95	Guatemala	10.7	96	16.4	92	15.0	94	16.7	96	14.7	95
96	Senegal	13.8	89	18.9	84	9.7	105	14.7	102	14.3	96
97	Pakistan	12.8	90	12.3	108	13.3	97	17.5	92	14.0	97
98	Honduras	10.8	95	15.0	96	13.9	95	15.2	101	13.7	98
99	Nigeria	11.6	93	12.6	106	12.0	98	18.5	89	13.7	99
100	Zambia	12.2	92	16.4	93	11.0	101	14.0	104	13.4	100
101	Algeria	11.1	94	12.9	104	10.3	104	15.6	100	12.5	101
102	Rwanda	7.3	105	13.5	102	7.6	111	19.0	88	11.9	102
103	Nepal	8.0	102	14.3	99	12.0	99	12.0	110	11.6	103
104	Kyrgyzstan	10.4	99	9.7	113	11.8	100	14.1	103	11.5	104
105	Bangladesh	10.4	98	9.6	114	10.9	102	13.8	106	11.2	105

106	Uganda	7.3	106	11.5	110	8.3	110	16.9	94	11.0	106
107	Cameroon	8.3	101	15.3	95	9.5	107	10.1	113	10.8	107
108	Mali	6.4	109	14.8	97	5.8	113	13.8	105	10.2	108
109	Zimbabwe	6.9	108	12.1	109	8.7	109	12.4	108	10.0	109
110	Cambodia	5.5	112	11.2	111	10.4	103	12.2	109	9.8	110
111	Tanzania	7.2	107	12.9	105	9.5	106	9.5	115	9.8	111
112	Malawi	8.0	103	13.7	101	5.1	115	11.8	111	9.6	112
113	Benin	5.0	114	13.2	103	9.5	108	10.5	112	9.5	113
114	Madagascar	4.4	115	5.1	116	6.4	112	12.9	107	7.2	114
115	Burundi	5.3	113	10.4	112	2.3	116	9.2	116	6.8	115
116	Ethiopia	0.7	116	8.3	115	5.4	114	9.5	114	6.0	116
										36.2	

Source: Acs, Z. J., Szerb, L., Song, A., Komlosi, E., Lafuente, E. (2021b). *The Digital Platform Economy Index: 2020,* The GEDI Institute, www.thegedi.org

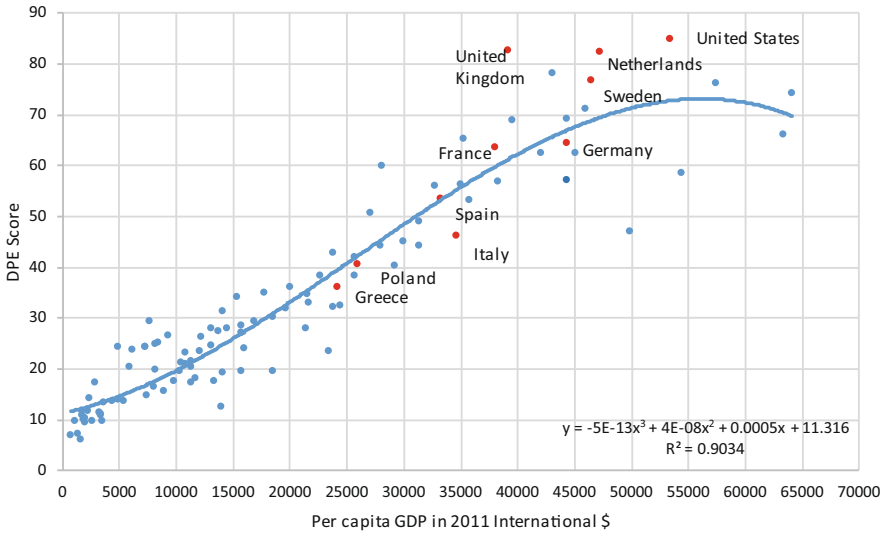

Fig. 2 The connection between the DPE Index and per capita GDP (development). Source: Acs, Z. J., Szerb, L., Song, A., Komlosi, E., Lafuente, E. (2021b). *The Digital Platform Economy Index: 2020,* The GEDI Institute, www.thegedi.org

3.3 The United Kingdom and Germany

The defining issue confronting the European Union for the past few years has been Brexit: The United Kingdom leaving the Union after 40 years. This is an issue of formation in the economy. Why the United Kingdom decided to leave the European Union has been studied extensively, with different scholars looking at immigration, a dysfunctional economy, regulation, the rule of law, and cultural differences. We can identify three major areas of concern: the economy, sovereignty, and culture.

The economic concern has been partly about the European Union as a dysfunctional economic entity. Innovation, entrepreneurship, trade, and employment policies have led to large disparities in Europe between the rich north and the much poorer south. Staying in the European Union would have pulled the United Kingdom down to the European level. The United Kingdom would not be able to realize its economic potential within a dysfunctional E.U. bureaucracy. According to Gramm and Toomey (2020), "Britain is leaving the European Union, which has trampled on British sovereignty, to escape its crippling regulatory structure."

The second issue was the rise of nationalism around the world and the distrust of international organizations to deal with global problems like security, trade, finance, inequality, and immigration. The sovereignty issue revolves around questions of whether a country should live under the rules of an international organization like the European Union, or national rules. With the European Union tightening its grip on all member states, the United Kingdom had limited freedom to enact its own laws and regulations.

Table 3 The four sub-indices of selected E.U. countries, the United Kingdom, and the United States

	Digital infrastructure governance	Digital user citizenship	Digital multisided platform	Digital technology entrepreneurship
France	63.5	64.9	60.3	65.3
Germany	67.6	70.3	**56.3**	**63.1**
Italy	40.7	50.3	**46.1**	**47.3**
Spain	54.0	53.1	52.5	53.7
United Kingdom	**80.1**	83.5	84.8	**81.3**
United States	**80.7**	79.0	87.4	**92.2**

Source: Acs, Z. J., Szerb, L., Song, A., Komlosi, E., Lafuente, E. (2021b). *The Digital Platform Economy Index: 2020,* The GEDI Institute, www.thegedi.org
Strengths and weaknesses in the EU are indicated in bold

The final issue is cultural and revolves around national identity and nationalism, which includes but is not limited to issues of immigration and religion, and their impact on cultural identity. Young people that voted against Brexit were influenced by cultural diversity and their lifestyle as full-time students. No relationship was found with education (Ehsan & Sloam, 2020).

The question remains: Why did Britain vote for Brexit? Looking at an individual level analysis Clarke et al. (2017) found that both the economic influence and immigration-terrorism cost-benefit factors played a very significant role in explaining the vote to leave. However, what has not been carefully researched is what aspect of economic influence was important? Was it innovation, technology, entrepreneurship, type of industry, or human capital? What the DPE shows is that the United Kingdom has a rather strong twenty-first-century digital entrepreneurial ecosystem but was stuck in a dysfunctional twentieth-century European Union bureaucracy. Looking at the scores of the DPE's four determinants, the United Kingdom is almost identical to the United States (Table 3). In other words, the four determinants are almost identical. Germany, Italy, and France lag far behind. If we look at the four determinants, the biggest differences are in agency. One interpretation of this is that the United Kingdom has a very strong DEE, which was tied into the rulemaking structure of the European Union, which is itself amended to a twentieth-century version of the twenty-first century. If the United Kingdom was to realize its economic potential, it had to extricate itself from the European Union. London is the home of the largest knowledge base in the world, hosting six of the top twenty universities in the world, the largest financial center in the world along with New York City, and an increasingly entrepreneurial hub populated by globalized human capital. Therefore, the formation of the U.-K. economy has now been freed to focus on the economy of the twenty-first century.

Germany is a different story. While the United Kingdom is a leader in digital entrepreneurship, Germany is a follower. This weaker position is holding Germany back from fully embracing a digital future. For Germany as the engine of Europe, the

lack of startups is a hindrance, especially in the area of information and digital technologies. The auto industry shows clearly that existing firms will not introduce new technologies, and the entry of Tesla into Berlin (the information capital of Europe) is a shot across the bow of the European auto empire.

The German auto industry dominates the world in many respects, from the mass market to the luxury market, and even the racing world. If we apply the Jovanovic analysis to the German auto industry, we can understand the likelihood of the industry implementing new technologies. The industry would focus on product improvement, which would give it cars that were, in a sense, over-engineered. Hobijn and Jovanovic (2001) suggested that new technologies will not be implemented by existing firms because of awareness and skill; vintage capital; and vested interests. The German auto industry fits this analysis like a glove. The industry is heavily invested in skills in the metal industry, engines transmissions, suspension, and steering, but there is a shortage of computer skills. Second, the huge investment in vintage capital prevents it from easily writing this investment off. Finally, the heavy investment in the governance of codetermination between labor business and government work councils makes meaningful restructuring almost impossible. This structure is reinforced by the top-down rules of the European Union.

Tesla's move to Berlin, arguably the digital capital of Europe, indicates that the future of the European auto industry may be with the startup and not the incumbent. Electric cars and self-driving vehicles are already here; they are just not necessarily evenly distributed. But the direction of change is clear and the only unknown is the rate of change. Once resource allocation decisions are redirected away from mechanical and diesel vehicles and toward electric vehicles that are cleaner and align with climate change priorities, the rate of change could accelerate very quickly (Monsellato, 2015).

A deeper analysis of Tesla's global growth provides greater insight into the specific advantages of the company's business model, and why entrepreneurs like Elon Musk choose to incorporate in the United States. It therefore shows what obstacles restrict German innovation and entrepreneurship. Tesla serves as an unprecedented case study because different government regulations have made entrance to the sector harder, since there are different standards in safety, emissions, and standards. Recent history has proved that besides Tesla Motors, no new player has entered the automotive industry in a significant manner in the last decades (Monsellato, 2015).

Indeed, Tesla has achieved what few previously thought possibly: turning profits on a premium-priced electronic vehicle (EV) with a developing supply chain that can potentially bring affordable and sustainable high-tech cars to the middle class. If successful, such a profitable and tech-driven business model would enable a domino effect in innovation among Musk's other companies, SpaceX and Solar City. Naturally, Tesla has utilized unconventional marketing to build its brand—a passion for transportation efficiency, high-tech adoption, and a sustainable footprint—and it has been noticed. Now, the Tesla Model S has earned numerous prizes like the Motor Trend Car of the Year 2013 and the World Green Car of the Year 2013 and

has chipped away at the market share of German luxury car makers (Monsellato, 2015). The great engineers at Tesla have fully embodied Schumpeterian entrepreneurship by identifying a need for EVs in the market, foreseeing the demand-desire and supply requirements, orchestrating a network of individuals with the knowledge and funds to create the new technology, and establishing strategic agreements with partners to scale commercialization and diversify output in the long run. Due to Tesla's high degree of vertical integration, location in Silicon Valley, status as the sole car maker in the western United States, and exceptional human capital—in addition to Musk's own credentials, he employs workers with backgrounds ranging from Ford to Cisco, Apple, Oracle, GM, and German car makers—the startup went from a niche concept shop to a global player with a successfully sustained stock price (Monsellato, 2015).[12]

4 Discussion

How do we interpret the evolution of the industrial structure and the rise of the digital platform economy? Political economy may have had a negative impact on economic policymaking regarding the ITR in the European Union. What do we mean by *political economy*? According to Brian Arthur (Root, 2020, p. xv),

> Economics before 1870 was concerned with two great problems. One was *allocation* within the economy: how quantities of goods and services and their prices are determined within and across markets or between trading countries. The other was *formation* within the economy: how an economy emerges and changes its structure over time. In the years since 1870, and the development of *neoclassical* economics. . . *allocation* came to constitute 'economic theory' itself.

Questions of formation thus faded from the central core of economic theory, and economics had little to say about adaption, adjustment, innovation, the formation of institutions, and structural change itself. The formation problem was not easily mathematized and was left to *political economists*, who restricted themselves to case studies and qualitative theories. This branch of economic theory was open to scholars from different persuasions, as the literature on National Systems of Innovation and Clusters, among others, demonstrates.[13]

How did the political economy approach gain a foothold in Europe? The short answer is that *neoclassical* economics never had a very strong footing in Europe. The longer answer lies in the Science Policy Research Unit (SPRU) at the University of Sussex. Here, some of the best minds in economics and innovation policy created a program with National Systems of Innovation and the role of the entrepreneurial state at its heart. This was built around the work of Richard Nelson and Sydney Winter in the 1980s on an evolutionary theory of economic growth. The theory

[12] I would like to thank Mathew Boyer for these insights into Tesla.

[13] See Root (2020).

assumed that innovation would take place in *existing firms*. At SPRU, a group of brilliant scholars including Richard Nelson, Christopher Freeman, Luc Soute, Giovani Dosi, Roy Rothwell, and David Rosenberg, among others, propagated a strong line of argument on the knowledge and firm question. There was no other group in Europe that had the intellectual firepower to counter this argument. Muzzucato, educated at the New School for Social Research in New York City, was a product of a European intellectual tradition that stressed the role of the state over the role of the individual. Systems thinking always put the system ahead of the individual.

Where among U.S. scholarly work do we find a larger emphasis on markets and entrepreneurship? The alternative set of arguments that developed in the United States came out of the old industrial organization literature and stressed the role of entry, startups, young firms, and new firms in bringing technology to market (Evans, 1989; Evans & Jovanovic, 1989). The literature on patents, technology, innovation, and productivity and the literature on finance—venture capital and angel investing—revolved around resource allocation. Here the key players were Michael Jensen, Eugene Fama, Josh Lerner, and Paul Gompers, among others. The ITR of the 1970s ushered in a wave of political, regulatory, and organizational change in the 1980s as countries around the world responded to the digital revolution (Jensen, 1993).

Why did the ITR favor new firms? The technology breakthroughs favored new firms for three reasons: awareness and skills; vintage capital; and vested interests (Hobijn & Jovanovic, 2001). First, managers of old firms may not have known what the new technologies offered or may have been unable to implement it. When IBM entered the PC market, it lacked the ability to quickly develop an operating system so it turned to Intel for its microprocessor and Microsoft for its operating system.

Second, the human and physical capital of old firms were tied to their current practices, so may not have easily converted to new technologies. Abandoning investment in old technologies may not have made sense. When the Berlin Wall fell, countries in Central Europe were reluctant to give up their vintage capital even in the face of far superior Western methods.[14] Unencumbered by the past, new firms had more incentive to invest in new technologies. When the biotechnology revolution took off in the 1970s, it was startups that introduced the new technologies. The human capital of existing pharmaceutical companies was in chemistry, while the biotechnology breakthroughs were in biology.

Third, workers and management in older firms, especially if they belonged to a union, may have resisted new technologies because they devalued their skills. In doing so, they may have harmed the interests of the firm and shareholders by reducing the firm's value. It appears this is exactly what happened in the European Union. The European Union protected traditional industries and hoped that existing firms would introduce new technologies. This was a policy designed to fail (Acs et al. 2021a, b).

[14] See Der Spiegel (2005).

As we have shown, the major theoretical underpinning of European economic policy postulated that *existing firms* would introduce the new technologies. How have these propositions influenced economic performance in the European Union as a whole and in the separate countries of the European Union? In one of the largest studies on the subject of Europe's entrepreneurial future (FIRES) Elert et al. (2019), p. 6) concluded the following:

> Overall, the data suggests that contemporary Europe has a comparatively less fertile 'ecosystem' for Schumpeterian/high-impact entrepreneurship than the USA, and in some respects even relative to China and East Asia. In Eastern Europe, much of the self-employment is marginal necessity-driven entrepreneurship, whereas in Western Europe the base of self-employment may be broad, but opportunities to grow into the global competitors of the future, in particular, seem limited.[15]

What has been the outcome of E.U. policy in limiting entrepreneurial activity over recent decades? It is immediately clear from Fig. 3 that the United States and China dominate the platform landscape. Based on the market value of top companies, the United States alone represents 66% of the world's platform economy with 41 of the top 100 companies. European platform-based companies play a marginal role, with only 3% of market value. Moreover, the distribution of the top 100 platform-based companies is uneven; the first 15 companies represent around 75% of the entire market value.

Of the 12 European platform-based companies, one is Norwegian, one Russian, two Dutch, two Swedish, three German, and three are in the United Kingdom. Just comparing platform-based ranking to the DPE Index ranking, the United Kingdom, the Netherlands, Sweden, and Norway are in the top ten, while Germany is 14th and Russia is 48th. It is immediately clear that a strong digital platform-based ecosystem alone is not enough to nurture multi-billion–dollar platform-based companies. Country size also seems to matter. The United Kingdom has now left the European Union, which has reduced the number of top platform-based companies in the European Union to nine, with only SAP among the top 15. Perhaps a more unified European Union will provide a more favorable environment for platform-based development.

5 Conclusion

In the hierarchical world of the twentieth century, giant firms and the state needed and relied on each other, especially after World War Two (Carter, 2020). The state needed corporations to create a growing and successful economy and corporations needed the state for market stability: labor markets, capital markets, financial markets, foreign exchange markets, and international markets. Both governments and corporations relied on hierarchical order. In this world, as Ferguson (2018)

[15] Also see Karlson et al. (2019).

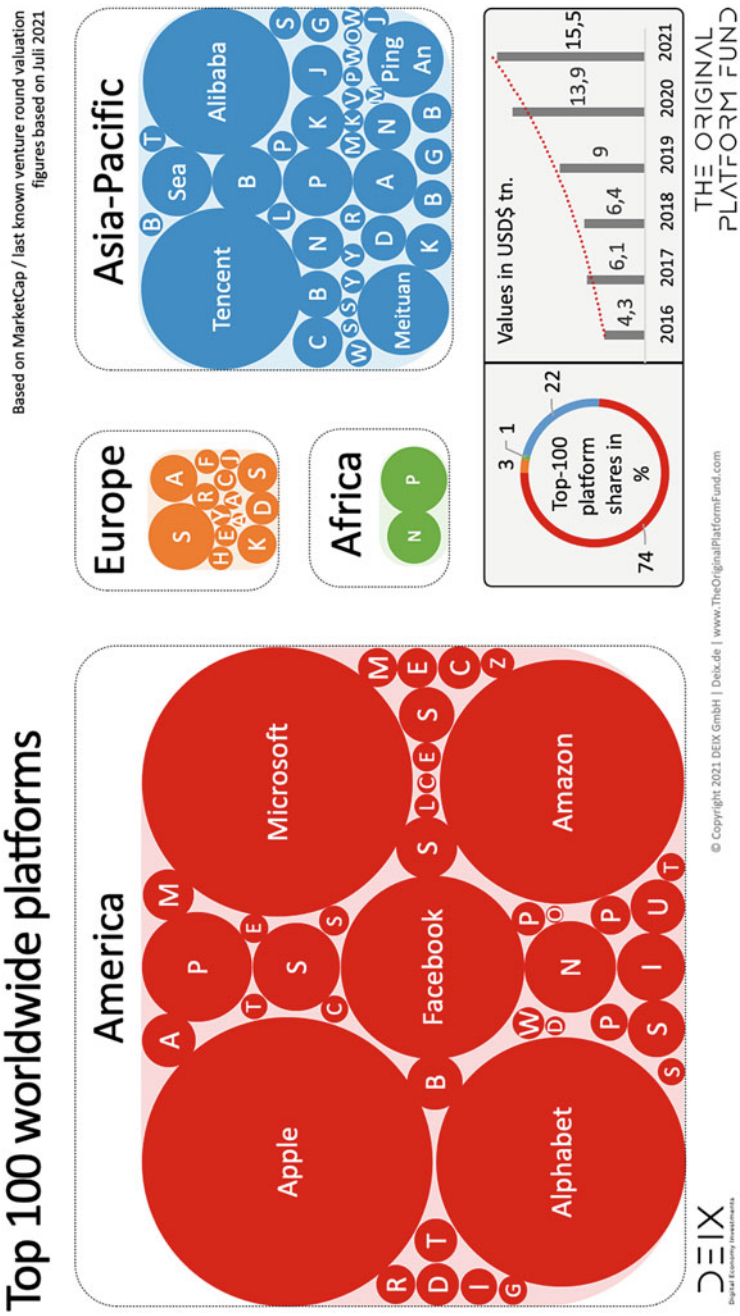

Fig. 3 The Top 100 Platform Companies around the World (July, 2021). Source: https://www.netzoekonom.de/plattform-oekonomie/Reprinted with permission

makes clear, "The tower represents hierarchy and the crucial incentive that favored hierarchical order was that it made the exercise of power more efficient." The symbiotic relationship between market and state is the greatest distinction between one government and another: the extent to which government replaces markets or markets replace government is not an *either–or*.

What has happened in the twenty-first century, according to Ferguson (2018) and others is that with the re-emergence of networks, the balance between state and market has shifted as hierarchy has been replaced with networks. The state has maintained its bureaucracy, but with little or nothing to manage, as networks are less concerned with power than hierarchies. This also explains why in the United States, the European Union, and China, the *political establishment* clings to power while society has mostly dismantled hierarchy in the private sector and the majority of the electorate is deeply alienated from the *political establishment*. The struggle is therefore now over liberty, with state and society in conflict over how to tame the despotic leviathan (Acemoglu & Robinson, 2019).[16]

In the digital age (Sachs, 2020) with the emergence of autonomous networks, the balance between state and market has shifted as networks have replaced hierarchies. The key research question for the twenty-first century concerns the governance structure of the digital age. This calls for the invention of more effective ways to govern an interdependent world. Future research should study the governance structure of the digital platform-based ecosystem with its billions of users and millions of entrepreneurs.

Acknowledgments This chapter grew out of a larger research project on systems of entrepreneurship and entrepreneurial ecosystems over the past decade at Imperial College and the London School of Economics. The project built on earlier work on National Systems of Entrepreneurship and The Global Entrepreneurship Index at the University of Pecs and George Mason University. The complete database and methodology are available from the authors upon request. I would like to thank Laszlo Szerb and two anonymous referees for helpful comments.

References

Acemoglu, D., & Robinson, J. A. (2019). *The narrow corridor: States, societies, and the fate of liberty*. Penguin UK.

Acs, Z. J. (1984). *The changing structure of the U. S. economy*. Praeger Publishers.

Acs, Z. J., & Audretsch, D. B. (1987). Innovation, market structure, & firm size. *Review of Economics & Statistics, 69*(4), 567.

Acs, Z. J., & Audretsch, D. B. (1988). Innovation in large & small firms: An empirical analysis. *American Economic Review, 78*(4), 678–690.

Ács, Z. J., & Audretsch, D. B. (1990). *Innovation and small firms*. MIT Press.

Ács, Z. J., & Audretsch, D. B. (2002). *Handbook of entrepreneurship research*. Kluwer Academic Publishers.

[16] https://www.washingtonpost.com/world/asia_pacific/china-crackdown-tech-celebrities-xi/2021/09/09/b4c2409c-0c66-11ec-a7c8-61bb7b3bf628_story.html

Acs, Z., Audretsch, D. B., & Feldman, M. (1992). Real effects of academic research: comment. *American Economic Review, 82*(1), 363–367.
Acs, Z., Audretsch, D. B., & Feldman, M. (1994). R & D spillovers and recipient firm size. *Review of Economics and Statistics, 76*(2), 336–340.
Acs, Z. J., Anselin, L., & Varga, A. (2002). Patents and innovation counts as measures of regional production of new knowledge. *Research Policy, 31*(7), 1069–1085.
Acs, Z. J., Braunerhjelm, P., Audretsch, D. B., & Carlsson, B. (2009). The knowledge spillover theory of entrepreneurship. *Small Business Economics, 32*(1), 15–30.
Acs, Z. J., Estrin, S., Mickiewicz, T., & Szerb, L. (2018). Entrepreneurship, institutional economics & economic growth: An ecosystem systems perspective. *Small Business Economics, 51*(2), 501–514.
Acs, Z., Song, A., Szerb, L., Audretsch, D., & Komlosi, E. (2021a). The evolution of the digital platform economy: 1971–2021. *Small Business Economics, 57*(2), 1–31.
Acs, Z. J., Szerb, L., Song, A., Komlosi, E., & Lafuente, E. (2021b). *The Digital Platform Economy Index: 2020*. The GEDI Institute. Retrieved from www.thegedi.org
Anselin, L., Varga, A., & Acs, Z. (1997). Local geographic spillovers between university research & high technology innovations. *Journal of Urban Economics, 42*(3), 422–448.
Audretsch, D. B. (1991). New-firm survival and the technological regime. *Review of Economics and Statistics, 73*(3), 441–450.
Audretsch, D. B. (1995). Innovation, growth & survival. *International Journal of Industrial Organization, 13*(4), 441–457.
Audretsch, D. B. (2007). *The entrepreneurial society*. Oxford University Press.
Audretsch, D. B., & Feldman, M. (1995). R&D spillovers and the geography of innovation and production. *American Economic Review, 86*(3), 630–640.
Berne, P. (2020, January 16). Alphabet becomes the fourth trillion dollar company. *Android Central*. Retrieved from androidcentral.com/alphabet-becomes-fourth-trillion-dollar-company
Birch, D. L. (1981). Who creates jobs? *The Public Interest, 65*, 3–14.
Carter, Z. (2020). *The price of peace: Money, democracy, & the life of John Maynard Keynes*. Random House.
Cavallo, A., Ghezzi, A., & Balocco, R. (2019). Entrepreneurial ecosystem research: Present debates and future directions. *International Entrepreneurship & Management Journal, 15*, 1291–1321.
Clarke, H. D., Goodwin, M., & Whiteley, P. (2017). Why Britain voted for Brexit: An individual-level analysis of the 2016 referendum vote. *Parliamentary Affairs, 70*(3), 439–464.
Der Spiegel. (2005). Globalization: The new world. *7,* 74–77.
Edquist, C., & Johnson, B. (1997). Institutions & organizations in systems of innovation. In C. Edquist (Ed.), *Systems of innovation—Technologies, institutions & organizations* (pp. 41–63). Pinter Publishers.
Ehsan, R., & Sloam, J. (2020). Resources, values, identity: Young cosmopolitans and the referendum on British membership of the European Union. *Parliamentary Affairs, 73*(1), 46–65.
Elert, N., Henrekson, M., & Saunders, M. (2019). *The entrepreneurial society: A reform strategy for the European Union*. Springer.
Evans, D. S. (1989). Tests of alternative theories of firm growth. *Journal of Political Economy., 95*(4), 657–674.
Evans, D. S., & Jovanovic, B. (1989). An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy, 97*(4), 808–827.
Ferguson, M. A. (2018). Building theory in public relations: Interorganizational relationships as a public relations paradigm. *Journal of Public Relations Research, 30*(4), 164–178.
Galbraith, J. K. (1952). *American capitalism*. Houghton Mifflin Company.
Giones, F., & Brem, A. (2017). Digital technology entrepreneurship: A definition and research agenda. *Technology Innovation Management Review, 7*(5), 44–51.
Goldfarb, A., & Tucker, C. (2019). Digital economics. *Journal of Economic Literature, 57*(1), 3–43.

Gompers, P., & Lerner, J. (2001). The venture capital revolution. *Journal of Economic Perspectives, 15*(2), 145–168.
Gramm, P. & Toomey, P. (2020, May 6). A new standard for free trade. *The Wall Street Journal*, A15.
Greenwood, J., & Jovanovic, B. (1999). The information-technology revolution & the stock market. *American Economic Review, 89*(2), 116–122.
Hobijn, B., & Jovanovic, B. (2001). The information-technology revolution & the stock market: Evidence. *American Economic Review, 91*(5), 1203–1220.
Jensen, M. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance, 48*, 831–880.
Jovanovic, B. (1982). Selection & the evolution of industry. *Econometrica, 50*(3), 649–670.
Jovanovic, B. (2001). New technology & the small firm. *Small Business Economics, 16*(1), 53–56.
Jovanovic, B. (2019). The entrepreneurship premium. *Small Business Economics, 53*(3), 555–568.
Karlson, N., Sandström, C., & Wennberg, K. (2019). *Bureaucrats or markets in innovation policy*. Ratio Institute.
Kauffman Foundation. (2006). *Roadmap for an entrepreneurial economy*. Kaufman Foundation.
Kenney, M., & Zysman, J. (2016). The rise of the platform economy. *Issues in Science & Technology, 32*(3), 61–69.
Lafuente, E., Acs, Z. J. & Szerb, L. (2021). A composite indicator analysis for optimizing entrepreneurial ecosystems. *Research Policy*.
Lundstrom, H., & Harirchi, G. (2018). The social structure of entrepreneurship as a scientific field. *Research Policy, 47*, 650–662.
Lundstrom, A., & Stevenson, L. (2005). *Entrepreneurship policy*. Edward Elgar.
Lundvall, B.-Å. (1992). *National systems of innovations*. Pinter Publishers.
Malecki, E. J. (2018). Entrepreneurship & entrepreneurial ecosystems. *Geography Compass, 12*, e12359.
Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs private sector myths*. Anthem press.
Monsellato, A. (2015). *Tesla Motors: A business model innovation in the automobile industry*. Luiss Business School, University International, Sicily Italy.
Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory & Practice, 41*(6), 1029–1055.
Nambisan, S., Siegel, D., & Kenney, M. (2018). On open innovation, platforms, & entrepreneurship. *Strategic Entrepreneurship Journal, 12*(3), 354–368.
Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation & entrepreneurship: Progress, challenges & key themes. *Research Policy, 48*(8), 103773.
Naudé, W. (2016). *Is European entrepreneurship in crisis? IZA Working Paper, DP 9817*.
Nelson, R. R. (Ed.). (1993). *National innovation systems: A comparative analysis*. Oxford University Press.
Oliner, S., & Sichel, D. (2002). Information technology and productivity: Where are we now and where are we going? *Economic Review – Federal Reserve Bank of Atlanta, 87*(3), 15–44.
Parker, S. C. (2004). *The economics of self-employment & entrepreneurship*. Cambridge.
Porter, M. E. (1990). *The competitive advantage of nations*. Free Press.
Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy, 98*(5), Part 2), S71–S102.
Root, H. L. (2020). *Network origins of the global economy: East vs West in a complex system perspective*. Cambridge University Press.
Sachs, J. D. (2020). *The ages of globalization: Geography, technology & institutions*. Columbia University Press.
Sahut, J. M., Iandoli, L., & Teulon, F. (2021). The age of digital entrepreneurship. *Small Business Economics, 56*, 1159–1169.
Schramm, K. (2004). Building entrepreneurial economies. *Foreign Affairs, 83*(4), 104–115.
Schramm, K. (2006). *The entrepreneurial imperative*. Collins.

Song, A. K. (2019). The digital entrepreneurial ecosystem—A critique & reconfiguration. *Small Business Economics, 53*(3), 569–590.
Sussan, F., & Acs, Z. J. (2017). The digital entrepreneurial ecosystem. *Small Business Economics, 49*(1), 55–73.
Terranova, T. (2000). Free labor: Producing culture for the digital economy. *Social Text, 18*(2), 33–58.
World Bank. (2017). *GDP per Capita, PPP (constant 2017 international $)*. Retrieved from https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD
Yardeni, E., & Abbott, J. (2021). *Industry indicators: FANGs*. Yardeni Research Inc. Retrieved from https://www.yardeni.com/pub/yardenifangoverview.pdf

Collaborative Innovation Blocs and Mission-Oriented Innovation Policy: An Ecosystem Perspective

Niklas Elert and Magnus Henrekson

Abstract Among contemporary economists, Mariana Mazzucato stands out for her emphasis on the importance of innovation to solving pressing challenges and achieve a greater quality of life. However, the type of mission-oriented innovation policies she promotes usually rely on an overly mechanical view of innovation and economic growth. We employ an ecosystem perspective to demonstrate that innovative entrepreneurship takes place in a *collaborative innovation bloc* consisting of a myriad of nodes. Entrepreneurs, inventors, early- and later-stage financiers, key personnel, and customers are all actors whose skills and abilities are necessary to realize an entrepreneurial project. When mission-oriented policies play a large role in an industry's production or financing, connections between actors in the innovation bloc risk being severed, severely curtailing the scope for actors to play their requisite roles. Thus, there is a risk that such policies do more harm than good for innovation and economic growth.

Keywords Entrepreneurial ecosystems · Collaboration · Entrepreneurship policy · Institutions · Innovation policy

1 Introduction

Mariana Mazzucato stands out among contemporary economists for her emphasis on the importance of innovation to achieving prosperity and a greater quality of life. The relevance of this focus cannot be in doubt: innovations are estimated to account for more than nine-tenths of the increase in GDP per capita since 1870 (Baumol, 2010) and have been depicted as "the only way for the most developed countries to secure sustainable long-run productivity growth" (Bloom et al., 2019, p. 163).

N. Elert (✉) · M. Henrekson
Research Institute of Industrial Economics (IFN), Stockholm, Sweden
e-mail: niklas.elert@ifn.se; magnus.henrekson@ifn.se

K. Wennberg, C. Sandström (eds.), *Questioning the Entrepreneurial State*,
International Studies in Entrepreneurship 53,
https://doi.org/10.1007/978-3-030-94273-1_18

Equally laudable is Mazzucato's insight that innovation requires focus on "high growth, high risk areas," and her ecosystem emphasis. Where we differ from her is in the view of (i) how innovation comes about; and (ii) as an immediate consequence, what the state's role should be in promoting innovation. This is not to say that there is no such role.

Scholars (in this volume and elsewhere, see, e.g., McCloskey & Mingardi, 2020) have scrutinized and criticized the historical account of US industrial policy that Mazzucato touts when making her case for why governments should "lead the process of industrial development, by developing strategies for technological advance in priority areas" (Mazzucato, 2013, p. 40). It is certainly legitimate to object against state involvement and the very notion of a Ministry of Innovation (McCloskey & Mingardi, 2020, p. 169), but the fact is that many industrialized nations already have such a ministry, Sweden among them. This situation is unlikely to change.

A more fruitful approach, we believe, is to take "public–private entanglement" (Wagner, 2016) as a given. Government agencies will want a seat at the innovation table—whether for purely altruistic public interest reasons or for public choice reasons of power. Treating government involvement in innovation as unavoidable allows us to think about what government entities currently do, and what they *should* do to maximize innovation—a laudable goal we share with Mazzucato—while simultaneously minimizing errors and distortions. Although Mazzucato pays lip service to the latter goal, she makes no secret of her wish to tilt the playing field when necessary, a point to which we will soon return. We hope to convince the reader that realism is a key virtue of our approach.

The state does have roles to play when it comes to innovation, and while some of them are quite proactive, we consider them to be of a different nature than Mazzucato does, although our perspectives do intersect. In her (2013) view, governments should strive to achieve "mission-oriented innovation" or (2018) "mission-oriented programs for innovation policy—and indeed policies aimed at investment-led growth." To achieve these goals, "(w)hat is needed is a 'systems' perspective, but one that is more realistic on the actual—rather than the mythological—role of the individual actors, and the linkages between actors" (Mazzucato, 2013, p. 196). Moreover (p. 198), "acknowledging the different roles played in the ecosystem—over time and along the bumpy risk landscape—will make it more difficult for overhyped economic actors that have captured the public imagination to argue for handouts and subsidies."

We fully agree with the emphasis revealed in these quotes, but the devil is in the details, of which there are precious few in Mazzucato's 2013 book *The Entrepreneurial State*. It seems possible to interpret her level of ambition as both an immense expansion of government powers (e.g., McCloskey & Mingardi, 2020) and as a fairly modest correction of market failures (e.g., Karlson et al., 2021). Therefore, we will focus on the six lessons she draws in her 2018 article "Mission-oriented

innovation policies: challenges and opportunities," precisely because they are sufficiently detailed to merit a fruitful critique that steers clear of unwarranted assumptions and straw men.

Discussing these six lessons from an ecosystem perspective will, we believe, offer food for thought for Mazzucato's critics and advocates alike. That said, we do differ from Mazzucato in our view of what an entrepreneurial ecosystem entails; all our writings on the subject see innovations as shrouded in uncertainty in Knight's (1921) sense, meaning it is impossible for private *and* public actors to know where the next generation of high-growth firms and radical innovations will emerge (e.g., Elert et al., 2019). A key goal for policy should, therefore, be to level the playing field, to make sure that no paths are closed unnecessarily, leaving the final selection to the entrepreneurial society rather than the entrepreneurial state (e.g., Elert et al., 2019). Mazzucato would likely call such a view "old-fashioned;" after all, she specifically highlights that mission-oriented agencies do (and one assumes, should) tilt the playing field (2018, p. 804):

> the relevant organizations made choices on what to fund, going against the more classic position that the point of policy making is simply to level the playing field. Indeed, these agencies, and the wider programs around them, 'tilted' the playing field through missions aimed at a public objective, with other policies needing to be introduced to make it more profitable to move in that direction.

This is an issue on which we disagree fundamentally with Mazzucato. However, mission-driven innovation and government interventions more broadly necessarily entail directing resources in a particular direction and away from another. This *is* something governments do, and while there are ample grounds for criticism of this fact, a more important concern is *how* governments do this. Treating mission-driven innovation policy (i.e., a considerable level of government involvement) as a given, how should this involvement take the existence of entrepreneurial ecosystems into account?

To answer this question, we will adopt a collaborative innovation bloc (CIB) perspective, which focuses on the actors and competencies necessary for an idea or invention to become an innovation that eventually becomes an efficiently produced and widely disseminated high-quality good or service (e.g., Elert & Henrekson, 2019a, 2020, 2021; Elert et al., 2019). The CIB perspective shows how successful innovation, especially in "high-growth, high-risk areas," depends on an entrepreneurial ecosystem that evolves spontaneously. As the name suggests, the ecosystem is inherently collaborative, and the perspective stands out in the ecosystem literature for its clear distinction between actors and institutions. A CIB consists of six pools of economic skills from which people are drawn or recruited to form part of a collaborative team. The six pools include entrepreneurs, inventors, early- and later-stage financiers, key personnel, and customers. The value of successful innovation materializes when entrepreneurs' talents, insights, and efforts are combined with the labor effort, human capital, and financial capital of other input providers drawn from the other pools to form a collaborative team. As such, entrepreneurial venturing and innovation are matters of collaborative effort, although each

collaborative team competes against other collaborative teams, causing competitive pressures that create favorable macro-level outcomes.

CIBs emerge spontaneously in modern economies, provided that the right policy and institutional conditions are at hand, but they will not emerge if those conditions are missing. For example, the system of CIBs known as Silicon Valley only emerged when (largely unrelated) reforms had created the right conditions, especially surrounding venture capital (see Sect. 4.6). While the ecosystem may be surprisingly resilient along some margins, it can be fragile enough along others that one single institutional bottleneck or one single flawed policy impedes an entire high-growth, high-risk area. In fact, given the complexities involved, one may wonder how successful collaboration can come about at all. This also emphasizes the need for a CIB-grounded analysis of government interventions and "mission-driven innovation"—and what they potentially entail for CIB actors and their collaborations. Specifically, we tie the perspective to the lessons Mazzucato draws in her 2018 article. Briefly, our lessons, drawn from her lessons, are as follows:

1. Mazzucato argues against picking winners, in favor of *picking the willing*, i.e., to promote and embolden firms and organizations that are ready to do what is necessary to achieve a certain mission-oriented policy goal. In our reading, this is just another way to say picking winners. While it may limit the risk of unwarranted failures in the CIB, it will also increase the risk that unsound economic ideas survive for too long, which will be detrimental to the CIB's selection processes and its long-term survival.
2. Mazzucato argues in favor of the *state actively co-shaping markets*, even creating new markets, rather than merely trying to fix them. As alluded to earlier, this is something most governments do. It is sometimes warranted, e.g., with respect to health care and education, but it *will* result in CIB problems. This is especially the case if governments curtail private citizens in their role as consumers, since they are usually the final arbiters of an innovation's success in the CIB.
3. Mazzucato argues that *governments should welcome experimentation* (instead of fearing failure). We agree that this is a laudable goal, not least in the policy arena. Yet, market selection (through entry and exit) offers a way for private actors to learn from such experimentation (and offers incentives to care) in a way that is unavailable to public actors, meaning that the more learning occurs through bottom-up process in CIBs, the better.
4. Mazzucato argues that governments should *focus on the quality of finance* (rather than the quantity), a point which, if we read her correctly, mainly seems to concern the way R&D is financed. We disagree; in fact, the CIB perspective reveals that a focus on government investments in R&D as a driver of innovation reveals a far too narrow and mechanical view of how innovation comes about.
5. Mazzucato argues for *engagement*, i.e., democratization and the inclusion of more stakeholders in mission-oriented projects. This is important for government activity writ large. Returning to point 2 above, however, we wonder if citizens *qua* consumers are not better placed than a government agency to decide what they want.

6. Finally, Mazzucato argues that governments should *share both risks and rewards* if they engage in venture capital (VC) activity. This is reasonable, but the "if" does much of the heavy lifting. Government involvement in VC rests, in our view, on a flawed idea regarding what early- and later-stage financiers should do in CIBs, wrongfully labeling sound investment behavior as shortsightedness.

The list should make clear that while we often disagree with Mazzucato's perspective, there is common ground. Few of her points can be disregarded out of hand. Hopefully, a fair reading of this article by advocates of Mazzucato's view will inspire hope, humility, and afterthought.

2 How Does Innovation Come About in the CIB?

Human collaborations are often superadditive, meaning that they have an "explosive upside, what is mathematically called a superadditive function" (Taleb, 2012, p. 238). Baumol (2005, p. 3) notes much the same thing when discussing the revolutionary innovations of small and new firms and the incremental innovation of large firms, stating that "the contribution of the two together is superadditive, that is, the combined result is greater than the sum of their individual contributions." This collaborative effect characterizes many economic interactions and likely explains both why many ventures are founded by teams (Schjoedt & Kraus, 2009) and why innovation and entrepreneurship are often localized phenomena (Zucker et al., 1998). A critical mass of firms in dense, knowledge-intensive areas seems to be required for a dynamic innovation environment to emerge (Feldman & Audretsch, 1999), with strong clusters enhancing growth opportunities in adjacent industries and clusters (Delgado et al., 2014).

The CIB perspective promises a greater understanding of such clusters and the conditions enabling collaborations within them. Its roots can be traced to the works of earlier Swedish economists (Erixon, 2011), but the perspective also shares features with the more recent literature on entrepreneurial ecosystems (Stam, 2013) and the *National Systems of Entrepreneurship* approach (Acs et al., 2014).[1] These related perspectives offer valuable insights, yet seldom make a clear distinction between actors and institutions, and "the institutional variables that are used, such as technology absorption, gender equality, R&D spending, and depth of capital markets, are not institutional variables; they are outcomes resulting from the evolution of the economic system in a given institutional setup" (Braunerhjelm &

[1] Christopher Freeman, Bengt-Åke Lundvall and Richard Nelson jointly pioneered the *National Systems of Innovation* approach in the 1980s, which was developed into the *Systems of Innovation* approach in an extensive effort by a group of scholars in the 1990s (see Edquist, 1997). Many of them had close ties to the Science Policy Research Unit (SPRU) at the University of Sussex and its founder Christopher Freeman. This is also true for Mazzucato, who was the RM Phillips Professor in Economics of Innovation at SPRU in 2011–2017.

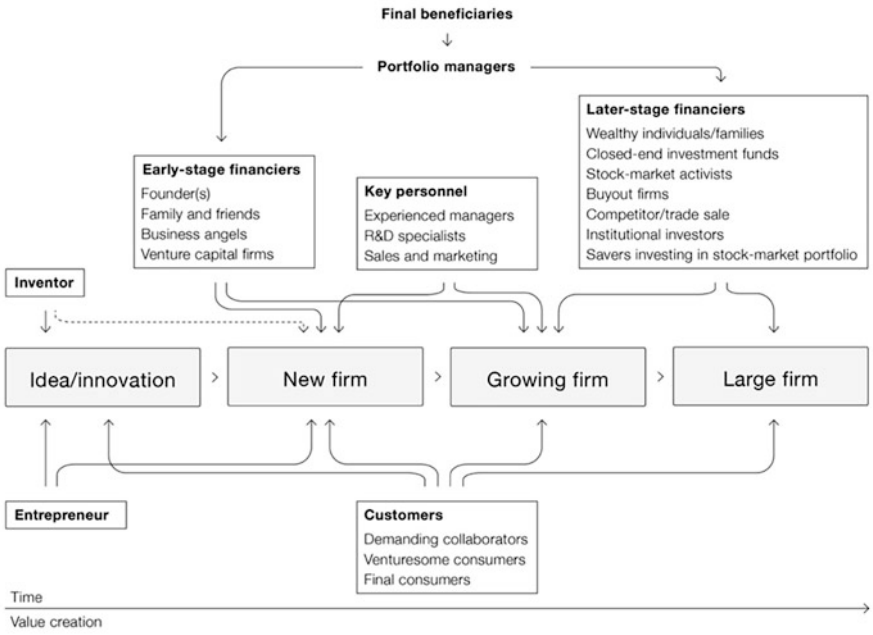

Fig. 1 The collaborative innovation bloc: an overview. Source: Elert and Henrekson (2021)

Henrekson, 2016, p. 101). Our reintroduction and reformulation of the CIB perspective (Elert & Henrekson, 2019a) resulted in a fruitful debate involving several entrepreneurship scholars (Lucas, 2019; Foss et al., 2019; Bylund, 2019; Elert & Henrekson, 2019b). We have applied the perspective to analyze what the European Union should do to become an entrepreneurial society (Elert et al., 2019) and to better understand Sweden's transformation into an entrepreneurial economy (Elert & Henrekson, 2020). We have recently taken stock of what the perspective has taught us (Elert & Henrekson, 2021).

Figure 1 provides an overview of the structure of skills that, according to the CIB perspective, are required to take an idea from inception to commercial use (e.g., Fenn et al., 1995; Gompers & Lerner, 2001). The skills and resources must be mobilized by drawing upon skill pools with six distinct, stylized skills: entrepreneurs, inventors, key personnel, early-stage financiers, later-stage financiers, and customers (Elert & Henrekson, 2019a). One person can embody more than one skill, but it is useful to consider them as distinct functions embodied by separate actors. For example, entrepreneurs generally have an overall understanding of how to exploit an opportunity but may lack specific knowledge regarding relevant technologies. Conversely, there is no reason to assume that inventors have a comparative advantage in bringing new ideas to the market as a good or service. In fact, Schumpeter (1934) distinguished between inventors and entrepreneurs, but the nuance was lost when modern growth models (e.g., Romer, 1990) collapsed invention, innovation, and commercialization into one decision (Acs & Sanders, 2013).

Entrepreneurs are regularly the prime movers: Most ideas and inventions originate with them or with inventors (Baumol, 2005). To commercialize the ideas, an entrepreneur or a group of entrepreneurs decides to create new collaborative teams, searching for and attracting the skills they perceive necessary to realizing their projects. In this role, entrepreneurs benefit from the skill pools in existing CIBs but they also create new blocs and help existing CIBs evolve. If their innovations are sufficiently disruptive, they can also cause the demise of existing CIBs (Beltagui et al., 2020). The process frequently begins when an entrepreneur identifies and attempts to develop a potential opportunity into a successfully commercialized innovation together with an *inventor and a small number of key personnel*. Financing is critical in this uncertain, experimental stage. *Early-stage financiers* like VC firms usually propel the project into a scale-up phase, during which the conjectured entrepreneurial profits can be realized (assuming the project reaches this point). While VC firms can substantially reduce uncertainty by concurrently investing in many young firms, entrepreneurs typically invest all their human capital and most of their financial assets into their venture, thus being unable to mitigate any uncertainty through diversification (Knight, 1921). A varied and competent VC industry is, therefore, a crucial aspect of the early-stage selection machinery of the CIB.

To scale up the business into a fully grown firm, entrepreneurs also require more *key personnel,* permitted and able to act upon the knowledge only they possess to promote intra-firm discoveries (Foss, 1997). When these conditions are met, the firm should react quickly to change and encourage innovation by way of intrapreneurship. Eventually, *later-stage financiers* assume responsibility for financing, which may be substantial. At this point, the innovation may have resulted in the emergence of new firms as perceptive competitors begin imitation efforts. The market grows through the operational scaling-up of activities resulting from differential growth and selection (Metcalfe, 1998), ultimately resulting in the emergence of a new industry.

Most ideas do not get this far—most business ideas and businesses fail (Hall & Woodward, 2010). Moreover, the ideas that are eventually commercialized may differ substantially from the idea that provided the igniting spark. Especially in the early stages, *customers acting as demanding collaborators* may be essential sources of information and offer critical inputs and feedback that shape emerging innovations (Bhidé, 2008; von Hippel et al., 2011). Errors are ubiquitous in this process, but so are plan and error corrections, as actors find ways to cross technological, economic, social, and institutional hurdles through trial and error and learning by doing, guided throughout this search by markets and prices.

3 How Do "Modest" Interventions Affect CIBs?

Before turning to the issue of how government interventions, especially mission-oriented innovation policy, affects CIBs, we should note that most CIBs are subject to an entanglement between the economic and political realms. First, politically

instituted rules and regulations fundamentally affect the strength of interactions between the different actor categories, their incentives to acquire and use skills, and ultimately the quality of the collaborations that come about (as discussed in all our previous articles on the subject, most recently Elert & Henrekson, 2021). Moreover, political appointees and state-owned firms can be big players in a CIB (although they exert influence rather than control; Wagner, 2016), e.g., as important customers or financiers. This is the realm of direct government involvement, the scope of which can differ widely. Before discussing mission-oriented innovation policy, we will devote a few words to more limited interventions.

No specific agent inside or outside of the innovation bloc is in charge in the CIB—in fact, no one understands more than a fraction of the ecosystem's inner workings (cf. Autio, 2016). In fact, the uncertainty shrouding all innovative efforts is a central reason why top-down "command-and-control" approaches should be undertaken with great humility. Because we are effectively dealing with a complex system, misguided policy interventions need not only be ineffective; rather, effects can be cascading, spelling doom for the entire CIB. And while the inverse—that good policy interventions may have beneficial spillovers for all actors in the bloc—may also be correct, the likelihood of being wrong in the context of a CIB is arguably at least as large as the likelihood of being right. After all, most business ideas do not survive, hence the strategy of spreading "attempts in as large a number of trials as possible" characterizing much of venture capitalism (Taleb, 2012, p. 235). Those ideas that do survive will usually do so not because they were perfect from the start but because their creators and caretakers responded to ever-changing conditions, adapting their ideas until they became marketable. Adding more (public or private) money does not change these fundamental facts.

Analyzing (fairly) limited state interventions and how they affect CIBs is attractive because they are more tractable, at least on paper, although there is no shortage of such instruments. In a survey, Bloom et al. (2019) argue that the top five policies for boosting (technological) innovation are as follows: (1) offering tax incentives for R&D; (2) promoting free trade; (3) supporting skilled migration; (4) training workers in STEM fields; and (5) providing direct grants for R&D. Among other strategies that *may* boost innovation, meaning the evidence is not yet in, they list the following: (1) providing incentives for university researchers; (2) engaging in intellectual property reform; and, interestingly (3) embarking on mission-oriented projects. While it is encouraging that policy levers (tax incentives and grants) aimed at increasing R&D seem to work, it is noteworthy that Bloom et al. (2019) essentially offer no real definition of innovations. Instead, they (subconsciously) seem to subscribe to a Schumpeter Mark II view of the world (Malerba & Orsenigo, 1995), effectively equating innovation with R&D except in a few instances. To us, this is obviously a far too narrow and mechanistic view of what innovations are and how they come about. In fact, a key point of the CIB perspective is that R&D is—at best—just an igniting spark to create an innovation that benefits consumers.

4 How Does Mission-Driven Innovation Policy Affect CIBs?

Mazzucato (2018) argues that mission-oriented innovation policies (should) tackle grand challenges such as climate change, demographic, health, and well-being concerns, and the difficulties of generating sustainable and inclusive growth. Her article presents six lessons that policymakers should draw on to make such missions a reality, based on evidence from previous mission-driven innovative projects. It is an informative read, although as Bloom et al. (2019, p. 179) put it when discussing mission-oriented policies under the label *moonshots*, "it is difficult to bring credible econometric evidence to bear on the efficacy and efficiency of moonshots. [They] are, by nature, highly selected episodes with no obvious counterfactuals."

This seems to us the nature of many economic puzzles of real significance. Absent natural experiments offering reliable identification, what researchers can do effectively is to observe patterns, and judge these patterns according to what essentially amounts to an aesthetic standard (Klein, 2012). When it comes to mission-oriented innovation policy, our view is that reasonable people can disagree on this standard. Mazzucato (2018, p. 805) argues that missions,

> should be feasible, draw on existing public and private resources, be amenable to existing policy instruments, and command broad and continuous political support. Missions should create a long-term public agenda for innovation policies, address a societal demand or need, and draw on the high potential of the country's science and technology system to develop innovations.

Her subsequent list of key lessons (section 3 of her article, pp. 805–809) is summarized as a new approach to policymaking (p. 809) and contrasts her approach with an older approach to missions-oriented projects (based on the so-called Maastricht Memorandum). We use her lessons as titles for the following six subsections, addressing each of them in turn. The purpose is not to refute them (although sometimes we will), but to see what insights can be yielded by seeing them through the CIB perspective.

4.1 From Picking Winners to Picking the Willing

Deciding on a mission is about deciding that a transformation of society must be made, implying that choices must be made. This, in Mazzucato's view, is not about picking winners, but rather about "picking the willing: those organizations across the economy (in different sectors, including both the public and private sphere) that are 'willing' to engage with a societally relevant mission" (Mazzucato, 2018, p. 806). Can this be considered as anything other than semantics, substituting one word for another in order to make corporate handouts sound more palatable? We struggle to see how.

Here, the CIB's spotlight on actors' interactions is helpful for understanding how and why entrepreneurial plans are reformulated, revised, or even abandoned over

time. These are necessary steps if an idea is to achieve success as an innovation benefiting consumers. It is important to understand which steps were missed when such a success failed to materialize and whether this "failure" was a good or a bad thing, but the government is seldom better placed to do so than private actors. To appreciate these points, one should recognize that a well-functioning CIB facilitates the joint mitigation of two error types (Eliasson, 2000).

The first error type is that of rejecting winners. Such missed opportunities often result from excessive pessimism on the part of entrepreneurs or other actors, and it is, we contend, from the fear of this type of error that the mission-oriented innovation argument draws much of its appeal. The other error type is perhaps more subtle, relating as it does to spurious discoveries that occur when an individual has partially or completely misread the data, thereby allowing failed projects to survive for too long. Market forces tend to systematically eliminate such errors as "market experience reveals the unfeasibility of some (hitherto sought after) courses of action and the (hitherto unnoticed) profitability of other courses of action" (Kirzner, 1997, p. 71).

The two error types are linked and omnipresent. For example, if "picking the willing" entails accepting a project that one "should" reject, it becomes impossible to put the resources that go into that project to alternative use. Collaborations in CIBs are essential for identifying and correcting such errors early and at the lowest cost possible. Having the government pick the willing/winners hampers this crucial function, and because CIB actors are interconnected, the consequences will be cascading. Thus, even the selection of a relatively small number of winners may create an imbalance throughout the CIB (or system of CIBs), with unfortunate consequences for the long-term ability to select those innovations that benefit consumers the most. This can be appreciated by considering government grants intended to stimulate innovation and growth. Swedish evidence suggests that "highly productive entrepreneurs abstain from seeking grants, moderately productive firms allocate a share of their effort to grant seeking, and low-productivity firms allocate most resources to seeking grants," but that receiving a grant negatively affects firm productivity and that several grants do so even more (Gustafsson et al., 2020).

Still, mission-driven projects often have an end goal that cannot be directly measured in terms of profit and loss (or productivity), meaning the market-selection mechanism for having the winners emerge, bottom up, through the CIB may be a poor (or at least inadequate) guide. An urgent mission may require selecting winners through some other mechanism. Mazzucato (2018, p. 806) states that "[a] mission-oriented approach uses specific challenges to stimulate innovation across sectors." Possibly, she here refers to innovation prizes of the kind that were common in the eighteenth and nineteenth centuries, yielding substantial progress in such varied fields as navigation, air voyage, and food preservation (Abramowicz, 2003). Currently, they are used by private organizations like the XPRIZE Foundation and, incidentally, by DARPA. The competitions stipulate a clear goal to be achieved—say, the development of a climate-neutral technology for transportation—but can be formulated in an open-ended way technology-wise. Furthermore, innovation prizes

are exempt from the welfare loss that comes from the monopoly rents associated with patents (Adler, 2011) and do not require an extensive bureaucracy that assesses and evaluates proposals and credentials ex ante. The use of such prizes to select winners would combine a minimal risk to taxpayers with innovation encouragement that does not commit to specific firms or a particular technology, hence reducing the risk of cascading errors in the CIB (Elert et al., 2019).

4.2 From Fixing Markets to Actively Co-Shaping them

"Missions do not fix existing markets but create new markets," Mazzucato (2018, p. 806) states, offering examples from the "three classic mission-oriented agencies" NASA, DARPA, and NIH to exemplify the point that the "organizations are not about fixing existing markets but creating new landscapes." This argument (developed further in Mazzucato, 2016) is indeed ambitious. At the same time, CIB activity rarely, if ever, takes place in a free market devoid of political influence. In fact, central segments of many advanced economies are heavily regulated or even monopolized by the public sector, especially the provision of private good social services such as health care, care of childcare and the elderly, and education (Andersen, 2008; Henrekson & Johansson, 2009). Some of these markets may be thought of as both created and maintained by the government.

Considering how this involvement affects CIBs is useful. For example, a government monopolizing both production and financing (or only production) will severely curtail the role of CIB actors, meaning a sufficient variety of actors with requisite skills and skin in the game will fail to emerge. In practice, it is only under free private provision of goods and services and private financing that incentives for all CIB actors can be harmonized. Moreover, even when private production is allowed but the government remains the sole buyer of goods and services, CIB development will suffer because the government *qua* monopsonist hampers the crucial function of consumers in the CIB. They are, after all, the ultimate arbiters of an innovation's success—those whose preferences (rather than those of the entrepreneurs) essentially govern all CIB activity.

The supplanting of this broad and diverse category by the state will likely have profound effects. After all, the consumer role is far from passive; rather, a nation's wealth rests crucially on its "venturesome consumption"—the willingness and ability of intermediate producers and individual consumers to take a chance on and effectively use new know-how and products (Bhidé, 2008). In addition, a sophisticated, active demand is a *sine qua non* for industrial success (Porter, 1990), which likely explains why modern markets for industrial goods and services are typified by open-ended relational contracts and long-term demand–supply relationships between business partners who know each other (Kasper et al., 2014). Thus, small and large consumers matter, and their opportunities to act competently are severely curtailed when a certain service or good can only be offered by a government-commissioned provider who typically has a limited scope for acting

entrepreneurially by offering and charging for additional services on top of what is granted through the tax-financed system, impeding the back-and-forth bargaining that characterizes evolving market relationships.

Thus, while mission-oriented innovation projects can be justified because problems are urgent, it is important to be aware of the potentially adverse implications for the long-term generation of innovations in such markets caused by the hampering of a crucial (and far from passive) actor. Something similar occurs when the state offers government grants to stimulate entrepreneurship (as discussed in Sect. 4.1), stripping consumers of their role as final arbiters, instead giving it to a bureaucrat or government agency who may or may not have preferences reflecting those of consumers. From a strict efficiency perspective, this seems unsound—but from other perspectives? The whole point of a mission-oriented project may be that the bureaucrat *should* have different preferences, promoting things that cannot survive on a private market but are deemed valuable in some other sense (say, solar energy to combat climate change). Again, many real-world puzzles can only be judged according to some aesthetic standard (Klein, 2012), over which reasonable people can disagree.

In summary, a mix of public financing and private provision does not preclude CIBs, but they are likely to be insufficiently coalesced to generate innovations in the long run. Still, permitting private provision is better than not doing so. Indeed, it has been shown that opening previously monopolized markets to private providers has led to impressive performance of high-growth firms. This suggests that there is large, untapped potential in sectors such as health care, education, and care of children and the elderly (Andersson et al., 2019). Sweden offers several illustrative examples in this respect, e.g., the voucher system for school choice introduced in the early 1990s, which paved the way for several high-growth firms in the area. At about the same time, local governments began to outsource health care, spawning several high-growth firms, some of which have become multinational (Blix & Jordahl, 2021).

4.3 From Fearing Failure to Welcoming Experimentation

Here, Mazzucato (2018, p. 807) embraces what in Harford's (2011) view (and ours), should guide private and public initiatives of all kinds. "Because innovation is extremely uncertain, the ability to experiment and explore is key for a successful entrepreneurial state," she writes. "Therefore, a crucial element in organizing the state for its entrepreneurial role is absorptive capacity or institutional learning … Governmental agencies learn in a process of investment, discovery, and experimentation that is part of mission-oriented initiatives." Yet, it is one thing to say that actors should experiment and learn, and another to appreciate how this is done; and to appreciate how learning differs between private actors staking their own money and public actors staking taxpayer money.

CIBs are experimental at their core, with frequent failure being inevitable and sometimes even desirable. Unsuccessful projects are not necessarily a waste of

resources; failures provide actors with valuable information on a business model's viability. This "process of learning by trial and error ... must involve a constant disappointment of some expectations" (Hayek, 1976, p. 124). The process will be quicker and less costly if entry and expansion, as well as contraction and exit, are easy. Indeed, empirical research shows that a higher turnover of companies leads to a more competitive economy both nationally and regionally, boosting the number of high-growth firms (Brown et al., 2008; Heyman et al., 2019). Conversely, business failures can stimulate firm-founding by opening new opportunities, enabling knowledge spillovers, and making additional resources available (Hoetker & Agarwal, 2007). Indeed, more lenient bankruptcy laws are associated with higher rates of venture formation (Peng et al., 2009), to the point where "lowering barriers to failure via lenient bankruptcy laws encourages more capable—and not just more—entrepreneurs to start firms" (Eberhart et al., 2017, p. 93).

How, absent turbulence driven by markets and ultimately by what citizens *qua* consumers want, do mission-driven innovation agencies determine what is a failure and what is success? Innovation prizes (Sect. 4.1) may be one way to do so. Other hints may be found in what Azoulay et al. (2019) label the "ARPA model" of mission-oriented research to generate breakthrough innovations. These authors argue that successful examples of such ambitious initiatives are characterized by decentralization, active project selection, tolerance for failure, and organizational flexibility. Essentially by mimicking the way markets work, we should add. While it is difficult to see how actors are to have the incentives to alter plans when they lack market actors' skin in the game, government agencies are likely to be more successful in doing so when embracing and maintaining an experimentally oriented political and bureaucratic culture that lauds experimentation.

But how? To us, at least, the current democratic and media-driven system appears highly intolerant of public sector failure, although we disagree with Mazzucato that this entirely inhibits politicians from taking risks (with someone else's money). Politicians do take risks; however, while they are usually ready to take credit for risky projects when they succeed, they are also ready to blame a scapegoat, usually a bureaucrat, an agency, or "the market," when projects fail. Mazzucato would likely counter with her juxtaposition between Solyndra, seen as a government failure, and Tesla, seen as a private success, even though both firms received government money.[2] While that narrative exists, so do narratives blaming private actors for virtually every financial crisis that has ever happened.

[2] Solyndra was a California-based manufacturer of thin film solar cells. The company was once touted for its unusual technology, but falling silicon prices made the company unable to compete with conventional solar panels. Solyndra filed for bankruptcy in 2011 and the U.S. government lost more than US$500 million based on a loan guarantee (Groom, 2014).

4.4 *From a Focus on Quantity of Finance to a Focus on Quality*

Whereas Mazzucato (2013, p. 40) argues against subsidies to R&D, this seems to be a matter of how. According to Mazzucato (2018, p. 808), several mission-driven institutions "have been critical to basic research," and continue to be so today, with the rise in R&D expenditure, e.g., by NIH, being "a deliberate and targeted choice on where to direct public R&D funding." She is certainly not alone in seeing R&D as key to innovation; indeed, this is a core assumption in much of the mainstream entrepreneurship and economics literature considering innovative activities as the result of systematic and purposeful efforts to create new knowledge by investing in R&D, followed by commercialization (Audretsch et al., 2006; Chandler, 1990). From the CIB perspective, the ancillary idea that more R&D spending is the tool that will promote innovation reveals an overly mechanical view of how the economic system works, neglecting other means of innovation, such as learning-by-doing, networking, and combinatorial insights (Braunerhjelm, 2011). Bhidé (2008) even argues that turning a high-level idea (available to anyone once produced) into a commercially viable product seldom involves much high-level R&D.

Although high R&D spending can be a necessary component of a thriving economy, it is far from sufficient, and a policy of increased government R&D spending or subsidies will not necessarily result in more economically valuable knowledge (Da Rin et al., 2006). Spillovers, after all, do not need to be positive. Public R&D can crowd out private R&D, as attested to by the fact that the share of R&D in the business sector that is directly or indirectly funded by the government is lower in countries with high R&D spending by business enterprises and higher in countries with low business spending (Elert et al., 2019). Furthermore, R&D is an *input* in the production process; the desired output from the CIB perspective is higher value creation, which depends on many more steps along the way.

This is not to neglect the role of the state, but to nuance what the state does: A broad policy program conducive to innovative entrepreneurial venturing will likely spontaneously increase R&D spending and allocate it efficiently as a side effect. In contrast, if a healthy system of CIBs is not already in place, a government R&D push becomes a waste of resources, directing focus and resources toward factors that would have found better use elsewhere. It should be clear by now that the CIB perspective judges it virtually impossible for a bureaucracy to "pick the winners," which is why spontaneous, demand-driven increases in R&D expenditures should be preferred to any top-down designed alternatives. Thus, policies and reforms should aim to mobilize and incentivize the available resources, including R&D, to flow to their most productive use. This implies that R&D—and ultimately, scientific knowledge and innovation—is most effectively promoted through the pull of demand rather than the push of supply.

So, what happens to the CIB when the government nevertheless opts to stimulate R&D? Both tax incentives and subsidies appear to promote this, as well as policy measures increasing the supply of skilled labor (whether through freer migration or

STEM-education policies) (Bloom et al., 2019). CIB effects from such efforts primarily accrue to two actor categories: inventors and key employees. Ideally, these skill pools should see an increase both in their breadth and their depth, to the benefit of the entire CIB. However, this consequence rests on the assumption that the skill pools did not already have sufficient breadth and depth, a debatable empirical fact, to say the least. As pointed out by Lucas (2019) in an article arguing that the CIB perspective needs public choice, actors thus supported are likely to become a politically relevant interest, using their power to suck up resources that could be put to better use elsewhere.

Making a particular type of key personnel less scarce than it should be could fundamentally alter entrepreneurs' calculus when putting together a collaborative team, skewing things away from what would be "desirable" in the non-subsidized case. As Bhidé (2008, pp. 150–151) puts it, "the commercial success of innovations turns not just on the attributes of the product or know-how, but on the effectiveness and efficiency of the innovator's sales and marketing process." The result may be too much knowledge generation at the expense of knowledge exploitation or diffusion, too great a reliance on technological innovations relative to process innovations, or too much focus on product development with too little effort put into marketing and sales. Or, maybe the intervention achieves the optimum level of the skill pool in order to achieve as great an innovation output as possible. The counterfactual is muddy, which is precisely the point. In complex, interconnected systems, even relatively targeted, relatively limited interventions can have far-reaching, unforeseen repercussions.

4.5 Engagement

Next, Mazzucato (2018, p. 808f) argues against an older view of missions where stakeholders are fewer in number and things are, generally, less democratic: "Understanding how the definition of missions can be opened up to a wider group of stakeholders, ... is a key area of interest," she states, and this "is tied to rethinking the notion of public value" as opposed to pure economic notions of "public good." We willingly acknowledge this point. Democratically elected public officials and their bureaucrats *should* take the will of their citizenry into account, meaning mission-oriented innovation policy should reflect principles of democracy and inclusion rather than autocracy and exclusion.

However (returning to our point in Sect. 4.2), the state taking on the role of buyer in a mission-oriented project puts the question of precisely who the innovation generating system is for under scrutiny. A normative underpinning of the CIB perspective is that innovations should increase prosperity and the quality of life of a country's citizens, with buying and selling and foregoing other options being an obvious way for those citizens, in their role as consumers, to express what they value at a specific point in time. Introducing the state as a middleman to interpret the will of citizens seems a roundabout way of achieving this goal, even when democratic

checks and balances are present. Again, this may be an issue of aesthetics, on which reasonable people can agree. Still, as we have stressed, sometimes the whole point of a mission-oriented project may be that the bureaucrat *should* have different preferences than citizens *qua* consumers, promoting the next generation of solar energy or other things that cannot (yet) survive in a private market but are deemed valuable in some other sense. Does this mean that mission-oriented innovation projects derive some of their value from not taking their citizens (short-term? irrational?) preferences into account?

We are unsure. Saying that values other than those that can be expressed in monetary terms "matter" can be an easy way out for people wishing to promote *their* pet project. Alternatively, it could reveal thoughtful criticism of the present day's "post-modern" sclerosis where the only acceptable criterion to gauge success, paradoxically, has become the corporate bottom-line. Failing to consider economic realities—market forces, CIB collaborations, etc.—when planning a project is, in our view, tantamount to ignoring gravity when building a bridge, but it is not the only thing that should be considered. It is an entirely different matter to distill what the public wants (or what it does not want but needs!), i.e., to weigh these "other things" and aggregate them in a manner that leaves everyone better off. Possibly, Mazzucato's reaching out to a wider group of stakeholders is a way to do this, but who can be sure they do not end up as rent-seekers striving to get as big a part of the mission-oriented pie as possible? Sometimes, a thin line separates public interest from public choice.

4.6 From De-risking to Sharing Both Risks and Rewards

Mazzucato (2018, p. 809) argues that "(m)issions require a vision about the direction in which to drive an economy, focusing investment in particular areas, not just creating the horizontal (framework) conditions for change." Moreover, "these types of investments are often those that private venture capitalists are not willing to make due to their exit driven model that seeks short-term returns (usually 3–5-year cycles) . . . some have argued that it is precisely this short-termism that has caused problems in sectors like biotechnology." Therefore, the government should act as venture capitalist as regards mission-oriented projects, sharing the risks *and* the rewards of its investments (cf. Mazzucato & Penna, 2016).

From a CIB perspective, the "short-termism" of VC is not to be lamented. It is merely an acknowledgment of specialization, and the fact that early-stage financiers (angels, VC firms) and later-stage financiers (buyout firms, etc.) add different things at different points of an innovation's journey. Thus, if VC does not exit at an early stage, it can probably not be considered VC. Nor is their role easy to mimic: The process of evaluation in the private VC industry is highly complex and typically includes tacit judgments. VC firms also perform important screening functions and contribute management and market expertise. Such non-financial value appears to be a main driver of the superior performance of firms backed by early-stage financiers (Croce et al., 2013; Landström & Mason, 2016). Sure, VC actors are at best

moderately successful in picking the winners among high-risk projects (Gompers & Lerner, 2004; Svensson, 2008; Gompers et al., 2009), but that is the point of VC's many-buckets strategy. Also, there is little empirical evidence to suggest that politically controlled organizations are better placed in this respect (Baumol et al., 2007, p. 220); government venture capital appears to promote less innovation than private or mixed venture capital (Bertoni & Tykvova, 2015) and private-backed firms seem to have better exit performance (Cumming et al., 2017). One likely reason for the discrepancy is that government entities base their decisions on political rather than commercial criteria. As our discussion suggests, however, this may be considered a feature rather than a bug of mission-oriented projects.

Second, while it may certainly be possible that the state can pool risks in a way that venture capitalists cannot, the very essence of the VC business model is precisely to convert high-risk opportunities to a more acceptable risk level through portfolio diversification, thereby aligning the incentives of investors, VC firms, and entrepreneurial founders. To the extent that the state is "better" at risk-pooling, this seems to be because it essentially shares the costs of its failed VC investments with taxpayers. This is to say that Mazzucato's (2018) suggestion that the taxpayer should also reap the rewards of successful projects seems fair (*if* the state acts as a venture capitalist). Still, the problem remains that the cost/benefit to each taxpayer will be so small as to be trivial, and the cost to the VC-bureaucrat non-existent, since they get a salary anyway. This lack of anyone with true skin in the game will substantially reduce the incentives to learn from failures, or even result in a "failure to fail," to borrow Lucas's (2019) terminology.[3]

According to Bloom et al. (2019), "removing constraints on the development of an active early-stage finance market (like angel finance or venture capital) might be a reasonable policy focus" to promote innovations. These sectors have been impeded historically in many countries. This was also true for the USA until a set of reforms around 1980 paved the way for the modern VC sector, without which there likely would not be any Silicon Valley to talk about (Henrekson & Rosenberg, 2001; Fenn et al., 1995). These policy prescriptions essentially entail capital gains taxes, the effective tax treatment of stock options in young entrepreneurial firms, and the right for pension funds to invest in high-risk securities, including VC funds. The recipe, where it has been tried, seems to work to unleash VC as a driver of creativity and innovation.

In addition, a reasonable "compromise" (between those in favor of and against the state acting as a venture capitalist) can perhaps be found when pondering the current trend of a progressively larger share of savings going into pension funds, which is unlikely to reverse anytime soon (OECD, 2018). Elsewhere, we have argued that at least part of these assets should be allowed to be invested in equity in general and

[3] As an example, Swedish government venture capital often seems to result in "exits by share buybacks to the original entrepreneur[, which] indicates that many investments in practice were used as long-term loans by the entrepreneurs" (Wennberg & Mason, 2018, p. 85). For a treatment of why a large portion of returns need to be in private VCs' hands, even in public-private VC collaborations, see Jääskeläinen et al. (2007).

venture capital specifically, thus reaching not only real estate, public stocks, and high-rated bonds but also entrepreneurial firms. This seems to us like a no-regret policy lever, as it achieves greater risk-pooling while utilizing people's specific knowledge of the circumstances of time and place, unleashing the creative power of a myriad of people. We should add that such a move does not bias the flow of capital toward a particular sector; rather, it opens doors for entrepreneurial firms that were previously only open for large incumbent firms (Elert et al., 2019).

5 Conclusion

Mazzucato paints with broad strokes, both in her books and in the article under discussion. When discussing her six lessons, we have occasionally done the same. That said, we hope our comments and criticisms have embodied some level of concreteness. We conclude by briefly summarizing our view of her lessons:

1. *Picking the willing* is just another way of saying picking winners. While it may limit the risk of unwarranted failures in the CIB, it will inevitably increase the risk of unsound economic ideas surviving for too long.
2. *Actively co-shaping markets*, even creating new markets, is something most governments do. It is sometimes warranted but will result in problems. This is especially the case if government policies curtail consumers, who are the final arbiters of an innovation's success in the CIB.
3. *Welcoming experimentation* (instead of fearing failure) is a laudable goal. Yet, the evidence strongly suggests that market selection (through entry, exit, contraction, and expansion) offers a way for private actors to learn from such experimentation (and incentives to care) in a way that is unavailable to public actors.
4. *Focusing on the quality of finance* (rather than the quantity) may entail government investments in R&D, but too much emphasis on R&D rests on a far too narrow and mechanical view of how innovation comes about. R&D is an input in a production process whose desired output—higher value creation—depends on many more steps along the way.
5. *Engagement*, i.e., democratization and the inclusion of more stakeholders, is of course laudable for government projects. Yet one may wonder if the citizen *qua* consumer is not better placed to decide what they want than the government agency.
6. Finally, the idea that governments should *share both risks and rewards* if they engage in VC activity is reasonable. Yet, the argument that they should do so rests, in our view, on a flawed idea regarding what early- and later-stage financiers should do, wrongfully labeling sound investment behavior as shortsightedness.

Acknowledgments We are grateful for useful comments and suggestions from Christian Sandström, Karl Wennberg and two anonymous reviewers. Financial support from Jan Wallanders och Tom Hedelius stiftelse (grant P2018-162) and the Marianne and Marcus Wallenberg Foundation (grant 2020.0049) is gratefully acknowledged.

References

Abramowicz, M. (2003). Perfecting patent prizes. *Vanderbilt Law Review, 56*(1), 115–236.

Acs, Z. J., & Sanders, M. (2013). Knowledge spillover entrepreneurship in an endogenous growth model. *Small Business Economics, 41*(4), 775–795. https://doi.org/10.1007/s11187-013-9506-8

Acs, Z. J., Autio, E., & Szerb, L. (2014). National systems of entrepreneurship: Measurement issues and policy implications. *Research Policy, 43*(3), 476–494. https://doi.org/10.1016/j.respol.2013.08.016

Adler, J. (2011). Eyes on the climate prize: Rewarding energy innovation to achieve climate stabilization. *Harvard Environmental Law Review, 35*(1), 1–45. https://doi.org/10.2139/ssrn.1576699

Andersen, T. M. (2008). The Scandinavian model – prospects and challenges. *International Tax and Public Finance, 15*(1), 45–66. https://doi.org/10.1007/s10797-007-9022-3

Andersson, F., Jordahl, H., & Josephson, J. (2019). Outsourcing public services: Contractibility, cost, and quality. *CESifo Economic Studies, 65*(4), 349–372. https://doi.org/10.1093/cesifo/ifz009

Audretsch, D. B., Keilbach, M. C., & Lehmann, E. E. (2006). *Entrepreneurship and economic growth*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195183511.001.0001

Autio, E. (2016). *Entrepreneurship support in Europe: Trends and challenges. Technical Report*. Imperial College. https://doi.org/10.13140/RG.2.1.1857.1762

Azoulay, P., Fuchs, E., Goldstein, A. P., & Kearney, M. J. (2019). Funding breakthrough research: Promises and challenges of the "ARPA Model". *Innovation Policy and the Economy, 19*(1), 69–96. https://doi.org/10.1086/699933

Baumol, W. J. (2005). Education for innovation: Entrepreneurial breakthroughs versus corporate incremental improvements. *Innovation Policy and the Economy, 5*, 33–56. https://doi.org/10.1086/ipe.5.25056170

Baumol, W. J. (2010). *The microtheory of innovative entrepreneurship*. Princeton University Press. https://doi.org/10.2307/j.ctt21668j9

Baumol, W. J., Litan, R. E., & Schramm, C. J. (2007). *Good capitalism, bad capitalism, and the economics of growth and prosperity*. Yale University Press. https://doi.org/10.2139/ssrn.985843

Beltagui, A., Rosli, A., & Candi, M. (2020). Exaptation in a digital innovation ecosystem: The disruptive impacts of 3D printing. *Research Policy, 49*(1), 103833. https://doi.org/10.1016/j.respol.2019.103833

Bertoni, F., & Tykvova, T. (2015). Does governmental venture capital spur invention and innovation? Evidence from young European biotech companies. *Research Policy, 44*(4), 925–935. https://doi.org/10.1016/j.respol.2015.02.002

Bhidé, A. (2008). *The venturesome economy: How innovation sustains prosperity in a more connected world*. Princeton University Press. https://doi.org/10.1111/j.1745-6622.2009.00211.x

Blix, M., & Jordahl, H. (2021). *Privatizing welfare services: Lessons from the Swedish experiment*. Oxford University Press. https://doi.org/10.1093/oso/9780198867210.001.0001

Bloom, N., Van Reenen, J., & Williams, H. (2019). A toolkit of policies to promote innovation. *Journal of Economic Perspectives, 33*(3), 163–184. https://doi.org/10.1257/jep.33.3.163

Braunerhjelm, P. (2011). Entrepreneurship, innovation and economic growth: Interdependencies, irregularities and regularities. In D. B. Audretsch, O. Falck, & S. Heblich (Eds.), *Handbook of research on innovation and entrepreneurship* (pp. 161–213). Edward Elgar. https://doi.org/10.4337/9781849807760

Braunerhjelm, P., & Henrekson, M. (2016). An innovation policy framework: Bridging the gap between industrial dynamics and growth. In D. B. Audretsch & A. N. Link (Eds.), *Essays in public sector entrepreneurship* (pp. 95–130). Springer. https://doi.org/10.1007/978-3-319-26677-0_4

Brown, C., Haltiwanger, J., & Lane, J. (2008). *Economic turbulence: Is a volatile economy good for America?* University of Chicago Press. https://doi.org/10.7208/chicago/9780226076348.001.0001

Bylund, P. L. (2019). Where is the Austrian theory of collaborative orders? Comment on Elert and Henrekson. *Review of Austrian Economics, 32*(4), 339–347. https://doi.org/10.1007/s11138-019-00457-w

Chandler, A. D. (1990). *Scale and scope: The dynamics of industrial capitalism*. Harvard University Press. https://doi.org/10.1080/05775132.1990.11471476

Croce, A., Martí, J., & Murtinu, S. (2013). The impact of venture capital on the productivity growth of European entrepreneurial firms: "Screening" or "value added" effect? *Journal of Business Venturing, 28*(4), 489–510. https://doi.org/10.2139/ssrn.1705225

Cumming, D. J., Grilli, L., & Murtinu, S. (2017). Governmental and independent venture capital investments in Europe: A firm-level performance analysis. *Journal of Corporate Finance, 42*, 439–459. https://doi.org/10.1016/j.jcorpfin.2014.10.016

Da Rin, M., Nicodano, G., & Sembenelli, A. (2006). Public policy and the creation of active venture capital markets. *Journal of Public Economics, 90*(8–9), 1699–1723. https://doi.org/10.1016/j.jpubeco.2005.09.013

Delgado, M., Porter, M. E., & Stern, S. (2014). Clusters, convergence, and economic performance. *Research Policy, 43*(10), 1785–1799. https://doi.org/10.1016/j.respol.2014.05.007

Eberhart, R. N., Eesley, C. E., & Eisenhardt, K. M. (2017). Failure is an option: Institutional change, entrepreneurial risk, and new firm growth. *Organization Science, 28*(1), 93–112. https://doi.org/10.1287/orsc.2017.1110

Edquist, C. (Ed.). (1997). *Systems of innovation: Technologies, institutions and organizations*. Routledge. https://doi.org/10.4324/9780203357620

Elert, N., & Henrekson, M. (2019a). The collaborative innovation bloc: A new mission for Austrian economics. *Review of Austrian Economics, 32*(4), 295–320.

Elert, N., & Henrekson, M. (2019b). The collaborative innovation bloc: A reply to our commentators. *Review of Austrian Economics, 32*(4), 349–361. https://doi.org/10.1007/s11138-019-00456-x

Elert, N., & Henrekson, M. (2020). Collaborative innovation blocs and antifragility. *Journal of Institutional Economics, 16*(4), 537–552. https://doi.org/10.1017/S1744137420000065

Elert, N., & Henrekson, M. (2021). Innovative entrepreneurship as a collaborative effort: An institutional framework. *Foundations and Trends in Entrepreneurship, 17*(4), 330–435. https://doi.org/10.1561/0300000098

Elert, N., Henrekson, M., & Sanders, M. (2019). *The entrepreneurial society: A Reform Strategy for the European Union. International studies in entrepreneurship 43*. Springer. https://doi.org/10.1007/978-3-662-59586-2

Eliasson, G. (2000). Industrial policy, competence blocs and the role of science in economic development. *Journal of Evolutionary Economics, 10*(1–2), 217–241. https://doi.org/10.1007/s001910050013

Erixon, L. (2011). Development blocks, malinvestment and structural tensions – The Åkerman-Dahmén theory of the business cycle. *Journal of Institutional Economics, 7*(1), 105–129. https://doi.org/10.1017/S1744137410000196

Feldman, M. P., & Audretsch, D. B. (1999). Innovation in cities: Science-based diversity, specialization and localized monopoly. *European Economic Review, 43*(2), 409–429. https://doi.org/10.1016/S0014-2921(98)00047-6

Fenn, G., Liang, N., & Prowse, S. (1995). *The economics of the private equity market*. Board of Governors of the Federal Reserve System. Retrieved from https://EconPapers.repec.org/RePEc:fip:fedgss:168

Foss, N. J. (1997). Austrian insights and the theory of the firm. In *Advances in Austrian economics* (Vol. 4, pp. 175–198). Emerald. https://doi.org/10.1016/S1529-2134(97)04014-3

Foss, N. J., Klein, P. G., & McCaffrey, M. (2019). The entrepreneurship scholar plays with blocs: Collaborative innovation or collaborative judgment? *Review of Austrian Economics, 32*(4), 321–330. https://doi.org/10.1007/s11138-019-00461-0

Gompers, P. A., & Lerner, J. (2001). *The money of invention: How venture capital creates new wealth*. MIT Press.

Gompers, P. A., & Lerner, J. (2004). *The venture capital cycle*. MIT Press.

Gompers, P. A., Lerner, J., & Kovner, A. (2009). Specialization and success: Evidence from venture capital. *Journal of Economics and Management Strategy, 18*(3), 817–844. https://doi.org/10.1111/j.1530-9134.2009.00230.x

Groom, N. (2014, November 13). Controversial U.S. energy loan program has wiped out losses. *Reuters*. Retrieved June 30, 2021, from https://www.reuters.com/article/us-doe-loans-idUSKCN0IX0A120141113

Gustafsson, A., Gustavsson Tingvall, P., & Halvarsson, D. (2020). Subsidy entrepreneurs: An inquiry into firms seeking public grants. *Journal of Industry, Competition and Trade, 20*(3), 439–478. https://doi.org/10.1007/s10842-019-00317-0

Hall, R. E., & Woodward, S. E. (2010). The burden of the nondiversifiable risk of entrepreneurship. *American Economic Review, 100*(3), 1163–1194. https://doi.org/10.1257/aer.100.3.1163

Harford, T. (2011). *Adapt: Why success always starts with failure*. Little.

Hayek, F. A. (1976). *Law, legislation and liberty: A new statement of the liberal principles of justice and political economy. Volume II: The mirage of social justice*. Routledge.

Henrekson, M., & Johansson, D. (2009). Competencies and institutions fostering high–growth firms. *Foundations and Trends in Entrepreneurship, 5*(1), 1–80. https://doi.org/10.1561/0300000026

Henrekson, M., & Rosenberg, N. (2001). Designing efficient institutions for science-based entrepreneurship: Lessons from the U.S. and Sweden. *Journal of Technology Transfer, 26*(3), 207–231. https://doi.org/10.1023/A:1011153922906

Heyman, F., Norbäck, P.-J., Persson, L., & Andersson, F. (2019). Has the Swedish business sector become more entrepreneurial than the U.S. business sector? *Research Policy, 48*(7), 1809–1822. https://doi.org/10.1016/j.respol.2019.04.007

Hoetker, G., & Agarwal, R. (2007). Death hurts, but it isn't fatal: The postexit diffusion of knowledge created by innovative companies. *Academy of Management Journal, 50*(2), 446–467. https://doi.org/10.5465/AMJ.2007.24634858

Jääskeläinen, M., Maula, M., & Murray, G. (2007). Profit distribution and compensation structures in publicly and privately funded hybrid venture capital funds. *Research Policy, 36*(7), 913–929. https://doi.org/10.1016/j.respol.2007.02.021

Karlson, N., Sandström, C., & Wennberg, K. (2021). Bureaucrats or markets in innovation policy? – A critique of the entrepreneurial state. *Review of Austrian Economics, 34*(1), 81–95. https://doi.org/10.1007/s11138-020-00508-7

Kasper, W., Streit, M. E., & Boettke, P. J. (2014). *Institutional economics: Property, competition, and policies* (2nd ed.). Edward Elgar. https://doi.org/10.1007/s11127-014-0160-8

Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature, 35*(1), 60–85.

Klein, D. B. (2012). *Knowledge and coordination – A liberal interpretation*. Oxford University Press. https://doi.org/10.4000/oeconomia.94

Knight, F. H. (1921). *Risk, uncertainty, and profit*. Houghton Mifflin.

Landström, H., & Mason, C. (Eds.). (2016). *Handbook of research on business angels*. Edward Elgar. https://doi.org/10.4337/9781783471720

Lucas, D. S. (2019). The political economy of the collaborative innovation bloc. *Review of Austrian Economics, 32*(4), 331–338. https://doi.org/10.2139/ssrn.3387687

Malerba, F., & Orsenigo, L. (1995). Schumpeterian patterns of innovation. *Cambridge Journal of Economics, 19*(1), 47–65. https://doi.org/10.1093/oxfordjournals.cje.a035308

Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press.

Mazzucato, M. (2016). From market fixing to market-creating: A new framework for innovation policy. *Industry and Innovation, 23*(2), 140–156. https://doi.org/10.1080/13662716.2016.1146124

Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities. *Industrial and Corporate Change, 27*(5), 803–815. https://doi.org/10.1093/icc/dty034

Mazzucato, M., & Penna, C. C. R. (2016). Beyond market failures: The market creating and shaping roles of state investment banks. *Journal of Economic Policy Reform, 19*(4), 305–326. https://doi.org/10.1080/17487870.2016.1216416

McCloskey, D. N., & Mingardi, A. (2020). *The myth of the entrepreneurial state*. American Institute for Economic Research.

Metcalfe, J. S. (1998). *Evolutionary economics and creative destruction*. Routledge. https://doi.org/10.4324/9780203018927

OECD. (2018). *Pension funds in figures*. OECD. Retrieved from https://www.oecd.org/daf/fin/.

Peng, M. W., Yamakawa, Y., & Lee, S.-H. (2009). Bankruptcy laws and entrepreneur friendliness. *Entrepreneurship Theory Practice, 34*(3), 517–530.

Porter, M. E. (1990). *The competitive advantage of nations*. Free Press.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy, 98*(5), S71–S102.

Schjoedt, L., & Kraus, S. (2009). Entrepreneurial teams: Definition and performance factors. *Management Research News, 32*(6), 513–524. https://doi.org/10.1108/01409170910962957

Schumpeter, J. A. (1934 [1911]). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Routledge.

Stam, E. (2013). Knowledge and entrepreneurial employees: A country level analysis. *Small Business Economics, 41*(4), 887–898. https://doi.org/10.1007/s11187-013-9511-y

Svensson, R. (2008). Innovation performance and government financing. *Journal of Small Business and Entrepreneurship, 21*(1), 95–116. https://doi.org/10.1080/08276331.2008.10593415

Taleb, N. N. (2012). *Antifragile: Things that gain from disorder*. Allen Lane.

von Hippel, E., Ogawa, S., & de Jong, J. P. J. (2011). The age of the consumer-innovator. *MIT Sloan Management Review, 53*(1), 27–35.

Wagner, R. E. (2016). *Politics as a peculiar business: Insights from a theory of entangled political economy*. Edward Elgar. https://doi.org/10.4337/9781785365485

Wennberg, K., & Mason, C. (2018). *Financial exits: Perspectives, regional development and policy interventions*. Report 2017/027. Swedish Agency for Growth Policy Analysis. Retrieved from https://www.tillvaxtanalys.se/download/18.62dd45451715a00666f1bdd2/1586366162822/Underlag%20Exitstudie.pdf

Zucker, L. G., Darby, M. R., & Brewer, M. B. (1998). Intellectual human capital and the birth of U.S. biotechnology enterprises. *American Economic Review, 88*(1), 290–306.