

# The food delivery industry and its lack of care in gender equality: the speculative case of 'GiGi'

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## Abstract

This research takes a speculative design-led approach to increase care and safety for the women working in the 'Gig Economy', specifically the food delivery industry.

Past research analysing the employment conditions of the Gig Economy have identified unsafe practices that particularly affect female food delivery drivers operating in large cities. Among others, women have no safe access to wash areas, or no possibility to choose safer routes. More recent research put forward regulations or worker unionisation as possible solutions to address some of these problems. Our strategy, based on 'Research through Design' (RtD), envisions the increase of inclusivity, safety, and care by designing a platform – 'GiGi' (the author's word game of 'Gig Economy Gigs') – that empowers women through training and professional development.

With 'GiGi' we combined technology, service design and business to explore how design practices could increase the level of care for women by developing a 'caring transformation' for the food Gig Economy; through the 'GiGi' physical and digital community hub (self-) employed women can reimagine and redesign their own working conditions beyond its current conditions and limitations. We report on our methods to discuss what implementation a prototype should require to effectively design care through participatory co-creation practices.

## Author keywords

Care; Design; Futures; Gig Economy; Research through Design

## Introduction

In our research care is intended as the factor driven by "[...] cooperation and emotion" (Tilley, 2015) and should develop earnest feelings of "concern or interest; [...] affection or liking" (Rodgers et al., 2017, p. 1) for something or someone. Care and design share the ambivalence of being both a verb and

a noun (Rodgers et al., 2017); hence, they can be understood as a response to issues (of care) and create opportunities for design 'to care more' about someone or something or to 'care less'. Consequently, it follows our working definition of care used in this research:

*Care is the provision of attention and beneficiary, participatory or respectful actions towards the well-being, recovery, and future integrity of all participants of ecosystems, including humans, non-human actors, all species, and nature. The provision of these actions also includes to care less about potentially overwhelming, harming or negatively influencing factors.*

## Key Issues of Care

In recent years the world has been facing major challenges in environmental, political, economic, societal, humanitarian, or medical contexts; furthermore, the recent COVID-19 pandemic has juxtaposed some of these, if looked from the angle of care.

As a response, our ambition was to explore how design could address these issues and develop a methodology that includes care as a strategy to generate possible solutions. We conducted an initial literature review (step 1 - figure 1) covering various contexts of care. We researched what contexts during the pandemic elicited matter of concerns due to an absence of care; these included (a) human careless attitude towards nature (Jax et al., 2018), (b) lack of care towards public healthcare (Yang & Zimmer, 2020), (c) disconnection of social relationships causing loneliness and isolation in elderly, children and adolescents (Loades et al., 2020; Zubatsky et al., 2020), (d) ethics of robot care-givers (Bertolaso & Rocchi, 2022; Leite et al., 2013), (e) growth in the gender pay-gap that disadvantaged women taking more caring responsibilities for family and children; on the latter, for instance, in 2020, women in the Slovakian education sector earned ca. 22 % less than men (Modranský et al., 2020,

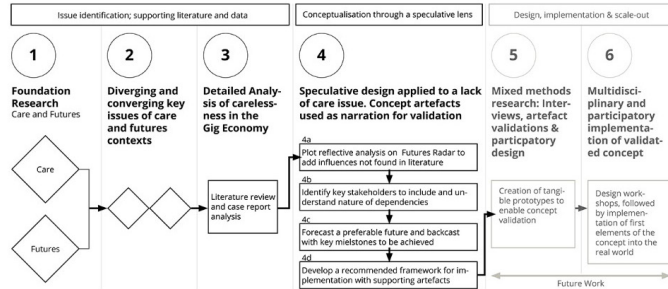


p. 302); furthermore, editors of Australian science publications outlined that women in some disciplines published up to 50% less in 2020, compared to a year before, while submissions by men doubled (Nash & Churchill, 2020).

It needs to be noted that issues such as pay gap or caregiver burden already existed before the pandemic (Chatzidakis et al., 2020); however, statistics reported an increased divide when the COVID-19 pandemic hit the global population. Hence our motivation was to develop a scenario capable of shaping more equal futures across society, including culture, economy, politics and environment (Dunne & Raby, 2013), by using design to facilitate the development of new perspectives (Mayer-Johanssen, 2021). Therefore, our work moved to a second phase (step 2 - figure 1) through the question: How do we future care?

**Research Through Design (RtD): Grounding the methodology for GiGi**

A case of how a design practice addressed an issue of care by developing a future narrative and a prototypal, speculative vision



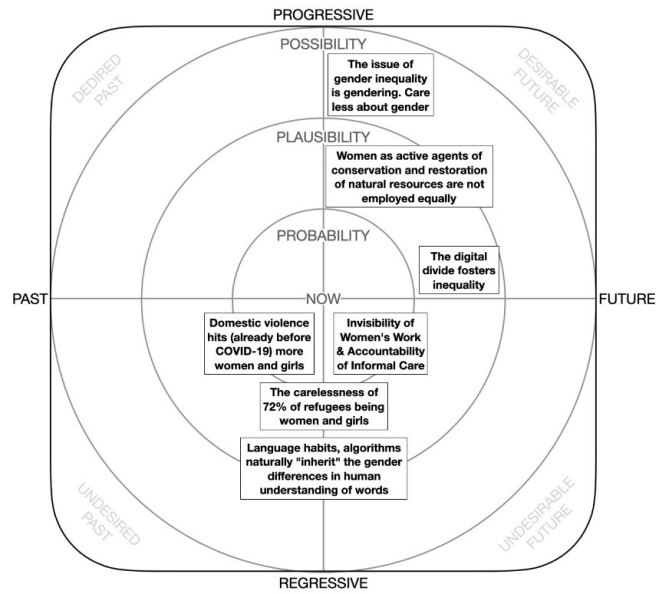
**Figure 1.** Overview of methodology of 'GiGi', following a Research Through Design (RtD) approach

By visualising different combinations of future societal scenarios in a matrix (adapted from IBM, 2018), we discussed, as a group of design multidisciplinary and multicultural design researchers, how we could draw connections between these and the issues of care, as identified in the literature. The matrix generated a very large pool of future issues in care, and we imagined how design could act upon them to prevent any further development and support future strategies of mitigation. From the literature review we identified that combining issues of gender bias and disadvantage and their related future projection share common factors; for example, the invisibility and inequality of women's work (society), the necessity of empowering women (economy) and gender biases in Artificial Intelligence (AI) technologies. These informed the next steps of the research.

**Ways to Future Care and Foster Gender Equality**

According to futurists there are three main classes of futures: possible, probable, and preferable (Amara, 1974; Bell, 2017a, 2017b; Heinonen & Ruotsalainen, 2013). We used these by asking *what are some possible, probable, and preferable ways we could design care to create gender equality in a desired future.*

We created the 'Futures Radar' diagram (figure 2) to position existing key issues and those that might become apparent through weak signals (Hiltunen, 2008) in the futures cone of possibilities (Voros, 2017) and plot them on a timeline: 1-3 years (short term), 3-5 years (mid term), 5-20 years (long-term); this helped us understand the likeliness and urgency of challenging issues and ultimately assign a 'lack of safety' index for women working in Gig Economies.



**Figure 2.** Futures Radar with examples of future issues in gender equality and disadvantage

We focused on the Gig Economy, as its self-employed model where a digital platform "facilitates and manage[s] interaction between buyers and sellers of services" (Goods et al., 2019, p. 505) suffers from the issues identified in the literature. We took the food delivery platforms as a case study, to outline how this industry doesn't "care" enough for its delivery workers, under the terms defined in this research. We used a Research Through Design (RtD) methodology (Zimmerman et al., 2007) to address the lack of safe zones for female food delivery bikers (figure 1). RtD offers a framework that structures foresight driven insights through research activities which are documented in and communicated through design artefacts. It aims to stimulate critical and reflective debates and new perspectives on matters that have been identified as being problematic (Zimmerman & Forlizzi, 2014).

**Putting the importance of care and the carelessness in the Gig Economy into context (step 3 - figure 1)**

The term 'gig' refers to the loose, irregular venues in the industry, which are also characterised by unstable income streams (Woodcock & Graham, 2020). Despite its instability, the (food) Gig Economy has generated positive aspects, which include flexibility in arranging work hours (Griesbach et al., 2019) or increase of income (Convery et al., 2020). Thus, the promise of a greater "flexibility and freedom" (Griesbach et al., 2019, 2) or "autonomy", as compared to other jobs (Goods et al., 2019, p. 513; Milkman et al., 2021, p. 358) has motivated many in joining these platforms.

The food sector has seen a rise of workforce personnel and revenues in the years leading up to the pandemic, and even more since 2020. In the USA the sector saw a growth in orders by +100% or more (Ecker & Strüver, 2022; Sumagaysay, 2020) and the percentage of female drivers has increased 22% (Delivery Drivers, 2020), which contrasts other regions of the world, e.g., a high number of job losses amongst food delivery drivers in India due to lockdowns during the pandemic (Parwez, 2022). Data from China, the largest food delivery market worldwide (Huang, 2022), suggests a strong increase

in food orders in 2020 with one of the leading platforms processing almost 30 million orders a day (Wu et al., 2022).

With the industry growth more issues surfaced, most likely linked to the interactions between drivers and the digital platform, and often caused by road traffic accidents or harassment. A “surveillance of workers through customer ratings and other performance measures” is reported by Griesbach (2019, 2) and, further, that the platforms’ apps direct workers “where to go and what to do” (2019, 3), but leave them uninformed about the destination or to which customer an order must be delivered. As customers rate services according to the expected delivery time, platforms might penalise late arrivals, which leads to more pressure, hence more traffic accidents (Convery et al., 2020; Li et al., 2020). These are all issues caused by the lack of transparency in human-platform interactions. The working conditions do not favour the drivers, as they are unable to estimate the profitability of a gig (Griesbach et al., 2019) and the related exposure to risks (Kilhoffer et al., 2020). The status of self-employment as “independent contractors” (Ecker & Strüver, 2022, p. 6) or “delivery partners” (Parwez, 2022, p. 4) removes employment protection (Kilhoffer et al., 2020). If for some of the workers the engagement with the platforms for short term work is acceptable (Ecker & Strüver, 2022; Goods et al., 2019), others suffer from underpayment (Goods et al., 2019).

Our motivation to investigate this industry from a female safety perspective was led by data suggesting an increase of female workers during the pandemic for the opportunity it offers “to prioritise commitment to their children, families [...]” (Milkman et al., 2021, p. 364). Despite the benefits, the Gig Economies exposed women to different types of risks (Perelman et al., 2020); they are confronted with general discrimination during in job-application and compensation (Som, 2020) as women carry a higher burden of care responsibilities and cannot work in the most profitable evening hours (Atal, 2020; Dokuka et al., 2022). In some cases, women earn less than men, 7% in the case of US based Uber drivers (Cook et al., 2021). Other statistics indicate that women avoid night delivery in unsafe areas or that they are verbally abused (Convery et al., 2020). Hence, care and safety are matters of high concern, as there is a general lack of support by platform providers that is worsened by the absence of a community that could support them through the exchange of information about safety (Perelman et al., 2020).

Administrative bodies, organisations and platform companies have partially responded to these issues; ‘Lieferando’ with “regular employment contracts” (Ecker & Strüver, 2022, p. 8); Australia (Goods et al., 2019), United Kingdom or India (Parwez, 2022) with regulations for delivery worker safety and social protection; or Austrian food delivery company ‘Velofood’ through the drivers’ self-governance of working schedules and a two-way radio type of app enabling communication between workers (Ecker & Strüver, 2022). Another alternative initiative is “platform cooperativism” which advocates more “democratic ownership models”, such as cooperatives, that sets out the use of technology and innovation for the benefit of all (Scholz, 2016, p. 14; also, in Ecker & Strüver, 2022). Despite these, the literature does not indicate solutions that have a more strategic mid- to long term plan for

changing the future of the industry by including care as a core component.

### **Future thinking and a speculative, collaborative lens to design and foster care (step 4 - figure 1)**

Following the analysis of the food Gig Economy and the lack of care for (female) bikers, we aimed to “raise awareness” and act “as a catalyst for change” (Dunne & Raby, 2013, p. 33) by designing care through a speculative scenario and “communicating the results” (Frayling, 1994, p. 5) through our Research Through Design (RtD) methodology, see steps 4a-d, figure 1. The design choices must result in a future where (a) women’s voices are heard, (b) safe environments for female delivery workers are established, (c) bias due to non-inclusion or disadvantage is avoided and (d) delivery workers co-participate in the development of more inclusive, safer, and caring working environments.

Employing a speculative lens with future foresight rooted in addressing the social issues uncovered through literature review, the strategy of our approach was (a) to identify and understand key stakeholders and the nature of their dependency, to ensure the right approach and target groups for an intervention; we also aimed to (b) forecast a preferable future (ca. 2030) for female delivery bikers that cares more for them, (c) backcast this future back in time to be able set achievable milestones to reach the preferable future and (d) develop a recommended framework for validation and implementation. These objectives have been developed as speculative concepts that prepare the ground for tangible prototypes. Hence ‘GiGi’, which is a sharable experience that engages key stakeholders and communities of users (Groß & Mandir, 2022) in co-designing a caring response to the unsafe female working conditions in food Gig Economies. With ‘GiGi’ we initiated a design toolkit with artefacts, such as storyboards that illustrate how empathy can be (co)created (Putnam et al., 2012) through the engagement of a target audience, i.e., the delivery bikers, envision a caring service of the Gig Economy (Reeder, 2005).

Through an extensive stakeholder analysis (Smith, 2000) that was guided by our set goal to avoid self-bias of missing out on all relevant, diverse groups of actors, we identified our key interlocutors: women in the food delivery sector, who act as primary users and beneficiaries of care in food delivery. We chose China as a first focus country due its large market and high number of delivery drivers.

### **Backcasting from the future**

A backcasting map (figure 3) is a planning method that begins with the concept of the desired future and then works backwards to determine policies and programmes connecting the future to the present (Holmberg & Robert, 2000). Through this method we identified two questions: (a) how does (female) food delivery work look like in 2030? and (b) what if in 2030 gender equality has settled in and disadvantages for women in the food delivery industry are a thing of the past? Our backcasting concept framed the achievement of equality when women are empowered to step up from the passive delivery work to an active, managerial role where they can succeed as creative actors and contribute to develop strategies, in our case, for food preparation, delivery and consump-

tion. This concept stems from the United Nations' strategy on achieving "gender mainstreaming" (UNSDG, 2016, p. 7), which regards empowerment as essential for reaching equality. Empowering female delivery drivers means to help them direct their life, professional choices, career development and care responsibilities by providing access to and use of technology (Mackey & Petrucka, 2021).

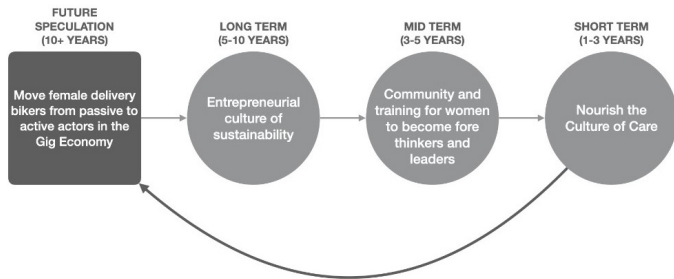


Figure 3. Backcasting 'GiGi'

'GiGi' envisions the development of a physical and digital community that acts as a hub to empower women in striving beyond the limitations of the current platforms. It offers an alternative to the current dominance of food delivery corporations and provides them with training to elicit more inclusive and caring approaches to the Gig Economy.

The backcasting activity outlined three different horizons: short-, medium- and long-term. In the short term we envision the development of a female delivery driver community to promote a Gig Economy culture based on the values of care. In this community members discourage unethical behaviour (of persons or technology) and define safe spaces for driving. A series of improvements are envisioned to be implementable on short terms. This community will provide training on driver's safety and skill improvement and on-site childcare services which has been proved to be a key support to help women progress their careers (Goryunova et al., 2018; Madsen, 2018). To make software safer and caring we speculated that women could avoid unknown, unsafe, or unwanted areas for delivery (thus safer delivery route planning) or use an alarm functionality for emergencies.

In the mid-term horizon (3-5 years) we envisioned alternative opportunities for employment that enable female drivers to reinvent their professional self through coaching and training, especially by leveraging safe and caring technology as a door opener (Mackey & Petrucka, 2021). As illustrated by previous research in India and (South-) East Asia, consumers are open to food delivery via drones as an innovative and environmentally friendly transportation (Chen et al., 2022; Hwang & Kim, 2019; Mathew et al., 2021). This trend might determine the use of delivery drones, hence pilot training, and certification as upskilling opportunities for our target group. Such a transformation might stimulate more, e.g., that female drivers rethink how food can be produced, prepared, and consumed through more sustainable alternatives, like "urban farming" (Mok et al., 2020, p. 157) and "biodegradable [...] packaging" (Mok et al., 2020, p. 161). 'GiGi' Hub would cater for all this with a respective, physical space (figure 5).

Furthermore, the 'GiGi future of food lab' can engage chefs, futurists, designers and artists in collaborating with these women to raise questions that might even break established "food rituals and cultures" (Burton & Nitta, 2020, p. 29), and transform women to be fore-thinkers and entrepreneurs of the food delivery sector. As a physical and digital self-sustaining ecosystem, 'GiGi' can promote inclusive, caring, and sustainable innovation in the food industry by enabling career progression of women, delivery bikers, and anyone else in the industry. Such an entrepreneurial spirit encourages women in becoming more confident and financially independent (Agrawal et al., 2021).

The short-term nourishing of a culture of care and mid term logistical and technological transformation of the food industry can develop long term impacts in the urban infrastructure. With the introduction of more autonomous systems (Zádor, 2022) that support an entrepreneurial culture to sustainability via the production, preparation, and consumption of food as well as more efficient delivery infrastructure could move the human from passive to active roles.

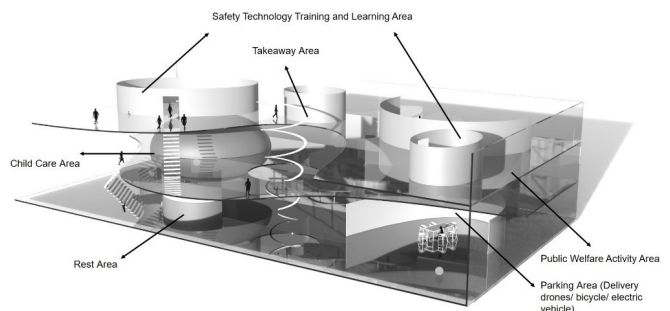


Figure 4. Speculative artefact, a conceptual model of 'GiGi' Hub, visualizing various service areas

### Discussion: A Different Approach to Care, Empowerment and Leadership

Through the backcasting strategy we designed a funding map that can lead to the introduction of a business model (figure 5). It would use any of the three stages to create safe spaces for women (care), foster autonomy (empowerment); transform the industry (leadership). To contrast the majority of food delivery services that are managed by tech-companies and have the main purpose of developing profit (Perelman et al., 2020), we developed a platform supporting learning, knowledge exchange and leadership ideas of commoning resources and knowledge (Simonovits & Balázs, 2022). The 'GiGi' Hub is envisioned as a not-for-profit, community-driven, and caring support network.

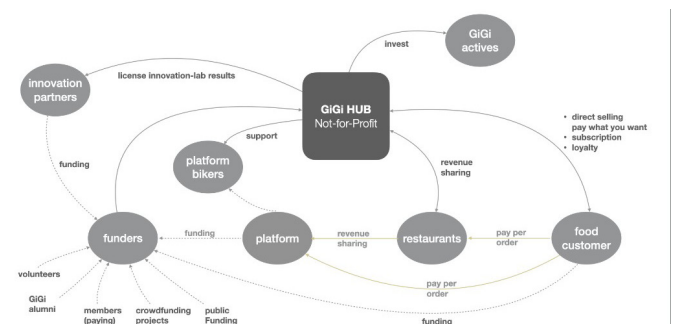
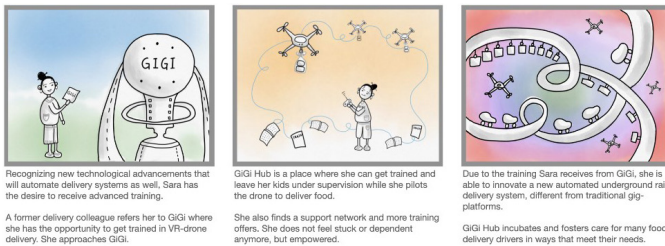


Figure 5. A not-for-profit model for 'GiGi'

To prepare for validation sessions (step 5 - figure 1) we conducted n=4 pilot interviews in China to validate our study protocol and the presentation of the platform. Participants were asked specific questions and shown a storyboard (figure 6) that describes the three temporal stages and key facts through an illustrated narrative and tasked to comment. We used a future scenario to improve the legibility of our proposed solutions during the interview process, and to support our observations and analysis of the participants' responses.



**Figure 6.** Storyboard (excerpt) to narrate the future vision of 'GiGi' to project stakeholders and future study participants

Here, we report first insights that give indications of the 'GiGi' acceptance rate, while stressing that these were pilot sessions and do not represent a statistically sound sample. We received feedback e.g., regarding our strategy to empower women; all interviewees considered the envisioned efforts as beneficial but challenged whether the model financially sustains as food delivery has very small margins. Another participant suggested improving our strategy of communication, which needs to be attracting more women to join 'GiGi' hub with its training and career development opportunities because many women choose not to opt-in to platforms as those are not offering career development for new female drivers. Confirming both positive aspects and a lack of care in food delivery, two women highlighted how they love the sense of control over her life when driving her scooter but find deliveries to distant locations truly terrifying. One participant also emphasized the issue of pressure by their platform's apps, e.g., when driving in difficult weather conditions and panicking as new orders came in and prior ones running out of time.

It needs to be noted that this is a very early-stage study carrying its different limitations, which include the demography of the sample and the accuracy of the business model.

### Limitations and Future Work

Our work has initiated discussion and critique towards the lack of care in the Gig Economy through a speculative Research through Design approach; despite several limitations, our research identifies opportunities for further research.

The speculative case of 'GiGi' needs prototype testing and analytical research to increase the provision of care and safety for female delivery drivers. At this stage we are not able to provide tangible prototypes that could be experienced in the real world. Nonetheless, we are driven to continue developing such research by conducting tests with female delivery drivers across different cities, cultures, and local needs in different social and professional contexts (step 5 - figure 1). Furthermore, we need to combine the speculative approach to a transdisciplinary strategy to further leverage knowledge from designers, architects, city planners, artists, technical experts,

and social scientists to prove its technical and economic viability (step 6 - figure 1). Drone technologies, e.g., might face issues of technical feasibility or in terms of security or data privacy. Further studies might include testing with existing food delivery services, which have their own business models and technology needs.

Finally, we are aware that empowering women in existing constructs of care responsibilities and food might not be the truest form of social liberation. The consequences of misogyny aren't yet tackled, and rehabilitation against harm does was not considered (Manne, 2018). The roles prescribed for men through societal expectations should be equally considered when securing safety for women.

### Conclusion

While the Gig Economy and its platform services such as food delivery provides benefits to their customers such as convenience, ease of use or, as observed in the COVID-19 pandemic, a provision of food for persons isolated in their homes, with this study we aimed to design more caring Gig Economies by empowering women and transforming their role in the industry. Our research identified deficiencies in the support and service policies for female delivery workers including gender pay gap, surveillance by and entrapment in digital systems as well as dependency on those for earning money, failures to provide future-proof career development opportunities and job safety or dangers of assault or harassment, isolation, and a lack of cultural solidarity.

Our response to these issues, 'GiGi', envisions a possible three stage future scenario in which female delivery drivers are more cared for and professionally supported. By creating a narrative describing near, mid- to long term futures we presented the value that a Research through Design approach plays in finding alternative solutions that are more aligned with values and people's needs. Employing critical and speculative perspectives on the issue of carelessness had a strong impact on the rigorousness of our research group's approach to analyse the problem space and supported the development of a speculative service solution, 'GiGi'.

Future work into real-world prototyping and validation of the visionary concepts should focus on generating first hand insights of users and stakeholders to go beyond the current phase's stage of narrating a possible future of female delivery bikers in the food delivery industry and start materialising research through detailed design and development (Frayling, 1994).

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## References

- Agrawal, A., Gandhi, P., & Khare, P. (2021). Women empowerment through entrepreneurship: case study of a social entrepreneurial intervention in rural India. *International Journal of Organizational Analysis*. Advance online publication. <https://doi.org/10.1108/IJOA-03-2021-2659>
- Amara, R. (1974). The futures field: Functions, forms, and critical issues. *Futures*, 6(4), 289–301. [https://doi.org/10.1016/0016-3287\(74\)90072-X](https://doi.org/10.1016/0016-3287(74)90072-X)
- Atal, S. (2020). *Towards A Gender Equal Future of Work for Women: A Preliminary Case Study of Women in the Gig Economy in India During COVID-19*. Tandem Research. <https://tandemresearch.org/assets/Women-Platform-TR-2020-5.pdf>
- Bell, W. (2017a). *Foundations of Futures Studies* (1st ed.). Routledge. <https://doi.org/10.4324/9780203791684>
- Bell, W. (2017b). *Foundations of Futures Studies* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203791677>
- Bertolaso, M., & Rocchi, M. (2022). Specifically human: Human work and care in the age of machines. *Business Ethics, the Environment & Responsibility*, 31(3), 888–898. <https://doi.org/10.1111/beer.12281>
- Burton, M., & Nitta, M. (2020). *-After You*. <https://books.apple.com/de/book/after-you/id1521958435>
- Chatzidakis, A., Hakim, J., Littler, J., Rottenberg, C., & Segal, L. (Eds.). (2020). *The care manifesto: The politics of interdependence*. Verso Books.
- Chen, C., Leon, S., & Ractham, P. (2022). Will customers adopt last-mile drone delivery services? An analysis of drone delivery in the emerging market economy. *Cogent Business & Management*, 9(1), Article 2074340. <https://doi.org/10.1080/23311975.2022.2074340>
- Convery, E., Morse, A., Fung, B., Wodak, S., Powell, Z., Quinn, V., Taylor, M., Searle, B., & Vårhammar, A. (2020). *Work health and safety of food delivery workers in the gig economy report*. Centre for Work Health and Safety. <http://www.centreforwhs.nsw.gov.au/knowledge-hub/work-health-and-safety-of-food-delivery-workers-in-the-gig-economy-report>
- Cook, C., Diamond, R., Hall, J. V., List, J. A., & Oyer, P. (2021). The Gender Earnings Gap in the Gig Economy: Evidence from over a Million Rideshare Drivers. *The Review of Economic Studies*, 88(5), 2210–2238. <https://doi.org/10.1093/restud/rdaa081>
- Delivery Drivers, I. (2020, November 12). 2020 Driver Survey Results. *Delivery Drivers, Inc.* <https://ddiwork.com/2020-driver-survey-results/>
- Dokuka, S., Kapuza, A., Sverdlov, M., & Yalov, T. (2022). Women in gig economy work less in the evenings. *Scientific Reports*, 12(1), 8502. <https://doi.org/10.1038/s41598-022-12558-x>
- Dunne, A., & Raby, F. (2013). *Speculative everything: Design, fiction, and social dreaming*. The MIT Press Ser. The MIT Press. <https://ebookcentral.proquest.com/lib/kxp/detail.action?docID=3339745>
- Ecker, Y., & Strüver, A. (2022). Towards alternative platform futures in post-pandemic cities? A case study on platformization and changing socio-spatial relations in on-demand food delivery. *Digital Geography and Society*, 3, Article 100032. <https://doi.org/10.1016/j.diggeo.2022.100032>
- Frayling, C. (1994). *Research in Art and Design*. Royal College of Art Research Papers: Vol. 1. Royal College of Art. <https://researchonline.rca.ac.uk/384>
- Goods, C., Veen, A., & Barratt, T. (2019). "Is your gig any good?" Analysing job quality in the Australian platform-based food-delivery sector. *Journal of Industrial Relations*, 61(4), 502–527. <https://doi.org/10.1177/0022185618817069>
- Goryunova, E., Scribner, R. T., & Madsen, S. R. (2018). The current status of women leaders worldwide. In S. R. Madsen (Ed.), *Edward Elgar E-Book Archive. Handbook of research on gender and leadership* (pp. 3–23). E. Elgar Publishing.
- Griesbach, K., Reich, A., Elliott-Negri, L., & Milkman, R. (2019). Algorithmic Control in Platform Food Delivery Work. *Socius: Sociological Research for a Dynamic World*, 5, 237802311987004. <https://doi.org/10.1177/2378023119870041>
- Groß, B., & Mandir, E. (2022). *Zukünfte gestalten: Spekulation. Kritik. Innovation. : mit Design Futuring Zukunftsszenarien strategisch erkunden, entwerfen und verhandeln* (1. Auflage). Verlag Hermann Schmidt.
- Heinonen, S., & Ruotsalainen, J. (2013). Futures Clinique—method for promoting futures learning and provoking radical futures. *European Journal of Futures Research*, 1(1). <https://doi.org/10.1007/s40309-013-0007-4>
- Hiltunen, E. (2008). The future sign and its three dimensions. *Futures*, 40(3), 247–260. <https://doi.org/10.1016/j.futures.2007.08.021>
- Holmberg, J., & Robert, K.-H. (2000). Backcasting — a framework for strategic planning. *International Journal of Sustainable Development & World Ecology*, 7(4), 291–308. <https://doi.org/10.1080/13504500009470049>
- Huang, H. (2022). Algorithmic management in food-delivery platform economy in China. *New Technology, Work and Employment*, Article ntw.12228. Advance online publication. <https://doi.org/10.1111/ntwe.12228>
- Hwang, J., & Kim, H. (2019). Consequences of a green image of drone food delivery services: The moderating role of gender and age. *Business Strategy and the Environment*, 28(5), 872–884. <https://doi.org/10.1002/bse.2289>
- IBM. (2018). *Prioritization Grid Toolkit activity - Enterprise Design Thinking*. IBM Enterprise Design Thinking. <https://www.ibm.com/design/thinking/page/toolkit/activity/prioritization>
- Jax, K., Calestani, M., Chan, K. M. A., Eser, U., Keune, H., Muraca, B., O'Brien, L., Potthast, T., Voget-Kleschin, L., & Wittmer, H. (2018). Caring for nature matters: a relational approach for understanding nature's contributions to human well-being. *Current Opinion in Environmental Sustainability*, 35, 22–29. <https://doi.org/10.1016/j.cosust.2018.10.009>
- Kilhoffer, Z., Groen, W. P. de, Lenaerts, K., Smits, I., Hauben, H., Waeyaert, W., Giacumacatos, E., Lhernould, J.-P., & Robin-Olivier, S. (2020). *Study to gather evidence on the working conditions of platform workers*. European Commission. <https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8280>
- Leite, I., Pereira, A., Mascarenhas, S., Martinho, C., Prada, R., & Paiva, A. (2013). The influence of empathy in human-robot relations. *International Journal of Human-Computer Studies*, 71(3), 250–260. <https://doi.org/10.1016/j.ijhcs.2012.09.005>
- Li, C., Miroso, M., & Bremer, P. (2020). Review of Online Food Delivery Platforms and their Impacts on Sustainability. *Sustainability*, 12(14), 5528. <https://doi.org/10.3390/su12145528>
- Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., Linney, C., McManus, M. N., Borwick, C., & Crawley, E. (2020). Rapid Systematic Review: The Impact of Social Isolation and Loneliness on the Mental Health of Children and Adolescents in the Context of COVID-19. *Journal of the American Academy of Child and Adolescent Psychiatry*, 59(11), 1218–1239.e3. <https://doi.org/10.1016/j.jaac.2020.05.009>
- Mackey, A., & Petrucka, P. (2021). Technology as the key to women's empowerment: A scoping review. *BMC Women's Health*, 21(1), 78. <https://doi.org/10.1186/s12905-021-01225-4>
- Madsen, S. R. (Ed.). (2018). *Edward Elgar E-Book Archive. Handbook of research on gender and leadership* (Paperback ed.). E. Elgar Publishing. <https://www.elgaronline.com/view/9781785363856.xml> <https://doi.org/10.4337/9781785363863>
- Manne, K. (2018). *Down girl: The logic of misogyny*. Oxford University Press. <https://ebookcentral.proquest.com/lib/kxp/detail.action?docID=5061698>
- Mathew, A. O., Jha, A. N., Lingappa, A. K., & Sinha, P. (2021). Attitude towards Drone Food Delivery Services—Role of Innovativeness, Perceived Risk, and Green Image. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(2), 144. <https://doi.org/10.3390/joitmc7020144>
- Mayer-Johanssen, U. (2021). *Zukunft ist Verantwortung: (Future means Responsibility)*. In Bayern design (Chair), *Munich Creative Business Week*, Munich. [https://u-m-j.de/wp-content/uploads/2021/04/MCBW\\_Uli\\_Mayer\\_Johanssen\\_Essay.pdf](https://u-m-j.de/wp-content/uploads/2021/04/MCBW_Uli_Mayer_Johanssen_Essay.pdf)
- Milkman, R., Elliott-Negri, L., Griesbach, K., & Reich, A. (2021). Gender, Class, and the Gig Economy: The Case of Platform-Based Food Delivery. *Critical Sociology*, 47(3), 357–372. <https://doi.org/10.1177/0896920520949631>
- Modranský, R., Jakabová, S., & Hanák, M. (2020). Effect of COVID-19 Locked Down on Gender Pay Gap in Slovakia in the Education Sector. *Technium Social Sciences Journal*, 12, 302–315.
- Mok, W. K., Tan, Y. X., & Chen, W. N. (2020). Technology innovations for food security in Singapore: A case study of future food systems for an increasingly natural resource-scarce world. *Trends in Food Science & Technology*, 102, 155–168. <https://doi.org/10.1016/j.tifs.2020.06.013>
- Nash, M., & Churchill, B. (2020). Caring during COVID-19: A gendered analysis of Australian university responses to managing remote working and caring responsibilities. *Gender, Work, and Organization*, 27(5), 833–846. <https://doi.org/10.1111/gwao.12484>
- Parwez, S. (2022). Covid-19 pandemic and work precarity at digital food platforms: A delivery worker's perspective. *Social Sciences & Humanities Open*, 5(1), Article 100259. <https://doi.org/10.1016/j.sshao.2022.100259>
- Perelman, L., Mangini, M., Perrot, B., Fierro, M. B., & Garbarz, M. S. (2020). *Proudly delivered by APP: The struggle of Latin America's first union for platform workers*. *Trade unions in transformation 4.0*. Friedrich-Ebert-Stiftung Global Policy and Development.
- Putnam, C., Kolko, B., & Wood, S. (2012). Communicating about users in ICTD. In M. L. Best & E. Zegura (Eds.), *Ictd 2012: Proceedings of the Fifth International Conference on Information and Communication Technologies and Development: Georgia Institute of Technology Atlanta, GA, USA March 12 - 15, 2012* (pp. 338–349). ACM. <https://doi.org/10.1145/2160673.2160714>
- Reeder, K. (2005). Using Storyboarding Techniques to Identify Design Opportunities. *The Technology Teacher*, 64(7), 9–11. <https://doi.org/2005>
- Rodgers, P., Innella, G., Bremner, C., & Coxon, I. (2017). *Does Design Care...? An International Workshop of Design Thought and Action*. <https://doi.org/10.13140/RG.2.2.24043.64805>
- Scholz, T. (2016). *Platform Cooperativism: Challenging the Corporate Sharing Economy*. New York: Rosa Luxemburg Stiftung, New York Office. <https://rosalux.nyc/wp-content/uploads/2020/11/RLS-NYC-platformcoop.pdf>
- Simonovits, B., & Balázs, B. (2022). From Uberisation to Communing: Experiences, Challenges, and Potential Pathways of the Sharing Economy in Food Supply Chains in Europe. In V. Česnuitytė, A. Klimczuk, C. Miguel, & G. Avram (Eds.), *The Sharing Economy in Europe: Developments, Practices, and Contradictions* (pp. 137–161). Springer International Publishing. [https://doi.org/10.1007/978-3-030-86897-0\\_7](https://doi.org/10.1007/978-3-030-86897-0_7)

- Smith, L. W. (2000). *Stakeholder analysis: a pivotal practice of successful projects*. Project Management Institute. <https://www.pmi.org/learning/library/stakeholder-analysis-pivotal-practice-projects-8905>
- Som, S. (2020). *Moving Beyond Bare Minimum: Will India Inc's Gig Economy Confront Gender And Social Discrimination?* Law School Policy Review. <https://lawschoolpolicyreview.com/2020/08/15/moving-beyond-bare-minimum-will-india-incs-gig-economy-confront-gender-and-social-discrimination/>
- Sumagaysay, L. (2020, November 25). The pandemic has more than doubled food-delivery apps' business. Now what? *MarketWatch*. <https://www.marketwatch.com/story/the-pandemic-has-more-than-doubled-americans-use-of-food-delivery-apps-but-that-doesnt-mean-the-companies-are-making-money-11606340169>
- Tilley, L. (2015). The Origins of Care. In L. Tilley (Ed.), *Theory and Practice in the Bioarchaeology of Care* (pp. 95–126). Springer International Publishing. [https://doi.org/10.1007/978-3-319-18860-7\\_4](https://doi.org/10.1007/978-3-319-18860-7_4)
- UNSDG. (2016). *Gender Mainstreaming in Development Programming: Guidance Note*. United Nations Sustainable Development Group. <https://unsdg.un.org/resources/guidance-note-gender-mainstreaming-development-programming>
- Voros, J. (2017). Big History and Anticipation. In Poli (Ed.), *Handbook of Anticipation* (pp. 1–40). Springer International Publishing. [https://doi.org/10.1007/978-3-319-31737-3\\_95-1](https://doi.org/10.1007/978-3-319-31737-3_95-1)
- Woodcock, J., & Graham, M. (2020). *The gig economy: A critical introduction*. Polity.
- Wu, P. F., Zheng, R., Zhao, Y., & Li, Y. (2022). Happy riders are all alike? Ambivalent subjective experience and mental well-being of food-delivery platform workers in China. *New Technology, Work and Employment*, 37(3), 425–444. <https://doi.org/10.1111/ntwe.12243>
- Yang, M., & Zimmer, R. (2020). Caregiver Burden. In J. L. Colburn, B. Leff, J. Hayashi, & M. Schuchman (Eds.), *Home-Based Medical Care for Older Adults* (pp. 35–40). Springer International Publishing. [https://doi.org/10.1007/978-3-030-23483-6\\_6](https://doi.org/10.1007/978-3-030-23483-6_6)
- Zádor, I. L. (2022). Concept of a Cost-effective Underground Air-propelled Tube-capsule Transport System. *Periodica Polytechnica Transportation Engineering*, 50(4), 357–360. <https://doi.org/10.3311/PPtr.15423>
- Zimmerman, J., Forlizzi, J., & Evenson, S. (2007). Research through design as a method for interaction design research in HCI. In M. B. Rosson & D. Gilmore (Eds.), *Conference on human factors in computing systems* (pp. 493–502). Association for Computing Machinery. <https://doi.org/10.1145/1240624.1240704>
- Zimmerman, J., & Forlizzi, J. (2014). Research Through Design in HCI. In J. S. Olson & W. A. Kellogg (Eds.), *Ways of Knowing in HCI* (pp. 167–189). Springer New York. [https://doi.org/10.1007/978-1-4939-0378-8\\_8](https://doi.org/10.1007/978-1-4939-0378-8_8)
- Zubatsky, M., Berg-Weger, M., & Morley, J. (2020). Using Telehealth Groups to Combat Loneliness in Older Adults Through COVID-19. *Journal of the American Geriatrics Society*, 68(8), 1678–1679. <https://doi.org/10.1111/jgs.16553>