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The Digital Maturity as a predictor of Organizational Resilience during a Severe Crisis

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Abstract

The COVID-19 pandemic spread around the world in early 2020, forcing governments to impose lockdowns. As a result, organizations had to find new ways to continue operating during this disruptive event. Not all organizations were able to use digital technology with the same degree of success.

This mainly qualitative study includes the use of mixed methods aimed to investigate the significance of digital maturity for an organization, so that it can develop resilience during a pandemic and retain competitiveness in a post-pandemic age, referred to as ‘the new normal’.

The outcome of this research suggests that under certain assumptions the digital maturity of an organization was a good predictor of its organizational resilience during the pandemic. The most influential factors in successfully coping with such event included both technical and managerial activities such as the existence of an adequate technological infrastructure, agile decision making, monitoring the situation, and improving the digital literacy of the workforce.

This study also identified the practices that are likely to be adopted in the post-pandemic era.

These outcomes were incorporated into a new model for managing disruptive events using digital technology ready for adoption by any kind of business, provided that geographical and cultural differences are considered and appropriate modifications are applied.

Keywords: Digital transformation, Digital maturity, Organizational resilience, Crisis management, New normal, Disruptive event

1. Introduction

The rapid spread of the COVID-19 virus at the beginning of 2020 caused an acute global health crisis. At first, governments worldwide did not have a clear understanding of the proper way to respond to the phenomenon and how to cope with the plague. Therefore, governments carried out lockdowns in order to provide immediate protection for their citizens. These lockdowns led to a deep financial and social crisis. During 2020, the GDP declined by 4.9% in the OECD area, the largest fall ever recorded (since 1962). Almost all countries were confronted with declines in GDP in 2020 (OECD 2021).

The use of digital technologies has enabled organizations to absorb and minimize disruptions and to continue to cope with daily needs. However, different organizations have dealt with this crisis differently using digital technology and demonstrated varying degrees of organizational resilience. For example, in the restaurant industry, there were different levels of activity and a variety of business operations models, such as deliveries, take-out and catering services, cooking at the customer's home, as well as temporary or complete closure of the service.

It appears that the correct and efficient use of digital technology may strengthen organizational resilience. The question is, thus, what should an organization do, to have the ability to better cope with similar future events? In other words, what is the digital maturity it should obtain?

In addition, due to the continuation of the crisis, governments, organizations, and individuals adopted a new pattern of work and behavior. This situation raised the question of whether this new pattern will become "the new normal" and what digital level organizations need to reach to gain a competitive advantage in the post-pandemic period.

What sets apart the current pandemic is the era in which it erupted — an era in which digital technology has become prevalent. Seeing pandemics, this was not the case and therefore, during previous pandemics, the available literature lacks specific elements like critical success factors (CSFs) of digital maturity that would help organizations cope with a similar event.

This research investigated the relationship between digital maturity and organizational resilience during and post-pandemic and posed three research questions:

- How can organizational digital maturity before a pandemic be a good predictor of organizational success in coping with crisis?

- What are the critical success factors (CSFs) that have enabled organizations to cope with the crisis successfully in the context of digital transformation?
- What will organizations adapt, in terms of digital transformation, from the actions taken during the current crisis and from the lessons learned as the new normal after the pandemic?

This study sheds light on the importance of digital maturity for organizations during a pandemic and maintaining competitiveness in the post-pandemic era. Applying a disruptive event management model using digital technology developed in this study will enable organizations to better prepare for the next crisis.

2. Literature Review

The research topic is at the intersection of three areas of knowledge: crisis management, organizational resilience and digital maturity of organizations. The researchers investigated existing theories in these domains and that underlie this study to help organizations to cope better with crises in the digital age.

Current literature suggests that a crisis can emanate from the following sources: internal or external, technical or economical, personal or humankind (Kovoor-Misra, 2020). It appears that the COVID-19 crisis contains elements of all the above types.

The literature confirmed that proactive and reactive approaches exist in business ‘how to cope with a crisis’ (Vasickova, 2019; Spillan, 2002; Cortez & Johnston, 2020). The reactive approach aims to eliminate or reduce the consequences of the crisis, and the proactive approach carries out systematic actions to identify and pre-analyze warning signals before they harm the organization (Kovoor-Misra, 2020). An interesting approach that manages a crisis as a process in time has been presented by several scholars and, it combines both reactive and proactive approaches in the same model (Vasickova, 2019).

Vasickova (2019) developed a model called Proactive Crisis Management Process (PCMP). It describes the way an organization should operate in 3-time horizons; before the crisis, to strengthen its resilience, during the crisis, to cope successfully with its possible consequences, and, post-crisis time, to learn the lesson, to update the organization's procedures, and to renew itself. The model combines reactive and proactive responses, and refers to resilience as a process in time. The model is shown in Fig. 1.

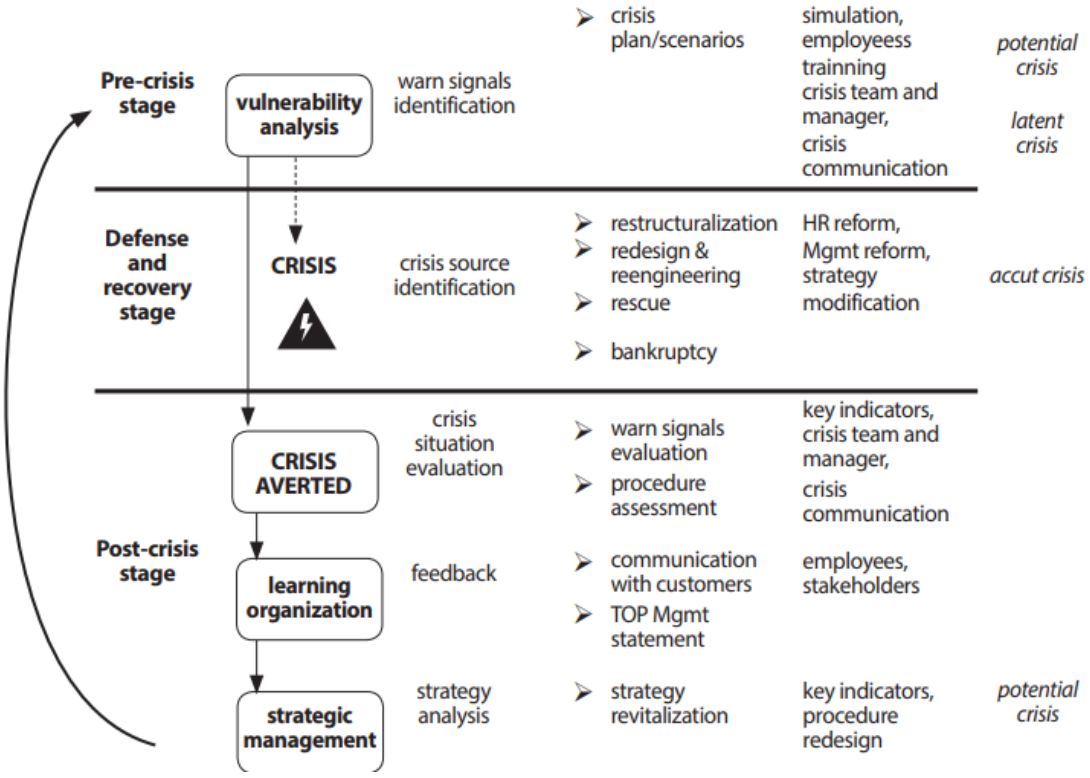

Figure 1. Proactive Crisis management process (PCMP). Source: Vasickova 2019

The researchers chose to use Vasickova's (2019) model as a framework for their new model. There are other crisis management models (Mitroff, Pauchant, & Shrivastava., 1998; Spillman, 2002) but these appear to lack the related and important digital aspect (Cortez & Johnston. 2020). Cortez & Johnston compared the financial aspect of the COVID-19 crisis to previous crises and they identified that differences exist between the various crises. They argued that in the COVID-19 crisis the person's ability to control must have been poor at the time of the outbreak, all actors (clients/suppliers/employees) are equally affected by the uncertainty, the crisis span was unknown, governments were much more significant actors and social distancing was forced on people. Cortez & Johnston adopted a so-called social exchange theory (SET) that had its roots in psychology and sociology (to address economic crises). They developed a model for coping with a financial crisis such as the one caused by COVID-19. This model even referred to the digital dimension, but it lacks the specific digital factors that help deal with a such disruptive event.

There is a consensus among scholars that organizational resilience appears to be a critical component in an organization’s ability to recover from crises and unforeseen events, and it can also enable an organization to have a competitive advantage (Lee, Vargo & Seville, 2013; Linnenluecke 2017). The rationale for the profound involvement of researchers in this field in recent decades is driven by the understanding that when the business and institutional environment is stable, it is able to provide sources of income and services to the community

(Lee et. al., p. 30.; McManus, Seville, Brundson & Vargo, 2007).

The current literature presents many definitions of the term organizational resilience. Different authors classified the definitions related to the organizational context of the term by different streams of thought, categories, or paths. The two main streams mentioned primarily in the literature are related to how organizations respond to existing disruptive events. This classification influenced the way they defined the concept (Conz & Magnini, 2020; Linnenluecke, 2017; Ruiz-Martin, López-Paredes, & Waine, 2018). According to this classification, there are organizations with absorptive attributes and others with adaptive attributes. Similarities can be found between this notion and the existing classification in the field of crisis management (reactive/proactive). Studies that develop the concept of absorption and organizations operating in this way are influenced by the engineering sciences framework of resilience. According to this concept, the organization strives to recover from an event and return to its original equilibrium point, whereas organizations with adaptability are influenced by the ecological school of thought of resilience. They are not only able to 'bounce back' but also to turn threats into opportunities. The literature review done by Conz & Magnini (2020) has highlighted another conceptual framework of organizational resilience: resilience as a process in time. Scholars in this stream distinguish between different time points of resilience (before, during, and after the event) and treat each one individually. the researchers adopted the definition belonging to the adaptive stream which describes the term as "the adaptation ability of an organization to return to a stronger state post-disturbance" (Coates, Alharbi, Li, Ahilan, & Wrigh. 2019, p.2). Although the definition of the concept of organizational resilience depends on the researchers' perception, they all have a common basis: they emphasize the survival of the organization and its ability to deal with disruptions, risks, or changes.

Due to the importance of resilience to organizations, they need to be able to assess their resilience to understand what their strengths and weaknesses are. Since the organization's resources are limited, it is important to carefully choose the factors or components that make up the resilience that the organization will want to strengthen. Over the years, models have been developed for this purpose. Most of them contain dimensions, each of which contains indicators for examining the degree of resilience of the organization.

A prominent study in the field was carried out by McManus et. al., (2007) who used grounded theory to study organizational resilience in New Zealand, developing a model called Relative Overall Resilience (ROR). This model consists of three factors, each of which can be measured by five indicators. The factors are: awareness of the situation, management of keystone vulnerabilities, and adaptability. Lee et al.'s (2013) study was based on this work and built a model with two factors: adaptability and planning. Eight (8) indicators are related to the adaptive factor, and five (5) indicators are related to the planning factor. This model served as the basis for many other studies that followed it.

The model developed by Lee et. al. (2013), was found as the most appropriate for this research and served as a basis for understanding the degree of organizational resilience of organizations, because its development processes are empirically based and well documented.

In addition, it is very simple to implement, and well known in the community of scholars.

To understand whether digital maturity can be used as a predictor of organizational resilience during an acute event such as COVID-19, it is necessary to understand what digital maturity is and how it is measured. The term digital maturity derives from the term digital transformation, which has recently been commonly defined as a change that an organization undergoes as a result of adopting digital technologies in the way it does business (Smith & Beretta, 2021; Heiferman & Sivan, 2018; Gollhardt, Halsbenning, Hermann, Karsakova & Becker, 2020). Until the outbreak of COVID-19, the goal of digital transformation was to achieve a competitive advantage on the one hand and prevent business risks, arising from the use of these advanced technologies by competitors on the other hand (Haffke, Kalgovas, & Benlian, 2016; Hess, Matt, Benlian, & Wiesböck, 2016). Since the beginning of the pandemic, the digital level of an organization has been important, especially for the survival of the organization during this time. (Fletcher & Griffiths, 2020; Van den Born, Bosma & Van Witteloostuijn, 2020).

The digital level that the organization has reached is also called digital maturity. Chanias & Hess, (2016, p.4) defined it as the status of a company's digital transformation, which describes what a company has already achieved in terms of performing transformation efforts. The tools for assessing the level reached by the organization are also called models. Most models in this field, similar to those in the organizational resilience field, contain dimensions and indicators. The main common characteristics of these models are: each model has a scale that indicates the maturity stage of the organization, climbing the ladder is possible one step at a time, no skipping steps, and all companies must go through the same steps.

The researchers found two waves of inquiry in the literature regarding digital maturity and assessment tools. Prominent in the first wave are models mainly developed between 2016 and 2018 by consulting firms such as McKinsey, Price Waterhouse Coopers, and Ernst & Young, for commercial purposes. In the second wave (2019-current) noticeable studies are done by scholars, and they are usually concerned with developing new models or comparing existing models, or both. This study used indicators from three models, all empirically grounded, and well-documented about their development process.

The first model was developed by Valdez de-Leon, 2016, for the telecommunications industry and contains 7 dimensions 132 indicators, each with 5 possible levels of digital maturity that have started their digital transformation journey and are: Pioneering, Optimizing, Integrating, Enabling, Initiating, Although the model was developed for the telecommunications industry, many researchers believe that it can be used, provided that the differences between the various industries are taken into account.

The second model was developed by Bumann & Peter (2019) who carried out a comparative analysis of eighteen prominent maturity models followed by interviews with Small to Medium Enterprises (SMEs) in the field of digital transformation. This methodology yielded a new model with 6 dimensions, each of which has 2-4 indicators that are: strategy, organization, culture, technology, customer, and people.

Gollhardt et al., (2020) developed another model for application within IT companies. The development methodology of this model was also a comparative analysis, this time of four well-known models and eight interviews with practitioners from different levels of hierarchy in an IT company. This methodology yielded a new model with 5 dimensions containing 5-6 indicators. The dimensions are culture, ecosystem, operations, governance, and strategy. Although the model was developed for an IT company, the authors argue that the model can be transferred to other areas of the service sector.

Table 1 presents the dimensions of the three models. This table shows that the only dimension repeated in all models is strategy, but there are other dimensions like ecosystem ,operation , culture, and technology that are repeated in two models out of the three shown here. The content of the dimensions can also be different. This table shows that there is no consensus among the authors about the dimensions of the models. However, the non-existence of any dimension in a particular model is sometimes due to the perception of the dimension by the developers of the model. For example, the technology dimension was rejected as a dedicated dimension, in the model of Gollhardt et al., (2020) because in their view the technological aspect is inherent in all other dimensions.

Table 1. Digital maturity dimensions of 3 chosen models

Model	**Dimensions**						
Gollhardt et al., (2020)	Strategy	Culture	Ecosystem	Operation	Governance		
Valdez-de-Leon (2016)	Strategy		Ecosystem	Operation	Customer	Technology	Innovation
Bumann & Peter (2019)	Strategy	Culture	Organization	People	Customer	Technology	

The available literature that attempts to link digital maturity, organizational resilience, and crisis management treat the digital component as one of a set of components that can be addressed. It lacks the specific components such as Critical Success Factors (CSFs) of digital maturity that help deal with a disruptive event at the time of its outbreak and the specific practices that are recommended to be performed after it subsides. In addition, the literature does not investigate what practices the business community is likely to adopt in the post-pandemic era. This study aimed to fill this knowledge gap.

3. Methods

3.1 Methods and Data Collection

This research used a sequential exploratory mixed method and it sought to explore a new phenomenon with specific characteristics. This research approach was considered most appropriate as the researchers wanted to get close to the subject matter under investigation within what they consider to be a socially constructed world.

The data collection strategy for the qualitative part of the study was realized through two rounds of in-depth interviews and a focus group. The data collection strategy for ranking the

critical success factors was realized through a survey.

In the first step, a literature review and eight preliminary interviews were carried out at a leading university in Israel. These interviews were conducted from April to July 2020. Five of them were face-to-face interviews, and the rest were conducted on the digital platform. All interviews lasted between 60 and 90 minutes.

Following the information acquired from the literature review and the preliminary interviews, the researchers developed the first model, Model #1 (presented in Appendix A). This model proposes a way to manage disruptive events using digital technology. It consists of three timespans and deals with organizational behavior in three-time horizons: before the outbreak of COVID-19 (hereinafter: "pre-event"), which handles the relationship between digital maturity and organizational resilience, during the pandemic (hereinafter: "during event"), which describes the actions taken by the organization to manage the crisis and the post-pandemic part (hereinafter: "post-event") which describes the processes and practices that may be adopted by organizations in the post-COVID-19 era.

To get a broader perspective of the subject under investigation, 15 additional interviews (hereinafter: core interviews) were conducted with practitioners with background in the topic under investigation and selected by purposive sampling (Merriam & Tisdell, 2015). These practitioners worked in various organizations, industries, sectors, and at the different levels of the hierarchy (c-level managers, middle-level managers, and rank-and-file level). All interviewees had worked for at least two years in their organization, all were Israeli, and the interviews were conducted in Hebrew to avoid cultural and linguistic biases. These core interviews lasted between 30 and 70 minutes and it carried out from February - April 2021. All interviews, except one, were recorded with the interviewees' consent. The interviews were all transcribed. Table 2 "List of core interviewees" provides details about the interviewees.

In order to maintain the confidentiality of the interviewees, their names and the organizations' names were hidden. Instead of the name of the interviewees, a code was given to each interviewee, as presented in table 2. Regarding the organizations, only the industry in which they operate was mentioned.

Table 2. List of core Interviewees

Interviewee Code	Industry	Sector	Role	Hierarchy level	Interview platform
C1	Electronic	Manufacture	SVP HR&IT	C-level	Zoom
C2			CIO	Intermediate level	Face to face
C3			Global Supply Chain Engineer	Rank-and-file	Zoom
C4	Data Providing	Services	CIO	C-level	Zoom
C5			Head of Development Team	Intermediate level	Zoom
C6			Programmer	Rank-and-file	Zoom
C7	Health	Services	Director of Forum and Digital Progress	Rank-and-file	Face to face
C8	IT	Services	CEO	C-level	Face to face
C9			Salesperson	Rank-and-file	Zoom
C10			Head of Project Division	Intermediate level	Zoom
C11	Metal	Services + manufacture	Marketing Manager	C-level	Zoom
C12			Responsible for applications	Rank-and-file	Face to face
C13	Health	Services	Chief Application Officer	Intermediate level	Face to face
C14			CDO	Intermediate level	Teams
C15	Food	Services +manufact.	Marketing Manager	C-level	Teams

Following the interviews, a focus group was held with three practitioners (selected by using a purposeful sample). The goal was to receive feedback from the research findings in which the members of the focus group participated, as well as to examine whether new data was created through group interaction.

From the interviews and the focus group, a list of the critical success factors for coping with a serious disruptive event was developed. It was not possible to understand which success factors, identified in the interviews and the focus group, had a greater influence than others. The researchers decided to conduct an online survey using a free tool called Google Forms. The researchers developed a short questionnaire in Hebrew (17 closed questions). For the convenience of readers, the questionnaire was translated into English (Appendix B). The questionnaire contained three sections: a demographic section and two sets of questions. In the first set, respondents were asked to rank the contribution of each specific factor to business continuity while in the second set, which aimed to check the consistency of the results, the respondents were asked to write down the three factors that contributed the most to this continuity.

The survey was designed to use the ‘wisdom of the crowd’ to rank the critical success factors. Establishing a regression model was not considered within the scope of this research. because the researchers because the researchers wanted establish the theory first.

The survey was distributed (after performing a pilot) through personal contact, engaging

other participants through current research participants (snowball technique), and via a post on LinkedIn. A questionnaire was distributed to research participants for completion between September 2021 and October 2021. A total of 60 valid responses were received. All of them are valid since every question in the survey was marked as required/mandatory to be answered.

3.2 Data Analysis

The researchers applied two paths of data analysis: an analysis that included the use of assessment tools to examine the relationship between digital maturity and organizational resilience and a coding technique (to obtain two lists: a list of critical factors for coping with a disruptive event and a list of practices that the business community intends to adopt as the new normal). A survey was conducted to rank the critical success factors according to their contribution to business continuity. The researchers employed both deductive and inductive approaches during coding to analyze the data. The deductive approach refers to a predetermined list that contained initial codes, also called a start list. It was used when certain core concepts were anticipated to appear in the raw data (Azungah, 2018, p.391). In this study, initial codes were drawn from the existing literature on the topic of inquiry, from the preliminary interviews. Codes that have a common ground have been grouped into categories. The critical factors were ranked, according to their contribution to business continuity, by analyzing the survey data. Since the collected data did not yield a regression model, the researchers calculated, from the sample, the confidence interval (α=0.05) that reflects the average score in the real population for each factor appearing in the list that emerged from the coding.

The researchers updated the initial model and developed an intermediate model (model #2). This model reflects the knowledge that emerged from data collection and analysis only. The results of the study were then discussed. The researchers' perception as participant observers was also added to the discussion. Following this discussion, the third and final model, model #3, was built.

4. Findings

The analysis and interpretation of the data are presented here in the order in which they were performed.

4.1 Digital Maturity as a Predictor of Organizational Resilience

The analysis of the data collected in the core interviews and in the focus group began with an assessment of the performance of each organization in which the interviewees worked; Both digital maturity and organizational resilience. First, this assessment was made by scoring each indicator separately (a scale of 1-5 where 1 is poor performance and 5 is an excellent performance). The scores that each organization has obtained are presented in Appendix C.

Then a final score was given to each organization for each domain, which is the sum of the organization's scores in each of the areas. Table 3 shows the overall score achieved by each organization in each domain.

Table 3. Digital maturity and organizational resilience relationship

	Digital Maturity		Organizational Resilience	
	Organization	**Score**	**Organization**	**Score**
1	Electronic company	86	Medical institution	93
2	Medical Institution	85	Electronic company	91
3	IT integration company	78	Metal trading	89
4	Data and information supply company	74	IT integration company	87
5	Metal trading	59	Data and information supply company	60
6	Professional food services company	45	Professional food services company	53
7	Health education institution	31	Health education institution	42

From observing the results, it can be seen that organizations that achieved a high resilience score also achieved a good digital maturity score (medical institution, electronic company, IT integration company). Organizations that demonstrated low organizational resilience had poor digital maturity level (professional food services company, health education institution). Data and information supply company demonstrated mediocre performance on both resilience and digital maturity.

One exception was the metal trading organization that achieved a high level of resilience and a medium-to-poor level of digital maturity. What were the reasons behind this result? How could this be explained? Re-examining the results of the interviews from this particular organization revealed two potential reasons for this discrepancy:

A. This was a small organization, with about 250 employees only, much smaller than the other organizations.

B. Both the organization and its customers were considered essential businesses and were therefore exempt from government restrictions such as lockdowns, that is, they were protected from the consequences of the crisis.

The first reason was ruled out because the Israeli Ministry of Economy and Industry published a report according to which the percentage of small businesses that considered closing the business permanently in 2019 was higher than the percentage of businesses that considered that in 2021, (Ministry of Economy Industry, 2021). Small organizations demonstrated better resilience in 2021 than in 2019. The researchers conclude at this point, without prejudice, that:

Digital maturity can be a good predictor of organizational success in coping with a serious crisis, except for organizations that are protected from the consequences of the crisis.

4.2 List of Critical Success Factors and List of Practices that Organizations Intend to Adopt as the New Normal

Using the coding technique factors with board support among interviewees were identified, such as the tasks suitable for remote work and the provision of good and quick decision-making in times of crisis, as stated by interviewees: "Our type of activity does not

require physical presence" (C10), "It is possible to perform a lot of activities remotely. for example, scheduling meetings" (C13).

The factor of providing good and fast decision-making in times of crisis was also attractive among the interviewees, "We succeeded because first of all the decision-making was quick and the execution was rapid. The organization was quick " (C12), or "all in all there was an understanding that there was a crisis and we had to act and make decisions quickly" (C3).

Other factors gained less popularity but were still mentioned by several interviewees, for example, the factor good intra-organizational relationship; as C10 claimed "The fact that we have been working together for many years and have a good working relationship also contributed to the matter".

From gathering the notions raised by all the interviewees, the following list of the critical success factors for coping with a severe disruptive event was obtained:

- The tasks can be performed remotely.
- Understanding and analyzing hazards and consequences.
- Good decision-making during times of crisis.
- Change work processes to suit the new situation.
- Existence of adequate technological infrastructure that enabled remote working.
- Ensure internal resources' ability to operate the existing technology.
- The ability to quickly transfer existing systems for use in new processes.
- Readiness to cut corners or/and to accept mistakes.
- Obtain employees' commitment/engagement to the organization.
- Ensure the organization knows how to measure employee throughputs.
- Develop good intra-organizational relationships.
- Ensure good communication between the various departments in the organization, minimizing silos.

Applying the same coding technique enabled to identify the list of processes and practices that organizations intend to adopt as the new normal.

Most of the interviewees (10 out of 15) said that the hybrid work model would continue and the use of highly virtualized tools for meetings would continue as well, provided that tasks could be carried out remotely productively. Some had reservations about this, C11 claimed "Regular work of two days a week from home, it's not here. It just doesn't fit. There is a consultation between the different groups and there is meaning to the fact that you are physically at work."

A hybrid work model requires increased investment in technology, C10 described it well, "There will be 3 things left that have a clear business benefit: A. You don't have to work from the office every day, it's clear to everyone, even more efficient, and this is beyond the financial savings. Integrated work will also contribute to maintaining competence for similar future events. B. The use of Zoom, Teams, infrastructure, and software is driven by this. C. Transformation towards the cloud".

The acquisition of new skills in this work model and the development of tools suitable for the organization to measure the throughputs of both employees and managers are also required. As C3 noted: “At employee level, this requires time management and different task management. As far as managers are concerned, the impact is much greater. Managers are now required to improve the effectiveness of teams under completely new conditions. Meaning, learning to manage product and productivity against time and visibility. Therefore, they need to be able to accommodate changes”

The C-Level interviewees pointed out the need to consistently monitor threats and opportunities, "Everyone will maintain the digital tension, meaning they will monitor risks and opportunities both to gain a competitive advantage and to prepare for the next coronavirus." (C8).

An analysis of the interviewees' answers yielded the following list:

- Enabling remote work (hybrid work, global, freelancers).
- Increasing the use of virtual tools (security, cloud, mobile apps).
- Upgrading organizations’ IT infrastructure.
- Adjusting appropriate capabilities.
- Adapting a new management style.
- Monitoring threats and opportunities frequently.

4.3 Ranking the Critical Success Factors

The list of critical success factors that appeared in section 4.2 does not rank the factors according to their contribution to business continuity. As explained in section 3.2, this ranking is done by calculating a confidence interval (α=0.05) of each of the factors found, using coding, to have contributed to the business continuity of organizations.

Considering the confidence interval, according to the first set of questions (ranking each factor), the researchers identified three groups of success factors, with different levels of influence in coping with a crisis: the most influential factors, moderate influence factors, and weak influence factors. Each of the identified three groups is shown in Figure 2, using blue circles.

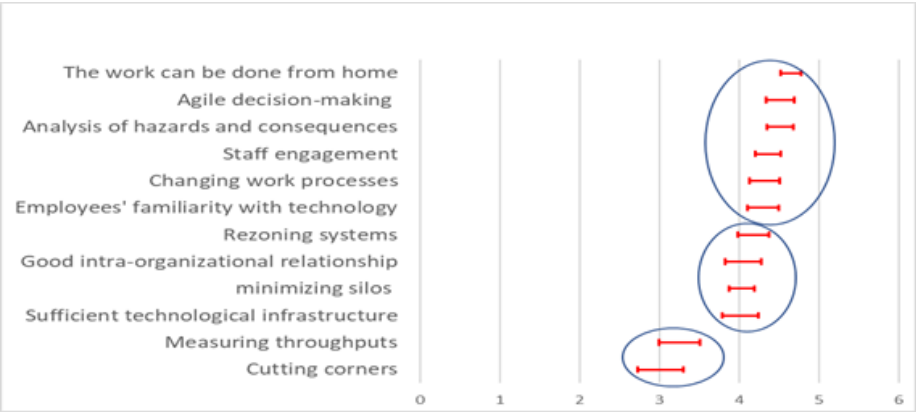

Figure 2. Confidence interval for each success factor

Observing the second set of questions (selecting three factors that contributed the most to business continuity), the results seem to be similar with one prominent exception: the factor "The existence of an adequate technological infrastructure in the organization" ranked highly in the second set and lowly in the first one. Fig. 3 presents the factor ranking for the second set.

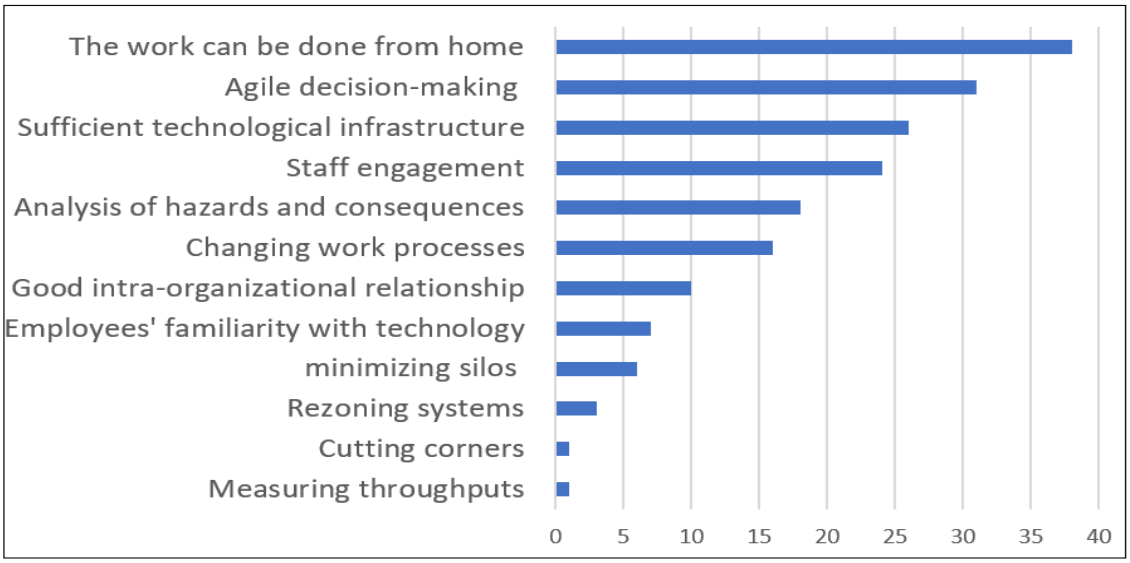

Figure 3. Factors ranking according to the responses for set 2

At the same time, in examining the differences in responses between the segments of the various populations, there was not much difference, except in the group of workers under the age of 35. This group consisted of only five practitioners, so its data analysis needs to be treated with caution. These respondents did not consider the factors "understanding the consequences" and "quick decision-making" as critical success factors.

Following the data analysis, model #1 was upgraded and an intermediate model established (model #2).

5. Discussion

5.1 Insights

The analysis of the data shows that organizations with high digital maturity coped better with disruptive events than organizations with low digital maturity. This finding is consistent with previous literature on digital maturity (Heiferman & Sivan, 2018; Chanias & Hess, 2016; Hess et al., 2016). Fletcher & Griffiths (2021), support this notion and argue that less digitally mature organizations are more fragile.

This study identified several success factors for coping with disruptive events such as COVID-19. Most of these factors are aligned with other studies carried out in both domains; digital maturity and organizational resilience such as agile decision-making, risks, situation awareness, employees' commitment, and adjustments to the new situation (Lee et. al., 2013;

McManus et. al., 2007).

Other factors have received greater refinement in this study, for example, the factor "existence of an adequate technological infrastructure", appears in the literature (Valdez de-Leon, 2016; Bumann & Peter, 2019; Salviotti, G., Gaur, A. & d Pennarola, 2019), but this study more accurately revealed the need for good connectivity in employees' homes, the network stability and the existence of sufficient peripheral equipment such as computers, headphones, speakers, etc. These components were deficient during 2020. Other factors that emerge from the study are completely new like rezoning systems and measuring throughputs, although these last two factors were found as part of the moderate and weak influential factors groups respectively.

These success factors were ranked using a survey distributed to practitioners. The researchers were aware that the distribution of the respondents in the survey was not a normal distribution. Most of them were men (67%) over the age of 35 (92%), and they worked in the high-tech industry (53%), although in this industry the researchers expected a high percentage of young workers.

Additional insights related to hybrid work emerged from the findings:

- **Physical ability to perform the work remotely**. Hybrid work is not currently suitable for all industries but this fact can change over time due to technological changes. For example, robots are replacing surgeons in some surgeries today. A few years ago, it would have been considered science fiction. Even in these industries, ons enablesome occupati remote working such as accountancy and computing.
- **Added value of remote work**. Even in organizations where a significant part of the work can be done remotely, in favor of hybrid work, there must be a win-win situation (employee-management,). Both sides need to understand what they will gain from this.
- **The time horizon of using the hybrid work model.** An organization that has decided to switch to a hybrid work model should take into account that the organizational equilibrium created may change over time. This may be due to new technological developments, unpredictable competition, regulatory changes, a different financial situation, or the will of employees who understand that those present in the office fully had a higher chance of winning coveted positions because they are in the inner circle or they feel that home life balance has been compromised.
- **Organizational adjustments are required.** Switching to a hybrid work model requires making physical, technological, and managerial adjustments in its implementation. That means good connectivity between the various work sites, adequate hardware, software, and furniture at the workstations, including in the employees' homes, and virtual conference rooms. The management style must also change. It will be necessary to take into account the location of the activity, the people participating in the activity, the required integration with other stakeholders related to the task, providing cut and clear instructions to the task, and the employee's ability to perform and absorb what is required. This means giving autonomy to the employee, and freedom to do what he or she thinks is right for the

organization without waiting for official approval at any stage (Westerman, Soule, & Eswaran, 2019). Acquiring these competencies means a financial investment.

5.2 The Final Model (Model #3)

Following the discussion of the research findings, the researchers updated the model for managing disruptive events using digital technology. The structure of this model is the same as the previously developed models, and it contains the same three timespans: before the event, during the event, and post-event. The final model is presented in Fig. 4. Table 4 explains the operations listed in Fig. 4.

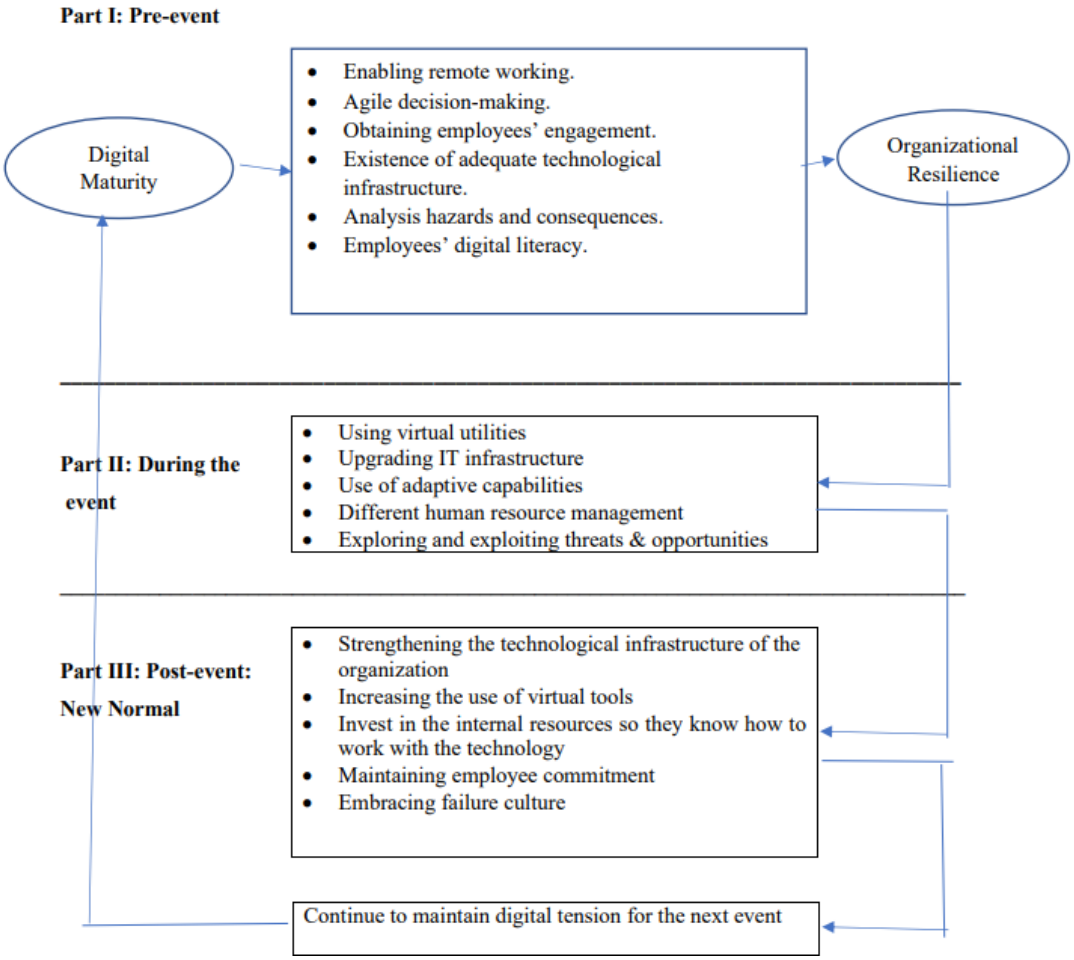

Figure 4. The final model

Table 4. Annotation of the final model

Time-Horizon	Action	Annotation
Pre-Event	Enabling remote working.	Essential core processes can be performed remotely.
	Agile decision-making.	Decisions should be made very quickly to enable a crisis response.
	Obtaining employee engagement.	Maintaining employee commitment and employee retention.
	Adequate technological infrastructure.	Existence of adequate technological infrastructure; good connectivity, network stability, equipment, licenses, etc.
	Analysis of hazards	Understanding and analysis of hazards and consequences.
	Employees' digital literacy.	Reinforcing employees' digital literacy, their knowledge of organizational information systems, common tools known in the market.
During-Event	Using virtual utilities.	Virtual meetings and virtual tutorials.
	Upgrading IT infrastructure	Upgrading the digital infrastructure needed for business continuity during the crisis.
	Use of adaptive capabilities.	Being more flexible by being innovative and creative.
	Different HR resources.	Managerial changes such as providing tasks in a clear-cut manner.
	Exploring/exploiting threats/opportunities.	Monitoring and mitigating risks while at the same time searching for new business models as a response to the crisis.
Post-Event	Strengthening the technological infrastructure of the organization.	Strengthening the technological infrastructure to enable the organization to move forward in the digital transformation process it undergoes.
	Increasing the use of virtual tools.	Virtual tools refer here to virtual meetings and training.
	Investment in HR – technology training.	Investing in the internal resources so they know how to work with the technology existing in the organization.
	Maintaining employee commitment.	Maintaining the relationship with the individual employee so he/she will not feel detached.
	Organizational adjustments	Technological, physical, and managerial adjustments.
Return Action	Continue to maintain digital tension for the next event.	Digital tension refers to the constant examination of innovation and its adaptation to the organization to gain a competitive advantage in the industry in which the organization operates.

5.3 Implications

This study has theoretical and practical implications; The main theoretical contributions of this study are: 1. Clarifying the importance of digital maturity for an organization so that it can develop resilience during a pandemic and retain competitiveness in a post-pandemic age. 2. Development of a three-time-horizon model for managing disruptive events using digital technology. 3. Improvement of the theories on the intersections of digital maturity, organizational resilience, and crisis management. Considering that the literature about the impact of digital maturity on organizational success to operate during such an event is in its early stage, this study contributes to the literature by identifying the digital factors influencing organizational resilience in such a situation and its aftermath.

From a practical point of view, this research highlights the importance of digital maturity in

organizations for developing resilience during a severe crisis. The findings of this research are important not only for organizations that are digital natives, like Google, Amazon, and Uber, but it is also especially important for traditional technology organizations like government offices, low-tech companies, and other small organizations, which were more vulnerable during the COVID-19 event.

The result of this study identified the specific indicators of digital maturity that strengthen an organization's resilience during a disruptive period. These components can be developed and thus strengthen any organization during a potential future crisis. In addition, research has identified the processes and practices that organizations are likely to adopt in the post-COVID-19 period. The study argues that the realization of these processes does not have to be dichotomous, and there is a spectrum of possibilities for their realization. Each organization will be able to decide which processes and work model is right for it.

5.4 Practical Recommendations

Following the findings of this study and the discussion, the researchers suggest implementing certain practices:

Reinforce the possibility of working remotely. As the ability to work remotely has been found as an important factor, organizations need to make efforts to strengthen it. This can be done by:

- Identifying core processes during a crisis is essential that can be performed remotely.
- Establishment of a business-technology team to examine the possibilities of using technological.
- Embrace the digital culture. Give autonomy to the employees.

Strengthening the technological infrastructure of the organization. In favor of supporting remote work, the organization's technological infrastructure must be adequate. This means, ensuring good connectivity between the different worksites. The data transfer rate and network stability monitoring, ensuring the existence of necessary peripherals, digital literacy of employees, and adequate information security.

Maintaining employee commitment to the organization. To maintain this commitment and so that the employee would not feel detached from the organization, the organization must find acceptable solutions for maintaining a personal and professional relationship with individual employees. Guidelines should be provided in a clear-cut manner and tasks that require collaboration will need to be done on days those employees are in the office.

Agile decision making. Decision-making during the COVID-19 event was made under conditions of uncertainty. In this situation, incorrect decision-making may occur. The organization must embrace and communicate that quick decision-making is welcome, at all levels of hierarchy. Even if the decision is wrong, it is better than not making decisions, which leads to stagnation

New normal. An organization will need to decide what is the most appropriate work model for it, in order to draw an appropriate strategic plan which will be integrally embedded across

the organization (and not just aligned).

6. Conclusions

This study shows that there is a relationship between the digital maturity of an organization before a disruptive event such as COVID-19 and the resilience it demonstrates during. Organizations that were subject to government restrictions such as lockdowns and demonstrated high digital maturity in the pre-event period also demonstrated higher organizational resilience during it. The study identified the specific success factors that contributed the most to business continuity during the crisis as well as the practices that the business community intends to adopt in post-pandemic era. The result of the study is a new model for managing disruptive events using digital technology. It is based on developing a theoretical framework on which to build its practical application capabilities. The most important contribution of the research is that it helps organizations to understand how digital technology can be embedded in the resilience of the organization and thus contribute to its business goals. The research was limited to Israeli practitioners only and therefore it can be argued that the findings of the study cannot be generalized. However, the researchers think that the results of this research can be used in any environment, regardless of geography, provided that local cultural differences are taken into account. In addition, the survey did not examine a regression model and the population of respondents in the survey yielded an unbalanced sample (in terms of gender, age, industries, and hierarchical level).

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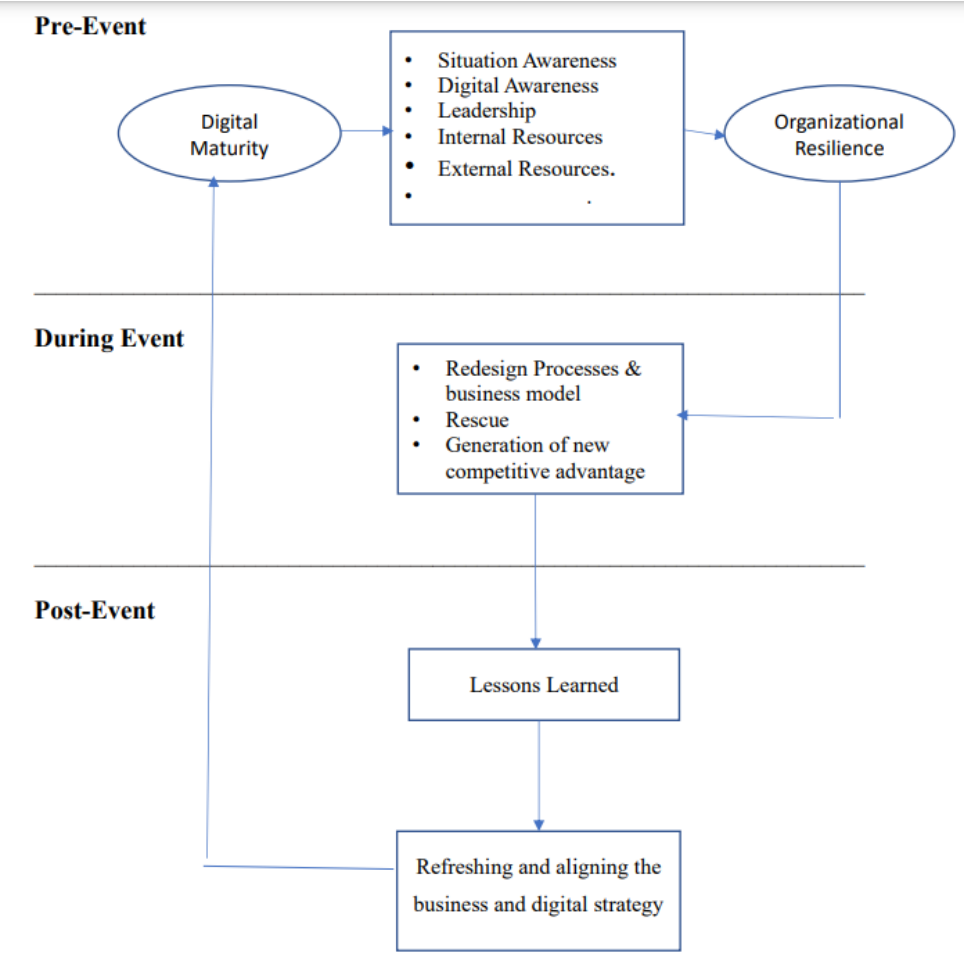
Appendices

Appendix A

Model #1



Appendix B

The Questionnaire

1. **Section 1: Demographic Information**
   - Gender
   - Age Group
   - Industry
2. **Section 2: How did your organization cope with the coronavirus**?

For these questions, the respondents were asked to rank the claim (1-5 degrees) from 1-do not agree at all to 5- strongly agree.

- The organization's management's understanding of the possible consequences of the outbreak of the coronavirus on the organization contributed greatly to the continuity of work during the pandemic.
- Prompt decision-making by the organization's management contributed greatly to the continuity of work during the pandemic.
- Changing work processes carried out with the outbreak of the crisis, to suit the new situation, contributed greatly to the continuity of work during the pandemic.
- The fact that many of the organization's tasks could be performed from home contributed greatly to the continuity of work during the pandemic.
- The technological infrastructure that was in the organization before the pandemic was sufficient and contributed greatly to the continuity of the work during the pandemic.
- The fact that people in the organization knew how to work with the organization's digital technologies contributed greatly to the continuity of work during the pandemic.
- The organization's ability to use existing computer systems to operate new processes created by the coronavirus outbreak contributed greatly to the continuity of work during the pandemic.
- Our organization's willingness to "cut corner" contributed greatly to the continuity of work during the pandemic.
- The commitment of employees to the organization was high and contributed greatly to the continuity of the work during the pandemic.
- The ability to measure the work outputs of employees working from home contributed greatly to the continuity of work during the pandemic
- he good relationship between employees, which exists in the organization in normal times (before the outbreak of the virus), contributed greatly to the continuity of work during the pandemic.
- The good communication between the various units in the organization, during the pandemic, contributed greatly to the continuity of the work during the pandemic.
- What do you think are the 3 most important factors that contributed the most to continuity of work during the pandemic?

Appendix C

The scores that organizations obtained following the interviews

Table C1. Digital maturity scores following the interviews

	Industry						
Indicators	Electronics	Data and information supply	Health Education	IT integration	Metal Trading	Medical institution	Professional food services
Existence of digital strategy	3	2	1	2	1	3	1
Existence of sufficient employees with appropriate capabilities	5	4	1	4	2	3	2
Willingness to acquire & develop new competencies	5	4	2	4	2	5	3
Existence of appropriate leaders to execute the digital strategy	5	5	1	4	2	5	1
Existence of digital transformation roles	4	3	1	2	2	5	3
Existence of basic infrastructure and extra peripherals equipment	4	3	1	4	4	3	4
Computerization of core processes	4	4	1	3	3	4	1
Providing good IT security	2	4	3	4	3	4	3
Using technological innovation (cloud, IoT, machine learning)	5	2	2	4	1	3	1
Exploration & evaluation of new trends	5	3	1	4	2	4	1
Alignment & cooperation between IT and business departments	5	5	2	4	4	5	3
Existing collaboration with external resources (operational and R&D)	5	3	1	4	5	5	2
Organizational flexibility & agility	5	3	2	5	4	5	2
Freedom to experiment/"fail forward culture"	4	5	4	4	4	4	5
Understanding the digital technology’s needs by executive	3	4	1	5	3	5	2
Setting clear and accurate measurable goals	5	5	1	5	5	5	2
Total	69	59	25	62	47	68	36
Score	86	74	31	78	59	85	45

Table C2. Organizational resilience scores following the interviews

	Industry						
Indicators	Electronics	Data and information supply	Health Education	IT integration	Metal Trading	Medical institution	Professional food services
Minimization of silos	5	3	3	4	5	4	4
Internal resources	5	4	3	4	5	5	3
Staff engagement and involvement	5	5	5	4	5	5	3
Information and knowledge	4	1	2	4	3	4	2
Leadership	4	4	1	5	5	5	2
Innovation and creativity	5	4	1	3	1	4	2
Decision making	3	2	1	4	5	3	3
Participation in exercise	4	1	1	3	4	5	2
Analyzing hazards and consequences, monitoring and reporting	2	2	1	4	5	4	1
Organizational connectivity	4	1	1	4	2	3	2
Total	41	27	19	39	40	42	24
Score	91	60	42	87	89	93	53