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Multilevel Antecedents of Organizational Speed: The Exemplary Case of a Small Italian R&D Organization

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Abstract: The COVID-19 outbreak has compelled many organizations to adapt to a rapidly changing environment. In this context, the aim of this article is to unveil how a small R&D organization has been able to rapidly take advantage of the opportunities offered by the COVID-19 outbreak and to understand the factors that have enabled organizational speed. Results of the qualitative analysis of this exemplary single case show that a combination of factors at the individual level (i.e., characteristics of the CEO and collaborators), organizational level (i.e., structure, resources, operative systems and processes, culture), and partner level (i.e., characteristics of the partner portfolio) is required to go through a very fast recognition–decision–execution process.

Keywords: organizational speed; dynamic capability; ambidexterity; COVID-19; R&D organization

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1. Introduction

The COVID-19 outbreak, which the World Health Organization declared a pandemic on 11 March 2020, has disrupted all business environments. Compared with other contagious diseases, COVID-19 appears to be both more deadly and more contagious, thus leading scientists to consider it "the worst health crisis of our times" [1]. Consequently, all COVID-19 health policies have been directed towards decreasing the replication of the disease and saving lives. This situation is posing serious problems for all individuals, organizations, and countries; looking at organizations, the economic shutdown has put pressure on manufacturing, decreased demand, and contracted industrial profits [2], shocking organizations and putting economic sustainability at risk, which has called for attention on this issue [3,4]. However, at the same time, it might also offer a potential opportunity for some organizations, especially for R&D labs operating in the healthcare industry domain, which has a direct impact on human health and wellbeing.

The topic of how organizations adapt to changes in their external environment is an issue around which there is recent and still open debate. Although the literature has dedicated increasing attention to this matter in recent decades, organizations continue to fail in doing it effectively, especially in the case of discontinuous change [5]. The changes that COVID-19 has brought about are not only discontinuous, but also unexpected, which further contributes to making this challenge tougher. Indeed, an organization needs to be flexible enough to move and reconfigure its organizational resources and processes to cope with environmental changes [6], which is far from being an easy undertaking, especially in certain situations where the key is responding *quickly* to environmental challenges [7]. In this regard, very recently, Dykes et al. [8] conceptualized *organizational speed* as "the dynamic Gestalt-like capacity of an organization to quickly identify, assemble, reconfigure, modify, and deploy its organizational processes and activities" [8] (p. 270), which seems to be exactly what firms need in such unexpected situations as the COVID-19 outbreak. They explain that this dynamic capability encompasses three

dimensions, namely recognition speed, decision speed, and execution speed, emphasizing the holistic perspective they use to study organizational change, and explicitly calling for further investigation on this underexplored concept, with a particular focus, among others, on antecedents [8].

In addition, to the best of our knowledge, strategic issues, related to the broader theme of dynamic capabilities that organizational speed is part of, have mainly been investigated in manufacturing contexts, with some exceptions focusing on service industries (e.g., [9]), thus leaving the domain of R&D organizations unexplored.

On such bases, this article aims to answer the following research questions: How can an R&D organization rapidly take advantage of the opportunities offered by the COVID-19 outbreak? What are the factors that enable the organizational speed of an R&D organization in the face of the COVID-19 outbreak?

For this purpose, we examine a single yet exemplary case of a small Italian R&D organization that has faced these challenges rapidly by launching several new explorative and exploitative projects to respond to the open questions posed by the COVID-19 outbreak.

This research is particularly relevant because it allows lessons to be learned after a crisis-like situation, so as to take advantage of the positive experience of an organization that was able to turn this difficult situation into an opportunity [4]. This study contributes, from a theoretical and practical standpoint, to the debate surrounding how small R&D organizations can promptly react to the disruption this new pandemic has brought about and turn challenges into opportunities. From a theoretical perspective, we elaborate on the concept of organizational speed, offering an overarching view on the recognition–decision–execution process in times of rapid change and associated antecedents at the individual, organizational, and partner levels. In addition, we contribute to the recent stream exploring the connection between the triple bottom-line dimensions of environmental, social, and economic sustainability and the COVID-19 pandemic, with a particular focus on economic sustainability. From a practical perspective, we make managers of small R&D organizations aware of how they could be prepared to face such disruptive situations, where the only chance to survive is by transforming challenges into opportunities.

The remainder of this article is structured as follows: in the next section, we briefly lay out the theoretical bases for our study, and then we illustrate the methodology that we followed and present the results of our analysis, before discussing them in light of existing studies and highlighting implications for theory and practice.

2. The COVID-19 Outbreak

After the first cases of pneumonia in China (Wuhan City, Hubei Province) at the end of 2019, the rapid escalation of coronavirus disease 2019 (COVID-19) led the World Health Organization declare it a global pandemic on 11 March 2020.

It is widely recognized that the COVID-19 pandemic crisis embraces the health, economic, and social domains. In this context, economists, scientists in the pharmaceutical, epidemiology and biology fields, and policy-makers have led the scene of ongoing debates, but the deep impact on work and organizations calls for a managerial and organizational perspective to complete the picture [10].

While being acquainted with all of the serious difficulties that people and organizations are facing, we must also acknowledge the opportunities that such a changing context offers to organizations [11]. Unquestionably, the COVID-19 pandemic has left no alternatives to organizations but to reconsider how to adapt to the new situation in the most suitable way [12]. Therefore, the capacity to rapidly respond to changes has been considered the key to survival, which is assured not only by financial assets in this scenario [13], further confirming the relevance of successfully adjusting to a mutable environment in all of its facets [14].

However, the ability to change is not enough, but rather speed is central; indeed, in a pandemic, "time is so valuable and essential, that the question of costs is far less important than the ability to get to a solution sooner" [15] (p. 410). Based on the rationale that organizations that have transformed to survive through previous crises have been able to change what they do quickly [16], authors of recent publications in the COVID-19 domain stress the prominent role of speed, both in engaging with new ideas and taking actions (e.g., [11,15,17]). Organizational capabilities related to such abilities are not simply associated with the redeployment of resources, but rather they require other mechanisms, which contributes to increasing the complexity and demands further research [18].

Despite this evidence, "we know little about the novel organizational and change aspects that the disease represents beyond our established and comfortable researching boundaries" [10] (p. 263).

On such premises, we aim to take advantage of the unique chance to carry out phenomenon-driven research, i.e., shaping research as the phenomenon occurs [10,19], which provides the perfect conditions for conducting research on organizational speed in the COVID-19 pandemic scenario.

3. Theoretical Background

One of the key issues in the strategic management field relates to modifications in the environment and the subsequent organizational adaptation on the part of firms through their strategic changes [20]. The literature has widely recognized the importance of strategic change, especially in dynamic environments, and has associated it with the reconfiguration of the resources and capabilities an organization possesses (e.g., [21]). In this context, agility and flexibility are the most used terms by the literature to refer to the ability organizations have to adapt to the changing environment and satisfy market demand [22]. However, the two terms (i.e., flexibility and agility) are often used interchangeably, blurring the boundaries between them [22]. Recently, some articles have tried to shed light on this issue, highlighting that, since "agility emphasizes speed and flexibility as the primary attributes of an agile organization" [23], flexibility seems to be just a component of agility, which is a more encompassing concept. In other words, agility has been recognized by some authors as a natural evolution of flexibility since fast market changes and global competition, which characterize the current competitive arena, have also emphasized the need for speed: flexibility is thus "an agility capability, among other capabilities such as responsiveness or speed" [22] (p. 1138). Along the same lines, Singh et al. [24] and, more recently, Baškarada and Koronios [25] further argue that agility enables a company to respond to the external *stimuli* producing changes along two independent dimensions: magnitude of change and rate of variety change, which respectively refer to flexibility and speed relative to the competitors. Besides flexibility and speed, Walter [26], in her up-to-date literature review, also identifies responsiveness and competency as the main agility capabilities, all falling under the broader umbrella of dynamic capabilities [26]. Our article is theoretically grounded in this literature and focuses on one of the dimensions of agility, namely *organizational speed*, which, in the face of the COVID-19 scenario, seems to be a winner and a needed capability for companies not deeply investigated by the literature so far [25]. Indeed, organizational speed can be considered one of the components of agility, even though it emphasizes rapidity, based on the idea that "for action to occur—and occur quickly when conditions warrant—the firm must be alert to the need for action, quickly decide what to do, and have the capability to execute the action" [8] (p. 272). Organizational speed is thus composed of three main dimensions: *recognition speed*, which is the speed with which an organization recognizes opportunities and challenges; *decision speed*, which is the speed with it reaches decisions to act; and *execution speed*, which is the speed with which it mobilizes resources, processes, and activities for the implementation of an initiative [8]. While so far studies on organizational speed are scant, studies on agility have mainly embraced the manufacturing industry, leaving R&D organizations and laboratories under-investigated;

only recently some articles, focused on the broader concept of dynamic capabilities, have started investigating R&D and technology-based organizations. To provide an overview of the studies on this issue in the R&D context, we performed a search in ISI Web of Science (WoS) combining the keywords "R&D lab*" OR "innov* lab*" OR "research lab*" OR "research cent*" OR "R&D organi*" OR "technology-based" with the keyword "dynamic capabilit*", both in the Topic (title, abstract, keywords). Results yielded 90 articles, which, after filtering by WoS categories (Management, Business), document type (Article, Review), and language (English), decreased to 58. After reading the full text, we identified 17 articles that fit well with the domain of interest. Table 1 exhibits some details of these articles, showing some first evidence concerning the paucity of literature in this area.

Articles can be divided into two main groups where the former contains the articles that assess the impact of dynamic capabilities on firm performance, whereas the latter contains those that investigate the antecedents. Overall, articles in the first group prove that different dynamic capabilities, such as R&D and marketing capabilities [27], absorptive, innovative, and adaptive capabilities (e.g., [28]), and organizational capability [29,30], play a positive role in enhancing different dimensions of firm performance.

Table 1. Overview of the literature on dynamic capabilities in R&D and technology-based organizations.

Reference	Purpose	DC Investigated	Main Evidence	Setting	Methodology
do Nascimento Welter et al. [31]	To identify the instruments and organizational mechanisms that provide the development of the innovative capacities of companies	Innovative capacity	The process of developing the innovative capacity of companies was studied, and this development occurred through behaviors and skills, routines, and processes and mechanisms of learning and knowledge governance that underpin the development of the product, process, and behavioral dimensions.	Small technology-based institutions in Brazil	Qualitative—multiple case study
Deligianni et al. [32]	To examine the nature of the relationship between technological competence and product innovation, and the moderating effects of the entrepreneur's political competence and prior start-up experience	Entrepreneurial political capability	Technological competence and entrepreneurial competences are key contingencies that influence resource orchestration efficiency in the context of new venture innovation.	New technology-based ventures in Greece	Quantitative
Salehi et al. [33]	To understand how the roles played by network actors evolve during the development and commercialization process of an emerging technology and what operational and dynamic capabilities are developed by actors through collaboration	DC in general	Actors developed sensing capabilities in the pre-collaboration stage, which drove joint new product development. During the collaboration, seizing capabilities were developed where resource commitment and alignment of resources among actors were essential. Capabilities gained through commercialization and large-scale production were predominantly transforming capabilities where actors realigned their structure and had a positive impact on capability development in the wider network.	Technology-based start-ups in a network context	Qualitative—single case study
Deakins and Bensemann [34]	To investigate the nexus between entrepreneurial	Entrepreneurial learning	Entrepreneurial learning has a critical role in the innovation process, enabling TBSFs to overcome	Technology-based new firms (TBNFs) in the	Qualitative interviews

	learning and the innovation process		resource constraints and challenges in a lean contextual environment such as New Zealand.	agri-business sector in New Zealand	
Jensen and Clausen [35]	To examine the origins of exploration and exploitation capabilities in NTBFs	Exploration and exploitation capabilities	There is an effect of exploitation and exploration behavior on capability emergence, and this effect is mediated through routines for deliberate learning.	New technology-based firms (NTBFs) in Norway	Quantitative
Cho et al. [36]	To propose an assessment framework for research and development (R&D) innovation capabilities	R&D-based innovation capabilities	Conceptualization of R&D-based innovation capabilities as composed of management, innovation, planning, and implementation capabilities; a framework with indices for each component is presented and tested.	SMEs in technology-based industries (chemistry, electronics, telecommunications, and semiconductors)	Conceptual + Qualitative
Löfsten [30]	To analyze the organizational capabilities among NTBFs and examine how these are linked to the firms' long-term survival	Organizational capabilities	Business experience (work experience, education, multidisciplinary) of the CEO positively influences firm survival, whereas financing and having international customers do not.	NTBFs in Sweden	Quantitative
Hutterer et al. [37]	To investigate how a research center is able to fulfil contradictory demands by scientific and industrial stakeholders	Ambidexterity	The fundamental abilities for managing contradictory demands are located on an individual level, and it is argued that especially autonomous, well-educated people and their competences of self-organization enable the research center to be ambidextrous.	Large research center in the mechatronic sector	Qualitative—single case study
Ortín-Ángel and Vendrell-Herrero [38]	To compare the evolution of firms' total factor productivity between university spin-offs and NTBFs from a capability perspective	DC in general	University spin-offs have lower initial substantive capabilities but greater dynamic capabilities than independent NTBFs.	University spin-off and NTBFs in Spain	Quantitative

Biedenbach and Müller [28]	To explore how absorptive, innovative, and adaptive capabilities within early project phases affect project and portfolio performances in pharmaceutical and biotechnology R&D organizations	Absorptive, innovative, and adaptive capabilities	The results show effects of absorptive, innovative, and adaptive capabilities on short- and long-term project performance and portfolio performance. Absorptive and adaptive capabilities are the primary contributors to the performance outcome, whereas innovative capabilities are a minor contributor.	Pharmaceutical and biotechnology R&D organizations	Qualitative-quantitative interviews
Brinckmann and Hoegl [39]	To examine how teamwork capability and relational capability of the entrepreneurial team affects the development of new firms	Relational capability and teamworking capability	The study finds that the founding team's initial relational capability is important for the development of NTBFs, whereas the founding team's initial teamwork capabilities is not.	NTBFs in Germany	Quantitative
Strehle et al. [40]	To investigate the impact of organizational learning as an endogenous growth driver for technology-based new ventures	Strategic planning, financial planning, and evaluation, human resource planning, and evaluation, product development, marketing and sales	Eight bundles of management control systems, which are used as proxies for the emergence of the dynamic capabilities strategic planning, financial planning, and evaluation, human resource planning, and evaluation, product development, marketing and sales, and partnering, are positively associated with the growth of the venture.	Technology-based new ventures	Qualitative
Thal and Shahady [29]	To examine perceptions regarding the practice of innovation in the US Air Force's science and technology (S&T) community	Innovation management as a form of organizational capability	The primary reasons the S&T community pursues innovation are a desire to be state-of-the-art, to use technology better, and to respond to the customer. However, innovation was not well integrated into their business and technology strategies, which may result in ad hoc innovation efforts that are incongruent. Therefore, the S&T community may be	Air Force Research Laboratory	Qualitative interviews

			better served by providing its workforce with the organizational processes to better facilitate game-changing innovation.		
Wu and Wang [41]	To analyze how firms transform resources into performance	Resource integration capability, resource reconfiguration capability, learning capability, ability to respond to the rapidly changing environment	DC serve as a link for transforming internal and external resources (specialized know-how, capital, operational management capability, reputation, cooperative alliance experience) first into firm competitiveness and then into financial performance. (Dynamic capabilities increase with firm resources and with the willingness of support firms to cooperate, and, in turn, they serve to increase firm competitiveness and then financial performance.)	Technology-based firms in Taiwan	Quantitative
Andries and Debackere [42]	To look at how the existing literature at the company level can inform us about adaptation in new technology-based companies	Adaptation	Model that proposes initial as well as later-acquired human, technological, financial, and networking resources as possible enablers for business model adaptation, which consists of different episodes, characterized by uncertainty or ambiguity.	New technology-based firms	Conceptual
Atuahene-Gima et al. [43]	To investigate the relationship between the marketing strategy innovativeness and new product performance	Marketing strategy innovativeness (MSI)	The team's extra industry relationships and market dynamism enhanced the impact of MSI on new product performance. In contrast, top management team's intra-industry relationships, financial relationships, and technology dynamism hindered the impact of MSI on new product performance.	Technology-based firms in China	Quantitative
Kor and Mahoney [27]	To examine the effects of the dynamics, management, and governance of R&D and marketing resource deployments on firm-level economic performance	R&D and marketing capabilities	A history of increased efforts in developing and maintaining marketing capabilities is an enduring source of competitive advantage. Moreover, if existing R&D capabilities are not renewed, in a high-velocity business world, economic rents from prior firm-level capabilities dissipate rapidly. Management experience moderates this effect.	Technology-based entrepreneurial firms in the medical, surgical, and dental instruments industry	Quantitative

Articles in the second group, encompassing contributions that are more recent, start to look at how dynamic capabilities are formed, thus examining antecedents of specific dynamic capabilities, such as ambidexterity [37], exploration and exploitation capabilities [35], or innovative capacity [31]. Overall, antecedents are found at three main levels, namely the individual, organizational, and partner levels. At the individual level, skills [31] are mentioned as important antecedents, with particular reference to the attitude towards adaptability and a strong previous knowledge base [35]. At the organizational level, routines and processes and mechanisms of learning and knowledge governance seem to serve to innovative capacity [31]; in particular, routines in systematizing existing knowledge and experience are given particular emphasis for their potential to transform that knowledge into future capabilities [35]. Finally, partnerships seem to contribute to develop sensing and seizing capabilities [33].

It is clear that the literature on how dynamic capabilities are formed is scant and that there is a lack of an overarching view on antecedents at different levels. In addition, it mainly focuses on new technology-based firms, leaving the other R&D organizations unexplored. Moreover, there is only one article [41] specifically dealing with the ability to respond to a rapidly changing environment, but only as one of the components through which the impact of dynamic capabilities on firm competitiveness and performance is tested. Therefore, the dimension of *speed* has not received the attention it deserves.

To bridge this gap, this article aims to understand how an R&D organization can rapidly take advantage of the opportunities offered by the COVID-19 outbreak and to unveil the factors that enable the organizational speed of an R&D organization in the face of the COVID-19 outbreak.

4. Methodology

We employed a qualitative methodological approach for its ability to capture evolutionary, relational, temporal, and cultural complexities and offer detailed and contextualized descriptions of actions and interactions associated with the innovation domain [44]. We relied on the recent article by Elsahn et al. [45] that aims to provide directions for more rigorous and transparent case studies in the field of technology and innovation management. Our study follows an approach that adopts a variance ontology with a process epistemology [46] in trying to describe innovation processes in terms of stages, phases, or cycles identifying causal relationships. Following the suggestion to select multiple cases or an exemplary single case theoretically proposing a strong justification, we selected the exemplary case of a small R&D organization, Polo GGB (Pole of Innovation in Genomics, Genetic and Biology), because it represents a "revelatory case" [47] of rapid reaction to the challenges posed by the COVID-19 outbreak. Moreover, it is set in Italy, which was the first country (after China) where the virus spread dramatically.

The rapidity Polo GGB shows in quickly adapting to the challenges posed allowed us to carry out an in-depth analysis of a complex phenomenon, analyzing it from different perspectives and precisely while things were happening. This is particularly important to increase internal validity of results and to avoid the risk that informants do not remember relevant events precisely [48]. Actually, this approach aims to understand the intricacies and complexity of the matter object of study by allowing researchers to unveil meaningful features of real-life events [49]. In addition, this responds to the recent push for research designs that are more focused on specific empirical phenomena based on a rich and contextualized qualitative approach [50]. Providing such a detailed analysis is time-consuming and implies a significant involvement of respondents, which was not simple at all considered the contingent situation related to the COVID-19 pandemic and pressure on organizations. This contributes to our opting for a single exemplary case where the object of analysis is likely to be detectable, as recommended by Pettigrew [51]. Indeed, when the COVID-19 pandemic exploded, the chosen R&D organization was strongly motivated and committed to launch new products and services in the market as soon as possible, which let us observe what it did and what allowed it to do so. Therefore, the

purpose is to develop new understanding and knowledge in a context of novel arrangements (i.e., the COVID-19 pandemic), exploring an under-investigated topic (i.e., organizational speed) from a pragmatic point of view and in line with what the literature suggests is feasible and appropriate for a single case study research (e.g., [52]).

The unit of analysis of this study is the organization, but we enlarged the scope of investigation with the intent to capture diverse elements that enabled organizational speed (i.e., at the individual, organizational, and partner levels). Methodologically, this was done by triangulating the data at distinct levels in the organization, as explicitly suggested by Ritala et al. [50], to cope with level multiplicity in innovation management research.

For this purpose, both authors carried out eight interviews with the CEO and two scientists from Polo GGB following the research protocol (available upon request), which were recorded and transcribed to increase reliability [53]. After a preliminary interview, the CEO was selected as the main key informant due to her deep knowledge and involvement in all ongoing initiatives in the organization regarding both strategic and operational aspects, as frequently happens in small organizations. Furthermore, we interviewed two researchers with a senior position and responsibility for projects who were selected in different areas of research of Polo GGB to get complementary feedback from employees at a different level in the organization, as anticipated. Using multiple sources of evidence and having different researchers involved in data collection are techniques that contribute to constructing validity and reliability, respectively. Data were collected on different occasions, approximately one per week, to have the possibility, on the one hand, to follow the course of events as they happened and, on the other hand, to understand well the relationship between events and connection with the theory. This allowed us to go into deeper details of the different facts interview by interview and sharpen interview protocols according to the theoretical background. During these interviews, we collected information on several aspects: the organization activities and structures, the new projects launched within the COVID-19 domain, the recognition of opportunities, the decision-making process, the execution of projects, and the factors that enabled the organization to be so rapid in taking advantage of opportunities offered after the COVID-19 outbreak. We also checked secondary sources such as reports and YouTube videos to increase the reliability of the data.

Considered the fast-paced nature of the study, immediately after each interview, one of the researchers wrote extensive minutes that carefully documented the questions asked, the responses given, and other relevant observations. Each researcher analyzed data collected independently, inferring some understandings that were then discussed to converge towards a shared interpretation.

To ensure the quality of data, we triangulated information derived from primary data with secondary sources, as archival analysis. To further increase construct validity, we asked the key informants to review the case study draft.

Data analysis involved identifying categories or data themes, as well as sub-categories, naming them, and finding relationships among these categories and data themes, as recommended by the literature (e.g., [47,49]). This step reflects the standard coding process, which, in this study, was partially "theory-driven" [54] since most categories were not unknown to the literature. The technique was to code the transcript of interviews, grouping together quotes by means of a thematic criterion, so that they pointed to the same construct and had a connection with organizational speed. Figure 1 exhibits an example of the coding process.

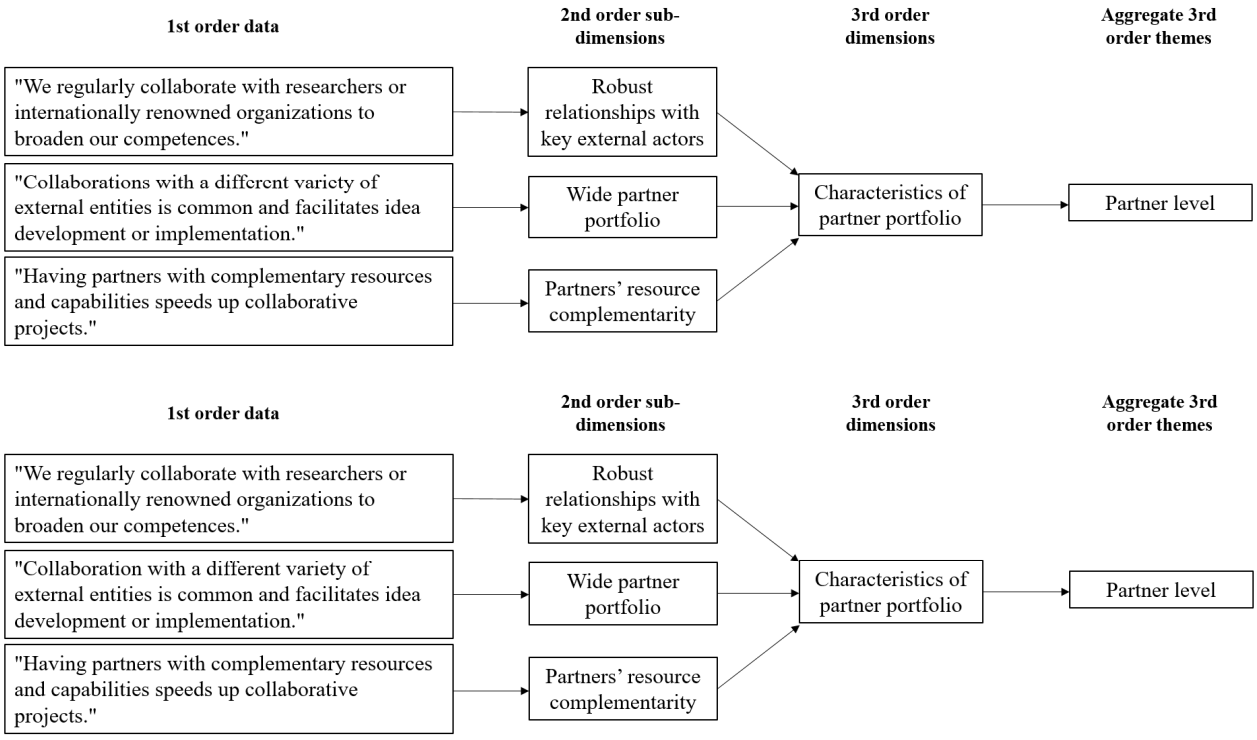

Figure 1. Example of coding—main dimensions and themes that emerged during the interviews.

We made extensive use of tables to organize and present data [55,56], thus making evidence emerge from the analysis, which was the result of a reiterated process of examining the data, going over the theory, and going back to the data. The comparison of evidence with the literature during data analysis contributes to increasing external validity [53].

5. Results

5.1. Case Description

Polo GGB is a small R&D organization and a service facility employing 19 people and founded in 2011 mainly by private companies, with the minor participation of one university. This center of excellence provides operational capacity for innovation and research infrastructure for projects involving genetics, genomics, biology, microbiology, human diagnostics, agro-food, and environment. In particular, it provides researchers with leading-edge facilities holding some of the most advanced instruments in three different laboratories: Genomics & Bioinformatic Laboratory, Ecology and Genetics Research Center, and the Immunology Laboratory. The Genomic and Computational Facility of Polo GGB, located in a bio-incubator inside the Tuscany Life Science and Pharma Valley district in central Italy, has two main objectives: driving innovation in genetics and genomics and promoting technology transfer with industry, with a strong competence in sequencing applications in all fields of biology. The Ecology & Genetics Research Centre is involved in state-of-the-art research projects aimed at developing genetic measures for the control of vector-borne diseases (malaria). The Immunology Laboratory is specialized in the production of monoclonal antibodies. These two laboratories are located in Terni within the Medicine Campus of the University of Perugia, still in the center of Italy but in an adjoining region.

The pool of competences this R&D organization possesses makes this case particularly relevant; indeed, the CEO explains: "Genomics, molecular biology, and immunodiagnostics serve the purpose of COVID-19-related projects; they are a sort of

tools to develop projects, and we have all of them inside our organization". This feature is not common in such small organizations, which, combined with the strength of speed, repeatedly stressed by interviewees ("Our strength is speed of action and reaction to changes"), makes this case exemplary to inform academics and practitioners regarding best practices to be prepared to face disruptive changes in the environment, such as the COVID-19 pandemic. Finally, yet importantly, Polo GGB, being involved in a number of projects that have a high scientific value, has been able to combine speed with quality of projects, overcoming the common tension between speed or efficiency and quality or accuracy (e.g., [57]), which further contributes to making it a case of excellence.

5.2. How to Take Advantage of Opportunities Deriving from the COVID-19 Outbreak Rapidly

In this paragraph, we describe how Polo GGB was able to react quickly to the COVID-19 outbreak, showing a high level of organizational speed, in all of its three components, namely recognition, decision, and execution.

5.2.1. Recognition Speed

The COVID-19 pandemic has posed many challenges in different fields, such as economics, improvement of healthcare systems, safety, and security. In the healthcare domain, the widely recognized opportunities have revolved around the development of a drug against COVID-19 and of swabs and serologic tests to detect the presence of the virus and antibodies, respectively.

In this scenario, the CEO of Polo GGB, who holds the responsibility for launching and managing projects for the organization, immediately senses the opportunity to use the competences of the Polo along two main lines: "*We are able to help and we are able to do business in this situation*", she asserts.

Different idea generation sessions, organized very rapidly with the purpose of understanding what they can do practically, are organized. The first outcome is the recognition of the type of competences they have and how they could be used fruitfully, as the CEO outlines: "*We have the competences in molecular biology, and we have an authorization to do diagnostics; let's exploit them and work immediately to validate the test to search for COVID-19 antibodies in real time*". In other words, the small R&D laboratory does not put routinized procedures in place for scanning the external environment, but mainly decides to analyze the scientific and multidisciplinary internal competences they possess to promptly recognize the opportunities they could pursue. This allows them to identify potentially interesting ideas even though they are not in their core business, as the CEO highlighted: "*We have never realized a real-time test with a diagnostic purpose, but we can do it*". This means they are able to re-think their way of doing business by combining the emergent opportunities with alternative use of their competence with respect to their standard way of doing business.

Furthermore, the role of an outstanding Scientific Director of the Polo, based at the University of Padova, must also be stressed: as the CEO outlines "*This new idea is an epiphany of our Scientific Director*", which means that the intuition of scientists can make the difference in recognizing an opportunity in a timely manner.

In parallel with internal actions to identify opportunities, external ideas are also evaluated: "*We always welcome ideas coming from outside our company and never discard them a priori*". On such a basis, despite the intense activity within the company, the CEO and staff accept discussion of proposals from other firms or institutions without delaying them as explicitly declared: "*A firm contacted us thanks to a collaboration I had years ago with a business angel that is now part of the advisory board of that firm, and I started listening and discussing with them straightaway*".

To summarize, the recognition phase has proceeded internally and externally without excluding any idea and trying to catch the necessary information as soon as possible to check the feasibility and interest for Polo GGB.

5.2.2. Decision Speed

Thanks to the degrees of freedom the CEO has in terms of decisions on which projects to launch, she quickly shares the ideas and opportunities with the Scientific Director of Polo GGB to verify their scientific value and feasibility: "*Polo GGB has a very quick decision process and the possibility to set aside funds for research: it can use them without the intervention of the Board if the investments are below 40,000 euros, as in the case of COVID-19-related projects*", the CEO explains. "*Moreover*", she adds, "*I have daily contact with the Scientific Director to check the feasibility and quality of the projects*". Overall, among the different opportunities that emerged, four new projects are launched in a very short time lapse, as the CEO confirms: "*We, the Scientific Director and I, took the decision to proceed with these projects in a few hours*". She also explains that this is not the standard way of progressing: "*Normally, we make a business plan […], but in this case we had to be fast in deciding to start with the project, so we gave priority to reaching the aim instead of doing the best financial choices; for example, we considered technological feasibility and quality of the output first instead of preparing a detailed budget*". This means that preliminary activities involving planning and budgeting, which normally take place before deciding whether to launch a project or not, are given less importance in favor of more operative tasks associated with whether the project could be carried out in practice.

The decision falls on four main projects, among which two are carried out within the laboratories of Polo GGB, and the other two in collaboration with a set of external partners.

The first internal project has an explorative nature, ambitiously aiming to produce a monoclonal antibody (i.e., a potential drug) against SARS-CoV-2; furthermore, they realize they could use these immunology-related competences to identify SARS-CoV-2 to also develop a serologic test (i.e., direct test to detect whether a person has developed antibodies against SARS-CoV-2). For the second internal project, which is more exploitative, they could use internal competences to execute the real-time analysis of a swab to detect infection by SARS-CoV-2, to be offered as a new service to clients.

As far as project ideas coming from external partners, the first project concerns explorative research to develop a platform for contagion risk management based on an idea developed by the research center MATEMA and the University of Padova. Indeed, the core idea is to identify clusters of employees that are more or less susceptible to SARS-CoV-2 based on social, work, and environmental conditions, determining a risk score that can improve decision-making on COVID-19 test execution. This project can contribute to active surveillance of COVID-19 spread and, thus, safety in workplaces. Polo GGB is contacted for its strong ability to analyze swabs and manage the logistics of swabs, considering the relevance of a timely diagnosis of the presence of SARS-CoV-2. For this purpose, on-site campers in remote zones are also set up thanks to the collaboration of a large Italian company.

The second proposal, whose idea comes from the National Centre of Research (CNR) of Italy, has the purpose of validating a method to test for the presence of SARS-CoV-2 in PM10 particles from filters made available by regional agencies for environmental safeguarding. The CEO understands that Polo GGB is called to bridge the lack of instruments required to analyze filters safely, as well as of the possibility to move them safely. The last explorative project departs from an idea of the CEO, who contacted another laboratory in the north of Italy with the aim of defining an algorithm meant to identify conditions increasing the probability of getting infected by COVID-19, which could reveal useful insights for the other ongoing projects.

5.2.3. Execution Speed

A few days after the decision to proceed, Polo GGB starts being operative on the four new projects, which are set as priorities. Concretizing these ideas into ongoing projects passes through the rapid re-allocation of different resources to the different new and existing projects, which makes the need for new resource acquisition emerge. As the CEO outlines, "*We immediately realized we needed more technicians due to the increase in workload in the laboratories after the COVID-19-related projects, so we hired four new employees straightaway, which, for an organization such as Polo GBB, is a lot*". Normally, new employees go through a training period when they are involved in some of the activities of ongoing projects; instead, in this case, "*We needed new technicians to be operative immediately; therefore, we integrated them into all project activities, making senior technicians and scientists take responsibility for them*", as the CEO and scientists explained. Indeed, in this case and contrarily from what normally happens at Polo GGB, mid-level project leaders are defined and, in general, senior technicians and scientists are given more autonomy and responsibility regarding the new projects. Obviously, this does not exclude the supervision of the CEO: "*I have multiple daily meetings, even extemporaneous, with staff to check work in progress, identify problems, and decide how to solve them, and frequent interactions with external partners*".

Interviewees admitted they have to face some difficulties in organizing the work and some resistance against some activities, especially at the beginning, but then results are surprising. As the CEO recognizes, "*Our team was able to quickly switch from the routinized activities that were mainly related to the genomic domain to molecular biology and diagnostics with a willingness to perform these activities even unexpectedly […]; they want to be active and help in this emergency situation, and the result is that they react in a proactive manner*".

One last relevant point raised during the interviews is the IT infrastructure: "*We put resources and efforts into creating an appropriate IT infrastructure to support the new activities that need to be done rapidly. Normally, we didn't need it, or at least we were used to a less developed infrastructure, but now that we have it, it is another opportunity*". The high quantity of tests to be processed requires strengthening the IT infrastructure to proceed more rapidly.

What is interesting for this study, beyond the scientific value of the projects that may have a significant impact on society, is the richness and variety of initiatives that a small R&D organization has been able to launch in such a short time span since the COVID-19 pandemic. Indeed, Polo GGB has gone through the recognition–decision–execution process in less than three months. Using the words of the CEO: "*Catching and developing new ideas and implementing them quickly is key for our organization; I am active in doing it*".

5.3. Antecedents of Organizational Speed

The data analysis shows that antecedents of organizational speed can be found at three levels, namely the individual, organizational, and partner levels, as described in the following paragraphs.

5.3.1. Antecedents at the Individual Level

As far as antecedents at the individual level are concerned, they refer to characteristics of the CEO and of the employees. The CEO clearly explains that human capital in an R&D organization is at the basis of the ability to react quickly, because if scientists are highly educated, they have a more flexible mindset, which is required to face challenges and solve problems. As the CEO outlines, a company like Polo GGB "*needs scientists and technicians with high skills to take advantage of challenging opportunities from the market*", and she further stresses, "*this profile (where 80% of the staff have a PhD) is necessary to have flexible resources*". People are encouraged "*to learn from others in several ways to enlarge their competences and be more flexible*".

On the other hand, scientists emphasize the fundamental role of the CEO in terms of proactivity and ability to be a leader while also being part of the team: "*(She) is involved in*

all issues and involves us researchers in the different projects", explains one of the researchers. Moreover, the CEO describes herself as a person who "*welcomes challenges; it is in my nature*": her strong attitude towards taking risks emerges clearly from the passion in describing the potential relevance, although uncertain, of the new projects. In addition, she explained that she was rapidly able to recognize and evaluate new challenges both at the technical and managerial levels, which reflects her dual competence.

5.3.2. Antecedents at the Organizational Level

At the organizational level, the flat organizational **structure** with a low degree of hierarchy further allows the CEO to make decisions autonomously: "*There are no other middle managers between top management and other employees, which speeds up all processes*". The organizational context, described by the interviewees as characterized by employees "*who normally carry out explorative and exploitative projects*" and where "*people are used to it and it helps switching from one to another easily*", seems to be a fruitful environment to catch the challenges posed by the COVID-19 emergency. Put in other words, the ability to start both explorative and exploitative projects rapidly is obtained through a contextual form of ambidexterity where scientists are used to easily moving between different tasks with a different nature within the same laboratory.

A bundle of broad financial, technological, and knowledge **resources** complements the flexibility allowed by the scientists and the structure, because it facilitates the number and variety of new projects Polo GGB is able to implement. As the employees declare, "*We have a wide variety of technologies available in house, which, together with a wide spectrum of competences, allows us to start new projects easily and rapidly*". Moreover, the CEO adds, "*financial resources are not a problem for us, and we have visibility on resource availability in the medium term, which poses no problems in carrying out new projects*".

The **culture** plays a fundamental role in this R&D organization, and the CEO emphasizes this aspect a lot during the interviews: "*We have put a lot of effort into creating a culture of continuous change to be ready to learn new things and adapt to the changing environment rapidly*". Indeed, shared values seem to be at the core of their mission and permeate all levels of the organization. The CEO has worked on fostering and stimulating a culture of mutual learning and inclination towards change that looks at the success of the organization instead of at the success of individuals. This culture is reflected by the rewards system, since the company "*does not reward individuals, but the team, which is pushed towards accomplishing the team goal*". Furthermore, scientists and employees have always been used to working with external partners, because "*for a small R&D organization such as Polo GGB, being open to collaboration is essential to being more ready and reactive; of course you are able to collaborate if you are an excellence in your field, so our employees are always pushed to maintain a high reputation*", the CEO underlines.

Finally, internal **operative systems and processes** reflect the climate where everybody is motivated to work and interact frequently with colleagues sharing different backgrounds, and communication is facilitated not only horizontally but also vertically. The speediness is also guaranteed by the fact that employees "*frequently check the work in progress through meetings, so that if there is a problem, it emerges immediately*"; in addition, "*communication is frequent and open; we use different channels to be always updated, almost in real time*", highlights the CEO. This open line of communication facilitates the monitoring of projects, problem solving, and control of the scientists' work, while maintaining a climate of collaboration. Generally, the employees "*are always open to accepting, evaluating, and discussing solutions proposed by third parties to find the most effective ones*". This is backed by the fact that scientists and technicians working in teams have different competences, as the CEO explains: "*People work in teams, and in each team there are different competences; problem solving is more rapid in this way*".

5.3.3. Antecedents at the Partner Level

The same open culture has made Polo GGB establish a wide portfolio of relationships with external partners, most of which are based on a complementarity principle. This factor further increases the potential of the organization to recognize new opportunities and implement projects more rapidly due to their previous experience of collaboration and lack of competition. In the words of the CEO, "*collaborations with a wide variety of external entities are common and facilitate idea development or implementation*"; complementarity among partners seems to play a positive role, as the CEO confirms: "*Having partners with complementary resources and capabilities speeds up collaborative projects*".

Figure 2 presents an overarching picture of how organizational speed is obtained and the antecedents of organizational speed, which is the main result of this study.

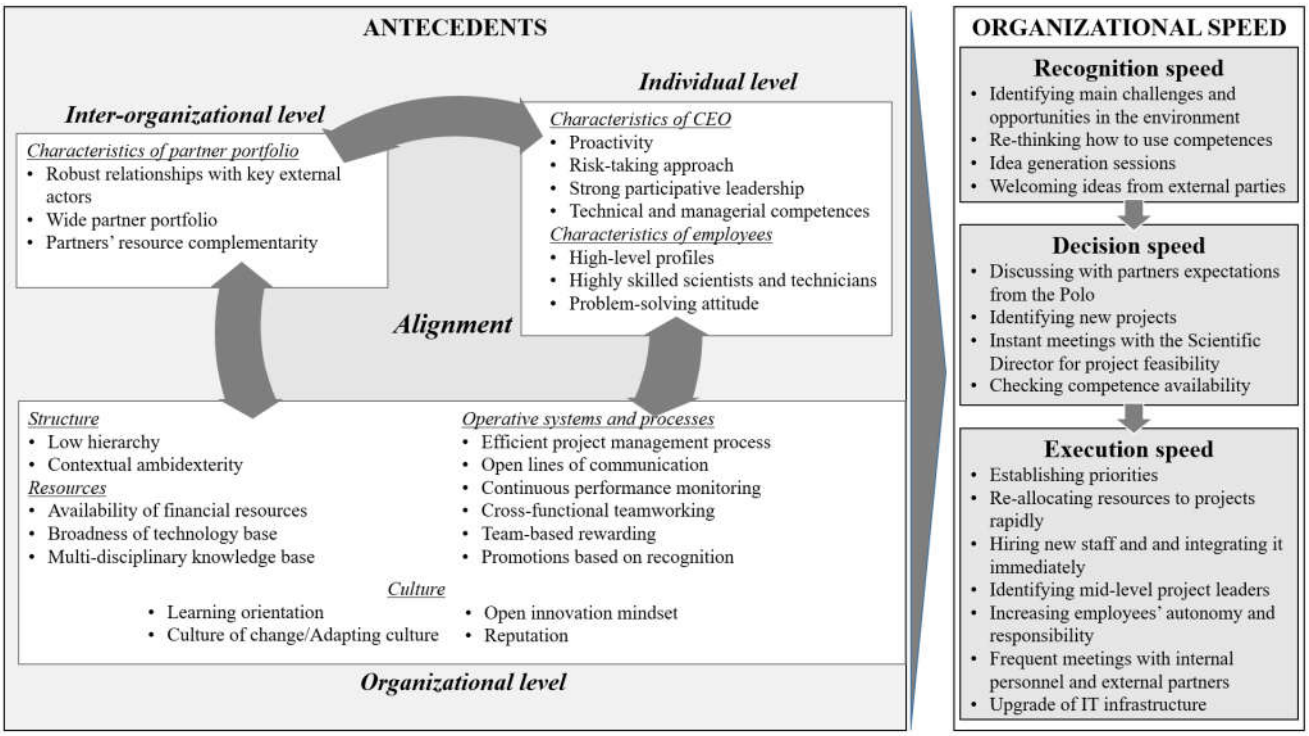

Figure 2. Overview of the antecedents of organizational speed.

6. Discussion and Conclusions

6.1. Discussion of Findings

The purpose of this study was to understand how an R&D organization can rapidly take advantage of the opportunities offered by the COVID-19 outbreak and to unveil the factors that enable the organizational speed of an R&D organization in the face of the COVID-19 outbreak.

Our case shows that Polo GGB is able to revise its strategy, integrating both explorative and exploitative projects, balancing the exploitation of the current capabilities with developing new ones.

In the face of the dramatic external circumstances, the R&D organization displays a great ability to adapt its strategic direction to seize the newly emerged opportunities fully; the whole organization is able to respond by adding a new set of projects to the current portfolio, thus keeping pace with the challenges posed by the external environment. Organizational speed is achieved through a quick process that involves fast awareness and recognition, decision, and action. Overall, it seems that the internal scientific competences, jointly with the outstanding profile of the Scientific Director of the Polo, are

at the basis of the first two steps. Firstly, Polo GGB recognizes they have a strong and differentiated pool of competences they can use for emerging opportunities, identified through idea generation sessions, despite not being in line with their core business. Secondly, in the decision phase, the attention is focused more on whether the Polo has all the competences required for the project and whether the project is feasible from a technological point of view, rather than on detailed planning and budgeting. During the execution phase, these new projects become operative very rapidly, revealing the strong potential of the small R&D organization that is the object of study. Indeed, through a rapid reallocation of resources and the hiring of new employees who become operative straightaway thanks to the supervision of senior technicians and researchers who are granted enhanced autonomy and responsibility, Polo GGB has reached the first results in a record time.

Results show there is a set of factors that enable the CEO to successfully recognize and act promptly when it is time to boost changes and to quickly commit the resources to new courses of actions in response to such changes. According to the few previous contributions on dynamic capabilities in R&D organizations, these factors are spread out over three different levels, namely the partner, organizational, and individual levels. For organizational speed to be increased, the combination of the specific identified elements at the three levels enables a quick recognition, decision, and execution process: what we add to the previous debate is an overarching and integrated picture of these antecedents that jointly allow these small R&D organizations to react promptly.

At the partner level, the open innovation attitude combined with the company's reputation, also boosted by the fact of having two laboratories located in an incubator and another one in a university, enables the proliferation of interesting external opportunities and partnerships and facilitates the identification and subsequent execution of some of the new projects. Furthermore, the partnerships already in place facilitate the scanning and sensing of new opportunities and projects as well as their subsequent execution. At the organizational level, the flat organization with a low hierarchy favors a climate of effective open communication and collaboration throughout the organization, where silos are broken up; as a result, employees are used to working in a team, where their multidisciplinary competences are enhanced and a process of mutual learning and cooperation is encouraged. The incentive system and the values of the organization promote cooperation instead of competition, nurtured by the fact that the evaluation is made on the team instead of on the individuals. At the individual level, employees are fully embodied in the culture and systems of the organization, handling exploitative and exploratory activities simultaneously. Furthermore, the strong knowledge in several different scientific fields and the commitment devoted to its development allow the company to be flexible in accepting new projects. In other words, commitment and flexibility coexist and contribute to organizational speed; this flexibility is rooted in the deep knowledge and experience of the organization in the three main scientific fields, representing the core competences, developed over time, which permits the generation of options for future explorative and exploitative projects.

Overall, the organization's attitude towards teamwork, the multidisciplinary collaboration among departments, the availability of financial resources, the partnership ecosystem, and the creativity and skills of the employees combined with their strong attitude in problem solving are all fundamental ingredients of the formula that leads the company to show this high level of organizational speed. These factors, embracing the partner, organizational, and individual levels, are inter-related, aligned, and mutually reinforcing. The principles and values of the organization permeate the systems, the practices, and the behavior of employees, fully nurtured by the strong participative leadership style of the CEO who is able to mentor and at the same time coach, orchestrate, and bring together diverse employees to create an effective team [57–59]. Furthermore, the existing contextual ambidextrous structure makes it possible to realize the strategic goals of the company on several fronts, also thanks to the highly skilled personnel of the

laboratories. It seems that the organization, at a time just as the new projects are introduced, is well-aligned along its central building blocks (structure, strategy, system, share value, style, skills, staff), often mentioned by the literature [60] as fundamental for firm competitive advantage. Indeed, maintaining the alignment along these elements keeps on being a key priority for the CEO: the implementation of new projects is consistent with the organizational structure of the laboratories and the systems in place; the new staff share the systems and values of the organization; cross-functional teams are maintained as much as possible, thanks to the support of virtual technologies. This allows the organization and the employees to reconfigure their activities to embrace these new opportunities in their daily work and strive to work together to achieve clear and consistent goals, while avoiding tensions and conflicts that could have emerged. While previous contributions on DC in R&D organizations have mainly investigated some specific factors, this study emphasizes the importance of having a set of different factors at different levels aligned and working in a synergic way to reach high levels of organizational speed.

6.2. Theoretical and Practical Implications and Limitations

This study offers some interesting theoretical and practical implications.

From an academic standpoint, the present article extends the literature on organizational speed and dynamic capabilities from the context of manufacturing firms to the much less investigated context of R&D organizations. Furthermore, it offers an overarching picture of how a combination of different and aligned elements allows an R&D organization to face the challenges posed by the COVID-19 outbreak promptly. Other studies can further enrich this literature by deeply investigating the interplay among the different enablers and the role of the CEO, as well as by shedding light on the process that leads to organizational speed, maybe enlarging the studies to other R&D organizations of different sizes and industries. Considering the increasingly mutable social, economic, and environmental scenario, R&D theorists are likely to be particularly interested in a better understanding of how R&D organizations or departments can face disruptive changes efficiently, as well as how they can prepare to be ready to do so. This study, aiming to elaborate on organizational speed, goes in that direction by providing an overarching picture on how to unfold the recognition–decision–execution process rapidly and identifying antecedents at the individual, organizational, and partner levels, which represented a gap in the literature. In addition, it contributes to the recent stream connecting the triple bottom-line dimensions of environmental, social, and economic sustainability with the COVID-19 pandemic (e.g., [3,61]), with particular attention on economic sustainability.

From a managerial viewpoint, the case shows that the antecedents of organizational speed are located at different levels of the organization, in the mind and knowledge of employees, in the values, systems, and processes in which they are embodied, and in the ecosystem of external relationships. In this context, CEOs must play the role of orchestrators who keep the communication channels open, interacting consistently, frequently, and effectively with employees and other stakeholders about strategic goals, priorities, and values. Due to the small size of the organization, the CEO becomes the point of reference for all employees and can easily expand the decision portfolio, adding variations to the initiatives already in place [62]. Managers of small R&D organizations should interestingly notice that an upgrade of the IT infrastructure is required to speed up processes, as widely recommended by the literature (e.g., [63]), which suggests investments in this area are useful even in those contexts where a deep use of IT is not widespread. At the same time, investments in improving the infrastructure, or in more general processes, may offer further opportunities to change the standard way of doing things, leading to processes that are more efficient. This example suggests that the first move towards change may be the most difficult one, but then it can open new scenarios for development in small contexts.

With particular reference to the global practicalities of curtailing the COVID-19 pandemic, this study can have an impact by showing how small R&D organizations can react to the disruption this outbreak has brought about and proving the fundamental role they can play in this situation thanks to their ability to react promptly. Small R&D organizations that have the right intuition and a structure able to support innovative ideas are making the difference in such a challenging situation.

Of course, we recognize the limitations related to the analysis of a single case, which prevents us from making our analysis generalizable to different contexts. For this purpose, future qualitative research could contribute to replicating or enriching our proposed framework across multiple settings, and subsequent quantitative studies could statistically test relationships among variables.

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