



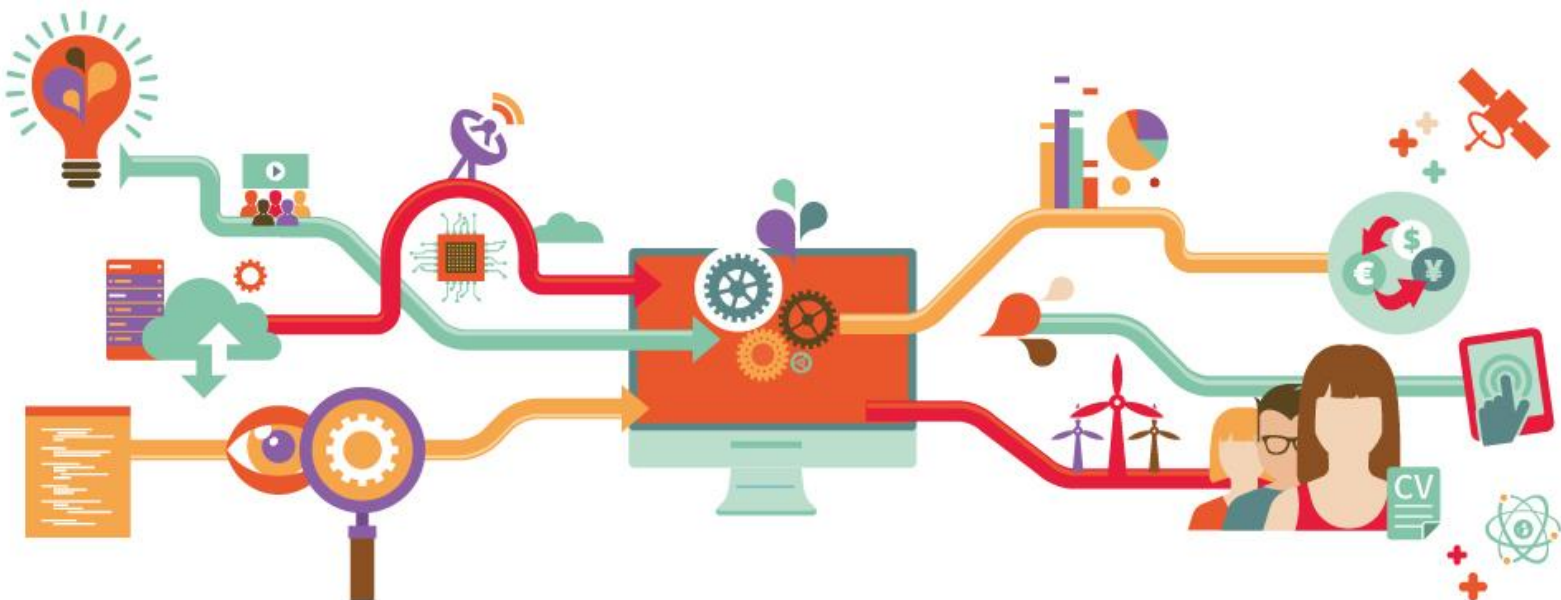
European
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How the “EU Innovation Champions” successfully absorbed and reacted to the shock caused by the COVID-19 pandemic

*JRC Working Papers on
Corporate R&D and
Innovation No 06/2020*

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2020



Joint
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This document has been produced within the context of the Global Industrial Research & Innovation Analyses (GLORIA) activities that are jointly carried out by the European Commission's Joint Research Centre –Directorate Innovation and Growth and the Directorate General for Research and Innovation-Directorate F, Prosperity. GLORIA has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 811163.

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JRC121856

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How to cite this report: De Massis, A., Di Minin, A., et al. (2020), *How the “EU Innovation Champions” successfully absorbed and reacted to the shock caused by the COVID-19 pandemic*, JRC Working Papers on Corporate R&D and Innovation No 06/2020, European Commission, JRC121856.

The **JRC Working Papers on Corporate R&D and Innovation** are published under the editorial supervision of Sara Amoroso in collaboration with Zoltan Csefalvay, Fernando Hervás, Koen Jonkers, Pietro Moncada-Paternò-Castello, Alexander Tübke, Daniel Vertesy at the European Commission – Joint Research Centre; Michele Cincera (Solvay Brussels School of Economics and Management, Université Libre de Bruxelles); Alex Coad (Universidad Pontificia del Perú – PE), Enrico Santarelli (University of Bologna, IT); Antonio Vezzani (Roma Tre University, IT); Marco Vivarelli (Università Cattolica del Sacro Cuore, Milan, IT).

Acknowledgements

This paper represents the opinions of the authors and is the product of professional research. It is not meant to represent the position or opinions of the EU or the official statements of the entrepreneurs and managers interviewed. We are grateful to the reviewers for their insightful feedback over two rounds of review, and to the founders and leaders of the 21 firms who took part in our study by generously providing a solid body of empirical evidence. We would also like to express our deepest gratitude to the European Commission, and particularly the EIC Accelerator Team, for their endorsement and the support given to several SMEs and start-ups across Europe as without them, it would have been impossible for us to identify the “European innovation champions,” and to all the stakeholders that have supported and contributed to generating new knowledge to help Europe overcome the current crisis.

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Abstract

- The COVID-19 pandemic presented great challenges, but also opportunities, to SMEs across Europe.
- We examine how the “European Innovation Champions” successfully absorbed and reacted to the shock caused by the COVID-19 pandemic.
- Five different paradoxical behaviors (i.e., planning, liquidity, time and velocity, partnership, resources and technology) characterized the European Innovation Champions during the peak of the COVID-19 pandemic.
- We distill 10 management principles representing key actions and decisions that allowed the European Innovation Champions to manage each paradox.
- This report provides policymakers and business leaders both within and outside the European Union with insights to enhance the capability of SMEs to succeed through a crisis.

1 Introduction and Background

The exponential worldwide spread of the COVID-19 pandemic and the unprecedented lockdown of societies and economic activities due to infection control measures marked the beginning of an acute and unpredictable crisis for most business sectors ⁽¹⁾. The first policy initiatives put in place by governments and central banks to protect economies from this crisis explicitly targeted sustaining employment and business recovery (Kuckertz et al., 2020) in an attempt to grasp the opportunities emerging from the “new normal challenge” (Winston, 2020). Less attention has been paid to how this crisis could threaten the enormous potential of R&D-intensive and innovative SMEs across Europe ⁽²⁾ (Cincera and Veugelers, 2013), which is fundamental to the future economic growth and renewal of the EU industrial structure (Moncada-Paternò-Castello and Voigt, 2013).

Young and innovative companies have persistently been the center of attention in EU research and innovation policies. The lack of “young leading innovators” is the major source of Europe’s persistent business innovation deficit relative to the US (Veugelers and Cincera, 2010). Therefore, supporting the creation and growth of young, innovative companies in emerging sectors has been one of the main objectives of the EU research and innovation policy agenda in recent decades, where prioritizing excellence and scale of impact is clearly identified as the key driver of future EU growth (European Commission, 2018a; 2018b).

SMEs were put in serious financial jeopardy by the crisis triggered by the COVID-19 pandemic (De Massis and Rondi, 2020; Juergensen et al., 2020). As reported in the first Communication from the EU Commission after the COVID-19 outbreak (March 13, 2020), one of the immediate economic consequences of the pandemic was the unexpected liquidity crunch affecting SMEs (European Commission, 2020). As banks were not incentivized to lend SMEs money due to the sudden increase in perceived risk, short-term measures were put in place under the EU COSME Loan Guarantees Facilities to support 100,000 EU SMEs’ working capital loans and mitigate a possible socio-economic impact of the crisis in terms of loss of employment (6 April 2020) ⁽³⁾.

In this context, highly innovative, technology-based small firms that are in their scale up phase represent vulnerable actors in the European economy (De Marco et al., 2019). Notwithstanding their importance in terms of higher share of total R&D expenditure compared to their US counterparts (Ortega Argilés and Voigt, 2009) and their substantial weight in terms of average R&D intensity and value added compared to larger EU companies (European Commission, 2019), young and innovative SMEs were predictably hard-hit by the lockdown measures. This is mainly due to negative cash flows, high risk investments, impediments to accessing early-stage risk finance, increased turbulence, and, more in general, liabilities of newness and smallness (Stinchcombe, 1968) that European entrepreneurship commonly faces in the first stages of development (Nepelski et al, 2016).

Against this background, while most companies were severely hurt by the economic shock associated with the COVID-19 outbreak, which led supply chains to collapse and to disruption dynamics in existing markets, some of them instead succeeded through this shock and even thrived. Thus, it becomes relevant to understand the behavior – in terms of key actions and decisions – of such firms during the first 90 days of the COVID-19 pandemic that allowed them to successfully adapt to the new situation.

To explore this phenomenon, we focus on “*European Innovation Champions*,” a term that we use to refer to relatively small but highly innovative firms showing ambitions of growth through the development of market-driven innovations with high-potential economic impact in the short-to-medium term (European Commission, 2016). Our ambition is to explore *how they successfully absorbed and reacted to the shock caused by the COVID-19 pandemic*. To examine their behavior, we relied on a qualitative research design, typical of emerging topic areas (Eisenhardt, 1989), collecting both primary and secondary data from different sources. As for primary data, we conducted interviews in which we asked the European Innovation Champions leaders to reveal how the COVID-19 pandemic changed their innovation strategy and processes, what actions they put in place to respond to the crisis, and how their market reacted to these changes ⁽⁴⁾. We then complemented these

⁽¹⁾ The OECD identified transport, manufacturing, construction, wholesale, retail, air transport, accommodation, food services, real estate, and professional services as the most affected sectors (<https://www.oecd.org/coronavirus/en/>).

⁽²⁾ Among the over 25 million SMEs in the EU28 countries, accounting for 99.8% of all enterprises and employing more than two-thirds of the active population in the non-financial business economy (EU Commission, 2019), only a small fraction (14%) are active in industries characterized by high or very high innovation intensity, and almost 50% (49.5%) undertook some form of innovation activity according to the latest available data (CIS, 2016).

⁽³⁾ https://ec.europa.eu/commission/presscorner/detail/en/ip_20_569.

⁽⁴⁾ Some examples of questions we asked during the interviews are: How did your innovation strategy change during the last 90 days? How did the pandemic affect your business? Did your firm change because of the pandemic? What were the most difficulties you had to cope with? Did you discover anything new during the pandemic? Did you explore new market opportunities? Were you able to identify new partnerships? How did you change the organization of work? How did you prepare to face the post-COVID-19 market competition? How did the market respond to your actions?

information with data gathered from secondary sources, such as official data, balance sheets, and firms' websites; information retrieved on firms' website were particularly useful to better understand how firms actually leveraged on COVID-19 in interacting with their external stakeholders.

We selected the European Innovation Champions in our sample from the SMEs granted by the European Innovation Council Accelerator Pilot Program (formerly known as Horizon 2020 SME Instrument Program) from 2018 onwards, listed on the EASME EIC accelerator data hub ⁽⁵⁾. Today the program counts more than 5,400 participants, with EUR2,660 million allocated to European SMEs' research and innovation projects. Companies can apply for funding from half a million to 2.5 million euros for projects focused on technologies with high readiness levels (Technology Readiness Level – TRL – from 6 to 8) by presenting a short-term development plan (12 to 24 months). While fresh evidence on the additionality and impact of the SME Instrument is beginning to surface (Santoleri et al., 2020), in the context of this study, the heterogeneity of firms applying for the program's support points to potential variation in the strategies and ways of coping with the unexpected shock caused by the COVID-19 pandemic. Nevertheless, as we illustrate below, we could identify common traits in the way that these European Innovation Champions succeeded through the crisis. Many lessons can be extracted from the accounts of the selected companies, the content of their application proposals (Di Minin et al., 2016), and a close observation of how they behaved.

Based on theoretical sampling criteria, according to which cases are selected because they are particularly suitable for illuminating a phenomenon and for extending relationships and logic among variables (Eisenhardt, 1989; De Massis and Kotlar, 2014), we selected 21 European Innovation Champions (Table 1) as an empirical basis to conveniently examine our phenomenon of interest (Siggelkow, 2007). To generate a holistic view of the phenomenon, we included SMEs operating in a variety of industries, differently affected by the COVID-19 outbreak, but where innovation is crucial to keep ahead of the competition: information and communication, manufacturing, scientific research and development, travel services, and wholesale of machinery. These 21 SMEs have an average turnover of EUR384.72 thousand and an average ratio of intangibles over total assets – a proxy of R&D investments – of 31.34% in 2018 (Source: Bureau van Dijk ORBIS database).

We used these cases to identify, map, and illustrate the firms' actions and decisions during the first 90 days of the pandemic. Our insights reveal that reality is more complex than we intuitively expected. More specifically, based on the use of "power quotes" (i.e., concise and insightful quotes capturing the essence of key concepts emerging from the interviews) and "proof quotes" (i.e., additional quotes to reinforce a point when different cases showed similar patterns of evidence) (Kammerlander and De Massis, 2020; Pratt, 2008), we distilled from our qualitative evidence five *paradoxical tensions* that characterized the European Innovation Champions' behavior during the peak of the COVID-19 pandemic ⁽⁶⁾. We also outlined the key actions and decisions that allowed these firms to address each paradox during the lockdown, which we labelled as "management principles."

Next, we introduce the five paradoxes that emerged from our qualitative account. We then present the management principles used by the European Innovation Champions to deal with these paradoxes, and finally draw some conclusions.

⁽⁵⁾ <https://sme.easme-web.eu/>

⁽⁶⁾ In organization studies, paradoxical behaviors are used to describe conflicting demands, opposing perspectives or seemingly illogical findings as a result of opposing tensions (Lewis, 2000). A paradoxical behavior is defined as something that is constructed by individuals when oppositional tendencies are brought into recognizable proximity through reflection or interaction (Ford & Backoff, 1988: 89).

Table 1. List of the interviewed European Innovation Champions.

| Name | Country | Industry (NACE – level 1) | Firm age (yrs) | Size (employees) | Turnover (EUR thous.) | Intangibles/ total assets |
|-----------------------|----------------|---|-------------------|---------------------|--------------------------|------------------------------|
| 3Bee Srl | Italy | Computer programming, consultancy and related activities | 4 | 11 - 50 | 33.42 | 33.66% |
| Datalive Ltd | Ireland | Computer programming, consultancy and related activities | 6 | 11 - 50 | - | 82.50% |
| Angular Velocity Oy | Finland | Scientific research and development | 4 | 1 - 10 | 292.00 | 72.02% |
| Cellply Srl | Italy | Scientific research and development | 7 | 11 - 50 | 4.20 | 3.13% |
| Content Flow GmbH | Germany | Computer programming, consultancy and related activities | 6 | 11 - 50 | - | - |
| Didimo SA | Portugal | Publishing activities | 3 | 11 - 50 | 313.70 | 5.20% |
| DNA Script SAS | France | Scientific research and development | 6 | 51 - 100 | 9.80 | 1.92% |
| GoSleep Oy | Finland | Wholesale trade, except of motor vehicles and motorcycles | 9 | 1 - 10 | 689.00 | 51.65% |
| Graphenea SA | Spain | Scientific research and development | 10 | 11 - 50 | 454.00 | 15.68% |
| Handiscover AB | Sweden | Travel agency, tour operator and other reservation service and related activities | 5 | 11 - 50 | 6.24 | 87.77% |
| IngeniArs Srl | Italy | Computer programming, consultancy and related activities | 6 | 11 - 50 | 429.75 | 0.10% |
| Iristick NV | Belgium | Manufacture of computer, electronic and optical products | 5 | 11 - 50 | - | 39.14% |
| Monozukuri SpA | Italy | Computer programming, consultancy and related activities | 6 | 1 - 10 | 0.00 | 58.66% |
| OZ ehf | Iceland | Computer programming, consultancy and related activities | 15 | 151 - 200 | 1321.37 | 31.54% |
| RebelRoam OÜ | Estonia | Telecommunications | 5 | 11 - 50 | 1586.31 | 19.91% |
| Smart Separations Ltd | United Kingdom | Scientific research and development | 7 | 11 - 50 | - | 0.00% |

| | | | | | | |
|--------------------|-----------------|--|---|----------|--------|--------|
| Tarsius Pharma Ltd | Israel | Scientific research and development | 4 | 1 - 10 | - | - |
| UBT Srl | Italy | Scientific research and development | 5 | 11 - 50 | 24.77 | 20.13% |
| USound GmbH | Austria | Scientific research and development | 7 | 51 - 100 | - | 0.92% |
| Withlocals BV | The Netherlands | Computer programming, consultancy and related activities | 7 | 51 - 100 | - | 25.50% |
| Xnext Srl | Italy | Manufacture of computer, electronic and optical products | 6 | 11 - 50 | 221.57 | 46.10% |

Source: ORBIS Bureau van Dijk, year 2018; for some firms, data are not available.

2 Paradoxical Behaviors in the Midst of the Pandemic

While risk is an inherent aspect of entrepreneurial life, the peak of the COVID-19 pandemic can be characterized as a context of high uncertainty (i.e., a situation where the chances of an event occurring are essentially unknown). As the entrepreneurship literature suggests, under uncertainty “the primary problem or function [of the entrepreneur] is deciding what to do and how to do it” (Knight, 1921, p. 268). Our investigation aimed to explore key actions and decisions of European Innovation Champions to cope with the unexpected shock induced by the COVID-19 outbreak; therefore, we focused on observed deviations in entrepreneurial actions and decisions in the first 90 days of the pandemic. Our analysis led us to unearth some tensions (i.e., oppositional forces emerging within an uncertain environment) that in our European Innovation Champions served as underlying sources of paradoxical behaviors (Lewis, 2000; Smith and Lewis, 2011) when these firms absorbed and reacted to the shock caused by the COVID-19 pandemic.

Put it differently, five key paradoxical behaviors emerged from our examination of how these European Innovation Champions dealt with the challenges caused by the pandemic. Next, we introduce each paradoxical behavior with an exemplary quote collected during our investigation and then briefly explain it (⁷).

Paradox of planning: “We got rid of planning! What is the point of planning for the future when you see your fundamental reference points constantly changing?”

To paraphrase General Dwight D. Eisenhower, although planning is fundamental to set priorities, in the midst of chaos plans become useless. As COVID-19 exponentially increased the levels of uncertainty and risk, the studied firms were able to grow out of the execution of pre-existing plans. Our examination of European Innovation Champions’ behavior during the COVID-19 pandemic clearly revealed the tension between what was planned and what needed to happen. On the one hand, they felt the need to intensify their planning efforts to optimize the use of current resources, minimize technological risks, and attract new funds (e.g., from investors); on the other hand, the speed of evolution and time constraints related to the COVID-19 crisis, as well as the uncertain and thus unpredictable nature of events made this effort almost useless. This tension gave rise to a planning paradox. As a result, the European Innovation Champions that succeeded in navigating the crisis were those that immediately realized that their planning priority was paradoxically to grow out of their pre-existing planning activities. We observed that in the first 90 days of the pandemic, most European Innovation Champions started considering planning – especially strategic planning – as a trap rather than a lever to overcome the crisis. They thus stopped making strategic plans, instead turning to effectuation approaches, asking their stakeholders and shareholders to trust them based on how they used to behave and work before the COVID-19 outbreak; in other words, they relied on their legacy. Signaling the firm’s identity and reputation, a result of long-term relationships with external actors within the supply chain and also the firm’s ability to navigate the crisis without rigid plans, was a key intangible resource for European Innovation Champions operating in the most disrupted industries. It allowed them to retain the most important (strategic) linkages throughout, increasing their resilience to the crisis. Moreover, European Innovation Champions’ availability of liquidity, agility, and ability to adapt to the changing environment were other elements that allowed them to avoid planning.

Paradox of liquidity: “How do we preserve and increase our cash flows without sacrificing our identity and purpose?”

As cash flows are essential to face uncertainty and survive crisis periods, the first reaction of small- and medium-sized firms, especially during crises, would be to search for liquidity. However, a paradoxical tension emerged in relation to European Innovation Champions’ financial strategies: we observed that finding a match between new purposes and key actions (aimed at generating cash) became a higher priority than searching for liquidity. To put it differently, under uncertainty, tension between economic and noneconomic goals gave rise to a paradox of liquidity. In the midst of the COVID-19 pandemic, managerial actions emphasizing creating (or maintaining) a strong purpose both within (i.e., towards employees) and outside (i.e., towards customers or investors) the firm’s boundaries *before* the definition of strategic goals and the related financial aspects were crucially important for European Innovation Champions to set a new direction for the future. In prioritizing noneconomic goals, European Innovation Champions chose to keep their focus on remaining loyal to their purpose; this was possible thanks to both effectuation strategies and the exploitation of signaling.

Paradox of time and velocity: “How can we wisely respond to opportunities that disappear as quickly as they appear? You need to find the right pace and make use of time wisely.”

When facing an unexpected crisis that spreads fast, such as the one related to the COVID-19 pandemic, firms are asked to decide and act very quickly in recognizing emerging opportunities and responding to them. As the

(⁷) The names of informants and firms that correspond to each quote have been omitted for confidentiality reasons.

COVID-19 pandemic spread so fast that it required the lockdown of economic activities in most European countries, European Innovation Champions faced an emerging tension between the need to provide immediate responses in a turbulent environment and the time required to evaluate emerging opportunities (i.e., making decisions on how to leverage the inherent chances of crisis in their industry with the right timing to avoid conflicting objectives). We observed that these firms were able to leverage their managerial culture (or experience) to set up the right pace and rhythm (rather than “acting in a rush”). Among them, those with a stronger identity and legacy and, more generally, those better able to leverage their noneconomic assets were the most successful. Further, we observed that the European Innovation Champions were surprisingly brilliant at balancing short- and long-term organizational goals during the pandemic – an ability we refer to as “multi-temporality.” Such multi-temporality was crucial for European Innovation Champions to quickly find the right pace to address the crisis.

Paradox of partnerships: “It is true, larger companies are the best players to partner with during a crisis given their resource endowments. But we developed partnerships with smaller firms that are similar to us instead!”

When looking for a fruitful partner to exploit innovation, tech-intensive SMEs typically search for knowledge and resource complementarities by focusing on large firms that might assure a financially rewarding partnership and/or easily supply the resources or complementary innovation assets they lack (Teece, 1988; Hagedoorn, 1993; Yang et al., 2014). While the need for such partnerships became very salient in the midst of the COVID-19 pandemic, European Innovation Champions displayed a paradoxical behavior. Given the short time frame available to absorb the market shock and react to the crisis, European Innovation Champions opted for faster partnerships with small and similar firms that shared a similar knowledge base and often the same difficulties related to the crisis; in some cases, these partners were also competitors. Fast attraction of such partners was eased by implementing effectuation strategies, as well as by leveraging signals from past interactions in the market fostered by the pandemic. Developing partnerships with similar, small firms in turn allowed firms to avoid “David vs. Goliath” issues that might emerge with larger partners. It also allowed firms to join forces and exploit synergies with the selected small partners to confront larger players and maintain their market position during the crisis.

Paradox of resources and technology: “We know we should look for additional resources, but we decided to change our way of using and deploying resources and this allowed us to compete with the existing, limited resources.”

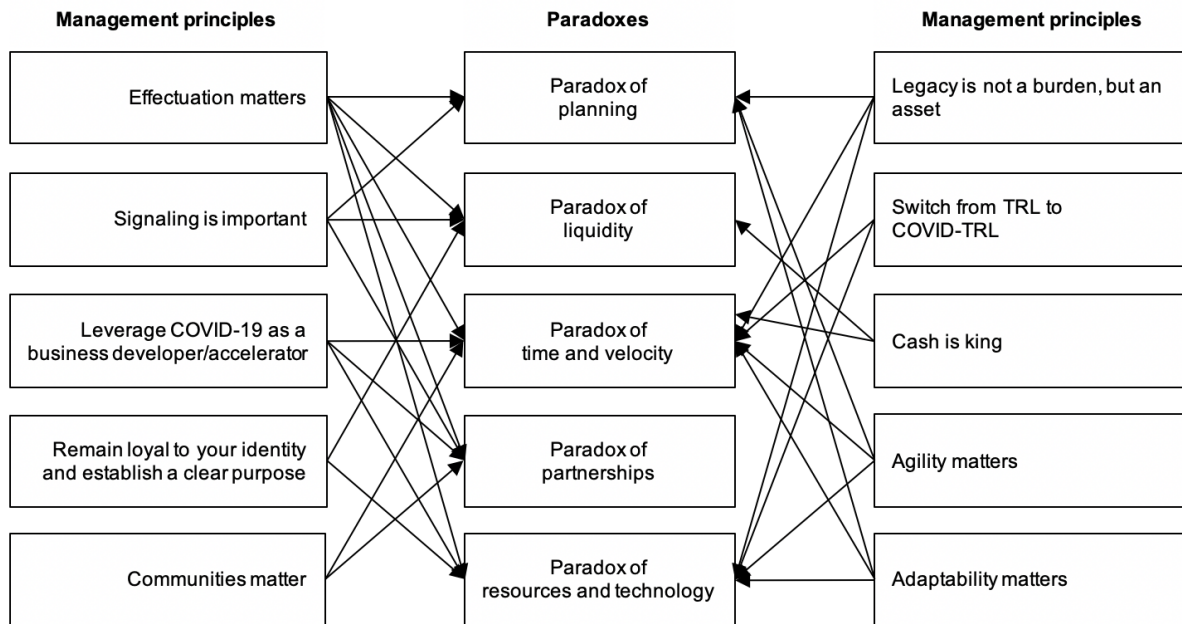
During a crisis, which typically leads to a shortage of resources, firms are expected to be inclined to search for new resources to fill this void. Paradoxically, the European Innovation Champions refrained from such a tendency and instead reacted to the COVID-19 pandemic by relying only on their limited resources, including technology, even re-organizing them and their internal processes so as to be highly flexible. This was possible thanks to their agility, adaptability, TRL, and effectuation strategies, which allowed them to achieve their milestones – even faster – with limited resources, while at the same time remaining loyal to their purpose. As developing new or more sophisticated technologies was not possible in some industries due to the lockdown of economic activities, European Innovation Champions leveraged their existing R&D assets by adapting and/or simplifying them to respond to the needs of the newly emerged COVID-19-driven markets – in a way leveraging COVID-19 as a business developer.

Next, we present some management principles in terms of actions and decisions undertaken by the European Innovation Champions to address each of the five paradoxes.

3 Addressing the Paradoxical Behaviors: Key Management Principles

The evidence we collected allowed us to distill 10 management principles representing actions and decisions that the European Innovation Champions adopted to resolve, or at least manage, the paradoxes presented above. Below we describe these management principles, while in Figure 1 we represent the connections between such principles and the five paradoxes as they emerged from our investigation. Again, a quote from an informant introduces each principle before we briefly explain it.

Figure 1. Connections between paradoxes and management principles for succeeding through a crisis.



3.1 Effectuation matters

“In every crisis there are chances. The main task for a leader is to locate the hidden gems in this crisis: for this, you need to walk the unknown by assessing the resources available in order to achieve your goals, while continuously balancing and changing these goals with your resources and actions...You cannot have a predetermined goal and it is impossible to plan this process.”

Effectuation practices are based on emergent or non-predictive strategies implemented by entrepreneurs facing high uncertainty and rare circumstances. According to Sarasvathy (2001), the effectuation strategies implemented by entrepreneurs to react to external shocks are mainly centered around four principles:

- Inclination towards supporting affordable losses: entrepreneurs look for alternatives that can lead to a more significant number of options to implement, instead of trying to secure returns at the current stage.
- The pursuit of strategic alliances: entrepreneurs accentuate the pursuit of new opportunities through new strategic partnerships and stakeholders’ involvement in moderating the level of uncertainty.
- Exploitation of contingencies: instead of relying on the organization’s embedded knowledge as a source of competitive advantage, entrepreneurs better rely on exploiting the new contingencies that emerged from unexpected times.
- Controlling an unpredictable future: entrepreneurs try to set adequate strategies to manage the possible aspects of the unpredictable future, without investing resources to predict it.

Our evidence revealed that the European Innovation Champions applied a set of heuristics to face the challenges brought by the crisis in their attempt to influence the future by their actions and decisions. This is consistent with the effectuation logic presented above, and such an effectuation approach has been used to manage the five paradoxical behaviors discussed in the previous section. Effectuation allowed the European Innovation Champions to avoid an over-planning trap, by minimizing technological risk and taking in a predetermined

amount of losses to explore new opportunities (paradox of planning). It allowed the firms to prioritize noneconomic goals and preserve their identity and socioemotional endowment (paradox of liquidity). The European Innovation Champions decided to accept these potential losses even though liquidity is crucial during uncertain and stressful conditions. Moreover, with respect to the paradox of time and velocity, effectuation helped the European Innovation Champions to react quickly to the challenges posed by the crisis, while showing their ability to set the pace in their adoption of new strategies and pursuit of new opportunities, such as looking at similar firms to set fruitful partnerships (paradox of partnership). Further, the re-allocation of internal resources needed to explore new opportunities was possible even if these resources were limited, thanks to the acceptance of affordable losses and the exploitation of contingencies that characterize effectuation (paradox of resources and technology).

What is more, the approach towards effectuation was not always the same across all European Innovation Champions. Based on our evidence, it is possible to clearly distinguish four different effectuation approaches adopted by the European Innovation Champions according to two main dimensions. The first one is *proactiveness*, referring to a firm's orientation to making efforts to seize new opportunities, anticipating market demands, and actively shaping the external environment (Lumpkin and Dess, 2001). Specifically, we define as *reactive orientation* a firm's inclination to maintain market positions within the markets already targeted by the firm before the COVID-19 pandemic. Conversely, we define as *proactive orientation* a firm's inclination to explore and identify new markets that were not targeted or prioritized before the crisis. The second dimension is *willingness to change*, referring to a firm's disposition toward the locus of innovation (De Massis et al., 2015). This refers to a firm's intention to search its existing knowledge base rather than a distant one, which results in a deep transformation of procedures, processes, and business models at both the organizational and the marketing level. Here, we distinguish between firms with *high* versus *low* willingness to change.

The effectuation approaches adopted by the European Innovation Champions can thus be categorized into four different groups according to these two dimensions, as depicted in the two-by-two matrix in Figure 2. We labeled the four groups using evocative animal names, epitomizing their behavior and characteristics: *ocelots*, *tigers*, *ostriches*, and *goats*.

- **Ocelots** display a high willingness to change, as they were inclined to substantially transform their business models and implement radical organizational changes in the midst of the pandemic. At the same time, ocelots are reactive firms, oriented to defending their position in the market already targeted before COVID-19. These firms “change everything to change nothing” and are well epitomized by the novel “The Leopard” written by Giuseppe Tomasi di Lampedusa and published in 1958. As one of our informants reported:

“Instead of focusing 70% B2C and 30% B2B, we switched it around. We are reviewing our priorities. It is a real shift, but it is not a complete pivot, it is an updated priority.”

- **Tigers** are also characterized by a high willingness to change, as they were willing to substantially restructure their innovation activities in the midst of the pandemic, to evolve their business model, and to change their “go to market” approaches. Differently from ocelots, these firms display a proactive orientation as they tended to aggressively hit new markets, looking for new opportunities during the pandemic. In doing so, tigers were ready to either use their technology or modify their commercial strategies to meet unanticipated market/consumer needs. As reported during one of the interviews:

“We just try to follow the flow, because if we stop one day to think, we lose an opportunity offered by this crisis.”

- **Ostriches** are characterized by a low willingness to change, tending to be steady and not willing to make any substantial change to their core strategies, processes, and business models (i.e., willing to stay close rather than distant in terms of locus of innovation). Ostriches also display low proactivity, as they tend to “shelter from the storm” (e.g., using existing resources, previously established partnerships, profitable market strategies, or cash reserves). The primary objective of ostriches was therefore to react to the pandemic and defend their position within their market with marginal changes to processes and business strategies, aiming at the preservation of the pre-COVID-19 conditions. As reported by one of our informants:

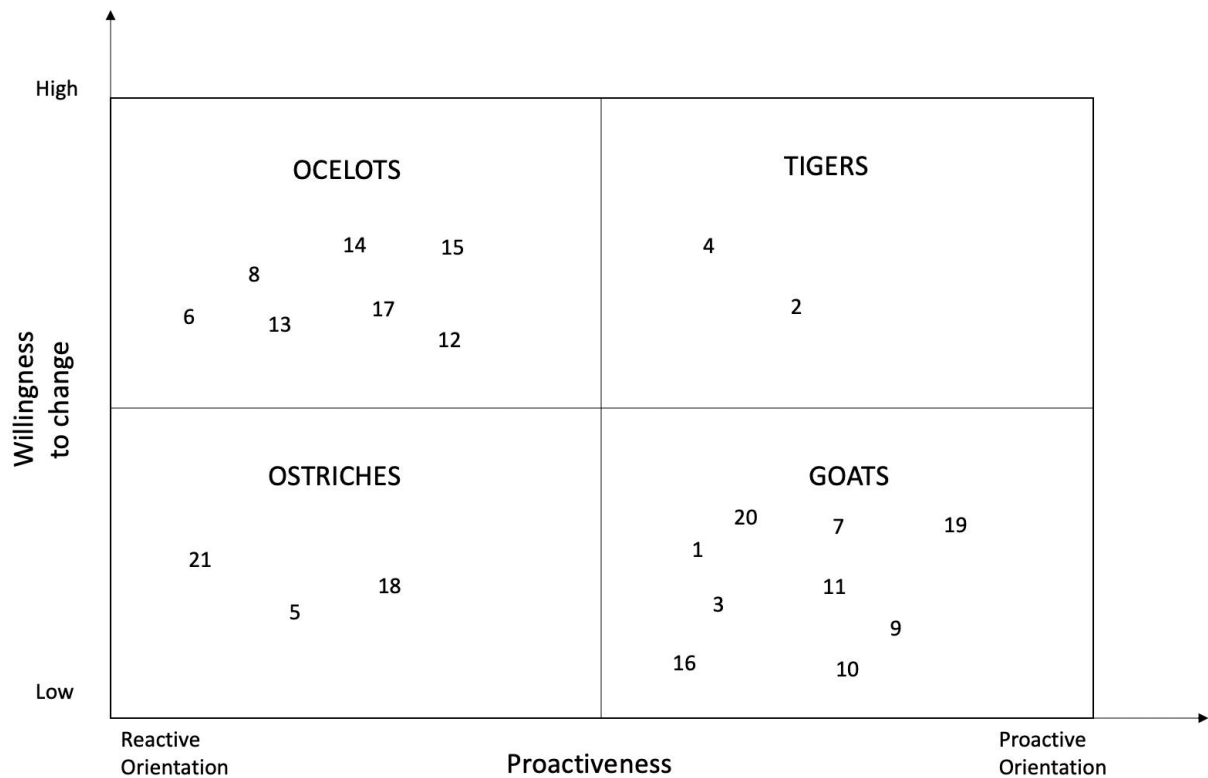
“This is probably going to be the hardest scenario we are ever going to face in our working careers; I don't think something like this is going to come along again in the next 25 years.”

- **Goats** are willing to “keep the boat steady in the storm” and not change their core strategies, procedures, or business models. Thus, they have a low willingness to change. At the same time, they

have a proactive orientation, as they persistently make efforts to seize potential new opportunities, especially implementing new solutions and new strategies that might anticipate market demands, while being consistent with their current business model. As one of our interviewees stated:

“The only problem is that we didn’t attract new customers. This was disappointing given our initial intention to invest in scouting new opportunities and anticipating potential new market demands. We didn’t lose anything in terms of business, as we did not undergo substantial changes of our core strategy and business model; I think we lost in terms of being unable to hit potential customers in the new environment.”

Figure 2. Taxonomy of effectuation strategies implemented by the European Innovation Champions ⁽¹⁾.



⁽¹⁾: Please note that the numbers reported in Figure 2 do not correspond to the ordering of firms in Table 1, where firms are listed in alphabetical order.

3.2 Signaling is important

“Investors are struggling with their portfolio, I hit the milestones and completed the study during COVID-19 [...] Then I made a significant effort to communicate such accomplishments to the outside audience [...] by revising our website and also undertaking direct announcements through our networks [...] that increased our reputation and gave us a unique advantage over so many companies who did not.”

The way the European Innovation Champions navigated the COVID-19 pandemic acted as an important signal of their value, quality, and ability to cope with uncertainty and the difficulties in the market. Certain firms proudly showcased to partners, investors, clients, and stakeholders that they were able to create new opportunities in an unforeseeable landscape. From our interviews, it emerged that due to the high degree of uncertainty in the external environment, reputation had become a crucial factor of firms’ success. Through the decisions made and the actions taken, the European Innovation Champions’ leaders signaled to the external stakeholders their strengths in surviving the crisis and, in most cases, also showcased their ability to grow and develop new business opportunities during the pandemic.

Signaling enabled the European Innovation Champions to manage several of the paradoxical behaviors we identified. Having given up on planning, these firms relied heavily on signaling. This allowed them to minimize the amount of time spent convincing stakeholders to trust them, freeing up time to ensure the survival of the firm. Indicating their commitment to pursuing noneconomic goals served as a strong signal that allowed them to sustain and improve their reputation, which in turn proved useful to avoid concerns about liquidity (paradox

of liquidity). Appearing solid to the market and the wider audience also allowed them to find the right partners to engage with (paradox of partnerships).

3.3 Leverage COVID-19 as a business developer/accelerator

“It is the simplest thing [technology] we could have developed, but it is also the fastest to respond to this situation [...] It accelerated our strategy’s change that needed to happen very quickly.”

For certain European Innovation Champions in our sample, COVID-19 led them to rapidly reshuffle their strategic priorities. The pandemic made certain activities critical to the survival of the firm. This led them to accelerate the development of certain investments planned for the long term, prioritizing them for immediate implementation. Some of the firms interviewed looked back on the previous months as a formidable call to action to pursue opportunities that would otherwise have been left untapped for many months or even years.

The pandemic pushed the European Innovation Champions’ leaders to rapidly re-focus their business strategies, implement new actions, accelerate ongoing processes, and/or re-organize and more effectively use existing resources. This allowed the European Innovation Champions to manage both the paradox of resources and technology and the paradox of time and velocity. Moreover, such accelerated strategic refocusing led these firms to consider more seriously possible exit strategy opportunities (mainly mergers or acquisitions), engaging with new partners, or applying for new financing tools. With respect to partnerships, it is worth mentioning that COVID-19 gave the European Innovation Champions the opportunity to partner with similar firms in order to gain from the crisis (thereby allowing them to manage the paradox of partnerships).

3.4 Remain loyal to your identity and establish a clear purpose

“If you [employee] feel at risk, we will take some precautions, such as allowing you to work from home. We will find a way. The job is waiting here for you, you have to feel that we care for you and that the reason for which our business is created and exists, its meaning and direction, is clear and goes beyond economic interests.”

Although entrepreneurs looked for new opportunities and new market niches where they could apply their technology, our findings suggest that the European Innovation Champions focused on maintaining and preserving their identity and values. These firms thus slightly pivoted by looking for new and more efficient ways of exploiting their resources without changing their inner nature and core values (paradox of resources and technology). While well-positioned European Innovation Champions took advantage of new opportunities, they also showed resilience and responded to threats by remaining authentic with respect to the position they had achieved before the outbreak.

This also translated into being perceived as loyal to the firm’s core values and conveyed a special emphasis on noneconomic utilities beyond economic ones, stressing the importance of socioemotional wealth during the crisis. In doing so, the European Innovation Champions put in great effort to assuring the well-being and motivation of their employees, by setting up daily calls for updates or virtual coffee breaks, sharing feelings, being honest with them, and being empathic. Instead of focusing on financial aspects, these firms leveraged their core noneconomic values and relied on their identity. This played a crucial role in setting the direction during the uncertainty (paradox of liquidity), allowing them to create empathic relationships with their internal and external stakeholders, and establish a clear business purpose.

3.5 Communities matter

“Before the crisis we sold mainly at trade fairs. This is not possible anymore. However, thanks to an active community, we are now building on social networks to explain our technology.”

Our findings suggest that the European Innovation Champions have been able to leverage existing communities or build new ones, which became important for their survival. In many cases these firms acted as a network broker (Kwon et al., 2020) between the actors in the surrounding communities. The exceptional conditions that emerged during the lockdown significantly changed the type of social interactions between individuals and firms, which in turn enabled new B2B and B2C approaches. Social distancing, smart working, and the accelerated adoption of online productivity and communication tools simply led to the creation of new communities of users/consumers and stakeholders, or reinforced existing ones. Specifically, on the one hand, the COVID-19 outbreak created the opportunity to engage differently with already existing communities (e.g., through an extensive use of social networks); on the other hand, it stimulated the creation of new communities, built on new COVID-19-related needs. The European Innovation Champions found comfort in these communities to navigate the storm and were able to put these communities (old and new) at the center of their reaction to the

crisis. This allowed them to quickly find new ways of B2B and B2C engagement with the communities to manage both the paradox of time and velocity and the paradox of partnerships.

3.6 Legacy is not a burden, but an asset

“We are using old answers for new challenges.”

The pandemic represented a testing ground for the European Innovation Champions to navigate through an unexpected crisis. Our evidence suggests that firm leaders’ personal and professional backgrounds were a key driving force determining the speed and type of their response to the crisis. These firms’ legacies in terms of past experience and the backgrounds of their leaders allowed them to react fast or quickly become capable of setting the right pace in responding to the challenges caused by the crisis (paradox of time and velocity). Moreover, the European Innovation Champions could rely on their legacies to find and attract the right firms for setting up valuable partnerships (paradox of partnerships). As the pandemic was reshaping industries’ reference points in terms of markets and supply chains, the European Innovation Champions’ leaders relied on their personal and professional networks, professional experience, and academic/research networks of entrepreneurs and founders to identify new strategic directions and partners. In other words, as these leaders intended to react to the pandemic in a consistent/robust way, they had no choice but to identify options with which they were very familiar (e.g., relying on and activating resources from their past). Finally, the firms’ legacies in terms of their leaders’ past experience and backgrounds also allowed the European Innovation Champions to know better how to re-organize and optimize the use of existing resources so as to be highly flexible during the COVID-19 pandemic (paradox of resources and technology).

3.7 Switch from TRL to COVID-TRL

“The market got ready for what we already had.”

The Technology Readiness Level (TRL) is a widely used metric within EU programs to map the steps in the different R&D and innovation processes and therefore assess the maturity level of a technology (European Commission, 2011). The firms we investigated are very familiar with the concept of TRL, since the European Commission adopted this metric in 2014 for the R&D projects funded by the Horizon 2020 program. In addition, all the project proposals within Phase 2 of the SME Instrument Program (today’s European Innovation Council Accelerator Pilot Program) must be centered around technologies with high readiness levels (TRL from 6 to 8).

During the COVID-19 pandemic, firms had to focus on another type of TRL, which we labeled COVID-TRL. The COVID-TRL refers to the maturity of technologies specifically developed for facing the challenges caused by the COVID-19-induced crisis. The COVID-TRL turned out to be especially important during the crisis. A high readiness level of this sort of technology allowed the European Innovation Champions to quickly respond to new market needs generated by the pandemic (paradox of time and velocity). Even with limited resources, the European Innovation Champions with a high COVID-TRL were able to speed up the development of their technologies or better use them to identify particularly interesting and important solutions to respond to the new consumer needs triggered by the crisis (paradox of resources and technologies). Conversely, firms with a low COVID-TRL remained stuck in their technology development and were not able to meet the new needs triggered by the outbreak.

3.8 Cash is king

“Every single euro counts for us as a small innovation firm, so we cannot risk being on hold at home. We need to be even more engaged now.”

One of the most relevant aspects characterizing a firm’s short-term reaction to crises is the availability of cash flow. Coherently, the informants from the European Innovation Champions suggested that on a psychological level, cash flow was one of the most important factors shaping opportunities to either survive or to pivot new strategies during the lockdown phase. Firms that were above this psychological threshold forgot about liquidity and could instead prioritize the pursuit of noneconomic goals (paradox of liquidity). Firms with sufficient cash available could also reserve the required time to evaluate opportunities emerging from the COVID-19 outbreak and to find the right pace and rhythm to react to the crisis (paradox of time and velocity).

In cases characterized by liquidity shortage, the firms’ leaders had limited opportunities to worry about new possible developments for their businesses. In such circumstances, two different behaviors emerged. While some firms looked for new financial opportunities in terms of European or national grants, others looked downstream for commercial partnerships to shorten their time to market and considered mergers or

acquisitions as possible exit strategies. In sum, when liquidity started to become a problem, firms prioritized short-term survival to the detriment of their long-term vision and were unable to focus on new opportunities. Moreover, as our interviews suggested, focusing mainly on planning to attract potential new grants or looking for exit strategies during a crisis might undermine a firm's market positioning, leading them out of the market.

3.9 Agility matters

"Rather than changing the milestones, we changed the way to reach the milestones."

A central element characterizing European Innovation Champions' responses to the unexpected crisis was their organizational agility, which allowed them to reconfigure and adapt their resource endowments and provide a quick response to the new situation. Most firms revealed an impressive ability to set the right pace in responding to external changes, use time wisely to reflect, and find the proper rhythm. They were able to balance short-term emergencies with long-term goals, weighing the two time horizons within their business models. Accordingly, agility allowed the European Innovation Champions to easily manage the paradox of planning and the paradox of time and velocity.

This agility also allowed an impressive acceleration in the European Innovation Champions' innovation strategies and operations. Some of them were able to explore collateral business opportunities, find new partnerships, and secure new resources to reach their milestones (paradox of partnerships); others were able to quickly reallocate R&D funds and advance their technology development strategies (paradox of resources and technology).

3.10 Adaptability matters

"Under pressure everything becomes liquid!"

The observed shifts in the European Innovation Champions' innovation strategies were, in most cases, determined by the deep uncertainty characterizing their specific business environments during the pandemic. The pandemic hit industries in very different ways, and firms needed to identify the right strategy to face new opportunities and emerging challenges within their own business environments. The ability to nimbly adapt their strategy to the environment – which was possible thanks to their agility – allowed the European Innovation Champions to properly respond to increased environmental turbulence in the midst of the pandemic, thus addressing the paradox of time and velocity. Moreover, this adaptability offered such firms the opportunity to easily set up new partnerships that in some cases were crucial to succeed through the crisis (paradox of partnerships), as well as to re-organize their resources and technologies to match the changed market needs (paradox of resources and technology). As entry barriers collapsed and new competitors surfaced, firms observed and reinterpreted their new industrial environment. The European Innovation Champions adapted their strategies to new levels and new forms of hostility. At the same time, new market segments became open to SMEs capable of seizing the momentum. Under pressure, European Innovation Champions had to adapt in order to survive and renew the sources of competitive advantage. In a nutshell, while agility helped these firms to promptly analyze and navigate the unpredictable and quickly respond to deal with this crisis, in a broader sense these firms were also observed to be adaptable in the nature of their response and reactions to the challenges they faced in this crisis.

4 Conclusions

This study was motivated by a research question and an intuition. The research question aimed to understand how some SMEs successfully absorbed and reacted to the shock caused by the COVID-19 pandemic. The intuition was that the most interesting responses to this question were not to be found by averaging out industrial dynamics, but rather by focusing on outliers and exceptional cases that portray unusual responses to the situation. Therefore, we decided to focus our investigation on European Innovation Champions – Europe's best and most innovative SMEs, which were recognized by the European Innovation Council (EIC) as outstanding in terms of their potential for success in technology commercialization in the short-to-medium term, and received an EIC acceleration grant.

As expected, the formidable, unprecedented reshuffling that the pandemic generated across Europe led to different responses as the European Innovation Champions reinterpreted the environment and themselves, finding new opportunities and facing new threats. In the last three months, these European Innovation Champions redirected resources and reinterpreted their traditional strengths and weaknesses in response to changing business environments. As a result, while certain SMEs adapted their business models to either replicate pre-crisis business opportunities or enter new markets, others sheltered their development activities and business practices, hoping to restore pre-crisis, favorable business conditions as quickly as possible. Further, others applied their traditional approaches to tap into new market opportunities. This was happening in industries where the distribution of opportunities changed, and new competitors and incumbents repositioned themselves through the rise and fall of old market barriers.

While the heterogeneity of behaviors was largely expected, we realized that – unexpectedly – these European Innovation Champions thrived through the crisis by behaving in a rather paradoxical way. More specifically, the crisis led them to face five different paradoxes, which these firms solved, or at least managed, by undertaking corresponding actions and decisions as emerged from our investigation, thereby either preserving their markets or exploring new opportunities. While COVID-19 will change many aspects of various industries, our qualitative evidence has revealed ten management principles that can be helpful to understand how an SME can succeed through a crisis ⁽⁶⁾. Since the crisis has affected European countries to a different extent – with also significant differences in policy initiatives and infection control measures –, future research using quantitative methodologies could draw on our study's findings and enrich the framework of our analysis. For instance, a large-scale examination of the territorial context/ecosystem in future research could bring further insights on country effects in firms' reaction to the COVID-19 pandemic (see, e.g. Autio et al. 2018). Further, the use of control groups in future studies would also allow to detect potential differences between European Innovation Champions and other groups of firms.

In a nutshell, extraordinary conditions require extraordinary actions and decisions. The firms we studied behaved in a paradoxical and counterintuitive way by elevating themselves above the crisis situation they were facing to rediscover new competitive advantage conditions.

Understanding the nature of paradoxical tensions emerging during the COVID-19 crisis and the management principles characterizing the European Innovation Champions' behavior during the peak of the pandemic is also crucial for policymakers to understand the factors that, during extraordinary conditions, can enhance the capability of European entrepreneurship to leverage on its unique features thereby lowering the barriers to scale up. While we hope that no firm will again have to face conditions like the ones engendered by the COVID-19 pandemic, we believe that unfortunate and catastrophic events like this are unique testbeds for the resilience and adaptability of the European innovation ecosystem.

We hope that the findings of our study can inspire policymakers and business leaders across Europe, while also highlighting that entrepreneurs across Europe are the most important forces for translating threats into opportunities and redesigning the shape of our future.

⁽⁶⁾ Of course, it is not possible to statistically generalize results from an exploratory case study analysis (Yin, 2003), nor to draw general conclusions on firms' behavior on the COVID-19 response in different industries. Our aim is to make analytical and theoretical generalizations (e.g., Eisenhardt, 1989) to the existing body of knowledge regarding small firms' innovation strategies under uncertainty conditions.

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List of abbreviations and definitions

R&D Research and Development

SMEs Small-Medium Enterprises

TRL Technology Readiness Level

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