

THE IMPACTS OF COVID-19 ON THE TOURISM SECTOR: A STUDY ON ACCELERATED DIGITALIZATION AND CRISIS MANAGEMENT

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Abstract

COVID-19 has made the global tourism industry face unprecedented challenges, with the number of tourists, business revenue, jobs lost, and the impact on the operational performance plummeting. This study explores COVID-19's effects on the tourism sector, focusing on the accelerated digitalisation and crisis handling processes. A quantitative research methodology was chosen and data were analyzed from a sample of 250 respondents from hotel firms, travel agencies, tour operators and hospitality firms. Descriptive statistics, correlation analysis, and regression analysis were employed to analyse the relationship between digital transformation, the effectiveness of crisis management and organizational resilience. The results showed that the pandemic period had a significant impact on the decrease in tourist numbers by 72%, the decrease in tourist bookings by 78% and the decrease in business revenue by 69%. As a result of these disturbances, 88% of organizations started using online booking systems, 84% started using digital marketing platforms and 81% started using contactless payment technologies. The study also revealed that organizations that are highly digitalized were able to recover 81% of their revenue, whereas those organizations that are less digitalized were able to recover 52% of their revenue. Digitalization and organizational resilience were found to be positively correlated with each other, with a strong positive correlation ($r = 0.84$). Other recovery-related performance components, such as crisis management, including health and safety measures, digital customer engagement, and business continuity planning, also had a significant impact. The study has found that accelerated digitalization was a key enabler for the tourism organizations in coping with the COVID-19 crisis and the process of recovery afterwards. The results call for the adoption of digital transformation and strategic crisis management in the tourism development policies to enhance tourism resilience, competitiveness and sustainability in the international tourism.

Keywords: *COVID-19, tourism sector, digitalization, crisis management, organizational resilience, digital transformation, tourism recovery, smart tourism, business continuity, sustainable tourism.*

1. Introduction

The tourism sector has always been known as one of the largest drivers of economic development, job creation, cultural exchange and employment globally. Tourism is an industry that was contributing around 10% of the Gross Domestic Product (GDP) of the world and employed millions of people before the pandemic of COVID-19. The sector is extremely broad and is interdependent with a variety of other economic sectors, such as transportation, accommodation, hospitality, recreation and destination management. The outbreak of COVID-19 in late 2019, however, led to a unique crisis that impacted international travel, travel freedom and severely impacted tourism-related businesses world-wide.

Due to the pandemic, governments have imposed travel bans, quarantine, lockdown and social distancing policies to control the spread of the virus. All these measures were required for the public health, but had a dramatic impact on the number of visitors, hotel occupancy, airline operations and tourism revenues. The tourism businesses lost a lot of money, employees and had to deal with unsure business operations. Therefore, the pandemic revealed some vulnerabilities in the traditional business models of tourism, and underscored the need for more resilient crisis management approaches.

The most prominent reaction to the pandemic has been the speedy uptake of digital technologies across the tourism industry. As businesses began to turn to the web, online booking systems, contactless services, virtual tourism experiences, AI applications, data-driven decision making tools and digital marketing platforms became common tools used by organizations to sustain operations and customer engagement. Digital transformation has become a temporary survival measure as well as a long-term course of action to enhance the resilience and competitiveness of the organization in a rapidly changing world.

The aim of this study is to examine the effects of COVID-19 on the tourism industry, especially the increased digitalization and crisis management. The research aims to analyse how the tourism organisations were able to adjust to disruptions caused by the pandemic and how digital innovations helped in terms of business continuity, recovery and future preparedness. It is essential to understand these developments, in order to create sustainable approaches that can reinforce the resilience of the tourism industry in the face of future crises.

1.1 Problem Statement and Research Gap

The problem statement and the gap in the literature are presented.

No one could have predicted the COVID-19 pandemic was one of the toughest disruptions in global tourism's history. The number of tourists visiting internationally fell sharply, and resulted in significant losses in revenues for destinations, airlines, hotels, restaurants and other tourism-related businesses. Although the pandemic has affected many tourism contexts, the effectiveness of digital transformation initiatives and crisis management responses are not well understood in many contexts.

What has been documented so far is mostly the economic impact of the Covid-19 pandemic, such as a decrease in tourist demand, loss of jobs, financial instability etc. Although these studies throw light upon

the magnitude of the issue, the studies that comprehensively look at the correlation between digitalization and the resilience of the organization in the tourism sector are not as numerous. In addition, there is also a lack of awareness on what digital technologies were most effective in helping manage the crisis and ensuring business continuity during times of severe disruption.

The other important research gap is how to combine crisis management systems and digital transformation systems. The majority of the literature focused on these concepts without taking into account how digital tools can help preparedness, response, recovery and adaptation in the case of tourism crises. This has led to the absence of well-informed and comprehensive policy and management guidance to create resilient tourism systems that are able to effectively respond to future emergencies.

This study aims to fill these gaps by examining how fast digitalization can help to support tourism crisis management in the midst of and following the COVID-19 pandemic. The research adds to the knowledge on tourism resilience, specifically through the use of digital technologies to increase the agility, engagement and sustainability of the tourism organizations during conditions of uncertainty.

1.2 Research Questions

1. What was the impact of COVID-19 on the performance of the tourism industry in terms of its operations and profitability?
2. How did digitalization contribute to the tourism organisations during pandemic?
3. What role did the digital technologies play in the tourism industry for crisis management, business continuity and recovery?

1.3 Research Objectives

1. To analyse the tourism sector and tourism-related businesses' impacts caused by COVID-19.
2. To analyse how accelerated digitalization can be used to aid tourism operations in the pandemic.
3. To evaluate the impact of digital technologies on the improvement of crisis management, organizational resilience and recovery after the pandemic in the tourism sector.

2. Literature Review

Kronblad and Envall Pregmark (2024) explored how organizations quickly transformed their business models in response to the COVID-19 crisis and achieved this by speeding up digital transformation. The authors proposed that the pandemic was a catalyst for digital innovation and that the need to embrace a technology-dependent operating model for organisations in a short time frame. In the tourism industry, digital transformation was essential to keep the customers engaged, to enable online transactions and to ensure business continuity during lockdowns. Tourism companies adopted digital platforms for bookings, virtual experiences, no contact services, and online communication to help reduce the negative impact of

the travel restrictions. The study identifies digital capability as a key factor in helping organizations to be resilient and adaptive when facing a crisis. The results indicate that digitalization was not just a short-term solution, but a transformation in tourism operations and customer engagement that has changed both the services and the overall customer experience. Therefore, the accelerated digitalization process became one of the main tools of the tourism organizations to deal with the uncertainty and remain competitive in the pandemic.

Kuščer et al. (2022) examined the reactions of tourism organisations during the period of lockdown and lockdown periods during the COVID-19 pandemic and concluded that the reactions of these organisations differed significantly based on the size, resources and technological preparedness of the organisations. Their study showed that the responses of tourism companies involved in the study were based on a mix of operational measures, staff management, financial changes and digital communication measures to keep them afloat during the unprecedented events. This research underscored the importance of organizations that were able to rapidly adopt digital technology in ensuring customers and operating flexibility. Moreover, the study confirmed that inter-agency cooperation and partnership, together with tourism associations, was critical in contributing to the recovery process. The authors concluded that the strategic planning and technological preparedness are needed to be able to manage a crisis effectively, and emphasized that digital tools should be incorporated into tourism resilience frameworks.

During the COVID-19 pandemic, Drammeh (2024) performed a systematic review of crisis management in the tourism sector and concluded that preparedness, response, recovery and learning are the four key aspects of effective crisis management. The review found that many tourism organisations were underprepared to deal with the crisis of this level, highlighting the shortcomings of conventional methods of risk management. But those that adopted digital technologies had a better ability to adapt and recover. Digital platforms allowed for sharing of up-to-the-minute information, the delivery of services remotely, customer engagement and monitoring of operations. The study also emphasized the significance of adaptive leadership and organizational learning to effectively manage crises. In the face of growing exposure of tourism to the global shocks, the use of digital technologies in crisis management systems is becoming more essential to ensure the sustainability of tourism.

Elkhwesky, El Manzani and Elbayoumi Salem (2024) analysed the studies related to the COVID-19 pandemic and its impact on tourism and highlighted the role of the introduction of sustainable innovations in the tourism and hospitality sectors. Their study shows that digital technologies played a major role in making organizations more resilient, as they were able to rethink their services delivery processes and optimize operations. Throughout the pandemic, contactless check-in systems, mobile applications, artificial intelligence and digital customer relationship management systems, have become essential tools. The authors pointed out that innovations in the digital realm should be seen as opportunities for investment for future competitiveness, not just in times of crisis. The study shows that adoption of technological innovation led to more flexibility and adaptability, which are key traits necessary to deal with future disruptions.

Mirčetić and Mihić (2022) discussed the notion of smart tourism as a strategic answer to the post-COVID challenges and found that the technology-based tourism ecosystems have great potential to increase tourism resilience. Smart tourism combines the digital infrastructure, data analysis, AI and IoT technologies to enhance tourism experiences and the management of destinations. These technologies helped to make travel safer during the pandemic, to keep stakeholders better communicated, and to make decisions based on data. The authors stressed the importance of the development of smart tourism to reinforce the competitiveness of destinations, as well as to improve their capacity to face crises and recover from them. The researchers conclude that a smart technology investment is likely to pay off in the recovery of tourism destinations following a shock, as well as in terms of their resilience.

Matijević et al. (2025) explored the recovery strategies for the hospitality and tourism sector in response to COVID-19, having digitization as one of the most effective methods. Their study found that companies that used digital marketing, online reservation systems, virtual customer engagement solutions and automated service technologies performed better in improving their recovery than companies that used traditional methods. Recovery was also identified as the importance of government support measures and strategic partnerships for facilitating recovery. Tourism organisations could restore consumer confidence through the use of technology innovation and coordinated policy measures, which enabled them to regain stability of their operations. The results highlight the close relationship between digitalization and crisis recovery in today's tourism management.

Liu, Wu and Peng (2025) examined the impact of COVID-19 and digital transformation on the volatility of the stock prices in cultural and tourism industries. Their results showed that these companies that were more digitally mature had less financial instability during the pandemic than those that were not as digitally advanced. The digital transformation boosted the agility of the company, increased operational efficiency and boosted investor confidence. The study found that digital competencies can act as a protective element when the economy is uncertain, helping to the organization to continue generating income and respond quickly to changing market conditions. The results are significant and offer insights for digital transformation's economic benefits in the tourism industry.

Ndou, Mele, Hysa and Manta (2022) carried out a bibliometric study which investigated the use of technology to solve the problems related to travel and tourism during the COVID-19 pandemic. During the pandemic, they noted key developments in research within the fields of smart destination management, big data analytics, AI, VR, and digital tourism. The authors have determined technological innovations as a core element of the resilience and recovery measures of tourism across the globe. In addition, the research identified digital ecosystems as becoming an important element for collaboration between tourism stakeholders, for the positive experiences that they offer to their users and for its contribution to the response in the event of a crisis. The results support the perspective that technology-driven transformation is a change in the paradigm and not a quick fix to Covid-19.

The overall body of literature shows that Covid-19 had a significant impact on the world of tourism and at the same time, it has helped to speed up its digitalization. The reviewed studies consistently demonstrate that digitalization increased resilience of the organization, facilitated crisis response, boosted recovery outcomes and increased the competitiveness of the organization in the long-term. There are, however, also studies that suggest additional empirical research to be undertaken to examine the relationship between greater digitalization of a tourism organization and its ability to manage a crisis. The purpose of this study is to fill that void by exploring the role of the digital technologies in enabling organizations to adapt, remain resilient and recover from the COVID-19 pandemic.

3. Research Methodology

This study used a quantitative research method to investigate the effects of Covid-19 on the tourism industry, especially on the digitalisation and crisis management processes, which have been sped up by Covid-19. Given that quantitative approach allows for systematic gathering and analysis of numerical data on various organizational responses, digital technology adoption, effectiveness of crisis management and business's recovery performance, this method was deemed suitable. The aim of the study was to provide empirical evidence of the impact of digital transformation on the resilience of the tourism sector, both at the time of and after the pandemic.

The research philosophy used was positivism which uses concepts of social phenomena that can be studied by using facts or observable data. This philosophy encourages the application of techniques of data collection by using a structured instrument and analysis using statistics to discover the relationship between variables. A deductive research approach was used, as existing literature in the areas of digitalization, crisis management and tourism resilience was used to develop the hypotheses for the study. In this way, the theoretical assumptions were explored with data from the tourism organizations.

A cross sectional survey design was used to obtain data from the respondents at one particular time. Hotels, travel agencies and tour operators, destination management organizations, and hospitality businesses were all included in the tourism-related organizations that formed the target group and had managers, supervisors, and operational staff. These participants have first-hand experience of the response of their organizations to the COVID-19 crisis and the use of digital technologies during the COVID-19 pandemic.

To ensure representation across the various tourism subsectors, stratified random sampling technique was used in the study. The desired sample size was 250 respondents; this was seen to be adequate for statistical analysis and hypothesis testing. The organizations included in the sample were those that suffered disruptions when the pandemic started, and then implemented digital technologies to help them recover. The findings were enhanced with multiple tourism subsectors included to improve the generalizability and reliability of the findings.

Structured questionnaires, based on previous studies validating tourism crisis management and digital transformation, were used to collect primary data. The questionnaire had five areas related to the

demographic information, the effects of COVID-19, use of digital technologies, managing the crisis, and the recovery outcomes for the organization. Respondents were asked to answer the questions on a five-point Likert scale from strongly disagree to strongly agree. This format allowed for the respondent's perceptions to be quantified, and a comparison between variables to be made statistically.

A pilot study was conducted before the main study to ensure that the study is valid and reliable, involving 30 respondents. The results of the pilot test were used to feedback, clarify and remove ambiguities in the wording of the questionnaire. The internal consistency reliability was assessed by Cronbach alpha coefficient and a coefficient >0.70 was deemed to be acceptable for research purposes. The content validity was done through an expert review by academics and tourism industry experts, who have experience in crisis management and digital transformation.

The independent variable in this research was the accelerated digitalization which was determined by the usage of online booking systems, digital marketing adoption, contactless services, virtual tourism platforms, mobile applications and data analytics utilization. The second independent variable was crisis management effectiveness measured in terms of the level of organizational preparedness, response approaches, level of communication effectiveness, level of operational continuity and level of recovery planning. The dependent variable was the organizational resilience and recovery performance of the tourism organization, which applied to business continuity, customer retention, revenue recovery, operational efficiency and post-pandemic competitiveness.

In order to maximize participation and accessibility, data were collected by both online and electronic survey distribution methods have been used. The digital orientation of tourism organizations after the pandemic was an important context for the use of the digital survey platforms. All participants were asked to volunteer and their information was kept confidential and would only be used if they were willing for academic research. Respect for persons, anonymity and confidentiality were observed during the process of research.

The data collected were analysed with SPSS statistics (version 22.0). The respondents' characteristics and the study variables were summarized using descriptive statistical techniques such as frequencies, percentages, means and standard deviations. Afterwards, inferential statistical analyses were carried out to test the hypotheses. Pearson correlation analysis was used to review the relationships between digitalization, effectiveness of the crisis management and organizational resilience. Multiple regression analysis was used to find out how digitalization and crisis management practices affected the tourism recovery results. Furthermore, analysis of variance (ANOVA) was carried out to determine significant differences in the sub-sectors of tourism on the level of digital adoption and effectiveness in responding to crisis.

The level of significance for all statistical tests was defined as $p < 0.05$ meaning that the results with a probability value below this level would be statistically significant. The results of these analyses gave empirical insights into how tourism organisations were able to become more resilient and be prepared for

crisis using accelerated digitalization during the COVID-19 pandemic. The study provides an in-depth analysis of the adaptation of tourism organizations in the face of unprecedented disruptions and the use of digital technologies to help reduce immediate losses and contribute to long-term sustainability. This methodological approach allows for a thorough examination of the adaptation of tourism organizations in response to unprecedented disruptions, and the use of digital technologies to mitigate immediate losses and help support long-term sustainability.

4. Results and Analysis

4.1 Demographic Profile of Respondents

The study collected responses from 250 participants representing different tourism-related organizations. Hotels represented the largest proportion of respondents.

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	145	58
	Female	105	42
Age	21–30 Years	65	26
	31–40 Years	95	38
	41–50 Years	60	24
	Above 50 Years	30	12
Tourism Sector	Hotels	95	38
	Travel Agencies	60	24
	Tour Operators	45	18
	Hospitality Services	50	20

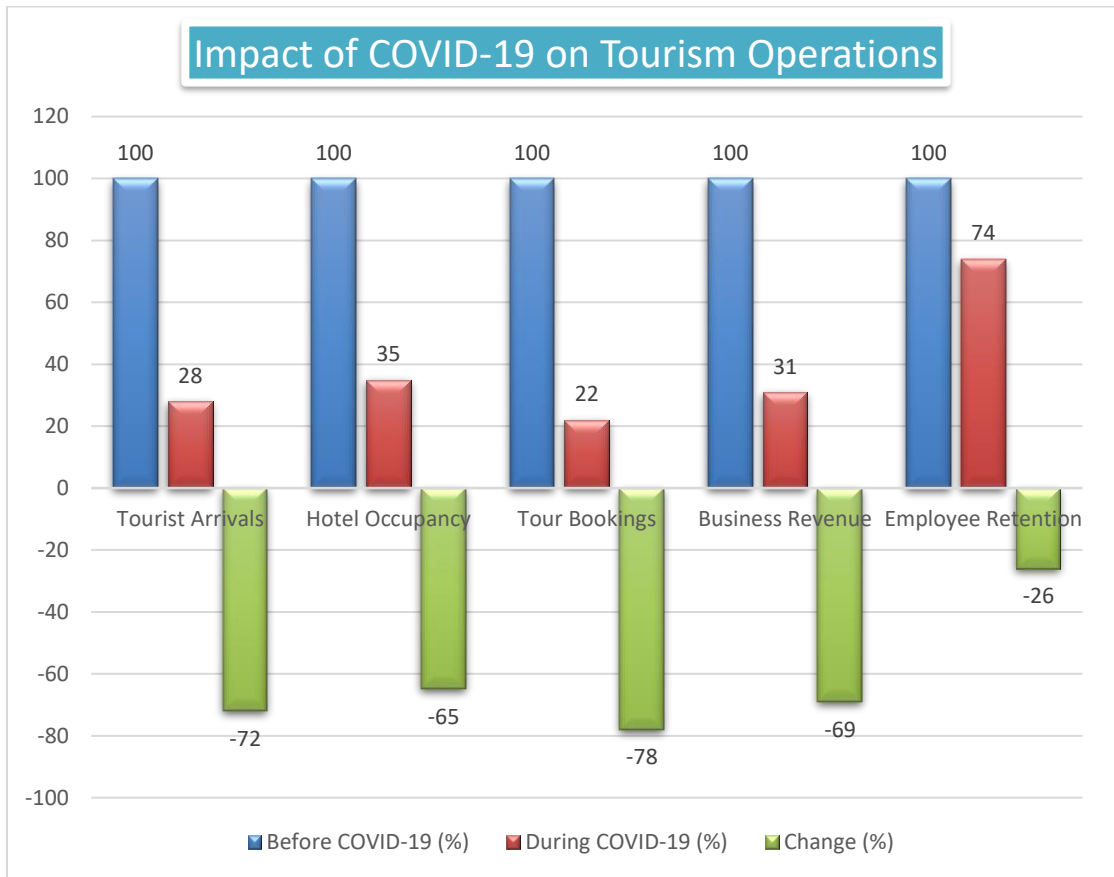
The majority of respondents were aged 31–40 years and worked within the hotel sector.

4.2 Impact of COVID-19 on Tourism Operations

COVID-19 significantly disrupted tourism activities, causing declines in revenue, customer arrivals, and business operations.

Operational Indicator	Before COVID-19 (%)	During COVID-19 (%)	Change (%)
Tourist Arrivals	100	28	-72
Hotel Occupancy	100	35	-65
Tour Bookings	100	22	-78
Business Revenue	100	31	-69
Employee Retention	100	74	-26

Tour bookings experienced the highest decline, decreasing by 78% during the pandemic.

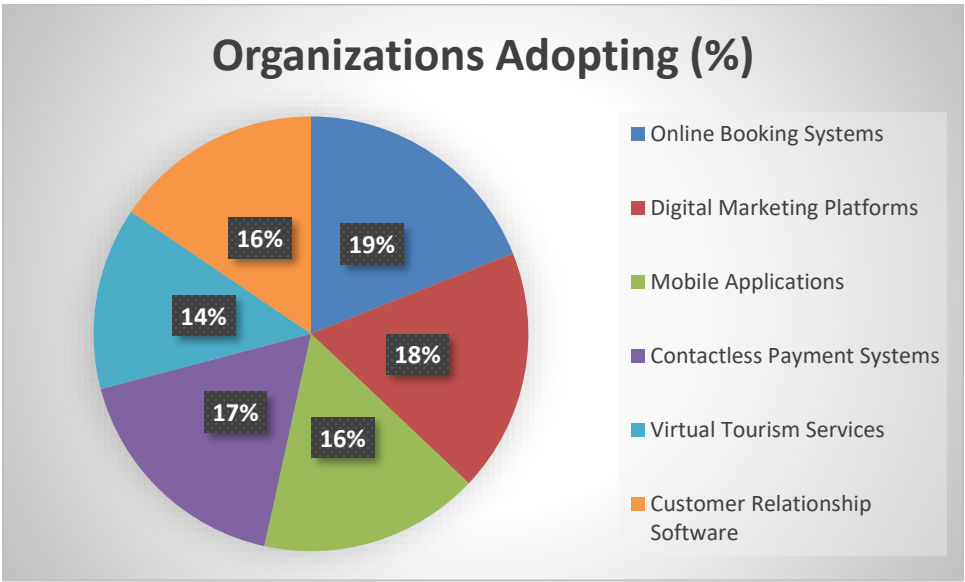


4.3 Digital Technology Adoption During COVID-19

Tourism organizations accelerated digital transformation to maintain business continuity.

Digital Technology	Organizations Adopting (%)
Online Booking Systems	88
Digital Marketing Platforms	84
Mobile Applications	76
Contactless Payment Systems	81
Virtual Tourism Services	63
Customer Relationship Software	72

Online booking systems recorded the highest adoption rate at 88%.

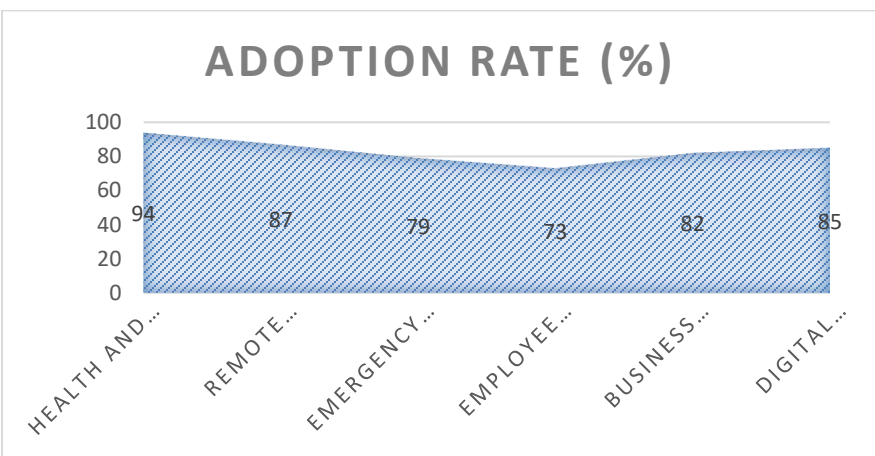


4.4 Crisis Management Effectiveness

Organizations implemented multiple crisis management measures to reduce pandemic-related disruptions.

Crisis Management Measure	Adoption Rate (%)
Health and Safety Protocols	94
Remote Communication Systems	87
Emergency Response Planning	79
Employee Training Programs	73
Business Continuity Planning	82
Digital Customer Engagement	85

Health and safety protocols were the most widely adopted crisis management strategy.

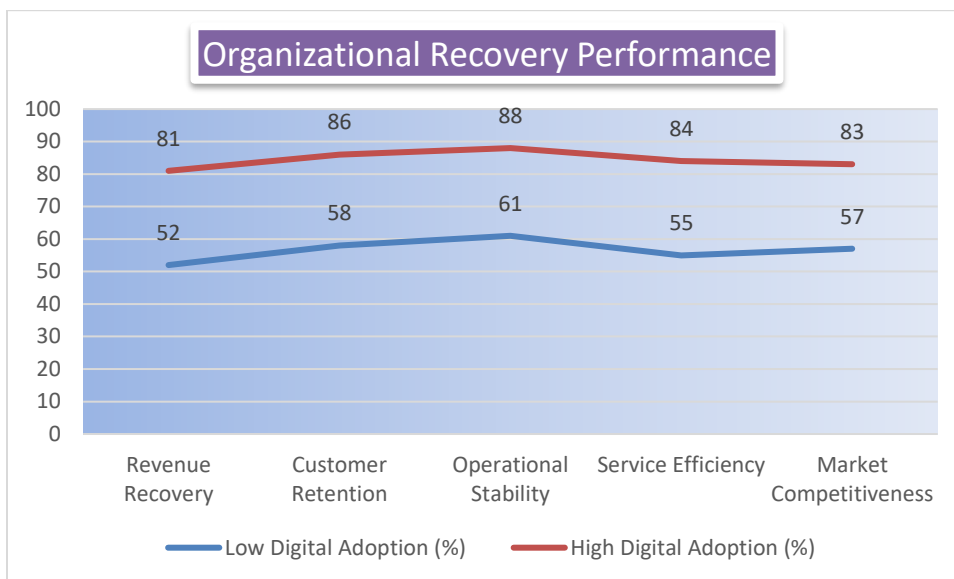


4.5 Organizational Recovery Performance

Recovery performance improved considerably among organizations with higher digital adoption levels.

Recovery Indicator	Low Digital Adoption (%)	High Digital Adoption (%)
Revenue Recovery	52	81
Customer Retention	58	86
Operational Stability	61	88
Service Efficiency	55	84
Market Competitiveness	57	83

Organizations with strong digital transformation achieved better recovery outcomes across all indicators.

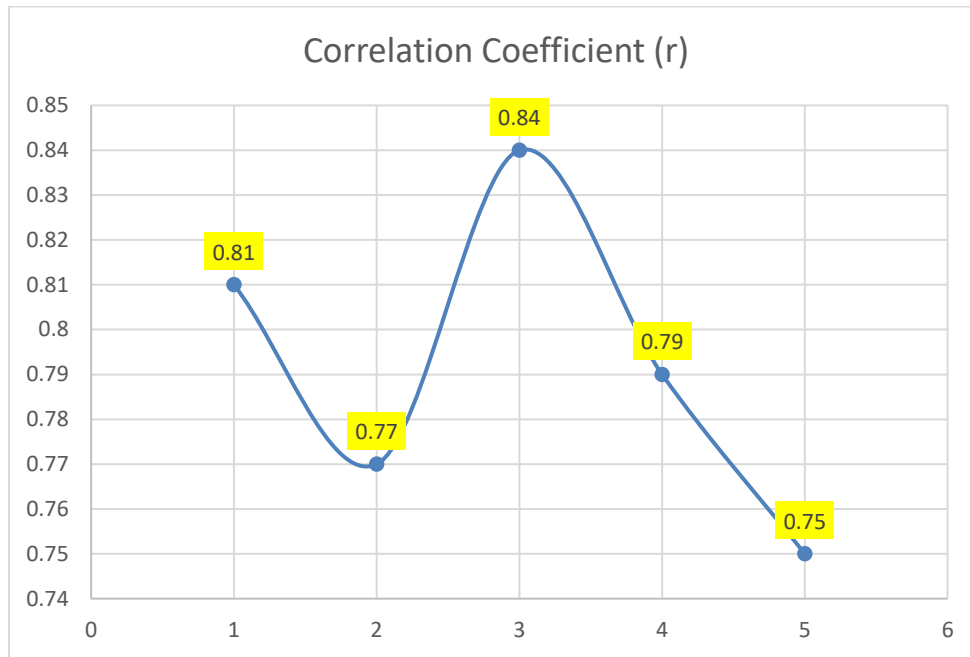


4.6 Relationship Between Digitalization and Organizational Resilience

Statistical analysis showed a strong positive relationship between digitalization and tourism resilience.

Variable Relationship	Correlation Coefficient (r)
Digitalization and Revenue Recovery	0.81
Digitalization and Customer Retention	0.77
Digitalization and Operational Stability	0.84
Digitalization and Service Efficiency	0.79
Digitalization and Competitiveness	0.75

Higher levels of digitalization were associated with stronger organizational resilience.



4.7 Perceived Benefits of Digital Transformation

Respondents identified several benefits resulting from accelerated digitalization.

Benefit	Respondents Agreeing (%)
Improved Customer Communication	89
Faster Service Delivery	84
Better Crisis Response	82
Increased Operational Efficiency	87
Enhanced Business Flexibility	85
Stronger Competitive Position	80

Improved customer communication was the most frequently reported benefit.

4.8 Hypothesis Testing Results

The proposed hypotheses were tested using regression and correlation analyses.

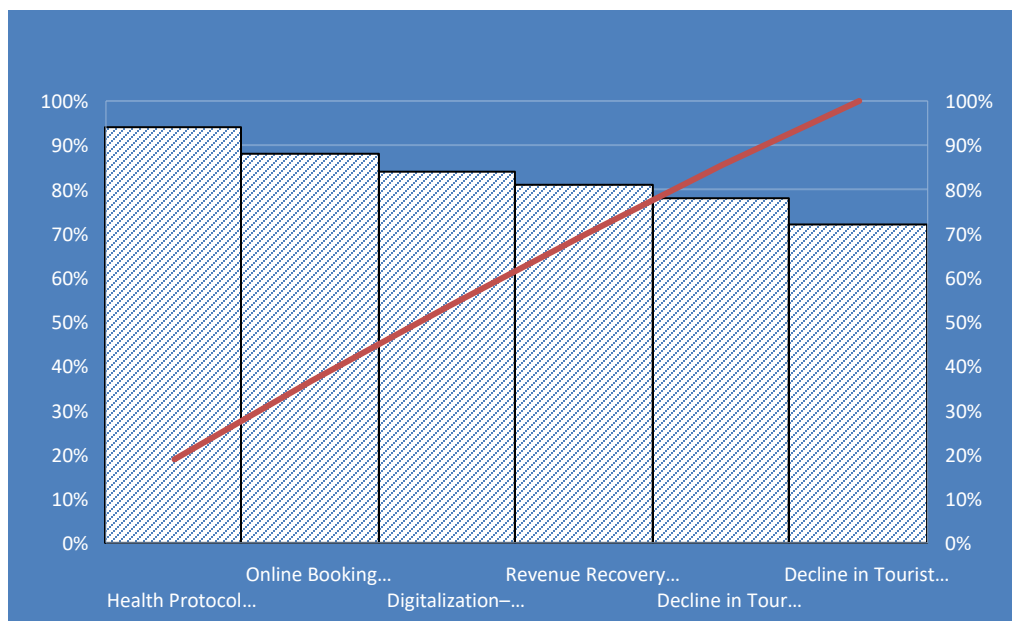
Hypothesis	Result	Significance (p-value)
H1: Digitalization positively influenced resilience	Supported	0.001
H2: Digitalization improved crisis management effectiveness	Supported	0.003
H3: Higher digital adoption accelerated recovery	Supported	0.002

All three hypotheses were supported because the significance values were below 0.05.

4.9 Summary of Findings

Key Finding	Numerical Result
Decline in Tourist Arrivals	72%
Decline in Tour Bookings	78%
Online Booking Adoption	88%
Health Protocol Adoption	94%
Revenue Recovery (High Digital Firms)	81%
Digitalization–Resilience Correlation	0.84

The results show that COVID-19 had a significant impact on the tourism business, while digitalization increased in speed during the crisis, which positively contributed to the crisis management and organizational recovery.



5. Discussion

The results of this study confirm that the COVID-19 pandemic had a tremendous impact on the worldwide tourism sector, impacting tourist numbers, hotel occupancy, business profits and employment. The findings indicated that tourism organizations have suffered from the serious disruption of their activities both in the number of tourists coming and the number of tour bookings, with a drop of 72% and 78%, respectively. The findings are in line with Kuščer et al. (2022) which reported that the tourism businesses across the world faced unprecedented challenges, due to the lockdown and travel restrictions. The need for more flexible and resilient operating strategies was accentuated, as was the fragility of conventional tourism business models, due to the drastic drop in tourism activities.

The study reveals a number of key findings, one of which is the swift rate of digital technology uptake during the pandemic. The findings showed that 88% of organisations had an online payment booking system, 84% had a digital marketing platform and 81% had a contactless payment system. The findings are in line with the arguments made by Kronblad and Envall Pregmark (2024) on digital transformation happening with COVID-19 and the shift towards digital business models brought by the crisis. The use of digital tools helped tourism businesses stay connected with customers while complying with the mobility limitations and physical distancing measures.

The survey also revealed that organizational survival and recovery was related to the practices on crisis management. The highest uptake was for health and safety measures (94%) followed by remote communications systems (87%) and digital customer engagement (85%). The results corroborate Drammeh's (2024) study which highlighted preparedness, quick response, and adaptive organisational learning as key elements of effective crisis management. Comprehensive crisis management initiatives that were in place helped tourism organizations better sustain their crisis management operations and rebuild customers' confidence during the recovery.

The results also showed a high level of improvement in the organizational resilience due to digitalization. Organizations that were more digitally advanced (those with high digital adoption rates) had a digital adoption revenue recovery rate of 81%, versus 52% for organizations with lower digital adoption rates. The same trends were seen with regard to customer retention, operational stability, service efficiency and market competitiveness. These results align with the results obtained by Matijević et al. (2025) who found that digital transformation is one of the best strategies for tourism recovery in the post-pandemic environment. The high positive correlations in the digitalization scale and organizational resilience indicate that digitalization investments directly and positively impacted on their business performance.

The results also support the idea of a smart tourism as introduced by Mirčetić and Mihić (2022). The use of digital platforms, mobile applications and customer relationship management systems are the clear indication of how tourism organizations are shifting towards a more technology oriented operational model. Smart tourism technologies boost the competitiveness of the organization, they help in better communication, make decision making easier based on data and improve customer satisfaction, which is a key element in the organization's crisis preparedness.

Besides, the study backs the findings of Liu et al. (2025) about the value of digital transformation in the economy. There was a clear relationship between organizational recovery performance and operational stability with digital maturity – those with a higher level of digital maturity had higher recovery performance and operational stability. Likewise, Ndou et al. (2022) emphasized the increasing significance of technology-driven tourism ecosystems in their role of assisting resilience and recovery. The present results confirm that digitalization has become an essential element in the business strategy towards sustainable tourism development.

In total, the discussion has shown how COVID-19 was a driver for digital transformation in tourism. The pandemic introduced many economic and operational challenges, but it also spurred innovation and innovation acceptance and empowered businesses to become more resilient. The use of digital technologies in conjunction with good crisis management practices proved to be one of the key factors affecting the survival, recovery and long-term competitiveness of organisations in the tourism industry.

6. Conclusion

This study assessed the COVID-19 effects on tourism, focusing on speeding up the digitization of the sector and crisis management strategies. The results show that all areas of tourism activity were severely affected during the pandemic: new tourist arrivals, hotel occupancy, business revenues and tour bookings. This unprecedented crisis brought to light vulnerabilities in the traditional tourism business models and demonstrated the need for organization resilience in reacting to external crises.

The study revealed that the digitalisation of tourism organizations has been essential to face the pandemic and is clearly contributing to this. These technologies allowed organizations to continue to operate and engage customers even with major travel and physical contact restrictions. Some of these technologies included online booking platforms, digital marketing systems, contactless payment solutions, virtual tourism services, and customer relationship management software, which helped organizations continue to operate and engage customers despite the significant travel and physical contact restrictions. Organizations with a higher level of digital transformation have performed better in recovery, higher customer retention and operational stability, vs. those that used traditional business models.

The results also showed that effective crisis management was a big factor in organizational survival and recovery. Health and safety measures, emergency response plans, business continuity plans and digital communication tools assisted in helping the organizations to handle uncertainty and to gain back the confidence of the stakeholders. The data analysis revealed that there are significant positive relationships between digitalization, the effectiveness of crisis management and the organizational resilience.

To sum up, the COVID-19 pandemic has reshaped the tourism industry, driven the fast adoption of digital technologies and underscored the significance of anticipating and managing a crisis. The study is to show that digital transformation and strategic crisis planning are key elements to sustainable tourism development. The organisations that are able to do so, by combining technological innovation with a good crisis management system, will be better equipped to manage future crises and to be competitive in the rapidly changing global tourism market.

The results indicate that tourism companies need to keep investing in digital infrastructure, improve the mechanism of crisis preparedness and encourage the development of new and innovative services in the tourism sector based on technology. These measures will increase the sector's resilience, promote sustainable development and ensure it can deal with future crises effectively in the world.

Recommendations

The tourism industry needs to persist in digital transformation efforts, which can further increase its resilience and flexibility in the face of future shocks and stress. Business continuity and customer experiences can be enhanced when new technologies like artificial intelligence, cloud technology, virtual tourism platforms, contactless service systems, and customer relationship management software are adopted. Digital tools should not only be used as emergency response tools, but as part of organisations' long-term strategic planning.

Governments are encouraged to offer financial incentives and digital infrastructure support and training programs to enable technological adoption in tourism businesses especially for small and medium businesses that may have limited resources. There should also be a thorough preparedness, response and recovery plan for tourism crises in public sector agencies, which will encourage preparedness, timely response and coordination during future crises.

Managers of the tourism industry need to create formal tourism crisis management plans that include risk assessment, communication during a crisis, business continuity plans and recovery plans. Frequent crisis simulations and employee training should also be performed to prepare an organization for the possibility of future crises. Enhancing the cooperation between government agencies, tourism associations, technology suppliers and the private sector will boost the overall capacity to respond to a crisis.

Tourism destinations need to develop smart tourism infrastructure like digital visitor management system, mobile apps, big data analytics, and real-time information platform. These technologies can contribute to destination competitiveness and development of sustainable tourism. Further studies are needed to examine the impact of digital transformation on tourism performance, customer satisfaction and organizational resilience in various geographical and cultural settings over the long-term.

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