

Article

# Dynamic Capabilities and Digital Transformation in the COVID-19 Era: Implications from Driving Schools

Fotis Kitsios \* , Evangelia Nousopoulou  and Maria Kamariotou 

Department of Applied Informatics, University of Macedonia, GR54636 Thessaloniki, Greece; mai20047@uom.edu.gr (E.N.); mkamariotou@uom.edu.gr (M.K.)

\* Correspondence: kitsios@uom.gr

**Abstract:** *Background:* The COVID-19 pandemic is a worldwide threat that has positioned micro-enterprises under enormous tension to persevere. As a result, these businesses are obligated to respond to the epidemic in an efficacious manner. In order to weather this economic storm, micro-enterprises have implemented a variety of digital technologies. *Methods:* The research investigates the connection between the communications technology of driving schools and the public crisis responses of those driving schools using a data set obtained from a survey administered to those schools. *Results:* The quantitative findings demonstrate that digitalization has made it possible for driving schools to efficiently and successfully respond to the public dilemma by utilizing their resilient functionality. In addition, digitalization can greatly enhance driving schools' performance. *Conclusions:* This paper provides drawings for digitalization and crisis responses for driving schools.

**Keywords:** digital transformation; dynamic capabilities; micro-enterprises; COVID-19; public crisis



**Citation:** Kitsios, F.; Nousopoulou, E.; Kamariotou, M. Dynamic Capabilities and Digital Transformation in the COVID-19 Era: Implications from Driving Schools. *Logistics* **2023**, *7*, 81. <https://doi.org/10.3390/logistics7040081>

Academic Editor: Robert Handfield

Received: 18 August 2023

Revised: 16 October 2023

Accepted: 30 October 2023

Published: 6 November 2023



**Copyright:** © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

The year 2019 came to a close with the unexpected outbreak of a novel coronavirus disease known as COVID-19, which quickly became a pandemic and spread all over the world. The current crisis in public health has created significant obstacles for the continued existence and growth of enterprises, with micro-enterprises bearing the brunt of these difficulties. In a variety of different ways, the COVID-19 pandemic has been economically destructive. First, there has been a significant disruption in the global supply chain due to the fact that both imports and exports are being stopped because the majority of governments are closing cities in an attempt to contain the health crisis. Furthermore, due to the general postponements in the reinstatement of work, companies' production capacities have been significantly reduced, but their capital expenditures, such as rent and salaries, have remained the same, leading to serious problems with cash flow. Moreover, the decrease in demand that has occurred as a direct result of the infestation has created significant risks for businesses in the service industry, particularly those in the retail and food, hospitality, and cultural tourism industries. Even worse, it is anticipated that the devastation caused by the COVID-19 outbreak will be lengthy and will have a detrimental impact on the expansion of the global economy.

Micro-enterprises play an essential role in the processes of fostering technological innovation, improving employment prospects, and preserving social cohesion [1–4]. However, because of their limited resources, are substantially more vulnerable to the consequences of a national or international crisis than other kinds of firms [5,6]. The research that has been conducted thus far has looked at how production recovery, corporate social responsibility, and community participation all play a part in decreasing the risk of public crises for small and medium-sized businesses [7–9]. Especially, it has been found that the dynamic capabilities of companies are the key to public response to crises [10–12]. Unfortunately, it is still largely unknown how micro-enterprises should construct and make use of dynamic capabilities in response to public crises.

For businesses, digital tools provide several important advantages. By improving and facilitating communication between personnel, suppliers, and networks, digitalization lowers transaction costs. The potential for trade in services has greatly expanded, which can assist micro-enterprises in integrating into international markets by decreasing the expenses associated with border and transportation operations. It makes it easier to access resources like government services, which are increasingly being made available online, as well as financial resources (like peer-to-peer lending), training opportunities, and recruitment channels. Additionally, it encourages innovation and easier access to innovation resources, as well as the possibility for businesses to produce data and analyze their own operations in novel ways to boost performance [13].

Digitization can help micro-enterprises respond to public emergencies successfully by leveraging their dynamic capabilities [13]. The process of fostering organizational transformation through the application of information technologies is referred to as “digitalization” [13–15]. A substantial amount of research, in the framework of the COVID-19 crisis, has proposed that the use of information technologies contributes a crucial role in crisis responses. Pandemic surveillance, virus tracking, therapeutic approaches, and employment reinstatement are all areas in which the government has actively incentivized the usage of information technologies such as big data, artificial intelligence (AI), and cloud computing. For instance, big data technology can offer substantial assistance in the form of effective support for real-time pandemic observing and documenting. The implementation of cloud-based office software gives workers the ability to work remotely and with greater flexibility.

In this research, we assert that digitalization and digital transformation have the capability to support micro-enterprises to efficaciously deal with upheavals by initiating their dynamic capabilities [13]. However, digital transformation has not been performed in circumstances that are both distinctive and crucially significant, such as the facility of driving schools, which has conventionally been provided in person and on site. As a result, the digital transformation of these physically performed services can provide the field with intriguing theoretical insights. In a similar vein, the context of technology in schools has frequently been about technology acceptance [16–18] rather than digital transformation, which has consequently further bolstered the need for the current investigation. The current paper aims to investigate the relationship between digitalization, emergency preparedness strategies for the COVID-19 outbreak, and the crisis response effectiveness of driving schools. The data for this study comes from driving schools. The findings of the survey make it abundantly evident that digitalization can assist driving schools in responding strategically to public crises over the long term, thereby contributing to an enhancement in the performance of driving schools.

## 2. Theoretical Framework

### 2.1. Public Crisis Responses

Crises in the public sector are unanticipated and obstructive independent factors that force organizations to make important decisions while under intense time and pressure [19]. Public health emergencies typically take the form of outbreaks of coronaviruses like SARS and COVID-19 [20]. To begin, the outbreak of the crisis was unanticipated [21], which necessitated a rapid response from businesses. Second, it is difficult to forecast the effects of the crisis because there is a great deal of unpredictability surrounding it [22]. Third, the effects of the crisis are felt by a large number of people. In the case of the COVID-19 pandemic, it has had a detrimental effect on an overwhelming proportion of the commercial subfields operating all over the world. The nature of public crises can have the potential to lead to destructive consequences [12,21,23]. These consequences can include the invalidation of normal practices and rules, as well as the creation of huge financial shortfalls and even humanitarian disasters [24].

Public crises can have a significant impact on private companies. Because of the instability brought on by these crises, firms are compelled to alter their internal strengths

and weaknesses in order to adapt to or perform within the changing environmental conditions [12]. Since businesses are required to react to public crises as rapidly as possible [25–27], it is extremely beneficial to investigate how businesses should react to such crises [6,19,28,29].

Public unrest plays a role in the advancement of the perspective on tailoring or adapting one's behavior in tumultuous crisis environments. These arguments can be divided into two groups: short-term emergency solutions for survival, and long-term strategic responses for development. While planned responses concentrate on expansion, emergency responses prioritize saving lives. In the short term, enterprises should implement emergency measures to lessen the crisis's rapid harmful consequences. During the crisis, standard operations and production activities of businesses will be temporarily disrupted [12]. As a result, businesses will be required to take immediate action that promises instant feedback, such as restarting manufacturing, increasing efficiency, and cutting costs. In addition, companies may be held accountable for significant social responsibilities in crisis-stricken areas [9]. They can acquire assistance from the government and the general public to function more effectively throughout the emergency by undergoing social obligations [8], such as preserving the basic entitlements of employees and contributing to communities. This will enable them to succeed better throughout the crisis [7].

On the other hand, this solution is insufficient to deal with ongoing dangers. Researchers suggest that businesses should work toward transforming potential dangers into lucrative opportunities over the course of their long-term operations. In the context of the COVID-19 outbreak, for instance, the practical value of digitalization has come to the attention of a significant number of people. In addition, the economic crisis has prompted strategic shifts, such as alterations to product lines, market width, and external relations [30]. As a result, companies should make it their long-term goal to exploit potential opportunities presented by the current economic climate by developing and implementing appropriate strategic responses [31,32].

Elements of public crisis interventions that are vital include having a comprehensive understanding of the crisis environment, making the most of any possibilities that present themselves, and rearranging facilities so that they can efficiently handle the situation [7,33]. As a result, the dynamic capabilities perspective is extremely important to the field of research on crisis response [11,12,34]. Since this COVID-19 outbreak was neither anticipated nor predictable, businesses need to be equipped with the ambidexterity necessary to deal with the situation in a way that is non-procedural, inventive, and vibrant.

**H1.** *The overall degree of digitalization significantly affects the implementation of crisis response strategies.*

**H2.** *Digital technology adoption significantly affects the implementation of crisis response strategies.*

## 2.2. Dynamic Capabilities and Public Crisis Responses

According to Teece (2007) [35] and Teece (2012) [36], dynamic capabilities are “detailed competence to construct, incorporate, and recalibrate intrinsic and extrinsic resources when dealing with a constantly changing world”. Dynamic capabilities are regarded as significant tools for businesses to create and sustain value in an environment that is constantly shifting [10,37]. When there is a crisis in the public sector, the volatile nature of the environment becomes even more apparent. As a result, difficult times present businesses with a genuine opportunity to make the most of the full potential of their dynamic capabilities [11,12,33].

In the perspective of a crisis, dynamic capabilities can be broken down into three categories: the functionality of detecting the crisis, the capacities of identifying and capitalizing on new prospects presented by the crisis [7,35], and the capability of reorganizing resources in order to better deal with the crisis. To begin, companies that have dynamic capabilities have a greater chance of being able to detect or comprehend the crisis in a timely manner [7,35]. Although it is true that no company was able to anticipate the arrival of the COVID-19 outbreak, it is probable that some businesses were able to monitor the

growth of the pandemic and foresee the major impact it would have on their company as a result of their observations. By determining how the potential crisis would affect the day-to-day activities of the local community, such as how it would affect production and distribution activities, market conditions, and supply and demand, firms are better able to perceive the crisis as a result of failures and staff shortages.

Furthermore, companies that have the capability to be dynamic have a greater chance of recognizing and seizing new chances in the midst of a crisis [7,38,39]. A public crisis disrupts established social patterns and creates novel opportunities for businesses. For instance, the shutdowns that have occurred as a direct result of the pandemic have created opportunities for the growth of online businesses. Enterprises that are installed with strategic flexibility are better able to capitalize on possibilities and are more inclined to generate and accumulate scientific understanding from the exogenous environment. This serves as a catalyst for transformation despite the ongoing economic crisis. Enterprises that are not endowed with strategic flexibility are less inclined to generate and disseminate new knowledge [7,40].

Moreover, businesses are able to cope with crises by integrating and reconfiguring the internal and external resources at their disposal [40]. Inertia at the administrative level can prevent companies from monitoring adjustments in their exogenous surroundings and responding appropriately [41]. As a consequence of this, businesses that lack the ability to reorganize their resources run the risk of being unable to put either short-term or long-term crisis response strategies into action.

In general, dynamic capabilities are absolutely necessary for the public crisis responses of companies. The next question that needs to be asked is, “What kind of companies have a higher likelihood of being able to react quickly to public crises?” In order to provide an answer to this question, the research presented here focuses on the significant role that the digitalization efforts of businesses play, particularly in light of the COVID-19 epidemic.

### *2.3. Digitalization: A Dynamic Perspective for Capabilities*

The process of organizational transformation is referred to as “digitalization” that occurs as a result of the enactment of digital technologies [13,15]. Digitalization is most commonly seen in businesses in the form of digital relics, digital operating systems, and digital facilities [42–46], as well as digital [47]. According to Sturgeon (2019) [48], information technologies are a combination of digitalized data and communication technologies, and they can be broken down into seven distinct categories. These categories are as follows: social, big data, mobile, cloud-based services, Internet of Things (IoT), platform development, and AI [13,15].

Digital technologies are configurable, accessible, perceptible, communicable, inspirational, identifiable, and associable [49]. Therefore, digitalization or digital transformation can help businesses obtain and preserve cumulative benefits by boosting their institutional agility and resilience [42] and by enhancing their dynamic capabilities. This can be accomplished by strengthening their dynamic capabilities [13,50]. In particular, we believe that there are advantages to be gained from digitalizing corporate processes. To begin, digitalization enables businesses to better sense the shifting environment [13,49,51]. Businesses can now acquire or retrieve information resources from the outside world at a lower cost because of the enormous advantages that digital resources offer in terms of volume, velocity, diversity, and value [52]. Additionally, the implementation of big data analysis systems and Internet of Things technologies assists businesses in sifting through potentially beneficial information and swift computing in order to monitor and anticipate changes in the environment [50,53].

Conversely, with the assistance of digital technologies, businesses are better able to seize the opportunities presented by a crisis environment. In the COVID-19 outbreak, digitalization has generated a plethora of new opportunities [45], and areas such as digital learning and operating as well as unpiloted transportation have demonstrated significant potential. In addition, the decentralized nature of digital technologies allows them to

overcome barriers in both time and space, and it encourages interrelationships between individual companies and their concepts of collaboration, which ultimately results in an increase in the opportunities available to them within open networks [54]. The dependability of business analysis has also been considerably improved by high-speed cloud analysis technology and high-volume big data technology which has assisted businesses in locating potential opportunities despite the presence of complex environments [42]. In addition, the advent of information technology has altered the rise of new chances, making it possible to do so in ways that are more creative and less predetermined [45].

Finally, digitalization makes it possible for businesses to reorganize their resources in order to better respond to crises. The increased scope, scale, and adaptability of a company's available resources are all benefits of digitalization. For instance, the cost of coordinating activities within firms can be reduced thanks to information and communication technologies, which also promote the flexible distribution of resources [55]. Additionally, information technologies have profoundly altered business processes, products, and services, in addition to interfirm relationships, which has greatly reduced the complexity of commodity shifting as well as the costs associated with it [45]. For instance, technologies such as blockchain, cloud computing, and the IoT have significantly reduced the amount of time needed to launch new products and transform firms, which enables firms to rapidly adjust their processes while maintaining a low level of operational expenditure [51]. In the wake of the COVID-19 pandemic, firms that have already embraced digitization to a significant degree have been in the best position to quickly adapt and evolve. Due to this, these businesses have been able to alleviate the symptoms of any negative repercussions or even profit from the crisis.

**H3.** *Overall digitalization degree and digital technology adoption significantly affects driving schools' performance.*

**H4.** *The implementation of crisis response strategies significantly affects driving schools' performance.*

### 3. Methodology

Variables such as digitalization, degree of digital adoption, public crisis response strategy, and public crisis response performance are based on previous surveys [55–57]. For the purpose of measuring these variables, a Likert scale with five points was used.

Greek micro-enterprises are the subject of this survey. Greek micro-enterprises are prone to trying to connect their business processes with digital technology in an effort to compete in the current uncertain climate, enhance their growth, and be innovative at the same time because the financial crisis has had a detrimental impact on them. Greek micro-enterprises prioritize long-term viability; however, they do not implement strategic planning. Greek micro-enterprises employ IS ineffectively as a result of the misalignment of their business and IT strategies, in addition to the absence of formal processes and strategic planning. Particularly in Greece, where there are many more micro-enterprises than in other European nations, the financial crisis has had a detrimental effect on the majority of them. The majority of businesses in Greece have between 20 and 50 employees; however, there are also lots of family businesses with between 5 and 10 workers [1–3]. The questionnaire was distributed to 1300 instructors working in driving schools across Greece and Cyprus through email. The assistance of the association of driving instructors was utilized in order to locate the contact information. In the end, three hundred instructors from driving schools filled out the questionnaire. In the process of data analysis, multivariate regression analysis was employed.

Educators working in driving schools are included in the sample. Driving schools are typically classified as either "micro" businesses, which have fewer than 10 employees, or "small-medium" businesses, which have fewer than 50 employees. They have a significant number of years of professional experience. The average age of a respondent was 41 years old, making up 61.2% of the total. In terms of the level of education they had, 86.3% of them held a bachelor's degree. The majority of driving schools had an annual revenue of

less than 20,000 euros and an average of 1–2 employees. The average number of employees was 1–2.

#### 4. Results

Cronbach's alpha was used, and the resulting values ranged from 0.694 to 0.891. Table 1 displays these aforementioned numerical values.

**Table 1.** Cronbach a.

Variables	Cronbach a Values
Digitalization degree	0.891
Digital technology adoption	0.723
Crisis response strategies	0.755
Performance	0.694

The findings of the multicollinearity test are summarized in Table 2. We can determine the variance inflation factor (VIF) and the tolerance level for the model's independent variables using this procedure. The results show that all independent variables have tolerance levels greater than 1 and VIF values less than 10. These numbers demonstrate that independent variables in every model do not display covariance.

**Table 2.** Regression model's tolerance level (N = 300).

Model	Tolerance	VIF
Digitalization degree	0.674	1.236
Digital technology adoption	0.821	1.115
Crisis response strategies	0.973	1.034
Performance	0.725	1.057

The  $R^2$  value is 0.735 for the model, with an adjusted  $R^2$  value of 0.882. Table 3's multiple regression analysis provides more evidence of the regression analysis's superior prediction performance.

**Table 3.** Hypothesis testing.

Model	$\beta$	t-Value	Sig.
Digitalization degree → Crisis response strategies	0.534	1.056	0.000
Digital technology adoption → Crisis response strategies	0.168	1.312	0.000
Digitalization degree → Performance	0.430	1.622	0.009
Digital technology adoption → Performance	0.023	1.244	0.007
Crisis response strategies → Performance	0.674	1.198	0.000

According to the results shown in Table 3, the digitalization degree's beta value was 0.534, and its significance level was 0.000. Therefore, Hypothesis 1 was supported. The beta value of digital technology adoption was 0.168, and the significance level was 0.000. Because of this, the data support the second hypothesis. The beta value of digitalization degree was 0.430, and the significance level was 0.009. Furthermore, the beta value of digital technology adoption was 0.023, and the significance level was 0.007. Because of this, the data support the third hypothesis. Crisis response strategies had a 0.674 beta value and a 0.000 significance level. Therefore, Hypothesis 4 was supported. Table 4 displays the associations between variables, while Table 5 provides descriptive and inferential statistics.

**Table 4.** Correlations.

	Digitalization Degree	Digital Technology Adoption	Crisis Response Strategies	Performance
Digitalization degree	1.000	0.633	0.914	0.722
Digital technology adoption	0.633	1.000	0.243	0.629
Crisis response strategies	0.914	0.243	1.000	0.072
Performance	0.722	0.629	0.072	1.000

**Table 5.** Descriptive statistics of the variables.

Variables	Mean	Std. Deviation	N
Digitalization degree	3.294	0.86501	300
Digital technology adoption	3.115	0.71324	300
Crisis response strategies	3.029	0.62850	300
Performance	3.788	1.43367	300

The process of digitalization revolves primarily around digital technologies. An expansion of the SMACIT framework that categorizes a variety of digital technologies is provided by Sebastian et al. (2017) [15]. The openness and receptivity of digital technologies allow for flexible access to external environments and facilitate the execution of agile responses to those environments. According to the existing body of research [13,49,51], digitalization can significantly improve the dynamic capabilities of businesses, allowing them to maintain their flexibility even in inherently unpredictable surroundings [42]. Digitalized enterprises are better equipped to perceive their surroundings [13,53,58], seize opportunities [42], and regulate themselves than traditional firms [13].

However, the meanings associated with dynamic capabilities are shifting as a result of digital transformation. In contrast, the pervasive application of information technologies is realigning the nature and goal of dynamic capabilities [51]. This is happening as a result of the impactful agglomeration and creation of digital technologies, which elevate businesses' dynamic capabilities. For example, technologies such as Blockchain, Cloud Computing, and the Internet of Things make it possible for businesses to vastly expand both the scope and scale of their operations. As a result, digital dynamic capabilities might become an important source of competitive advantages for businesses operating in the digital economy [51]. Nevertheless, the limit of dynamic capabilities is also shifting as time goes on. For instance, dynamic capabilities are now classified as regenerative and renewing capabilities by Makkonen et al. (2014) [40]. These functionalities are shown to exist when metrics such as realignment, utilization, learning, detection and confiscation, expertise formation, and knowledge assimilation are present.

Today's business environment stands for volatile, uncertain, complex, and ambiguous [59]. In recent years, we have been witness to an increasing number of crises. These crises all serve as a reminder that we should pay attention to how we respond to them. Companies need to construct, integrate, and reconfigure their resources in order to function effectively in environments that are complex, turbulent, and highly uncertain [59]. A new industrial revolution—the digital revolution—is currently taking place all over the world [60]. The advent of digitalization paves the way for a wealth of new commercial opportunities, and it is interesting to speculate about whether or not it could assist businesses in surviving or even thriving during times of crisis.

## 5. Discussion

Systems and technology integration is especially important for microbusinesses and driving schools. Accurate information would be provided by these technologies, enhancing knowledge exchange between internal organization members and external collaborative partners. As a result, there will be more creative ideas and organizations will be better able to create creative processes.

The bulk of driving schools in Greece are small, highly bureaucratized businesses with few resources. Governments have taken a lot of steps to digitize procedures and cut red tape during the COVID-19 pandemic. Driving school owners must deal with a number of digital difficulties, including e-learning, electrification, and digital signatures. They must so be ready for these technological advancements. They are able to adapt new technologies and cultivate a digital vision that will boost flexibility and agility in work as well as organizational performance.

### 5.1. Managerial Implications

The outcomes of the study reveal that a greater extent of digitalization is significantly linked with the public emergency preparedness tactics and outcomes of driving schools. This shows that during the COVID-19 outbreak, driving schools with a higher level of digitalization were more successful in implementing efficient public crisis feedback strategies and getting better outcomes. Using the dynamic capabilities perspective as a foundation, we placed a strong emphasis on the role that digitalization activities play in the crisis responses of businesses. Companies with a high level of digitalization are able to exploit their dynamic skills to detect a crisis, grasp the opportunities presented by the crisis, and restructure their resources so that companies can better anticipate the crisis [13,49,51]. This means that highly digitalized businesses are more likely to respond to crises in a timely and effective manner. In addition, the performance of driving schools can be improved through the adoption of crisis response strategies [7]. These strategies can include both short-term emergency responses and long-term strategic responses.

However, the existing research on how organizations respond to crises focuses on firm-level issues such liquidation, declines in share price, and reputational damage [6,61,62], and public crisis responses have been investigated less frequently [6,61,62]. In addition, many studies that have been conducted on public crises have focused on topics such as governance and community resistance [12], but they have ignored the role that businesses play. The results of our survey make it abundantly clear that digitalization may be of assistance in public response efforts during times of emergency. Digitalized businesses have a greater likelihood of adopting both short-term and long-term crisis responses, and they also benefit from improved performance results than other types of businesses. Additionally, we have successfully bridged the gap between digitalization and crisis responses using the lens of dynamic capabilities. Studies on this hypothetical bridge, on the other hand, are still in their infancy, and there are many gaps in it. There are a number of different theories besides the dynamic capability theory that might assist us in comprehending digitalization and emergency responses. There is the potential for additional traditional management theories to be incorporated with digital transformation, and the theory of digital transformation itself merits further investigation. Therefore, it is beneficial to examine the connection between digital transformation and crisis response strategies at the level of the company.

The following is a list of research questions that we propose answering. To begin, how does the business environment change as a result of various types of public crises (natural vs. social)? Second, in emergency situations characterized by rapid and severe climatic and environmental shifts, what kinds of strategic choices do businesses make, and how do they make them? Furthermore, what are the commonalities between strategic response procedures and emergency response strategies that are designed for the short term and long term, respectively? Finally, what underlying mechanism is responsible for the impact that digitalization has on crisis response strategies?

According to the findings of the survey, digitalization contributes to the success of driving schools. Even though the present performance of driving schools is the only topic covered in this article, researchers in the future should take into account both the present and the future performance of companies because digitalization strategies have an enduring effect on businesses. According to Ofek and Wathieu (2010) [63], the advent of digitalization has brought about significant shifts in the management practices of businesses, which can provide companies with new opportunities to gain a competitive advantage. In

contrast, digitalization can increase a company's operational effectiveness by automating decision-making, making business processes more efficient, and reducing costs [64,65]. For instance, elastic resources provided by cloud computing technology reduce the cost of employing, managing, and sustaining technical expertise [55]. Big data technology speeds up the decision-making processes of businesses, which in turn increases the rate at which companies can react to the introduction of intelligent products and services [14]. On the other hand, digitalization includes activities related to digital innovation [66], such as the development of new products, services, business models, and organizational forms [49,67].

### 5.2. Limitations and Suggestions for Future Research

As a result of the fact that digitalization frequently takes place at the level of the firm, businesses are required to make holistic strategic deployments [68], also known as digital transformation strategies. Contrarily, it is still not entirely clear how businesses should plan and carry out their digital transformation strategies [69]. In addition, despite the fact that the importance of digitalization has been acknowledged, there is not yet a theoretical framework in place that can direct businesses toward successfully implementing this transformation [70,71]. Nevertheless, despite the advantages and opportunities that come with digital technology (e.g., blockchain) and the increasing uptake in recent years, many micro-enterprises still lag behind in adoption. For smaller enterprises, in particular, digital adoption disparities relative to bigger enterprises have widened over the past ten years [72]. Vial (2019) [13] maintains that digitization will improve business performance through the development of digital business strategies, the uptake of information technologies, and modifications to the value-creation processes. Nonetheless, it is not clear how this process should be carried out.

Exploring digital transformation strategies as well as the impact that these strategies have on the competitive advantages of businesses is therefore a promising research direction. The following is a list of research questions that we recommend. The first question to address is whether or not digitalization represents a new source of competitive benefits for businesses. Furthermore, how should organizations go about planning their digital business strategies? Thirdly, in what ways can an organization's adoption of digital technologies be guided by a digital business strategy? Finally, how does the adoption of digital technology change the routes that a company takes to create value?

With the rise of digitalization, facilitated economic, and social interaction, COVID-19 has raised expectations for digital access and engagement, emphasizing that interconnection and the use of digital technologies are ever-changing objectives. Even though a few of these online operations may decrease as COVID-19 therapies become available, allowing for more in-person interactions, they are substantial in areas where the pandemic has served as a catalyst, such as telework. Future researchers can examine how telework impacts driving schools' performance.

Therefore, further research needs to be conducted to ascertain how the dynamic capabilities of businesses are transformed by digitalization. The following is a list of research questions that are associated with this subject. To begin with, what exactly is digitalization, and what do activities associated with it entail? It is important to clearly delineate academic terms like "digitalization", "digital innovation", "digital technology adoption", and "digital transformation". Conversely, what characteristics should define a digital or digitalized company? Thirdly, what exactly is meant by the term "digital dynamic capabilities"? To put it another way, in the digital economy, what constitutes the dynamic capabilities and where do their limits lie? Moreover, what effect will the implementation of numerous digital technologies and the pairing of these technologies have on the strategic flexibility of companies? Last but not least, how should a company go about building its digital and dynamic capabilities?

## 6. Conclusions

The COVID-19 outbreak is a health challenge that creates obstacles for driving schools to continue operating and grow. The crisis has also brought to light the significant contribution that digital technologies can make to the fight against the COVID-19 epidemic. This study examined the relationships acquired from structured questionnaires in order to evaluate the linkages among digital transformation, health crisis measures, and micro-enterprises' performance in the framework of the COVID-19 epidemic. The findings of this paper demonstrate that an SME's endeavors towards digital transformation, as exhibited by their extent of e-commerce, implementation of communications technology, and taking part in various trades, can aid them in supplying a more efficacious rebuttal to public crises. These results are supported by the fact that an SME's degree of digitalization, deployment of digital technologies, and business mode influence. In addition, the implementation of public crisis response strategies is another way that digitalization supports the improvement of the performance of driving schools. In order to draw a conclusion from this study, we first construct drawings that link digital transformation with public crisis responses from the perspective of dynamic capabilities, and then we suggest three different directions for research that could be conducted in the future.

**Author Contributions:** Conceptualization, F.K. and E.N.; methodology, F.K.; formal analysis, M.K.; investigation, E.N.; data curation, F.K.; writing—original draft preparation, F.K., E.N. and M.K.; writing—review and editing, F.K., E.N. and M.K.; supervision, F.K. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Data available on request due to restrictions. The data presented in this study are available on request from the corresponding author. The data are not publicly available.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Kitsios, F.; Kamariotou, M. Strategic IT alignment: Business performance during financial crisis. In *Advances in Applied Economic Research, Springer Proceedings in Business and Economics*; Tsounis, N., Vlachvei, A., Eds.; Springer: Berlin/Heidelberg, Germany, 2017; pp. 503–525.
2. Kitsios, F.; Kamariotou, M. Information Systems Strategy and Strategy-as-Practice: Planning Evaluation in SMEs. In *Proceedings of the Americas Conference on Information Systems (AMCIS2019)*, Cancun, Mexico, 15–17 August 2019; pp. 1–10.
3. Kitsios, F.; Kamariotou, M. Strategizing information systems: An empirical analysis of IT alignment and success in SMEs. *Computers* **2019**, *8*, 74. [\[CrossRef\]](#)
4. O'Regan, N.; Ghobadian, A.; Gallea, D. In search of the drivers of high growth in manufacturing SMEs. *Technovation* **2006**, *26*, 30–41. [\[CrossRef\]](#)
5. Barron, A.; Hulten, P.; Hudson, S. The financial crisis and the gathering of political intelligence: A cross-country comparison of SMEs in France, Sweden and the UK. *Int. Small Bus. J.* **2012**, *30*, 345–366. [\[CrossRef\]](#)
6. Mayr, S.; Mitter, C.; Aichmayr, A. Corporate crisis and sustainable reorganization: Evidence from bankrupt Austrian SMEs. *J. Small Bus. Manag.* **2016**, *55*, 108–127. [\[CrossRef\]](#)
7. Ballesteros, L.; Useem, M.; Wry, T. Masters of disasters? An empirical analysis of how societies benefit from corporate disaster aid. *Acad. Manag. J.* **2017**, *60*, 1682–1708. [\[CrossRef\]](#)
8. Kearins, K. Corporate social responsibility: The good, the bad and the ugly. *Soc. Bus. Rev.* **2017**, *34*, 51–79. [\[CrossRef\]](#)
9. Neise, T.; Diez, J.R. Adapt, move or surrender? Manufacturing firms' routines and dynamic capabilities on flood risk reduction in coastal cities of Indonesia. *Int. J. Disaster Risk Reduct.* **2019**, *10*, 332–342. [\[CrossRef\]](#)
10. Lin, Y.; Wu, L.Y. Exploring the role of dynamic capabilities in firm performance under the resource-based view framework. *J. Bus. Res.* **2014**, *67*, 407–413.
11. Linnenluecke, M.K. Resilience in business and management research: A review of influential publications and a research agenda. *Int. J. Manag. Rev.* **2017**, *19*, 4–30. [\[CrossRef\]](#)
12. Martinelli, E.; Tagliacozzi, G.; Marchi, G. The resilient retail entrepreneur: Dynamic capabilities for facing natural disasters. *Int. J. Entrep. Behav. Res.* **2018**, *24*, 1222–1243. [\[CrossRef\]](#)
13. Vial, G. Understanding digital transformation: A review and a research agenda. *J. Strateg. Inf. Syst.* **2019**, *28*, 118–144. [\[CrossRef\]](#)

14. Bharadwaj, A.; Sawy, O.A.E.; Pavlou, P.A.; Venkatraman, N. Digital business strategy: Toward a next generation of insights. *MIS Q.* **2013**, *37*, 471–482. [[CrossRef](#)]
15. Sebastian, I.; Ross, J.; Beath, C.; Mocker, M.; Moloney, K.; Fonstad, N. How big old companies navigate digital transformation. *MIS Q.* **2017**, *16*, 197–213.
16. Quévat, A.; Heinze, A. The digital transformation of preventive telemedicine in France based on the use of connected wearable devices. *Glob. Bus. Organ. Excell.* **2020**, *39*, 17–27. [[CrossRef](#)]
17. Vaudour, F.; Heinze, A. Software as a service: Lessons from the video game industry. *Glob. Bus. Organ. Excell.* **2020**, *39*, 31–40. [[CrossRef](#)]
18. Alnoor, A.M.; Al-Abrow, H.; Abdullah, H.; Abbas, S. The impact of self-efficacy on employees' ability to accept new technology in an Iraqi university. *Glob. Bus. Organ. Excell.* **2020**, *39*, 41–50. [[CrossRef](#)]
19. Cui, T.; Wang, D.; Ping, J.W. The exploration of crisis management strategies: Looking back and ahead. *Front. Bus. Res. China* **2016**, *10*, 220–244.
20. Pereira, V.; Temouri, Y.; Patnaik, S.; Mellahi, K. Managing and preparing for emerging infectious diseases: A multistakeholder strategic partnership approach towards avoiding a catastrophe. *Acad. Manag. Perspect.* **2019**, *3*, 1–42.
21. Bundy, J.; Pfarrer, M.D.; Short, C.E.; Coombs, W.T. Crises and crisis management: Integration, interpretation, and research development. *J. Manag.* **2016**, *43*, 1661–1692. [[CrossRef](#)]
22. Lim, N.K.; Das, S.S.; Das, A. Diversification strategy, capital structure, and the Asian financial crisis (1997–1998): Evidence from Singapore firms. *Strateg. Manag. J.* **2009**, *30*, 577–594.
23. Noy, I. The macroeconomic consequences of disasters. *J. Dev. Econ.* **2009**, *88*, 221–231. [[CrossRef](#)]
24. Wasileski, G.; Rodriguez, H.; Diaz, W. Business closure and relocation: A comparative analysis of the Loma Prieta earthquake and Hurricane Andrew. *Disasters* **2011**, *35*, 102–129. [[CrossRef](#)] [[PubMed](#)]
25. Bundy, J.; Pfarrer, M.D. A burden of responsibility: The role of social approval at the onset of a crisis. *Acad. Manag. Rev.* **2015**, *40*, 345–369. [[CrossRef](#)]
26. Helmer, M.; Hilhorst, D. Natural disasters and climate change. *Disasters* **2006**, *30*, 1–4. [[CrossRef](#)]
27. Williams, J. Adaptation to climate change: From resilience to transformation. *Scott. Geogr. J.* **2012**, *128*, 1–3. [[CrossRef](#)]
28. Geroski, P.A.; Mata, J.; Portugal, P. Founding conditions and the survival of new firms. *Strateg. Manag. J.* **2010**, *31*, 510–529. [[CrossRef](#)]
29. Thornhill, S.; Amit, R. Learning about failure: Bankruptcy, firm age, and the resource-based view. *Organ. Sci.* **2003**, *14*, 497–509. [[CrossRef](#)]
30. Kirtley, J.; O'Mahony, S. What is a pivot? Explaining when and how entrepreneurial firms decide to make strategic change and pivot. *Strateg. Manag. J.* **2020**, *in press*. [[CrossRef](#)]
31. Wan, W.P.; Yu, D.W. From crisis to opportunity: Environmental jolt, corporate acquisitions, and firm performance. *Strateg. Manag. J.* **2009**, *30*, 791–801. [[CrossRef](#)]
32. Wenzel, M.; Stanske, S.; Lieberman, M.B. Strategic responses to crisis. *Strateg. Manag. J.* **2020**, *41*, 7–18.
33. Yang, T.K.; Hsieh, M.H. Case analysis of capability deployment in crisis prevention and response. *Int. J. Inf. Manag.* **2013**, *33*, 408–412. [[CrossRef](#)]
34. Fainshmidt, S.; Nair, A.; Mallon, M.R. MNE performance during a crisis: An evolutionary perspective on the role of dynamic managerial capabilities and industry context. *Int. Bus. Rev.* **2017**, *26*, 1088–1099. [[CrossRef](#)]
35. Teece, D.J. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strateg. Manag. J.* **2007**, *28*, 1319–1350. [[CrossRef](#)]
36. Teece, D.J. Dynamic capabilities: Routines versus entrepreneurial action. *J. Manag. Stud.* **2012**, *49*, 1395–1401. [[CrossRef](#)]
37. Eisenhardt, M.; Jeffrey, A.M. Dynamic capabilities: What are they? *Strateg. Manag. J.* **2000**, *21*, 1105–1121. [[CrossRef](#)]
38. Danneels, E. The dynamics of product innovation and firm competences. *Strateg. Manag. J.* **2002**, *23*, 1095–1121. [[CrossRef](#)]
39. Easterby-Smith, M.; Lyles, M.A.; Peteraf, M.A. Dynamic capabilities: Current debates and future directions. *Br. J. Manag.* **2009**, *20*, S1–S8. [[CrossRef](#)]
40. Makkonen, H.; Pohjola, M.; Olkkonen, R.; Koponen, A. Dynamic capabilities and firm performance in a financial crisis. *J. Bus. Res.* **2014**, *67*, 2707–2719. [[CrossRef](#)]
41. Newey, L.R.; Zahra, S.A. The evolving firm: How dynamic and operating capabilities interact to enable entrepreneurship. *Br. J. Manag.* **2009**, *20*, 81–100. [[CrossRef](#)]
42. Briel, F.V.; Davidsson, P.; Recker, J. Digital technologies as external enablers of new venture creation in the IT hardware sector. *Entrep. Theory Pract.* **2018**, *42*, 47–69. [[CrossRef](#)]
43. Giones, F.; Brem, A. Digital technology entrepreneurship: A definition and research agenda. *Technol. Innov. Manag. Rev.* **2017**, *7*, 44–51. [[CrossRef](#)]
44. Nambisan, S. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrep. Theory Pract.* **2017**, *41*, 1029–1055. [[CrossRef](#)]
45. Nambisan, S.; Wright, M.; Feldman, M. The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Res. Policy* **2019**, *48*, 103773. [[CrossRef](#)]
46. Yi, J.; He, J.; Yang, L. Platform heterogeneity, platform governance and complementors' product performance: An empirical study of the mobile application industry. *Front. Bus. Res. China* **2019**, *13*, 13. [[CrossRef](#)]

47. Srinivasan, A.; Venkatraman, N. Entrepreneurship in digital platforms: A network-centric view. *Strateg. Entrep. J.* **2018**, *12*, 54–71. [[CrossRef](#)]
48. Sturgeon, T.J. Upgrading strategies for the digital economy. *Glob. Strategy J.* **2019**, *11*, 34–57. [[CrossRef](#)]
49. Yoo, Y. Computing in everyday life: A call for research on experiential computing. *MIS Q.* **2010**, *34*, 213–231. [[CrossRef](#)]
50. Sambamurthy, V.; Bharadwaj, A.; Grover, V. Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS Q.* **2003**, *27*, 237–263. [[CrossRef](#)]
51. Warner, K.S.R.; Maximilian, W. Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Plan.* **2018**, *12*, 326–349. [[CrossRef](#)]
52. Gandomi, A.; Haider, M. Beyond the hype: Big data concepts, methods, and analytics. *Int. J. Inf. Manag.* **2015**, *35*, 137–144. [[CrossRef](#)]
53. George, G.; Haas, M.R.; Pentland, A. Big data and management. *Acad. Manag. J.* **2014**, *57*, 321–326. [[CrossRef](#)]
54. Zeng, J.; Glaister, K.W. Value creation from big data: Looking inside the black box. *Strateg. Organ.* **2018**, *16*, 105–140. [[CrossRef](#)]
55. Tajudeen, F.P.; Nadarajah, D.; Jaafar, N.I.; Sulaiman, A. The impact of digitalisation vision and information technology on organisations' innovation. *Eur. J. Innov. Manag.* **2022**, *25*, 607–629. [[CrossRef](#)]
56. Ekbia, H.R. Digital artifacts as quasi-objects: Qualification, mediation, and materiality. *J. Am. Soc. Inf. Sci. Technol.* **2009**, *60*, 2554–2566. [[CrossRef](#)]
57. Guo, H.; Yang, Z.; Huang, R.; Guo, A. The digitalization and public crisis responses of small and medium enterprises: Implications from a COVID-19 survey. *Front. Bus. Res. China* **2020**, *14*, 19. [[CrossRef](#)]
58. Nylen, D.; Holmstrom, J. Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation. *Bus. Horiz.* **2015**, *58*, 57–67. [[CrossRef](#)]
59. Bennett, N.; Lemoine, G.J. What VUCA really means for you. *Harv. Bus. Rev.* **2014**, *92*, 1126.
60. Rindfleisch, A.; O'Hern, M.; Sachdev, V. The digital revolution, 3D printing, and innovation as data. *J. Prod. Innov. Manag.* **2017**, *34*, 681–690. [[CrossRef](#)]
61. Snyder, P.; Hall, M.; Robertson, J.; Miller, J.J.S. Ethical rationality: A strategic approach to organizational crisis. *J. Bus. Eth.* **2006**, *63*, 371–383. [[CrossRef](#)]
62. Wei, J.; Ouyang, Z.; Chen, H. Well known or well liked? The effects of corporate reputation on firm value at the onset of a corporate crisis. *Strateg. Manag. J.* **2017**, *38*, 2103–2120. [[CrossRef](#)]
63. Ofek, E.; Wathieu, L. Are you ignoring trends that could shake up your business? *Harv. Bus. Rev.* **2010**, *88*, 26–38.
64. Andriole, S.J. Five myths about digital transformation. *MIT Sloan Manag. Rev.* **2017**, *58*, 20–22.
65. Pagani, M. Digital business strategy and value creation: Framing the dynamic cycle of control points. *MIS Q.* **2013**, *37*, 617–632. [[CrossRef](#)]
66. Li, W.; Du, W.; Yin, J. Digital entrepreneurship ecosystem as a new form of organizing: The case of Zhongguancun. *Front. Bus. Res. China* **2017**, *11*, 69–100. [[CrossRef](#)]
67. Autio, E.; Nambisan, S.; Thomas, L.D.W.; Wright, M. Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems. *Strateg. Entrep. J.* **2018**, *12*, 72–95. [[CrossRef](#)]
68. Fitzgerald, M. How digital acceleration teams are influencing Nestles 2000 brands. *MIT Sloan Manag. Rev.* **2014**, *55*, 1–5.
69. Kamariotou, M.; Kitsios, F. Information Systems Phases and Firm Performance: A conceptual Framework. In *Strategic Innovative Marketing. Springer Proceedings in Business and Economics*; Kavoura, A., Sakas, D., Tomaras, P., Eds.; Springer: Berlin/Heidelberg, Germany, 2017; pp. 553–560.
70. Liu, W.; Zhu, Y.; Huang, R.; Ohashi, T.; Auernhammer, J.; Zhang, X.; Wang, L. Designing Interactive Glazing through an Engineering Psychology Approach: Six Augmented Reality Scenarios That Envision Future Car Human-Machine Interface. *Virtual Real. Intell. Hardw.* **2022**, *5*, 157–170. [[CrossRef](#)]
71. Desmet, P.; Fokkinga, S. Beyond Maslow's pyramid: Introducing a typology of thirteen fundamental needs for human-centered design. *Multimodal Technol. Interact.* **2020**, *4*, 38. [[CrossRef](#)]
72. Shahzad, K.; Zhang, Q.; Khan, M.K.; Ashfaq, M.; Hafeez, M. The acceptance and continued use of blockchain technology in supply chain management: A unified model from supply chain professional's stance. *Int. J. Emerg. Mark.* **2022**. *ahead-of-print*. [[CrossRef](#)]

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.