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Title:

“The Impact of Digitalization and Managerial Innovation on Resilience in the Face of the Covid-19 Crisis: The Case of SMEs in the Greater Agadir Region”

Abstract:

African businesses have been severely affected by the Covid-19 pandemic, which has had a considerable impact on the global economy, and Morocco has not been spared. Indeed, Moroccan SMEs have had to face unprecedented challenges that threaten their sustainability. In this context, the resilience of businesses can be significantly strengthened through digitalization and managerial innovation by implementing effective crisis management.

This article aims to examine the link between innovation, crisis management, and resilience, with a particular focus on the potential contribution of digitalization and managerial innovation to effective crisis management and, consequently, the resilience of SMEs during the Covid-19 pandemic.

Adopting a post-positivist paradigm and employing a hypothetico-deductive reasoning, the transition from the hypothetical model to the empirical phase of the study was conducted through quantitative research on a sample of 32 SMEs located in the Greater Agadir region. The results reveal the absence of a positive impact of digitalization on crisis management and, consequently, on resilience. However, managerial innovation demonstrates a positive impact on the resilience of the enterprise through effective crisis management. Furthermore, our findings also establish a positive and significant relationship between crisis management and enterprise resilience.

Keywords: Covid-19 Crisis, Digitalization, Managerial Innovation, SMEs, Resilience.

Introduction:

Today, every company faces the difficulties of adapting to a changing environment, learning from past successes and failures, identifying and correcting past mistakes, anticipating and addressing imminent risks, being constantly innovative, and thus resilient. The concept of resilience has developed in response to several recurring and severe economic crises. Resilience is the ability to cope with a variety of regular and irregular disturbances and threats, the ability to flexibly monitor what is happening, the ability to anticipate disruptions, and the ability to learn from experience (Hollnagel et al., 2008). Therefore, resilience is a risk management strategy that emerges when a company can continue to generate above-average returns even after absorbing shocks from the competitive environment (Armeanu et al., 2017).

In the literature on crises and turbulences, three phases are identified: prevention and preparation, crisis management, and post-crisis learning. The first two phases, which focus on understanding an organization's resilience, have been combined, while the third phase focuses on using the lessons learned from a crisis to strengthen an organization's resilience. Indeed, using crisis management to ensure resilience by implementing a solid strategy based on forecasts is crucial, as the stability of the company depends on its ability to overcome crises, which is not always efficient. Therefore, it is necessary to continuously integrate new innovations in terms of study plans and potential corrective actions (Dauphiné, Provitolo, 2007).

The Covid-19 pandemic has provided the ideal opportunity to demonstrate the value and intrinsic applicability of new technologies, as well as the need to accelerate their integration into all sectors of activity. However, the scale and complexity of the changes go beyond the digitalization of processes and the use of technology to create digital management of daily business operations. The latter undergoes a significant transformation that will impact its culture, operational styles, and internal processes.

In order to maintain a certain level of business sustainability and achieve the desired organizational objectives, resulting in improved outcomes, SMEs are now more than ever facing pressures and a series of obstacles. The ability of a company to use innovation is one of the main factors favoring this process. Therefore, mitigating problems related to dependence on infrastructures and IT solutions that are not suitable for remote work or situations requiring rapid modification of data models forces companies to adopt a digitalization strategy, which is a driving force for change in crisis management, such as that of the Covid-19 pandemic.

These different perceptions prompt academics and even managers to question the variables that can affect SME resilience during the spread of a crisis, such as the current COVID-19 crisis. Therefore, our issue is to answer the following main question: “To what extent do digitalization and managerial innovation impact SME resilience through crisis management?”

More specifically, we seek to answer the following three research questions:

- To what extent does digitalization have a positive impact on crisis management?
- To what extent does managerial innovation have a positive impact on crisis management?
- To what extent does crisis management have a positive impact on resilience?

The objective of this contribution is to examine the link between innovation and resilience, especially the potential contribution of digitalization and managerial innovation to effective crisis management, and consequently, to the resilience of SMEs in the Grand Agadir region during the Covid-19 pandemic. However, a better understanding of this relationship is crucial.

Based on a post-positivist paradigm that we have inscribed in hypothetico-deductive reasoning, the transition from the hypothetical model to the empirical aspect of the study was done through a quantitative study on a sample of 32 SMEs located in the Grand Agadir region. The data collected is analyzed using the PLS approach with the SMART PLS3 software. Therefore, this present work will be an added value to the existing literature and will provide new researchers with a research benchmark to advance knowledge in this field. Thus, the results derived from this research work reveal practical utility for managers and investors.

To carry out this study, we will start by reviewing the literature on previous research conducted on the subject in question while deriving research hypotheses. In the second section, we will present the methodology pursued as well as the research area. The results will be presented and discussed in the last section.

I. Literature Review and Hypothesis Development:

1. Digitalization:

All major research institutions worldwide are closely interested in the expanding phenomenon of digitalization. Due to the diversity of businesses and the specific nature of their capabilities, the idea of digitalization can have a significant impact on companies. Given their significant economic contribution to the global economy and their specific organizational characteristics, small and medium-sized enterprises (SMEs) are of the utmost importance in this research field, and digitalization is a concept that requires special attention for these businesses.

It is necessary to develop technology adoption models that go beyond the use of digitization and digital technologies in SMEs. An architecture that supports business continuity and can increase business resilience results from effective digital deployment (Tajer et al., 2022).

Today's entrepreneurs must be ready to adapt to the pandemic if they want to survive. By creating websites that incorporate digital marketing, social media, and sales through electronic marketplaces where they can also find reseller groups to sell their products, they are beginning to focus on digital marketing. In reality, the health crisis has created both opportunities and challenges. Furthermore, to retain their customer base and navigate through the crisis phase, businesses must be able to seize this opportunity and react swiftly (Hidayat et al., 2020; Khairi et al., 2021). Companies during this period quickly realized the need to closely monitor their activities. To make informed decisions, they had to have access to a multitude of real-time information about their business, rather than relying solely on collecting and analyzing past data.

The role of the management controller, which was mainly based on cost analysis, budgeting, dashboards, and reporting, is undergoing a new role change due to the development of so-called predictive tools that can provide managers with all the necessary information and analysis directly and automatically. It is also the application of artificial intelligence that will force the management controller to transform into a true manager and performance advisor (business partner). The primary responsibility of this business partner is to ensure the accuracy and reliability of the data used to feed the analytical tools while minimizing the risk of making quick or impulsive decisions (Boutgayout and Elghazali, 2020).

Controllers must now acquire new skills to address this new situation, including those related to data analysis, machine learning, and cloud computing, a brand-new field of study focused on cutting-edge technologies and artificial intelligence (Boutgayout and Elghazali, 2020).

However, the current situation has revealed weaknesses that mainly affect the flexibility, performance, and accessibility of operations. This incident forces management to accelerate the digitalization of processes and complete their integration into the data value chain. To mitigate problems related to dependence on infrastructures and IT solutions that are not suitable for remote work or situations requiring rapid modification of data models, it must adopt more integrated solutions hosted in the cloud. The cloud is undoubtedly a driving force in crisis management and is already perceived as a logical, natural, and inevitable evolution (Sossi Alaoui & Oubaassou, 2023).

Furthermore, all companies must turn to technology to continue selling products, maintaining contact with customers, etc. (Tremblay, 2020). Social media platforms are also the most used technologies in this situation. Indeed, the use of e-commerce and computer proficiency become crucial elements of crisis management (Tajer et al., 2022).

Based on our literature review, our first hypothesis is thus formulated:

Hypothesis 1: Digitalization would have a positive impact on crisis management.

2. Managerial Innovation:

According to Kimberly (1981), managerial innovation is defined as "Any program, product, or technique that represents a significant departure from the state of management at the time it first appears and affects the nature, location, quality, or quantity of information available in a decision-making process." For Hamel et al. (2008), managerial innovation is "the establishment of new managerial processes, practices, or techniques compared to those already known in order to achieve the desired objectives."

According to Hecker and Ganter (2013), managerial innovation is the adoption of new management techniques with the aim of improving business performance. In the same vein, Damanpour and Aravind (2011) propose what seems to be the most relevant definition. According to them, managerial innovation is the introduction of new organizational structures, administrative systems, management practices, processes, and techniques that have the potential to add value to the organization (cited by Messaoudi et al., 2020).

According to Eddahani et al. (2022), reimagining the organization, rehabilitating it, reviving it, rebalancing it, adapting it to conform to the world of today and tomorrow, and above all, enabling it to preserve and endure – these are the challenges revealed by this crisis. This departure from traditional behaviors is the result of organizational changes induced by the Covid-19 crisis, which have impacted organizational structures, work practices, interpersonal relationships, employee requirements, and expectations. In recent years, the definition of work has undergone significant evolution; therefore, in order to respond as effectively as possible to the daily functioning of the company and its personnel, management practices must, as far as possible, keep up with this forced pace. Thus, it is important to implement new management techniques focused on the short term and taking into account the unexpected.

In other words, the primary responsibility of the manager is to ensure the success of his team. This means being able to promote initiative and activity by appealing to the intelligence and

flexibility of each individual, making them autonomous and performing well. Therefore, it is important to build a management style based on trust and responsibility, where the employee is evaluated based on their ability to achieve their goals, regardless of the time spent in the office.

While the implementation of these elements does not guarantee crisis resolution, it reassures individuals by promoting a culture of trust and encouraging their participation in group coordination (Karsenty, 2015). Since no one in crisis management has perfect control over everything, the manager actively seeks other viewpoints by engaging in debate with their personnel. They do this because they know that acting otherwise to protect their management may compromise their reputation. Indeed, more open communication is made possible through more collaborative management, which promotes the development of innovative ideas and consequently earns their trust (Barbara, 2022).

In short, it is crucial for managers to develop greater agility to cope with unexpected events. Therefore, it is essential to be flexible, adaptable, and discerning. The biggest challenge for managers is to innovate and adapt. In the same vein of thought, BordaRodriguez & Vicari (2015) state that innovation has contributed to reducing exposure to specific risks by improving anticipatory capacity.

Eddahani et al. (2022) have established six pillars of managerial innovation that form the basis of a co-responsible culture in times of crisis, which include: preserving and strengthening trust, enhancing responsibility and autonomy, ensuring well-being and engagement, maintaining collaboration, developing agility, and boosting creativity. We have considered these pillars as the most relevant to measure the variable of managerial innovation in our research model, and they are presented in the following table.

Table 1: The pillars of managerial innovation

Pillars of MI	Explanations
Preserving and Strengthening Trust	To preserve trust, companies must strengthen social bonds and demonstrate more authenticity and transparency. Building trust during a crisis becomes crucial for maintaining relationships with stakeholders and ensuring business continuity
Enhancing Responsibility and Autonomy	Unable to directly observe work execution, many managers have been forced to let go and provide more freedom in organizing work. This empowerment has allowed employees to become more responsible for their

	well-being and performance, fostering a sense of ownership.
Ensuring Well-being and Engagement	Facing anxiety among some employees, managers have devoted considerable time and energy to ensuring their well-being and preserving their engagement. However, recognizing the diversity of individual reactions and situations, many companies have adapted their approaches to provide tailored support, acting at the right time and in an appropriate manner.
Maintaining Collaboration	Isolation highlighted the importance of collaboration. To prevent this situation from affecting group dynamics and mutual assistance, some companies adopted new collaborative tools and strategies to maintain teamwork and communication.
Developing Agility	The complexity of the situation and the impact of the crisis on certain professions prompted companies to break free from traditional organizational structures. They sought increased flexibility to adapt quickly to changing circumstances and business needs.
Boosting Creativity	While the Covid-19 crisis had dramatic consequences, it also presented an opportunity for some companies to reinvent themselves. By encouraging creativity, businesses could discover innovative solutions to overcome challenges and reshape their operations positively.

Source: Eddahani et al. (2022)

Based on the above, our second hypothesis is formulated as follows:

Hypothesis 2. Managerial innovation would have a positive impact on crisis management.

3. Resilience:

3.1. Definition:

According to Hollnagel et al. (2008), "Resilience is the ability to cope with a variety of regular and irregular disturbances and threats, the ability to monitor flexibly what is happening, the ability to anticipate disturbances, and the ability to learn from experience." Similarly, for Stephenson et al. (2010): "organizations may struggle to prioritize and allocate resources to strengthen resilience due to the difficulty in demonstrating progress or success." For this reason, sustainability is an effective business lever and a significant competitive advantage to increase the value of the company.

The table below presents definitions and typologies that have been developed, providing a varied foundation for understanding resilience in the context of organizations.

Table 2: Definitions of resilience in the context of organizations.

Authors	Nature of Capability	Definitions
(Horne & Orr, 1998)	Resistance and recovery capacity	The ability to absorb tensions and changes with minimal disruption.
(McDonald, 2008)	Adaptation Capacity	La résilience transmet les propriétés de pouvoir s'adapter aux exigences de l'environnement et de gérer les aléas de l'environnement.
(Danes, et al., 2009)	Anticipation Capacity	The resilience capacity of family businesses refers to a "stock" or "reservoir" of individual and family resources that protect the family business from disruptions and is characterized by individual and collective creativity used to solve problems and get the job done.
(Acquaah, et al., 2011)	Resistance and Recovery Capacity	The ability of a company to persist in the face of significant changes in the environment and/or the ability to withstand disruptions and catastrophic events.
(Jaaron & Backhouse, 2014)	Anticipation Capacity	The ability to detect and absorb variability, surprises, and disturbances in the environment.
(Edgeman, 2015)	Adaptation Capacity	The company's ability to renew itself through innovation, change, and reinvention by adapting its responses to political, social, economic, and other shocks or challenges.

Source : Yacoubi, L., Tourabi, A. (2020)

3.2. Characteristics of Resilience:

Kruk et al. (2015) established a model of health system resilience that contains five characteristics: awareness, diversity, self-regulation, integration, and adaptability, to analyze the impact of crisis management on resilience (cited by Barakat and Bendou, 2019). We deemed these characteristics to be the most relevant for our study as there is no single model to measure resilience due to its normative nature and the fact that it can only be evaluated through comparisons (Chandler, 2014).

Table 3: Definitions of each characteristic.

Characteristics	Definitions
Awareness	Knowing the strengths, vulnerabilities, risks, intervention strategies, and planning for possible risks to the system's disturbances.

Diversity	Being able to cope with a variety of health challenges while maintaining basic and quality services.
Self-regulation	Identifying threats and quickly isolating them by mobilizing appropriate resources.
Integration	Sharing information, communication, and coordination with all stakeholders.
Adaptability	Adaptability Learning from experience and continuously transforming approaches based on these learnings.

Source: Kruk et al., 2015

3.3. Risk Management and Resilience of Small and Medium-sized Enterprises:

In SMEs, risk management is often solely the responsibility of the business owner and is carried out implicitly without the use of specific instruments (Jayathilake, 2012). Until now, risk management in SMEs has not been considered a specific source of costs or a significant source of value creation because it is not always subject to specific commitment, and its impact on performance is still difficult to demonstrate. According to research conducted by Hmidou and Binkkour (2022), results show that SMEs adopt risk management approaches both formally and informally, without a precise methodology. The findings also indicate that the companies adopting risk management approach primarily belong to the agri-food sector and use quality frameworks.

Furthermore, Sossi Alaoui and Oubaassou (2023) affirm that risk management has traditionally been limited to the financial aspect of the organization, which is considered the most critical risk as it can lead to insolvency and the disappearance of the business. Researchers have attempted to bring together previously scattered and sometimes incomprehensible work on enterprise risk and to theoretically establish the concept of risk management and the practices that support it, in order to have visibility beyond the financial character of risks related to SMEs.

Through flexible workforce, strategic management principles, hierarchical support, and the use of technology, SMEs retain their knowledge. To understand that knowledge has value and sharing knowledge adds value, they must be proactive in knowledge-sharing agreements. Personal relationships have always been a key factor in business success. Developing these existing relationships and having a clear understanding of the company's strategic objectives can result in a sustainable competitive advantage that can drive expansion and increased profits. According to Egbu et al. (2005), this leads to consumer happiness and loyalty.

Thus, to survive and thrive in a changing market, SMEs frequently encounter new obstacles in terms of costs, quality, delivery, flexibility, and human resource development. An enterprise's

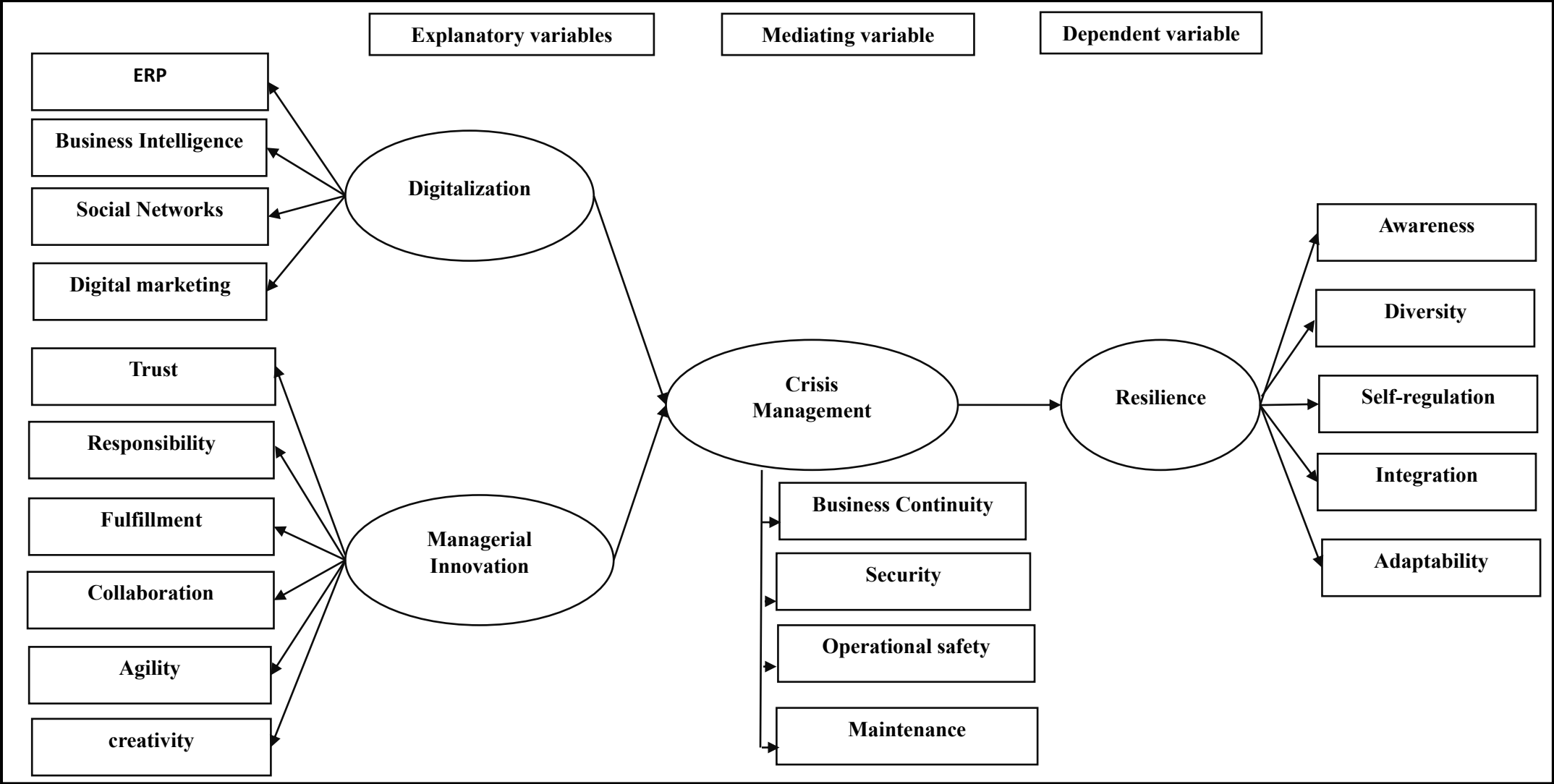
competitive strategy establishes its list of possible products and markets, long-term objectives, and the methods to achieve these objectives. Companies must regularly assess their manufacturing strategy to identify factors such as market orientation, product structure, factory configuration, and investments (Singh et al., 2008).

It is crucial to use risk management to ensure resilience by implementing a robust strategy based on forecasts because the stability of the company depends on its ability to overcome crises, which is not always effective. Therefore, it is necessary to continuously integrate new innovations in terms of study plans and potential corrective actions (Dauphiné, Provitolo, 2007). Given the strong presence of the principle of uncertainty (difficulty in establishing the precise probability of risk), which requires cognitive evaluation, risk determination must be linked to an effective evaluation system.

Based on the above, our final hypothesis is formulated as follows:

Hypothesis 3. Crisis management would have a positive impact on the resilience of SMEs

Figure 1: Research Model



Source: Authors

II. Methodology and Research Field:

In this study, we aim to examine, firstly, the impact of digitization and managerial innovation on crisis management, and secondly, the impact of crisis management on the resilience of SMEs in the Greater Agadir region during the COVID-19 pandemic, including the direct and mediating effects of crisis management.

To address our research problem, we adopt a post-positivist paradigm, employing a hypothetico-deductive approach that begins with theoretical examination and exploration leading to the formulation of hypotheses and ends with empirical tests to refute or support the hypotheses.

For empirical investigation, we selected the self-administered questionnaire as the data collection method, distributed online through the professional networking platform LinkedIn using Google Forms. This allowed us to gather sufficient data from our sample, consisting of SMEs operating in various sectors in the Greater Agadir region. We used a "snowball sampling" technique, limited to SMEs that were active before the appearance of the COVID-19 pandemic. We utilized our personal connections' professional networks, and they, in turn, recommended reaching out to others until we reached a point where we could no longer find new respondents. In Morocco, we adopted the definition provided by the High Commission for Planning (HCP) for SMEs: "Any company with an annual turnover between 3 and 175 million Moroccan Dirhams and a permanent workforce of 10 to 200 employees" (HCP, 2019).

The data collection period and administration of the questionnaire lasted for one month. After several successive follow-ups, out of 50 self-administered questionnaires distributed to SME employees and managers in the Greater Agadir region on LinkedIn, we received a total of 32 responses. The collected data will be analyzed using Structural Equation Modeling (SEM) with Smart PLS3 software to test the hypotheses of our research model.

III. Analysis and Discussion of Results:

1. The Sample Characteristics:

After organizing the collected data, we conducted the profiling of the observations in two stages: first, we describe the profiles of the respondents, and then we present the characteristics of the companies that form our sample. The profile of the studied respondents (Gender, Age, Job Position) is summarized in Table X. Taking into account the gender criterion of the respondents, 71.87% of the respondents are male, while females represent only 28.13%.

The sample is thus characterized by 78.12% of the respondents belonging to the age group [30, 40 years], [40, 50 years]. As for the job position, the positions of "General Manager / Deputy Director," "Financial and Accounting Manager," and "Operations and Production Manager" account for 87.5% of the observations.

The table below summarizes the profile of the respondents in question.

Table 4: Respondents' Profiling

Categories	Subcategories	Frequency	%
Respondent's Gender	Male	23	71,87
	Female	9	28,13
Respondent's Age	Less than 30 years	5	15,62
	Between 31 and 40 years	18	56,25
	Between 41 and 50 years	7	21,87
	Over 50 years	2	6,26
Job Position	General Manager / Deputy Manager	4	12,5
	Financial and Accounting Manager	17	53,13
	Operations and Production Manager	7	21,87
	IT Manager	1	3,13
	Quality Manager	3	9,37

Source: Own calculations using SPSS

The respondents were also asked about the companies they work for. The profiling of the companies reveals that SARL (Limited Liability Company) is the most common legal form in our sample, accounting for 75%, followed by SA (Public Limited Company) with 21.88%. The analysis of the variable "number of employees" shows that the majority of respondents (78.12%) work in small companies with 10 to 50 employees, while 15.63% of the companies are of medium size with a number of employees ranging from 101 to 200. Additionally, we observe geographical disparities in our population, with 40.63% of the observations from Agadir Ida-Outanane, 41.2% from Inezgane-Aït Melloul, and 6.25% from Chtouka-Ait Baha.

Regarding the sector of activity, 34.37% of the companies operate in the agricultural sector, which is due to its dominance in the region's economy. The construction and public works sector represents 25% of the observations, followed by the transport sector with 18.75%. The remaining 13% is made up of various sectors, including the banking sector and others.

The table below summarizes the profile of the companies:

Table 5: Company Profiling

Categories	Subcategories	Frequency	%
Legal status of the company	SARL	24	75
	SNC	1	3,12
	SA	7	21,88
	SCA	0	0
	Other	0	0
Number of employees	Between 10 and 50	25	78,12
	Between 51 and 100	2	6,25
	Between 101 and 200	5	15,63
Geographical area of the company	Agadir Ida-Outanane	17	53,12
	Chtouka-Ait Baha	2	6,25
	Inezgane-Aït Melloul	13	40,63
	Dchira	0	0
	Temssia	0	0
	Lakliâa	0	0
	Drarga	0	0
	Awrir	0	0
	Taghazout	0	0
Sector of activity	Agricultural sector	11	34,37
	Maritime fisheries sector	3	9,38
	Manufacturing sector	0	0
	Building and public works sector	8	25
	Transport sector	6	18,75
	Telecommunications sector	0	0
	Banking sector	3	9,38
	other	1	3,12

Source: Own calculations under SPSS

2. Presentation of the results:

The data collected from our respondents were analyzed using the method of structural equations with the Smart PLS 3 software, which allowed us to test our research hypotheses and the overall model, taking into account measurement errors. The first step was to test the reliability and

validity of the measurement model before conducting tests on the hypotheses of the structural model.

2.1. Reliability and convergent validity of the measurement model:

To test the reliability of the items, a confirmatory factor analysis was conducted as shown in Table X. The assessment of item reliability is given by the "loadings," and the basic rule is that each item should account for at least 0.40 of the variation of each indicator (Evrard et al., 2003), with "loadings" greater than or equal to 0.7 preferred (Ringle et al., 2018). In the case of our study, the results allowed us to verify that the necessary conditions to ensure the reliability of the items of the constructs were met, as the majority of the implemented items showed acceptable correlations.

The representation qualities of all indicators were higher than the tolerated threshold of 0.40 (Evrard et al., 2003), ranging from 0.670 to 0.903. We will remove item 3 from the Managerial Innovation variable as its correlation is below 0.7. The removal of this indicator results in an increase in the average variance extracted. Therefore, we conclude that the majority of the items are reliable and representative, with a correlation higher than 0.70 for each item.

Similarly, the reliability of the measuring instrument used in this research was verified using the composite reliability test (CR). Technically, it is more appropriate to apply a different measure of reliability than internal consistency reliability, called composite reliability. The results of our study show that the required conditions to ensure the composite reliability of the variables were met, indicating that all the selected variables have acceptable values, with a value higher than 0.7. Consequently, all constructs are validated, and measurement validation is performed.

The convergent validity of the scales of the measurement model is assessed by first examining the level of average variance extracted (AVE), which can be defined as the average of the squared correlations of the indicators associated with the construct. In our study, the displayed values are aligned with the norm, requiring a minimum threshold of 0.5.

This shows that the required conditions to ensure the convergent validity of the variables were met, as the average variance extracted of all latent constructs is between 0.699 and 0.767, which is well above the threshold recognized by researchers, that is, 0.5. As a result, all constructs are validated, and measurement validation is performed.

The table below summarizes all the results of reliability and convergent validity:

Table 6 - Reliability and Convergent Validity Results

Construits	Items	Loading	Fiabilité composite	AVE
Digitalisation	DIG 1	0.832	0.930	0.767
	DIG 2	0.849		
	DIG 3	0.732		
	DIG 4	0.853		
Managerial innovation	IM 1	0.799	0.937	0.749
	IM 2	0.903		
	IM 4	0.867		
	IM 5	0.882		
	IM 6	0.874		
Crisis management	GC 1	0.900	0.890	0.669
	GC 2	0.856		
	GC 3	0.859		
	GC 4	0.888		
Resilience	RES 1	0.852	0.930	0.738
	RES 2	0.867		
	RES 3	0.884		
	RES 4	0.831		

Source: Authors based on results obtained from SmartPls calculations

The evaluation of discriminant validity is the final step in the process of assessing the measurement model. It represents the extent to which a construct is distinct from other constructs by empirical standards. It aims to prove that the construct is unique and measures the intended phenomenon, not something else. To do this, we apply the Fornell and Larcker (1981) criterion, which states that a latent variable should explain more variance in its own indicators than the variance in other latent variables.

The AVE (Average Variance Extracted) of a latent variable should be greater than the square of the correlations between the latent variable and all other variables (Chin, 2010; Chin, 1998b; Fornell & Larcker, 1981).

The evaluation of the Fornell Larcker criterion with the square root of the AVE shows that all constructs exceed the correlations of these constructs with other latent variables in the conceptual model, indicating that all constructs are distinct.

Table 7 - Discriminant Validity Results: Root Square of AVE

Construits	Digitalisation	Managerial innovation	Crisis management	Resilience
Digitalisation	0.876			
Managerial innovation	0.636	0.866		
Crisis management	0.494	0.521	0.818	
Resilience	0.671	0.613	0.441	0.859

Source: The authors behind the results obtained from calculations using SmartPLS

In summary, the evaluation of the measurement model through the analysis of convergent validity and discriminant validity reveals that the measurement scales of the variables demonstrate significant levels of reliability and validity. This demonstrates that the prerequisites for ensuring the validity of the measurement model are met.

2.2. Assessment of the structural model

In this section, we analyze the validity of the structural model after evaluating the validity of the measurement model. At this stage, several parameters are assessed, including the testing of hypotheses, the coefficient of determination (R^2), predictive relevance (Q^2), and Goodness of Fit (GOF).

2.2.1. Testing the hypotheses of the structural model

The testing of hypotheses examines the significance of the structural relationships in the model. For this purpose, we relied on two criteria, namely the T statistic and the P-value.

According to the first criterion, T should have a value greater than 1.96 at a significance level of 5% to validate a relationship between two variables. On the other hand, the probability of error (P-value) for the second criterion indicates that a hypothesis can be accepted if the association between the two variables is significant at the 95% level. In other words, at the 5% level, the link is not statistically significant. Therefore, a hypothesis must be accepted if the P-value is less than 0.05. The results of the test of hypotheses are presented in Table 8.

Tableau 8 : Hypothesis testing

Hypothesis	The relationship between constructs	Correlation coefficient	Student-t	The P-value	Decision
H1	Digitalisation-> Crisis management	0.065	0.530	0.597	Rejected
H2	Managerial innovation-> Crisis management	0.290	2.778	0.006	Accepted
H3	Crisis management -> Resilience	0.454	5.802	0.000	Accepted

Source: The authors behind the results obtained from calculations using SmartPls

The results of the hypothesis tests for each of the relationships between the latent variables presented in table 8 indicate that H1 proposed the existence of a negative relationship between digitalization and crisis management, with a correlation coefficient of 0.065 and a significance level of 0.597, resulting in the rejection of hypothesis (H1).

Moreover, the results show the existence of a positive relationship between managerial innovation and crisis management ($\beta_1 = 0.290$). The Student's t-value shows that the latter is 2.778, which is greater than 1.96, and the p-value is less than 0.05, confirming the significance between the two variables. Hence, it can be concluded that hypothesis (H2) is confirmed.

As for H3, the obtained estimations show a positive correlation between crisis management and resilience ($\beta_2=0.454$). The examination of the t-value indicates that it is equal to 5.802, and the p-value is 0.000, showing the significance between the two variables. In summary, crisis management is positively and significantly influenced by managerial innovation during the COVID-19 pandemic (p-value $0.006 < 0.05$). Similarly, crisis management has a positive and significant impact on resilience (p-value $0.000 < 0.05$). Furthermore, digitalization has no significant effect on crisis management (p-value $0.597 < 0.05$).

2.2.2. Test of the overall quality of the research model

The second phase of evaluating the structural model involves assessing its overall quality using the following parameters: the coefficient of determination (R^2), the predictive relevance of the model (Q2), and the overall quality of model fit (GOF).

The values of the coefficient of determination R^2 represent the amount of explained variance of the endogenous constructs in the structural model. The precise interpretation of the R^2 value

depends on the specific research discipline. Generally, R^2 values of 0.25, 0.50, and 0.75 for target constructs are considered weak, moderate, and substantial, respectively (Hair, Ringle, and Sarstedt, 2011; Henseler et al., 2009).

In our case, the coefficient of determination (R^2) shows a value of 51.1%, indicating that the two variables (digitalization and managerial innovation) jointly explain, on average, 51.1% of the variation in crisis management in SMEs. Following the recommendations of Hair, Ringle, and Sarstedt (2011), we can conclude that there is a strong relationship between the two variables and crisis management. On the other hand, crisis management explains, on average, 24.4% of the variation in organizational resilience. This shows, according to the classification of Hair, Ringle, and Sarstedt (2011), a moderate relationship between crisis management and organizational resilience in SMEs.

In addition to assessing the magnitude of R^2 values as a criterion for predictive accuracy, researchers should also examine the Stone-Geisser Q^2 value (Geisser, 1974; Stone, 1974). This measure serves as an indicator of the out-of-sample predictive power or predictive relevance of the model. The results of our study indicate a substantial predictive power of the model with Q^2 values significantly exceeding the recommended thresholds ($Q^2 = 0.336 > 0$ and $Q^2 = 0.1036 > 0$), supporting the claim that our research model has adequate predictive capacity.

The last indicator is used to measure the overall quality of the model. Therefore, Wetzels, Odekerken-Schröder, and Van Oppen in 2009 provided criteria for GOF to determine whether the GOF values are not suitable, small, moderate, or large enough to be considered as a valid global PLS model. The closer this index is to 1, the better the model fits the data. Wetzels et al. (2009) suggest that values of 0.10, 0.25, and 0.36 indicate weak, moderate, and strong fit, respectively. The results show that the goodness-of-fit index (GOF) is 0.614, which is significantly higher than the threshold value of 0.36, confirming the overall quality of our model. The results of the three indicators are presented in the table below:

Tableau 9 : Adjusting the global model

Variables	R^2	Adjusted R^2	Prédicative Relevance Q^2	GOF
Crisis management	0.511	0.495	0.336	0.614
Resilience	0,244	0,212	0,103	

Source : The authors behind the results obtained from calculations using SmartPLS

3. Discussion of the results of the hypothetical model:

This section discusses the various elements that were previously engaged by comparing them to the existing literature. The discussion will start with an analysis of the direct structural relationships (hypotheses) that have been established. We will then proceed to discuss the results of each hypothesis, carefully comparing them to previous research.

After conducting tests concerning the impact of digitalization and managerial innovation on crisis management, and subsequently their relationship with the resilience of SMEs during the pandemic, we have been able to draw conclusions that underpin this research. The first result indicates that digitalization did not have a significant impact on crisis management, and therefore, on the resilience of SMEs in the greater Agadir area (Hypothesis 1). These findings confirm the claims made by Tajer et al. (2022) who state that the use of technology has been found to have no significant impact on crisis management. On the contrary, Benyacoub and Hadj Ali (2021) arrived at contrary results, suggesting that digitalization is essential for Moroccan organizations and businesses, playing an important role in protecting against an epidemic by effectively countering the virus and managing the crisis.

Regarding managerial innovation, the analysis of the structural link (Managerial innovation -> Crisis management) revealed a significant relationship between managerial innovation and crisis management (Hypothesis 2). Our results align with previous studies conducted by Lengnick-Hall and Beck (2005; 2009) and Hamel and Välikangas (2003), who asserts that "the company must be able to act and imagine innovative solutions in the face of unusual situations."

Lastly, we observe a strongly significant relationship between risk management and the resilience of SMEs (Hypothesis 3). This confirms the findings of several researchers who have demonstrated that risk management ensures the resilience that a company needs to gain a competitive advantage through its ability to avoid, contain, defend, react, and adapt to any form of disruption while recovering quickly (Somers, 2009; Gatzert and Martin, 2015; Eshima and Anderson, 2017; Yang et al., 2018; Rehamn and Anwar, 2019; Tajer et al., 2022). Our results also align with research conducted on the actions and reactions of companies faced with unexpected turbulence, which emphasized the mechanisms underlying resilience capacity (Lengnick-Hall and Beck, 2005; Weick and Sutcliffe, 2007; Hollganel et al., 2009).

Conclusion:

This study analyzed the impact of digitalization and managerial innovation, mediated through crisis management, on the resilience of SMEs in the Greater Agadir region during the Covid-19 pandemic. Our empirical results confirmed all hypotheses except one, indicating that digitalization did not have a significant impact on crisis management and, consequently, on the resilience of SMEs.

However, the analysis established a significant relationship between managerial innovation and crisis management, suggesting that managerial innovation enables SME leaders to be reactive and adapt to the volatility of their environment, making it a source of resilience for businesses. Additionally, the results revealed a strongly significant relationship between risk management and the resilience of SMEs in the Greater Agadir region during the Covid-19 pandemic.

As with any research work, our study has limitations. Methodologically, the small sample size may have contributed to the rejection of certain hypotheses, preventing the generalization of our results. Furthermore, some companies declined to participate in our survey, which limited our ability to increase the sample size. The proposed research model also overlooks other variables that may be crucial in the study, such as leader characteristics, organizational learning, and governance mechanisms of SMEs, which can significantly impact crisis management and, consequently, SME resilience.

Our study paves the way for further research due to its limitations. Future researchers may address the constraints outlined here to complement our research. We suggest that future studies focus on expanding the sample size to generalize the findings and include additional variables that can enrich the research model. Additionally, taking into account cultural and contextual specificities related to SMEs in the Greater Agadir region can provide valuable insights.

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