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Determinants of Established Entrepreneurs' Innovative Activity in Northern and Western Europe

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Abstract

For established entrepreneurs from Western European economies (WEEs) and Northern European economies (NEEs), we estimated relationships between firms' innovative activity and their owner-managers' educational level, the firms' international orientation, and their growth aspirations. International orientation proved to be positively and significantly related to innovative activity in both groups, but associations were stronger in NEEs. Established entrepreneurs with higher educational levels are more innovative than those with less education, with an exception for NEEs, where more innovative are entrepreneurs with a secondary instead of a postsecondary degree. Established entrepreneurs with growth aspirations are more innovative only for the NEEs. The empirical results confirm our two hypotheses for both groups of economies, whereas the third hypothesis which suggests that established entrepreneurs with aspirations for growing their firms are expected to be more innovative is confirmed only for the NEEs.

Keywords: global entrepreneurship monitor, innovative versus imitative activities, international orientation, educational level, firm growth aspirations

1. Introduction

Although the EU policy strives to unify the EU market as much as possible, extensive country and regional differences in economic growth and the prosperity between them still exist. Strengthening the knowledge of regional differences in entrepreneurial activity and its determinants is of utmost importance. When comparing entrepreneurial activity across regions, it is important to take into account that not all companies can be regarded as "entrepreneurial" [1–3] or "productive" [4]. Schutjens and Wever [5] as well as Koellinger [6] argue the difference between imitative and innovative types of entrepreneurial activity. The latter, innovative type, is uppermost in the minds of decision-makers throughout Europe. In the policymaking context, innovation is considered a prerequisite for economic growth [1, 7, 8]. An evident gap

exists in studies on entrepreneurial activity that simultaneously encompass regions and countries [9, 10]. Therefore, investigating determinants of entrepreneurship over regions (in our case, Western and Northern European economies) enables us to disentangle regional demography attributes (e.g., identifying ambitious entrepreneurs), institutional components (e.g., educational system), and specific regional attributes (e.g., international orientation). In recent years, the connection among innovation and international orientation, educational level, and growth aspiration has attracted increased interest among policymakers, researchers, and business leaders [6, 8, 11–15].

Prior studies lack a thorough investigation of the factors that stimulate innovative rather than imitative forms of entrepreneurial activity. They are certainly related to the phenomena of business opportunity recognition; therefore the current paper adds to the knowledge of the development of different types and levels of companies' innovation and focus on the determinants that might differ between Western and Northern European economies' established entrepreneurs. The reasoning behind expected differences of these two regions lies in the Innovation Union Scoreboard (IUS) 2014's results, showing four different performance groups, based on the average innovation performance in the EU. Three countries from our northern group (i.e., Denmark, Finland, and Sweden) fell into the group of "innovation leaders," with innovation performance being well above the EU average, whereas only Germany from the investigated western group belonged to this same category [16].

This paper focuses on country and regional differences in innovation activity. Our research is based on the Global Entrepreneurship Monitor (GEM). GEM's contribution to the knowledge and understanding of the entrepreneurial process is unique as it is the only existing data set that can provide consistent cross-country comparisons and information on entrepreneurial activity. As such, the importance of its findings is invaluable for policymakers as well as academics. GEM focuses in particular on the level of involvement in a country's early-stage entrepreneurial activity. But one needs to understand that many new entrepreneurs can be characterized as imitators, not "real" entrepreneurs in search of novelty; in fact their aim is not to innovate or grow their business [17]. At the regional level, our interest therefore lies in another group, called established entrepreneurs, by which we can investigate the innovative type of entrepreneurial activity as, in the Schumpeterian perspective, they will boost the employment growth and innovation at the company level and, consequently, growth at the regional level [18, 19]. According to van der Zwan et al. [20], the structural presence of entrepreneurial activities within a country depends strongly on the prevalence rates of established entrepreneurs. This means that established companies ultimately create certainty for employment and jobs.

Different authors claim that entrepreneurial innovativeness relates strongly to individual as well as environmental circumstances and differs significantly between countries. More developed countries have higher intensity of innovative rather than purely imitative entrepreneurs [1, 6, 8]. Also the presence of business opportunities in general depends on environmental factors such as technology advancement, rules of law, and demographics and also other society characteristics, such as values, customs, and urbanization [6]. For example, Morris [21] describes Northern European high-growth entrepreneurs as being very unlikely to allow fear

of failure to prevent them from starting a new business, whereas Western European high-growth entrepreneurs are among the least likely to have started their business in order to increase their incomes. They are the most likely to start their business in order to become more independent.

Our research concentrates on the relationship among various dimensions of entrepreneurship (e.g., educational level, firms' customers from other countries—international orientation, growth aspirations, about future employment) and their innovative versus imitative activity. Investigated variables of our research are in line with three broad areas of innovative performance as described in IUS 2014: enablers, firm activities, and outputs. Among the enablers, which refer to a firm's external drivers of innovation activity, human resources measured with entrepreneurs' educational level have been examined. From the firm activities, companies' international orientation has been explored. Finally, using output, entrepreneurs' growth aspirations have been taken into consideration. We derived data from the GEM research for 2001–2008. The NEEs that participated in the GEM and in which we were interested included Denmark, Finland, Iceland, Ireland, Latvia, Norway, Sweden, and the United Kingdom, whereas the WEEs comprise Austria, Belgium, France, Germany, Italy, the Netherlands, Portugal, Spain, and Switzerland.

This paper is divided into six sections. The next section presents the theoretical background and previous research. The following section describes research hypotheses, which is succeeded by the presentation of the data, variables, and models. Results are explained in the next section. The final section presents the discussion and conclusion.

2. Theoretical background and previous research

Entrepreneurship and innovation theories demonstrate that it is easier to find common points than to define limits between them; this might be one reason why we often see them as a single phenomenon.

Such understanding originates from the work of Schumpeter [22]. He defined an entrepreneur “as an individual carrying out new combinations—namely, innovations.” In his view the entrepreneur was the one who innovates. Schumpeter undoubtedly assigned the role of innovator to the entrepreneur and made a distinction between invention and innovation. He also explicitly differentiates the role of entrepreneurs and enterprise: “The carrying out of new combinations we call ‘enterprise’; the individuals who carry them out, we call ‘entrepreneurs’” [22]. In this way he emphasized the relevance of explicit human possessions: the ability to think, be creative, and innovate. Therefore, the entrepreneur becomes essential resource for an enterprise to exist. In order for an enterprise to grow, develop, and succeed, the entrepreneur needs to be innovative in constantly performing new combinations of existing resources [23].

Innovative activity in a given economy depends not only on individuals (entrepreneurs), networks of innovative enterprises and research organizations, suppliers, and customers but also on various institutional factors, such as the public financing system of research, the nation's system of schooling, training, and financial establishments. As such, innovation can

be seen as the outcome of mutual activities of various members of the whole system [24]. Thus, the functioning of these joint constituencies of the system of which the outcome is represented by innovation is greatly dependent on economy-specific formal (e.g., regulatory frameworks) and informal (e.g., rules, conventions, and norms) institutions [2, 8, 25]. As a result, innovation activities are not equally distributed in space, i.e., [2, 26–29], and we are faced with different development levels of regional innovation systems, i.e., [1, 8, 30–33].

Andersson and Ejermo [14], for example, found a positive relationship between the innovativeness of a firm and its accessibility to university researchers within regions where a firm's own research groups are located. They also found that, for a firm's innovativeness, the size of the firm's R&D staff is the most important internal factor, whereas intraregional accessibility to other firms' research is not important. That regional effect matter has also been argued by Ashem et al. [34], who presented a regional innovation policy model aimed to enable regional advantage.

Insights into the determinants of innovative versus imitative entrepreneurship are relevant for policymakers as increasing the share of the former (i.e., innovative entrepreneurial activity) is a major target for the EU's 2020 Entrepreneurship as well as Innovation Strategy Agenda [16, 35, 36]. Previous study results [9, 10] have suggested that accounting for the regional context is important. They have also confirmed the distinction between low- and high-ambition entrepreneurship within various regions. Therefore, we expect to identify the significant differences in the innovative activity of established entrepreneurs within Western and Northern European regions. Bosma and Schutjens [9] further suggest that (the process of) setting up new businesses generally relates to regional conditions and regional demography effects, such as urbanization, age, and education structure, whereas entrepreneurs' growth and innovation ambitions are subject to national institutional factors, including entrepreneurial and cultural attitudes. Thus, we aim to see whether regional institutional conditions affect a firm's innovative activity.

3. Research propositions

3.1. Entrepreneurs' educational level and innovative activity

Education at individual as well as country level is strongly related to productivity. Therefore, economies investing more into education express higher levels of national wealth. Different types of education—formal, informal, job training, as well as work experience—present a higher level of human capital that clearly benefits individuals. Some studies have shown that each year of school raises an individual's wage by 5–7% on average. The percentage depends on the quality of school, education type, and so on, but more highly educated workers are undoubtedly better paid and—unless firms are throwing their money away—more productive, e.g., [37–39].

Millán et al. [12] recently demonstrated that a higher level of education positively affects the average entrepreneur's performance. When profitable opportunities for new economic activities exist, individuals with more human capital should more effectively identify and develop

them. Entrepreneurs' higher educational level positively affects the company's innovation activities.

The 2011 Eurydice survey "Entrepreneurship Education" [40] gathered information on the state of entrepreneurship education as well as on the associated national strategies, action plans, initiatives, and ongoing reforms. The study investigated 31 European countries. Results show the wide recognition of the entrepreneurship education importance, since almost half of the countries have integrated the objectives linked to the promotion of entrepreneurship education within their broader strategies. Especially Northern European countries went even further and launched also specific entrepreneurship education strategies. It needs to be emphasized that Scandinavian countries promote innovation and entrepreneurship at every educational level. Entrepreneurship is taught from primary school on as a cross-curricular skill and not as a separate class. Universities systematically teach entrepreneurship in many different classes and create projects for students that include the development of an entrepreneurial mind set [41].

The expected positive relationship of educational level and a firm's innovative activity implicates that a firm's knowledge is managed properly and efficiently, which is manifested in a firm's innovativeness [42]. We use the term knowledge management as a description of "everything from the application of new technology to the broader endeavour of harnessing the intellectual capital of an organization" [42]. Successful organizations are capable of making new value by creating knowledge, which is manifested in a firm's innovation (new products or services) [42].

Behind that reasoning, we expect that higher levels of educational attainment lead individuals to perceive and exploit innovative rather than imitative business ideas. Thus, our first research hypothesis (H1) reads:

H1: A higher educational level is significantly and positively related to firm innovative activity, more so in Northern Europe than in the western part of the region.

3.2. International orientation and innovative activity

Internationalization has been defined by several different schools of thoughts. The monopolistic advantage theory proposes the internationalization when enterprises may use their established advantages abroad at no or very low cost. Product cycle theory suggests the internationalization as a strategy where enterprises protect their existing markets of mature products or services. The stage theory of internationalization describes the enterprise's internationalization as a result of development advancement. After accumulating a certain amount of knowledge and experience, enterprises start to work abroad and develop relationships across international boundaries [43].

Globalization raises the importance of global trade. Modern technologies allow smaller firms to compete on international markets. However, reasons for entrepreneurial internationalization remain quite different. Sometimes products and service might be more suitable for foreign markets. In the case of smaller economies, the size of internal markets might be the stimulating factor for going international. The intense local competition motivates them to pursue customers outside their countries. A broader leverage of high investments as well as

geographical factors and strategic partnership connections can also stimulate cross border activities [39, 44, 45].

International orientation and innovative activity are strongly interrelated. Williams and Shaw [13] stated that “successful internationalization requires innovation, and internationalization requires firms to have superior knowledge.” Knight and Cavusgil [46] claimed that “fast internationalisers are more innovative than domestic firms or slow internationalisers” and their entrepreneurial teams have more international experience. Andersson and Lööf [47] found that, especially for small firms, persistence in pursuing exports appears to be necessary and sufficient for gleaning learning effects from exports. The authors also found that such an effect of learning by exporting increases with the extent of small firms’ exports [48].

The reason we use international orientation as an indicator of a firm’s innovative activity stems from the general consideration that innovative products or services are easily exploited across countries [49]. According to Cerrato [49], the consequence of a more international presence leads to a higher level of innovation. The mediating role of the region is included in our research because of the recent empirical arguments that both the diversity and strength of knowledge generated within the region or brought into the region on the basis of international cooperation are crucial for the region’s innovative activity [41, 45, 50]. Regarding Andersson and Lööf’s [51] findings, for micro and small firms to be innovative, important determinants include skilled labor, affiliation to a domestically owned multinational corporation, and international trade with the G7 countries. As Kaufmann and Tödtling [52] argued, determinants of innovation for SMEs depend on characteristics of the region in which SMEs are integrated; thus, we divide the sample into two regions in order to address such distinctions.

A specific GEM measure assesses the extent to which entrepreneurs sell to customers outside their economies. Internationalization is—on average—lowest in the factor-driven economies and increases with the economic development level [53, 54]. Based on Porter’s typology [55], all the investigated countries in our sample are innovation-driven economies; the one exception is Latvia, which is an efficiency-driven economy. In line with the discussed circumstances, we presuppose a positive association between innovative activity and international orientation of established entrepreneurs. Our second research hypothesis (H2) reads:

H2: International orientation is significantly and positively related to firm innovative activity, more so in Northern Europe than in the western part of the region.

3.3. Growth aspirations and innovative activity

Entrepreneurship research and practice emphasize company growth as a measure of entrepreneurial success. One reason why society values entrepreneurs is their potential to create employment opportunities for others [19, 56]. Davidsson [57] argues that a determinant of perpetual entrepreneurship is firm growth. To Penrose [58] firms that are oriented to grow are better equipped to allure exceptionally qualified management, as well as outside investors, partners, and rivals. Since business growth is advantageous, it would be a good idea for entrepreneurs to pursue it [59].

The variable of firm growth aspirations is added to our model as the growth enables small firms to achieve a competitive advantage, which can be developed and is implicated by

innovation [19, 60, 61]. A positive but not significant relationship was estimated between a firm's entrepreneurial orientation and its growth aspirations for a sample of 1612 small- and medium-sized enterprises from Germany, Austria, Switzerland, and Liechtenstein [11]. Harrison et al. [62] studied the impact of process and product innovations on employment growth in manufacturing and services firms from France, Germany, Spain, and the United Kingdom (20,000 firms) for the 1998–2000 period. The results indicated that employment decreases with productivity growth in the production of old products, whereas it remains unchanged or rises with process innovations.

In our investigation, we sought to uncover an individual's unique capacity to be innovative and creative. We believe that essential factors for transferring ideas, knowledge, and experiences into something that is radically new or ameliorates a product or process are at least two. The first factor is determination and longing to innovate (innovation impulse), while the second factor comprises opportunities and the feasibility to innovate (innovation capacity). From this standpoint, the economic literature interprets innovation capacity of organizations [63] and innovation capacity of countries [64, 65]. Notwithstanding, the previous literature, according to our knowledge, has not researched and debated about the innovation impulse or innovation capacity of an individual as determinants related to his/her aspiration for growing a firm. We propose that individuals who declare a larger extent of innovation activity are more plausible to be engaged in growing their firms. Hence, the third hypothesis (H3) is:

H3: Firm growth aspirations are significantly and positively related to firm innovative activity.

All three hypotheses were tested for established entrepreneurs in nine Western European economies (WEEs) and eight Northern European economies (NEEs).

4. Data, variables, and models

4.1. Data

Research data were derived from the GEM research. Bosma et al. [53] fully explained the GEM study's content and procedures. GEM is a large-scale entrepreneurship research program launched with ten countries in 1997. In 2014, the coverage was extended to 73 countries [66]. For our research, we used GEM data pooled from Adult Population Survey (APS) collected for the period 2001–2008. Interviewing was done by the method of computer-assisted telephone interviewing (CATI). Our model is represented by a sample of 13,285 to 15,358 individuals from the nine WEEs and 6144 to 7618 individuals from eight NEEs.

4.2. Variables

In this section, we described the way we measured the variables included in our research. We used the GEM data already mentioned. In the following, we first presented the dependent (criterion) variable, which is innovative activity. Then we proceeded with main independent variables (predictors), which are educational level, international orientation, and firm growth aspirations. We built a model for established entrepreneurs from WEEs and NEEs combined as well as separately for the two groups of countries.

4.2.1. *Dependent (criterion) variable*

We assumed the activity of established entrepreneurs being innovative or imitative according to given answers to the next questions:

- Were the technologies or procedures available more than a year ago? Interviewees selected the answer from two options: no (coded as 0) and yes (coded as 1).
- How many (potential) customers consider the product new/unfamiliar? Interviewees selected their answer from three options: all (coded as 1), some (coded as 2), and none (coded as 3).
- How many businesses offer the same products? Interviewees selected the answer from three options: many (coded as 1), few (coded as 2), and none (coded as 3).

We assumed as innovative (coded as 1) an established entrepreneur (an interviewee) who selected no to the first question, all or some to second question, and few or none to the third question. Interviewees that selected yes to the first question, none to second question, and many to the third question represented imitative established entrepreneurs (coded 0, which assumes the reference category).

4.2.2. *Independent variables (predictors)*

In the binary logistic regression model, we included three independent variables and five control variables:

1. Educational level. Interviewees were able to choose the answer from the following options: some secondary (coded as 1), secondary degree (coded as 2), postsecondary (coded as 3), or graduate expanded (coded as 4). The fourth option represented the indicator of reference.
2. International orientation. Interviewees were choosing their answers from the following options: 76–100% (coded as 1), 26–75% (coded as 2), 11–25% (coded as 3), 1–10% (coded as 4), or none (coded as 5). We used the last option for the reference indicator.
3. Firm growth aspirations. Interviewees responded if they intend to recruit more than five employees in the next 5 years: no (coded as 0) or yes (coded as 1). The last option represented the reference indicator.
4. Technology sector (control variable). Interviewees' business and the technology sector were selected from among two given options considering the classification of the technology level proposed by OECD: no/low technology sector (coded as 0) or medium or high technology sector (coded as 1). The last option represented the reference indicator.
5. Firm type (control variable). Interviewees selected their answers from four options: extractive (coded as 1), transforming (coded as 2), business services (coded as 3), or consumer oriented (coded as 4). The representative of the reference indicator was the fourth option.
6. Skills (control variable). Interviewees answered whether they had the capacity, represented by knowledge, skill, and experience, necessary to establish a new firm. They selected the

answer from two options: no (coded as 0) or yes (coded as 1). Yes represented the reference indicator.

7. Year survey (control variable). Data for the survey was collecting in the period 2001 to 2008. The year of 2008 represented the reference indicator.
8. Gender (control variable). Respondents indicated their gender: male (coded as 1) or female (coded as 2).

4.3. Binary logistic regression models

We built three pooled binary logistic regression models for eight consecutive years (2001–2008) in one dataset: the first model for nine WECs, the second model for eight NECs, and the third model for both groups combined. Pooling the years in one dataset allowed us to control the fluctuations in the distribution across countries over time. In the models, we assumed that the criterion variable is a linear combination of the eight predictors. The models for estimation read:

$$\begin{aligned} \text{Logit } [P(y = 1)]_{ji} = & a_j + B_{1jk} \text{ Educational level}_{kji} + B_{2jl} \text{ International orientation}_{lji} \\ & + B_{3j} \text{ Firm growth aspirations}_{ji} + B_{4j} \text{ Technology sector}_{ji} + B_{5jm} \text{ Firm type}_{mji} + B_{6j} \text{ Skills}_{ji} \quad (1) \\ & + B_{7jn} \text{ Year survey}_{nji} + B_{8j} \text{ Gender}_{ji} + e_{ji} \end{aligned}$$

where Logit $[P(y = 1)]$ is the criterion variable (i.e., the binary logit estimate for innovative activity); a is the binary logit for the regression constant; B is the binary logit estimate for the regression coefficients of predictors; j is the index for the WEEs, NEEs, and combined model ($j = 1, 2, 3$); k is the index for three categories of educational level ($k = 1, 2, 3$); l is the index of four categories of international orientation ($l = 1, \dots, 4$); m is the index of three categories of firm type ($m = 1, 2, 3$); n is the index of eight categories of survey year ($n = 1, \dots, 8$); i is the index for the number of cases ($N_{WEEs} = 13,285$ to $15,358$; $N_{NEEs} = 6144$ to 7618); and e_{ji} is the binary logit estimate for the error term.

By adding the control variables (technology sector, firm type, skills, survey year, and gender), we tried to improve the results presented in the next section.

5. Results

Table 1 summarizes the results. The binary logit estimate for educational level is negative and significant, whereas it is positive for international orientation. Firm growth aspirations are negatively and significantly related to innovative activity only for the NEEs model, whereas this predictor proved to be irrelevant for the WEEs model and combined economies (when both groups were pooled together). As the WEEs and NEEs models' estimations are correct, in the following we focus on explaining the meaning of these models' regression coefficients. The empirical results confirm our H1 and H2 hypotheses for both groups of economies, whereas the H3 hypothesis is confirmed only for the NEEs. In the H1 hypothesis, we suggested that higher levels of education positively affect a firm's innovative activity. In the H2 hypothesis, we

Predictor	Coefficient	West European economies (WEEs) (j = 1) (N = 12,314*)				North European economies (NEEs) (j = 2) (N = 5095**)				West and North European economies (j = 3) (N = 20,935***)			
		B	Exp(B) (odds ratio)	Wald	p-Value	B	Exp(B) (odds ratio)	Wald	p-value	B	Exp(B) (odds ratio)	Wald	p-Value
Educational level	B _{1j}			58,650	0.000			33,903	0.000			104,815	0.000
Educational level (some secondary)	B _{11j}	-0.595	0.551	54,724	0.000	-0.822	0.440	27,984	0.000	-0.647	0.524	101,485	0.000
Educational level (secondary degree)	B _{12j}	-0.403	0.668	21,484	0.000	-0.327	0.721	6850	0.009	-0.389	0.678	36,679	0.000
Education (postsecondary)	B _{13j}	-0.197	0.821	4445	0.035	-0.514	0.598	13,825	0.000	-0.352	0.703	25,117	0.000
International orientation	B _{2j}			131,062	0.000			65,210	0.000			209,617	0.000
International orientation (76–100%)	B _{21j}	1033	2809	69,962	0.000	1166	3210	41,125	0.000	1001	2721	109,840	0.000
International orientation (26–75%)	B _{22j}	0.807	2240	73,950	0.000	0.835	2305	29,511	0.000	0.779	2179	109,398	0.000
International orientation (11–25%)	B _{23j}	0.579	1784	21,769	0.000	0.931	2538	20,767	0.000	0.675	1963	46,996	0.000
International orientation (1–10%)	B _{24j}	0.304	1356	16,402	0.000	0.514	1672	20,218	0.000	0.408	1504	52,738	0.000
Firm growth aspirations (No)	B _{3j}	0.061	1063	0.492	0.483	-0.382	0.682	7638	0.006	0.030	1031	0,192	0.661
Technology sector (low technology) – 0,138	B _{4j}	-0.138	0.871	1298	0.255	-0.884	0.413	30,478	0.000	-0.433	0.648	25,561	0.000
Firm type	B _{5j}			11,460	0.009			31,353	0.000			51,142	0.000
Firm type (extractive)	B _{51j}	-0.401	0.670	10,701	0.001	-0.969	0.379	28,673	0.000	-0.587	0.556	38,247	0.000
Firm type (transforming)	B _{52j}	-0.072	0.930	0.996	0.318	-0.217	0.805	3128	0.077	-0.090	0.914	2492	0.114
Firm type (business service)	B _{53j}	-0.131	0.877	2203	0.138	-0.406	0.666	8171	0.004	-0.310	0.734	20,468	0.000
Skills (No)	B _{6j}	-0.081	0.922	0.594	0.441	-0.267	0.766	2855	0.091	-0.214	0.808	6821	0.009
Year survey	B _{7j}			161,070	0.000			159,336	0.000			476,715	0.000
Year survey (2003)	B _{71j}	-2776	0.062	41,357	0.000	-2079	0.125	41,406	0.000	-2083	0.125	159,045	0.000
Year survey (2004)	B _{72j}	-1628	0.196	114,446	0.000	-1738	0.176	95,675	0.000	-1702	0.182	285,514	0.000
Year survey (2005)	B _{73j}	-0.004	0.996	0.002	0.960	-0.230	0.794	2145	0.143	-0.081	0.923	1385	0.239

Predictor	Coefficient	West European economies (WEEs) (j = 1) (N = 12,314*)				North European economies (NEEs) (j = 2) (N = 5095**)				West and North European economies (j = 3) (N = 20,935***)			
		B	Exp(B) (odds ratio)	Wald	p-Value	B	Exp(B) (odds ratio)	Wald	p-value	B	Exp(B) (odds ratio)	Wald	p-Value
Year survey (2006)	B _{74j}	-0.004	0.996	0.002	0.966	-0.022	0.978	0.024	0.878	0.032	1032	0.189	0.663
Year survey (2007)	B _{75j}	-0.125	0.882	2054	0.152	-0.098	0.907	0.399	0.527	-0.090	0.914	1776	0.183
Gender (males)	B _{8j}	0.054	1055	0.725	0.394	0.037	1037	0.111	0.738				
Intercept	a _j	-1614	0.199	87,633	0.000	-0.273	0.761	1008	0.315	-1173	0.309	85,283	0.000
-2Log Likelihood		7639,356				3047,352				12,677,829			
Nagelkerke R Square		0.091				0.179				0.118			
Model χ^2		548,834				485,470				1233,768			
Model χ^2 Significance		0.000				0.000				0.000			
Overall Predictive Accuracy (%)		88,7				89,9				89,6			

Notes: The reference category of the criterion variable in the estimation is 0 (Imitative) by which respondents with the imitative activity are coded. Reference categories of the seven predictors are: educational level (graduate expanded; = 0), international orientation (none; = 0), firm growth aspirations (yes; = 0), technology sector (medium or high tech; = 0), firm type (consumer oriented; = 0), skills (yes; = 0), year survey (2008; = 0), and gender (female; = 0). In the model, there is no problem of multicollinearity which is confirmed by correlation matrices. These matrices are not included in the paper but are accessible on request.

West European economies (WEEs) include Austria, Belgium, France, Germany, Italy, the Netherlands, Portugal, Spain, and Switzerland; North European economies (NEEs) include Denmark, Finland, Iceland, Ireland, Latvia, Norway, Sweden, and the United Kingdom.

*Included in analysis (missing cases 4065; total 16,379);

**included in analysis (missing cases 2265; total 7360);

***included in analysis (missing cases 10,008; total 30,943).

Table 1. Results of the binary logistic regression for the WEEs, NEEs, and combined established entrepreneurs, 2001–2008 (criterion variable: innovative activity = 1).

presupposed that established enterprises that export certain proportions of their products or services are more innovative (compared to those that do not export). Our H3 hypothesis suggests that established entrepreneurs that have aspirations for growing their firms are expected to be more innovative. In the following, we analyze the results in greater detail.

Some secondary education showed the highest negative and significant binary logit estimate for NEEs [B_{11} (NEEs) = -0.822 , odds ratio = 0.440]. The odds ratio indicates that the likelihood of being innovative for an established entrepreneur with some secondary education is 56% smaller than an established entrepreneur with an expanded graduate-level education. This predictor in WEEs model has a smaller binary logit estimate and a higher odds ratio [B_{11} (WEEs) = -0.595 , odds ratio = 0.551], which means that the likelihood of being innovative for an established entrepreneur with some secondary education is 45% less than for an established entrepreneur with an expanded graduate-level education. As indicated in **Table 1**, the odds ratios increase with higher educational levels in the WEEs and combined models, which mean that the probability of innovative activity (compared to imitative activity) of established entrepreneurs is higher an entrepreneur's higher educational level. However, in the NEEs model, we can see (in **Table 1**) that a secondary education degree creates a larger likelihood that an established entrepreneur is innovative [B_{13} (NEEs) = -0.514 , odds ratio = 0.598] than a postsecondary education (the reference category). Thus, the likelihood of innovative activity is higher by 12% points for an established entrepreneur with a secondary degree compared to a postsecondary degree. Such results can be compared to the empirical research results of Ucbasaran et al. [67], who found that business owners with more experience, managerial, entrepreneurial, and technical capabilities (presented by the educational level variable in our case) identify and realize more business opportunity (presented by the innovative activity variable in our case).

The overall impact of international orientation proved to be a positive and significant predictor in all three models, although the regression coefficients were quite different. In all cases, the coefficients were the highest in the NEEs model. A positive relationship between innovative activity and a specific degree of international orientation was expected, as presupposed in our H2 hypothesis. As the reference category for comparison was no international orientation, an increasing value of regression coefficients was expected; this was true for the WEEs and combined cases, but not for the NEEs model. In the WEEs model, the highest positive impact had exports of 76–100% [B_{21} (WEEs) = 1.033 , odds ratio = 2.809]. The likelihood of being innovative in a WEEs' established enterprise is 2.8 times greater if a firm exports 76–100% of its products or services, compared to a similar firm not involved in exporting. In the NEEs model, this figure is even higher [B_{21} (NEEs) = 1.166 , odds ratio = 3.210]. Thus, the probability of being innovative is 3.2 times greater for an established enterprise that exports 76–100% of its products or services than a firm not involved in exporting. The value of regression coefficients for exports between 26 and 75% for both the WEEs and NEEs models was almost the same [B_{22} (WEEs) = 0.807 , odds ratio = 2.240 and B_{22} (NEEs) = 0.835 , odds ratio = 2.305]. Therefore, the likelihood of being innovative in a WEEs established enterprise is 2.2, whereas in the NEEs model, it is 2.3 times greater if a firm exports 26–75%. For the WEEs model, the results for another two categories of the predictor show that the likelihood of firm's innovative activity is 1.8 and 1.4 times bigger if a firm exports 11–25% and 1–10% of its products, respectively,

compared to a firm not involved in exporting. In the NEEs model (as shown in **Table 1**), the greatest likelihood of innovative activity in an established enterprise is expected in firms with 11–25% of exporting as its odds ratio amounts to 2.5. Thus, the probability of innovative orientation is 2.5 times greater if a firm exports 11–25% compared to a firm not involved in exporting. Our result confirms and further refines Palangkaraya's [68] findings of the positive correlation between innovation and export market participation among Australia's small and medium enterprises. The result can also be compared to Cerrato's [49] research findings that a stronger international presence among micro and small enterprises affects the greater level of their innovation.

Firm growth aspirations proved to be a significant predictor only in the NEEs model. The binary logit estimate was negative [B_3 (NEEs) = -0.382 , odds ratio = 0.682], indicating that the likelihood of established entrepreneurs with no growth aspirations being innovative is 32% smaller than the innovative orientation of established entrepreneurs that have firm growth aspirations. Our H3 hypothesis, which states that firm growth aspirations have a positive impact on innovative activity, was only partly confirmed as it was only valid for the NEEs model. This result for the NEEs is supported by Colombelli et al. [69] empirical finding of a positive association between firm growth and innovation for French industry. A positive but not significant relationship was estimated between a firm's entrepreneurial orientation and its growth aspirations for small- and medium-sized enterprises from Germany, Austria, Switzerland, and Liechtenstein [11]. In a way, our results can be compared to those of Harrison et al. [62], who estimated the impact of process and product innovations on employment growth in manufacturing and services firms from France, Germany, Spain, and the United Kingdom. Their results indicated that employment remains unchanged or increases with process innovations.

Regarding control variables, the results demonstrated that their inclusion in the models was reasonable as they proved to be additional indicators of innovative activity, although they were not significant in all cases. For example, the technology sector is a significant indicator for NEEs' established entrepreneurs [B_4 (NEEs) = -0.884 , odds ratio = 0.413], but not for the WEEs. Thus, the likelihood of innovative activity for established entrepreneurs from NEEs is 59% smaller if a firm operates in a low technology sector compared to a medium or high technology sector. However, technological classification does not contribute to the explanation of innovative activity in WEEs. In the combined model, this relationship also proved to be negative and significant, although the value of the regression coefficient was halved compared to that of the NEEs, which we consider to be incorrect.

Firm type for the extractive sector proved to be a negative and significant indicator in both cases. The likelihood of being innovative is 33 and 62% smaller if an established enterprise operated in the extractive sector compared to the consumer-oriented sector [B_{51} (WEEs) = -0.401 , odds ratio = 0.670 and B_{51} (NEEs) = -0.969 , odds ratio = 0.379]. The business service is another significant category of the firm-type predictor, but only for the NEEs model [B_{53} (NEEs) = -0.406 , odds ratio = 0.666]. This means that a likelihood of being innovative is 33% smaller if an established firm operates in the business service sector than in the consumer-oriented sector.

The results indicate that the binary estimate for the 2003 and 2004 survey years were negative and significant (compared to 2008) (see B_{71} and B_{72} for WEEs and NEEs in **Table 1**). Thus, during these years, established entrepreneurs were less innovative than in 2008.

Skills are not a significant indicator of firm innovative activity in WEEs and NEEs models. It is a significant indicator in the combined model, which is considered incorrect. The results also show that the gender control variable is not a significant indicator of innovative activity either.

In summary, using three main predictors (educational level, international orientation, and firm growth aspirations) and five control variables (technology sector, firm type, skills, survey year, and gender), we can adequately explain the innovative activity of established entrepreneurs from Western European and Northern European economies.

6. Conclusion

According to IUS [16], the differences in innovation performance among EU member states are still high and diminishing only slowly. At the regional level, the innovation gap is even wider. IUS 2014 revealed considerable differences among member states, particularly in knowledge excellence, internationalization, and business innovation cooperation. This is why this paper sought to achieve a better understanding of the development of innovative versus imitative innovation activity. We highlighted determinants that differ between Western and Northern European economies' established entrepreneurs. The identified differences strongly support the need for the sound development and implementation of a smart specialization strategy, which should include innovation on a country as well as regional level. Countries and their regions need to focus their efforts on building economic strengths and developing innovative ways to face global competition. Continuous innovation is inevitably dependent on new knowledge creation – a process that is multidimensional in nature and “must be managed at individual and organizational level, as well as in the societal, cultural, economic and political context” [8, 70].

We empirically estimated that firms' differences in innovation effectiveness among EU countries are large, still present, and diminishing only slowly. We estimated the impact of educational level, international orientation, and firm growth aspirations on firms' innovative activity. Therefore, our aim was to contribute to comprehension of the relationships between the presented variables, which we believe is essential for policy decision-makers, entrepreneurs, as well as academics. In this paper, our aim has been to confirm the hypotheses of significant relationships between an innovative activity and the three identified predictors. The hypotheses were tested on a sample of more than 17,000 established entrepreneurs from WEEs and NEEs.

We empirically succeeded in confirming two of the three proposed hypotheses for both groups of economies, whereas the third hypothesis was confirmed only for the NEEs. The results of the binary logistic regressions also highlighted that associations among variables differed across economies and were higher for the NEEs.

In the H1 hypothesis, we suggested that the higher the educational level, the greater the firm's expected innovative activity. This expectation was confirmed. Namely, the results demonstrated that the likelihood of established enterprises' innovative activity increased as the firm owners' educational level increased. The only exception was for NEEs' established entrepreneurs with a secondary level of education, who experienced a stronger impact of innovative activity in their firms than those with postsecondary education (the likelihood of innovative

activity at the secondary level of education was 12 percentage points larger than at the postsecondary level).

We also confirmed our H2 hypothesis, which presupposed that more innovative establish enterprises that export a certain proportion of their products or services (compared to not exporting them). For all four categories of exporting, the likelihood of a firm's innovative activity increases as the proportion of exports increased compared to no exports in both groups of economies. The one exception to this was NEEs' established enterprises, where the likelihood of innovative activity was greater by almost 10 percentage points in terms of the smaller proportion of exports (11–25%) compared to a larger proportion (26–75%).

Our H3 hypothesis suggested that established entrepreneurs that have aspirations for growing their firms are expected to be more innovative. Firm growth aspirations proved to be the significant indicator of innovative activity only for NEEs' established entrepreneurs.

However, we need to address the limitations of our study. First, the innovation activity might be observed from a variety of aspects. The findings could be replicated using a different type of innovation activity (e.g., processes, product, or outsourcing innovation). In addition, other measures of internationalization could be used. Second, this study utilized GEM data. To present more sophisticated results, future research should encompass other national-level measurements in order to provide more precise distinctions and reasoning behind differences within regions and countries. Another interesting avenue for future work on firms' innovative activity might focus on the comparison of regions that differ significantly in the level and history of their entrepreneurial activity.

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