



Sustainability Versus Digitalization: A Dilemma¹

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Abstract

This paper examines the key factors that influence how businesses manage digital transformation, focusing on an approach that prioritizes sustainability and integrates digitalization around this central theme. This study utilized an exploratory qualitative method. A multiple case study pattern was preferred as the method of inquiry. It combined various data collection techniques, with semi-structured interviews serving as the main source of data. Additional data were gathered through literature reviews, business documents, and online applications, which served as secondary sources. Data were collected using the criterion sampling method. Data were analyzed using a thematic approach. The findings indicate that the dynamism and conversational structure of digital networks have enhanced the role of customs as stakeholders in the digital transformation process while also boosting sustainability awareness. Additionally, it was found that digitalization offers benefits such as increased profits, improved competitiveness, bigger market share, enhanced quality of goods, and better corporate reputation. It also provides opportunities to analyze and apply new ideas, thereby supporting sustainable efforts.

Keywords: Digitalization, sustainability, tourism, business model

Jel Codes: O32, O33, Q5, Z32

Sürdürülebilirliğe Karşı Dijitalleşme: Bir İkilem Özet

Bu çalışmada, sürdürülebilirliğin merkezde olduğu ve dijitalleşmenin bu temel merkez üzerine yapılandırıldığı bir yaklaşımla, işletmelerde dijital dönüşüm sürecinin yönetiminde etkileşimin yönünü belirleyen kritik noktalar araştırılmaktadır. Çalışmada araştırma yöntemi olarak keşifsel nitel yaklaşımla çoklu vaka çalışması deseni tercih edilmiştir. Karma veri toplama tekniği benimsenerek, birincil kaynak olarak yarı yapılandırılmış görüşme tekniği ile elde edilen veriler, ikincil kaynak olarak da literatür taramasıyla elde edilen veriler, işletmelerle ilgili dokümanlar ve çevrimiçi uygulamalar kullanılmıştır. Veri toplamak için ölçüt örnekleme yöntemi uygulanmıştır. Veriler tematik bir yaklaşımla betimsel analiz edilmiştir. Bulgulara göre dijital ağların dinamik ve etkileşimli yapısının, dijital dönüşüm sürecinde müşterilerin paydaş rollerini güçlendirdiği ve bu dijital ağların desteğiyle sürdürülebilirliğe ilişkin farkındalığın arttığı tespit edilmiştir. Ayrıca dijitalleşmenin kâr, rekabet, pazar payı, mal ve hizmet kalitesi ve kurumsal itibar açısından avantajlar sağladığı ve yeni fikirleri test etme ve uygulama fırsatı sunarak sürdürülebilirliği sağladığı belirlenmiştir.

Anahtar kelimeler: Dijitalleşme, sürdürülebilirlik, turizm, iş modeli

Jel Kodu: O32, O33, Q5, Z32

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1. INTRODUCTION

Digitalization is a key element for sustainability in businesses (Farias and Cancino, 2021). As businesses try to balance their growth goals with the need to be sustainable, the role of digitalization in this balance becomes even more important (Capgemini, 2021). The digitainability research conducted by the Bonn Alliance for Sustainability Research (BASR) focuses on the intersection of digitalization and sustainability. This study seeks to explore how digitalization influences sustainable development. The goal of digitainability is to identify the ways in which digital advancements can support sustainable practices. It is crucial to determine whether digitalization has beneficial or detrimental effects on sustainable development. There is a belief that digitalization can greatly enhance the achievement of the United Nations Sustainable Development Goals (Bonnallience, 2022).

1.1 Motivation

Existing forms of digitalization can accelerate economic and social inequalities, and sometimes their environmental costs can outweigh the benefits. As businesses increasingly recognize the importance of sustainability, it becomes essential to effectively manage the digital transformation process with sustainability as a fundamental principle. Previous research has investigated the link between sustainability and digitalization in the tourism industry, highlighting the need to maintain a balanced relationship between these two concepts (Farias and Cancino, 2021; Bonnallience, 2022). However, this study goes further by investigating the key factors that influence how businesses manage their digital transformation while centering sustainability and using digitalization as a supporting element. It specifically examines the interplay between sustainability and digitalization, emphasizing that sustainability should be the focal point, with digitalization serving as a crucial component in this relationship. The following research questions were explored:

Research Question 1: From which perspective can we manage the digital transformation process and sustainability together?

Research Question 2: In what ways does digitalization affect the principles and innovations that support sustainability?

Research Question 3: Why should the sustainability principles be at the center of the digital transformation process?

Therefore, they were asked to describe their application, and these personal narratives were utilised to improve the SvD (Sustainability Versus Digitalization) Model, to describe the management of these two processes in a balance: digital transformation and sustainability, and to guide the configuration of an explanatory model revealing why sustainability should be at the core and digitalization should be structured on this core.

1.2 Contribution

The analysis of the participants' viewpoints and experiences revealed that the active and interconnected structure of digital networks bolstered the roles of customers as stakeholders in the digital transformation and heightened their mindfulness of sustainability. Furthermore, it was found that digitalization offers several benefits, including increased profits, enhanced competitiveness, a larger market share, improved quality of products and services, and a stronger corporate reputation. Managers are increasingly leveraging big data to address sustainability challenges, while digitalization fosters the creation of innovative sustainability policies. Additionally, it allows for the experimentation and implementation of new ideas that promote sustainability.

The relationship between digitalization and sustainability encompasses both advantages and disadvantages. When sustainability is prioritized in the digital transformation process, factors such as big data analytics, innovative strategies, the ability to experiment with new concepts, and the

benefits of digital networks can enhance the positive interactions between digitalization and sustainability within businesses. The study makes three valuable contributions to both digitalization and sustainability in tourism literature:

- introducing a new concept definition and categorisation by providing another viewpoint to the advances in the literature about the changes related to sustainability created by digital transformation.
- establishing a new definition of the factors that digitalization affects and the principles and innovations that support sustainability.
- adding a new strategy area (design & innovation) changed by digital transformation in tourism services to the Rogers' (2016) Model.

2. RELATED WORKS

2.1 Digitalization

Digitalization encompasses the transformation of activities involved in the planning, production, and distribution of goods and services (Kim et al., 2021: 3). From a technical standpoint, it can be described as the utilization of computer-based information and communication technologies to enhance, manage, and unify various processes, procedures, and product systems. More broadly, digitalization represents a significant shift in civilization, highlighting the growing influence of digital systems in every facet of information and daily life (Rammler, 2017: 159). Digitalization leads to significant changes in the dynamics of competition and rapidly differentiates traditional business actors and practices (ECLAC, 2022). Given the significant and swift advancements in digitalization, it is widely acknowledged that digital technologies are transforming business models (Reis et al., 2020; EPC, 2020; Hilali et al., 2020). Digitalization is dramatically altering how businesses operate within industrial value chains by leveraging IoT technologies, facilitating extensive data sharing, and employing predictive analytics (Parida et al., 2019). This transformation impacts not just the production and marketing strategies of businesses but also affects their workforce and the way consumers interact with these products (UNIDO, 2019). Furthermore, it introduces innovative methods for creating value for all stakeholders, making business models more inclusive (WEF, 2020). As digitalization radically changes the basic assumptions of lifestyles and business models in societies globally, it becomes more and more important for businesses to plan their digitalization actions quickly, efficiently, and appropriately in order to gain flexibility and maintain sustainable competitiveness (Gorensek and Kohot, 2019: 93). In addition, the fact that successful new technology applications will be followed by other businesses in a very short time can be evaluated as digitalization creates a competition based on speed in the adoption and application of new technologies (Knudsen et al., 2021).

The rapidly growing digital economy is defined by the rise of a platform-driven ecosystem that encompasses various digital products and services (UNCTAD, 2019a). Thanks to the possibilities offered by digitalization, it seems possible to produce higher quality goods at relatively lower costs (UNCTAD, 2019b). The digitization of services helps lower transaction costs in comparison to traditional methods, allowing consumers around the globe to access higher quality services at more competitive prices (UNCTAD, 2022). Digitalization affects all areas of social life. The rapid development in the field of hardware and software increases the speed of the evolution towards a digital society (Rappitsch, 2017). It plays an important role in accelerating the transition to sustainable economic models that will enable environmental and social transformation globally. Digitalization is anticipated to facilitate the adoption of more environmentally friendly business models and lifestyles, promoting sustainable patterns of production and consumption. It is believed

that digitalization can play a crucial role in counteracting the increasing trend of resource and energy use (EPC, 2020). Digitization also has a significant impact on logistics and buildings (IEA, 2017).

2.2 The Relationship between Digitalization and Sustainability

When evaluating digitalization in relation to environmental sustainability, it encompasses mobile technologies that facilitate the creation and implementation of sustainability solutions, such as artificial intelligence (AI), big data analytics, the Internet of Things (IoT), sustainable urban development, eco-friendly production, and pollution management. Regarding economic sustainability, it involves advancements in the circular economy and the digital sharing economy, along with sustainable production and infrastructure development. Additionally, addressing social sustainability requires a multifaceted approach to policy (Rosário and Dias, 2022). Digitalization plays an increasingly important role in the development of production towards environmental sustainability (Chen et al., 2020). Digital tools will facilitate the establishment of circular economies, significantly lower greenhouse gas emissions, encourage the use of renewable energy, and aid in the monitoring and protection of ecosystems (Messner and Schieferdecker, 2019). Digitalization plays a crucial role in achieving the United Nations Sustainable Development Goals (Bican and Brem, 2020; Rappitsch, 2017). Ekudden (2022) refers to digitalization as a “silver bullet” for reaching these sustainable development goals, as it provides social, economic, and environmental benefits that enhance efficiency, minimize waste, and pave the way for innovative solutions in emerging markets across all 17 goals set for 2030.

In the United Nations 2030 Agenda, it is underlined that digital transformation will enable businesses to contribute towards sustainable development goals (Camodeca and Almici, 2021). DIGITALEUROPE (2022a) emphasizes and promotes the importance of digital solutions in achieving sustainable goals. DIGITALEUROPE (2022b) states that digital technologies have enormous potential. Digital technologies increase the efficiency of operations through autonomous and connected vehicles as well as car sharing systems and digital energy distribution networks that contribute to reducing emissions from transportation. As a systemic enabling process, digitalization has high potential to improve the circular economy and contribute to sustainability (Gupta, 2019). Digitalization can accelerate the journey to circularity by scaling micro-solutions both globally and across industries and supporting attractive global circular business models (Jensen, 2022). In order to achieve this, a coherent and inclusive global digitalization effort is crucial. Digitalization aids in assessing and tracking sustainability initiatives, optimizing resource utilization, lowering greenhouse gas emissions, and enabling a more efficient circular economy. It also enhances innovation and fosters collaboration (Anderson and Caimi, 2022). To ensure that digitalization effectively supports the transition to a successful circular economy, it is crucial to adopt a design strategy that emphasizes multidimensional solutions involving all stakeholders.

Considering its transformative nature, it can be said that digitalization is a factor that can carry sustainability to different dimensions (Seele and Irina, 2017). Digitalization fosters ecological innovations that aid in sustainable development by minimizing environmental impacts and enhancing resource efficiency. As digitalization advances, it opens the door to numerous innovations that can support a sustainable future, particularly with the help of biotechnology and nanotechnology (ECLAC, 2022). Additionally, digitalization offers opportunities for improving environmental health by enabling prompt monitoring of urban climate conditions, noise pollution, and air quality. Tools like Breezometer and LuftDaten deliver real-time data on air quality at the city level (Gupta, 2019). Concerns and expectations for all dimensions of sustainability point to digitalization as a critical factor in achieving both global and business-based goals. WEF (2022) emphasizes the possibilities offered by creating the digital twin of cities. The simultaneous existence of the physical and digital model of the city results in the development of analytical insight and smart interventions. Digital

urban twins offer many alternatives to create a livable, suitable, and sustainable urban ecological environment.

Digitalization promises many opportunities to deliver value to society, the environment, and the economy through innovative products. In order to achieve these goals, digitalization is of great value in achieving the goals of meeting the needs in a sustainable manner in all industries. Considering the potential dangers that digitalization offers as well as the opportunities it offers in solving problems related to sustainability, it should be evaluated very sensitively in favor of a sustainable future. It should not be forgotten that one of the important dangers in the front of the global spread of the benefits of digitalization is the risk that the future of digitalization will be monopolized by a few global enterprises. The danger in question indicates that it is inevitable for all stakeholders to be involved and contribute to the global digitalization process with a fair digitalization policy. Structuring a global digital ecosystem to include all relevant stakeholders and ensuring that global principles for digitalization are determined in cooperation by all stakeholders seem to be a priority. Humans should be at the center of the collaborative digital design of the global digital ecosystem. Thus, digitalization will be able to progress into the future with a beneficial design in which positive approaches related to all dimensions of sustainability can be developed.

Digitalization has the power to have profound global impacts by creating opportunities for sustainable development and inclusive growth. But it also brings with it new threats and challenges (European Union, 2021). The global scenario for digitization seems to be developing differently from the default. Many countries have not benefited from transitions to a digitalization-based sustainable economy (Messner and Schieferdecker, 2019). Digitalization is a valuable tool to solve social, environmental, and economic problems. All arrangements should be made to support the positive separation of digital technologies and models that offer high social, environmental, and economic efficiency, especially in terms of resource use and outputs, from alternatives that do not. In the digitalization process, data seems to be an important problem area in terms of privacy and human rights. The need for a holistic policy approach for data is evident. Data-driven digitalization presents both global opportunities and challenges that necessitate international solutions to maximize the benefits and mitigate the downsides. To achieve the economic, social, and environmental objectives of the 2030 sustainable development agenda, it is essential to have effective global governance of data (UNCTAD, 2021). The digitization process results in a huge amount of hardware, including final digital products, data centers, networks, and infrastructures (devices that meet the cooling needs, uninterruptible power supply, etc.). All these physical products use enormous amounts of energy globally throughout their life cycle (Öko-Institut, 2019: 90). This process, which results in the intensive use of information technologies and digital devices, reveals extremely high energy costs as a serious problem. Therefore, it can be said that one of the most challenging areas in the equation between digitalization and sustainability is energy. This situation emphasizes the importance of using renewable energy sources in terms of both software and hardware and the development of digital infrastructure and devices that require low energy.

Digital products have a relatively short lifespan. As a result, it is important to thoroughly assess the environmental and social effects of digital technologies. Additionally, principles should be established based on a circular approach for digital products to ensure their economic viability and achieve a globally positive outcome (Berg et al., 2020). Although their economic and technical life is relatively short, studies on extending the product life cycles of digital products, which cause great resource consumption in their production, are of great importance. In addition, effective processes must be configured for the recycling of these devices. Designing hardware features and software algorithms to reduce energy consumption can be considered a valuable solution approach. On the other hand, the development of international agreements and applicable standards for digital device production is also critical. Digitalization offers significant opportunities in the security, efficiency,

effectiveness, and sustainability of global energy systems (IEA, 2017). Digital energy distribution is of great importance for energy efficiency and sustainable management (MASDAR, 2020). In order to reduce energy consumption, hardware and software structures should be designed to be energy efficient.

2.3 The Relationship Between Digitalization and Sustainability in Tourism Sector

Digitalization affects the tourism sector to a certain extent, as it does every sector. It is possible to observe the effects of digitalization on the tourism sector, especially in the marketing of tourism businesses or destinations and the restructuring of reservation systems. In such a period where the use of the internet and social media is inevitable and concepts such as artificial intelligence, augmented reality, and real-time data analysis attract the attention of the industry, tourism businesses and destinations have to take an important step in adapting and reshaping their touristic products in this context. The tourism sector, which is aware of the heavy consequences of falling behind this change in today's constantly developing and renewing world, must develop itself in parallel and adopt a structure that relies on innovation. The rapid advancement of technology is transforming even the most traditional markets and fostering more agile processes. In the tourism sector, the impacts of digitalization on sustainability can be both beneficial and detrimental (Miceli et al., 2021). Digitalization has the potential to influence the achievement of the United Nations' 2020 sustainable development goals and promote a fairer distribution of economic benefits derived from tourism (UN, 2020). However, there are concerns about how the integration of AI-driven solutions, enhanced virtual experiences, and social robots in the hospitality industry will affect interactions with customers and employees in the future (De Carlo et al., 2021). Digital transformation primarily allows for a clearer understanding and expansion of sustainable tourism practices (Liu and Mačerinskienė, 2016). Digital tools such as social media, chatbots, and digital assistants help spread information about various aspects of sustainable development in tourism. They also promote best practices in the field and support the advancement of sustainable development goals within the tourism sector (Saseanu et al., 2020). Perhaps the most basic effect of digitalization on tourists is that it facilitates access to information. With the effect of the internet and social media, tourists collect and share information about the destinations or touristic businesses they will prefer. The understanding of sustainable tourism is gaining importance day by day as a result of the acceleration of the green consumer understanding, the increase in the interaction between touristic businesses and tourists, the profitability brought by sustainable development, the suitability of large enterprises for sustainability studies, and the enlightenment on ethical issues (Weaver and Lawton, 2010). Sustainable tourism seeks to balance the growth opportunities of the tourism industry with the imperative of environmental protection (Lane, 1994). Digitalization has the potential to reduce the environmental impact of tourism by leveraging the advantages of the Internet of Things, data collection, analysis, and artificial intelligence applications. Additionally, virtual reality and augmented reality can actively promote the cultural heritage of tourist destinations. Digital advancements have also transformed consumer behavior related to accommodation services. According to Buhalis and Leung (2018), smart hospitality systems will offer personalized and context-aware services and experiences, placing customers at the forefront and enabling information exchange throughout the value chain. Furthermore, Ben Youssef and Zeqiri (2022) highlight that tourists will gain from a digital framework that allows for the exploration of various activities through digital technologies. Digitalization enables the development of more tailored and innovative services for travelers, addressing challenges like overcrowding, personalized experiences, and sustainability. In this regard, digitalization enriches the tourism experience for both current and prospective tourists (Stankov and Gretzel, 2020).

3. METHOD

In this paper, an exploratory qualitative approach was employed, and a qualitative multiple case study design (Creswell, 2007) was used. A case study (Trickett, 1984) conducts in-depth research based on data about an event, individual, or process (Creswell, 2007). The multiple case study design, in which several cases or events are examined, has all the advantages of the single case design in capturing real-world contexts, but by repeating the procedures across multiple cases, this replication increases the validity and generalizability of the findings (Galloway and Sheridan, 1993). Additionally, when analyzing and interpreting multiple case designs, each case should be viewed as an independent experiment rather than a single sampling unit, thus following the logic of recurrence (Yin, 1994).

3.1 Research Sample

In this section, information is given about the Case Studies selected as case studies in the survey, and their general characteristics are clarified as shown in Table 1. In addition, the main reasons for selecting the interview participants determined as the case study are defined. In this study, researchers interviewed a large number of tourism professionals (e.g., assistant general manager, general manager, training manager, facility operations manager, assistant manager, lecturer, tourism professional, human resources manager) serving in different areas of the tourism sector. The participants were selected because they are trained experts/senior executives from world-leader and innovator companies serving the global market. We also selected these interview participants in an effort to showcase the important issues that specify the aspect of interaction in governing the digital transformation process and sustainability policies in various tourism services. This is why a purposive or purposeful sampling strategy was adopted, pointing to what Aguinis and Solarino (2019) refer to as “elite informants.” Therefore, participants were asked to tell their practices, and these personal narratives were used to improve the SvD (Sustainability and Digitalization) Model to explain how to manage these two processes, digital transformation and sustainability, in balance and to lead the structure of an explanatory model that explains why sustainability should be at the core and digitalization should be based on this core.

In this paper, we used the criterion sampling method as the data collection method (Patton, 2015). It is one of the purposeful sampling techniques defined as follows: “The logic and power of purposeful sampling lie in selecting information-rich cases for in-depth study (Patton 2015: 264). Patton (2002: 238) indicates that criterion sampling includes checking and examining ‘all cases that meet some significant predetermined criteria’. The rationale of criterion sampling originates from choosing samples that meet significant criteria, which helps create independent, information-rich samples (Mathstopia, 2022). Sample size for qualitative research varies. Dworkin (2012) suggests that 5-50 interviews would be sufficient (Patton, 2002), while he suggests that there is no principle for the desired sample size. The main criterion for choosing interview participants was that they should be up-to-date on digital technology and sustainability processes and practices, have a comprehensive understanding of why and how sustainability should be at the core, and that digitalization should be based on this foundation (Bogner and Menz, 2009; Patton, 2018).

Table 1. Demographic Features of Participants

Participant Id.	Position	Experience	Business Type
P1	Assistant General Manager	20	Thermal Hotel &SPA
P2	General Manager	33	Thermal Hotel &SPA

P3	Training Director	10	Hotel Group
P4	Resort Operations Manager	27	Resort Hotel
P5	Assistant Manager	35	Provincial Directorate of Culture and tourism
P6	Academic Member (Professor)	34	University
P7	Tourism Professional	45	Travel Agency
P8	Human Resources Manager	9	Technology Systems Firm

3.2 Data Collection and Analysis Procedure

We used mixed data collection technique, including literature reviews, examination of business-related documents and online applications, and semi-structured in-depth interview technique (Brewer, 2000). It took place between September and December 2022. First, we began with a semi-structured interview phase. The previous studies were referenced in the development of interview questions (Nielsen, 2015; Rogers, 2016; Moodie, 2016; Glenn, 2007; Salvatore and Carmine, 2014; Hilali et al., 2020; Andrea, 2017). The research questions were organized according to the strategy areas changed by digitalization identified by Rogers (2016): customer, competition, data, and innovation. Moreover, three open-ended questions were designed to investigate the relationship between digitalization and sustainability. Data were analysed through the descriptive analysis technique. This analysis was carried out in four-stages (Yıldırım and Şimşek, 2018). These are creating a frame, analysing and processing the data in accordance with the thematic frame, explaining the results, and interpreting the results. During the data processing stage, the entire transcript (approximately 2000 words) was first printed. Then these were read, relevant findings were marked, notes were taken, and the data were transcribed. A thematic approach was taken for data analysis, based on a priori themes used in earlier literature (Creswell, 2007). In this study, Rogers' (2016) four basic strategy areas (customer, competition, data, and innovation) were taken as references to create interview questions. For this reason, these four strategy areas were taken as reference in establishing the thematic frame. Themes were determined to indicate the relationship and common aspects between the four strategy areas of Rogers (2016). During the data processing process, the data were then read, analysed and classified under 5 themes. In accordance with the created frame, non-significant and invalid data were chosen and excluded from the analysis due to misunderstandings (Yıldırım and Şimşek, 2018).

In the phase of determination of the results, data classified in accordance with the thematic frame were determined and promoted with quotes from the participant's respective statements. At this stage, the entire data set was examined well to check whether the data under the themes formed a significant whole (internal consistency) and whether all themes explained the data obtained in the study meaningfully (external consistency). Thus, the representativeness of the dataset in accordance with the themes was assessed. In the meantime, the opinion of another researcher experienced in qualitative data analysis was consulted to confirm whether the themes captured the data set sufficiently. Then, the descriptive analysis results were explained, assessed, and interpreted in the

light of the sources in the literature (Marshall and Rossman, 2006). Direct participant emphasises are also included. The following section shows how to manage digital transformation and sustainable development processes in balance and guide the creation of an explanatory model that explains why sustainability should be at the core and digitalization should be configured on this foundation. In line with previous research on digital transformation and sustainable development processes (Nielsen, 2015; Rogers, 2016; Moodie, 2016; Glenn, 2007; Salvatore and Carmine, 2014; Hilali et al., 2020; Andrea, 2017), four key strategy areas of digital transformation have been observed that drive the sustainable development process: customer, competition, data, and innovation. Additionally, new strategy areas of digital transformation were also found: Design & innovation. Quotes from interviews were used to explain the roles of digital transformation and sustainability in tourism service operations.

4. RESULTS: EMERGING THEMES

Five themes regarding the role of interaction in managing the digital transformation process within businesses that prioritize sustainability and position digitalization as a foundational element were examined. A brief overview of these themes is provided below, presented as direct quotes from participants.

4.1 Customer & Digital Networks

The following open-ended questions were asked to participants to define whether customers have an impact on businesses' sustainability commitments:

Do you think your customers are more sensitive to social and environmental impacts in the digital age? Can you explain with a few examples?

Do you think digitalization enables customers to become a dynamic network? Do you think this has an impact on the brand image of the business?

The majority of participants reflected on digital networks. For example, one participant's prominent opinions related to this question are given below:

I think visitors have been more sensitive to social and environmental impacts lately. In this context, there is a demand for environmentally sensitive and environmentally friendly businesses, and I witness that they show sensitivity in protecting the environment and nature. P5

This discourse resonates results from previous research. As the literature (ECLAC, 2022) suggests, digitalization strongly supports the idea that it is a factor that can carry sustainability to different dimensions. It promotes ecological innovations that contribute to sustainable development by reducing environmental impacts and optimizing resource use. As digitalization develops, it may be possible to realize many innovations that contribute to a sustainable environment with the contribution of biotechnology and nanotechnology. Also, the summary of the participant's thoughts about the impact of digitalization on customers to become a digital network and its impact on the brand image of the business are given below in their descriptive expressions:

Digitization enables our guests to come to a more dynamic network. When we announce changes, such as promotions and actions in our hotel, on social media, they also share them in their own groups. Therefore, it reflects positively on us and keeps our business dynamic. P2

"Visitors interact with each other by following social media closely and sharing their experiences and comments. Tripadvisor, Trivago, etc. Sites and comments on these sites play an important role in customer preferences. Yes, I think because the comments of the customers come to the fore in determining the preferences. P5

The analysis of participants' viewpoints and experiences revealed that the dynamism and interactive structure of digital networks enhance the involvement of customers as stakeholders in the digital transformation process. Additionally, these networks contribute to a greater awareness of sustainability, aligning with the findings of Rogers (2016). As he suggests, customers in today's digital landscape are active participants rather than passive consumers; they function as interconnected nodes within dynamic networks that influence brands, markets, and one another. Businesses must acknowledge this shift and adjust their approach to customers accordingly. They should comprehend how customer networks are transforming the marketing funnel, altering the purchasing journey, and creating opportunities for value co-creation with consumers. Additionally, he emphasized the importance of understanding five key behaviours - access, engage, customize, connect, and collaborate - that drive customer interactions and experiences in the digital realm. Companies need to harness these behaviours to develop innovative communications, products, or experiences that bring value to both the businesses and their customers (Rogers, 2016). This observation aligns with what UNIDO (2019) indicates, which is that digitalization alters not just the production and marketing activities of businesses but also impacts their employees and the manner in which consumers engage with these products. Similarly, as pointed out by IEA (2017), the digital world has three key elements: digital information (data), using data to generate useful information and insights (analytics), and exchanging data between humans and machines through digital communication networks. Participants supported this and stated that with digital transformation, customers can access sustainability-themed information more easily, and awareness has increased as the frequency of exposure to this information has increased remarkably. Extending this view, they stated environmental awareness of customers has increased with the effect of digital networks as a key impact of customers on businesses' sustainability commitments: They emphasized that the short and striking information flow that emerged thanks to mobile devices increased the spread and impact. In addition, this situation results in customers being exposed to intense information without time and place limits.

4.2 Competition & Profit

The following open-ended questions were asked to participants to identify how digital transformation affects the competitiveness of the enterprises:

Do you think digital transformation is advantageous in terms of increasing business profits and providing competitive advantage?

Do you think that digitalization provides advantages in terms of market share, quality of goods and services, and corporate reputation?

Findings from global research (Saseanu et al., 2020) suggest that access to information on tourism services has been effective in the digitalization of tourism, together with the effect of information technologies and the relationship between the online sales-buying process. Travel agencies, airlines, hotels, and other elements of the tourism industry are increasingly concentrating their efforts on gaining a competitive edge through the online aspects of their services, often at the expense of considerations related to their physical locations and the quality of service provided (Saseanu et al., 2020). Tourism professionals answer these questions with the following statements:

Its biggest advantages can be listed as increasing operational efficiency, providing data and data analysis easily, measuring consumer experience, and facilitating strategic decision making for managers. P4

Every digital investment and new application make a difference and add value to the business. For example, increasing internet speed in our hotel, offering an online check-in option, and offering online privileges with a loyalty card had a positive impact on the annual profit. P3

Participants' quotations have shown that digitalization has positive effects in terms of profit and competition. Participants stated that investments made for digital transformation provide significant returns in sustainability areas. The digitization of business processes reduces the consumption of paper, energy, and many other materials while reducing costs. While the decrease in unit costs positively affects the increase in profitability, digitalized processes also reduce total quality costs. Also, such views were strongly expressed by P4. He stated as key advantages of digital transformation and digitalization:

Digitalization contributes positively to corporate reputation and brand image in terms of ease and cheapness in distribution, more comfortable interaction with the consumer, instant response, attractiveness, access to global markets, always / continuous service, and instant sales. P4

According to UNCTAD (2022), as the digitization of services can reduce transaction costs compared to the analog world, it provides consumers worldwide with better access to quality services at a competitive price. Consistent with this research, this quotation points out that businesses gain advantages in terms of service quality and corporate reputation thanks to digital transformation. Increasing service quality, measuring consumer experience, and activating data collection, analysis, and processing activities provide significant added value. With the increase in the quality of decision-making, it increases the competitiveness and ensures the support of sustainability practices. The ability of businesses to configure their digital work culture will have a significant role in their competitiveness in the near future.

4.3 Data

The question below was asked to participants to determine how data impacts companies' commitment to sustainability in the digital age:

How do you use big data within the scope of social, economic, and environmental sustainability policies?

The following extract reflects how managers tend to utilise big data to clear up sustainability problems:

It is beneficial for the announcement and benchmarking of the activities of the institution in the fields of human, nature, environment, energy, and workforce, especially in the implementation of the sustainability policy. P6

We use it to appeal to target groups, uncover their tendencies, reach and touch them, identify their trends and develop new market strategies. P5

It is particularly useful for announcing and benchmarking the activities of the institution in the fields of people, nature, environment, energy, and labor in implementing the sustainability policy. P3

As Gupta (2019) suggests, digitalization provides opportunities for environmental health to facilitate timely monitoring of urban climate, noise pollution, and air pollution. Applications such as Breezometer and LuftDaten provide real-time information about city-level air quality. According to Ziyadin et al. (2019), another technological trend affecting the tourism industry is QR code applications that have emerged with mobile devices. This technology, which has an important place in event management, has brought many advantages by enabling the transfer of tickets from paper format to digital format. Thanks to the QR code, tickets cannot be imitated and duplicated (QR codes provide uniqueness), they are not lost or forgotten at home (all ticket data are stored in the "cloud", accessible from any device), and the need to wait at the box office for their purchase is eliminated. This situation also provides great convenience in terms of obtaining and analyzing data (Ziyadin et al., 2019). Similar to previous research, the fact that businesses have the infrastructure they need, especially for real-time data management, increases the quality of the information produced with the data and accordingly the information quality. As a result of the analysis of participant statements, it

was seen that managers tend to utilise big data to clear up sustainability problems. Participants stated that big data has critical value, especially in business development, consistent with Emek (2012). As he stated, QR codes also allow museums and art galleries to provide detailed descriptions of artworks without spending a lot of money. Museums use QR codes to offer their visitors a multimedia experience. In addition to the information about the artworks, the customer experience can be enriched by creating a data, picture, sound, or presentation environment in the exhibitions. Guided tours can turn into a video guided tour for the visitor. Traditional headset information systems can be supported with QR codes, and artworks can be animated with the help of videos. In addition, QR codes are used on cards in rooms, elevators, concierge desks, and message boards in accommodation establishments; tourists can be given tips on where to eat or events they might want to attend during their stay (Emek, 2012). Real-time monitoring and evaluation of regional data, as well as global and macro data, provide insight into the opportunities that can be created for sustainability. As Rogers (2016) suggests, in conventional businesses, acquiring data was costly, challenging to store, and often confined to separate organizational units. Managing this data necessitated the purchase and upkeep of large IT systems. In contrast, today data is generated at an unparalleled pace - not just by companies but by individuals as well. Furthermore, cloud-based storage solutions have become more affordable, accessible, and user-friendly. The main challenge now lies in transforming the vast amounts of data we collect into actionable insights.

4.4 Innovation

To determine how innovation in the digital age impacts companies' commitment to sustainability, the following questions were asked to participants:

What kind of innovations do you have in solving social and environmental problems with digitalization?

Regarding the types of innovation, nearly all of the managers identified the digitalization process as a driver of innovations.

We use thermal water instead of natural gas and coal for heating, LED bulbs for lighting, and inverter pumps for pumps. P2

Vehicle charging station, hybrid congress service, waste compost unit, regeneration unit, events with local associations. P3

Applications that will minimize the use of paper and printed documents (using QR codes, express check/in transactions, online surveys, CRM systems online personality test applications in recruitment, online trainings) 24 hours used against natural disasters, fire, etc. 360-degree high-definition motion-sensitive cameras broadcasting live, license plate reading systems, and remotely controllable lifeguard robots that we use in our bays. P4

Similar to previous research (EPC, 2020; Gupta, 2019; Rogers, 2016), we credit the results of this research to the need for companies to innovate in a fundamentally different way that emphasizes rapid experimentation and ongoing learning. Instead of primarily focusing on creating a final product, this method prioritizes pinpointing the right problem and then exploring, testing, and learning from various potential solutions. With digital technologies enabling quicker and easier idea testing, this innovative approach is vital for accelerating the introduction of new concepts to the market while reducing costs, minimizing risks, and enhancing organizational learning. In addition, participants have the opinion that the characteristics of the digitalization process are effective in innovations for sustainability purposes in support of previous research (Hilali, et. al., 2020; Parida et. al., 2019).. They underlined the importance of many tools, especially user and environment-friendly mobile applications that reduce energy consumption, that form the particles of a digital architecture.

4.5 Design & Innovation

To determine how innovation in the digital age impacts companies' commitment to sustainability, the following questions were asked to participants:

In your opinion, what kind of facilities does digitalization provide for businesses in terms of testing and implementing new ideas?

In the words of participants:

It provides agility in understanding consumer habits, preferences, and requests and responding to them. P3

The greatest convenience is that it can be applied regardless of time and place, it saves time and labor, and the application costs are low. P4

The application is practical. It is very easy to correct a mistake immediately. Updates can be made easily. It is possible to evaluate the returns in a very short time. It is easy to reach the mass in a shorter time and effectively. P5

Ability to follow the activities instantly. Checking whether the tasks are fulfilled, making simulations/predictions about the future, analyzing performances, etc. P6

These quotations are closely linked to the design approach. This design reflects an approach centered around one type of sustainability, emphasizing the key factors that support it. Evidence shows that digitalization has played a role in generating new sustainability policies through innovative practices. This aligns with earlier research indicating that digitalization also enhances innovation and collaboration. As Anderson and Caimi (2022) noted, for digitalization to effectively contribute to a successful change to a circular economy, it is crucial to adopt a design strategy that emphasizes multidimensional solutions involving all stakeholders. It has also been found that digitalization helps to increase the quality of sustainability practices by providing the opportunity to test and implement new ideas. Participants stated that it is possible to easily test sustainability ideas, models, or predictions of digital infrastructures due to the flexibility to make mistakes, low costs, time and space independent configuration, and ease of measurement. Moreover, we attribute P3's quotation to be closely linked to "customer & digital networks" and "innovation", which are another theme of the roles that digitalization provides for businesses in terms of commitment to sustainability. Conversely, the mentioned findings are also valuable in terms of new business model designs. This new era, in which the role of the customer is redefined, the power of digital networks is constantly increasing, real-time data analysis gains importance, profit and competition are seriously affected by digital transformation, and innovation approaches add value to sustainability also presents opportunities for the design of new business models as well as points out new threats. There are supporting references indicating that digital technologies and the rise of new disruptive threats are transforming business models and processes. The digital revolution has turned the old business playbook upside down (Rogers, 2016).

5. Conclusion, Discussion and Implications

The analysis of participants' viewpoints and experiences revealed that the dynamism and interactive structure of digital networks enhance the role of customs as stakeholders in the digital transformation process and boost awareness of sustainability supported by these networks.

Furthermore, it was found that digitalization offers several benefits, including increased profits, improved competition, bigger market share, better quality of goods, and a stronger corporate reputation. It was also noted that managers are increasingly leveraging big data to address sustainability challenges and that digitalization plays a key role in developing new sustainability policies through innovation. Additionally, digitalization facilitates the improvement of sustainability

practices by enabling the testing and implementation of new ideas. The relationship between digitalization and sustainability involves both benefits and challenges. When sustainability is prioritized within the digital transformation process, it enhances the positive interaction between the two, particularly using big data, innovative methods, the ability to analyze new ideas, and the benefits provided by digital networks. This research contributes to the existing literature in three significant ways regarding the direction of interaction in managing digital transformation in businesses that place sustainability at their core, with digitalization supporting this focus. First, it introduces a new definition and classification of terms, offering a fresh perspective on how digital transformation influences sustainability. Second, it defines the parameters by which digitalization impacts the principles and innovations that promote sustainability. Third, it expands upon Rogers' (2016) Model by incorporating a new strategic area that has evolved due to digital transformation in tourism services. Furthermore, by creating the Sustainability Versus Digitalization (SvD) Model, this study not only enhances theoretic understanding but also provides essential business strategies for tourism companies to effectively balance digital transformation with sustainability efforts.

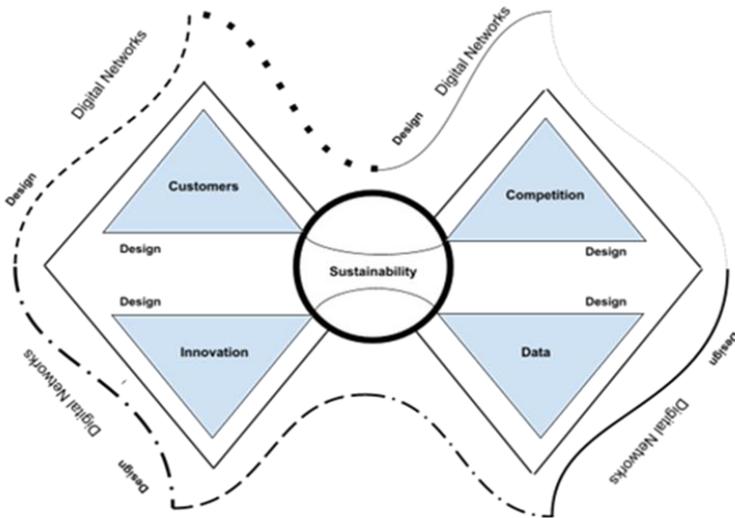
5.1 Theoretical Implication

A significant contribution to the literature from the results is the introduction of a unique strategic area, which is Design & Innovation, to the framework proposed by Rogers (2016). Digital networks primarily enable the redefinition of the role of the customer within the scope of new business approaches. At the same time, it is of great importance for businesses to produce their own digital network structures and present them in the right networks. It should be noted that there are many different digital networks, and the number of connections determines the value of these networks. While the number of connections increases the value of the network, it brings the problem of visibility for those who connect to the network. For this reason, businesses should do the necessary work for network-visibility optimization. The design & innovation dimension, along with its original value, is included in the four dimensions in the model and affects them. For example, businesses may prioritize real-time data analysis in system design for data management. Or they may prefer to work with innovative stakeholders in the design of a new business model. On the other hand, they can design a network that will test new ideas digitally.

This new dimension obtained as a result of the research provides a configuration (design) and stay connected support for other dimensions through the customer & digital networks dimension. The most important issue for a new business model aimed at achieving sustainable and digital transformation will be to stay in touch with all stakeholders. The design & innovation dimension will ensure that all stakeholders and dimensions are networked in the design of the model in question. Below is a suggested model that includes the new dimensions that we obtained as a result of our research. Model SvD (Sustainability Versus Digitalization) is structured as a model in which all dimensions are combined and the basic qualities of interactions are emphasized. Model SvD is basically based on an approach where sustainability is the core, that is, at the center of the whole design idea. Based on the basic approach of Rogers (2016), customers, competition, innovation, and data interact with sustainability. Each dimension is connected to the sustainability center (SC) as an open system, that is, it affects and is affected. For example, data conveys to sustainability management (SM) how the innovation aspect of competition affects the customer. This information is processed in real time to put sustainability at the center of the SM design and used to improve decision quality. All this real-time streaming results in the impact of digital networks on the design of sustainability. This effect also applies to other dimensions. SvD basically sees digital networks that define the framework of digitalization and express digital transformation at the limits of this interaction. In Model SvD, digital networks expressing the limits of expansion are expressed with lines of different nature. This is because there are many different types of digital networks (in short, a network that includes all stakeholders; for example, digital energy distribution networks or digital

networks between customers and businesses). Businesses have to make the best decisions in the selection and management of these digital networks. SvD has a design where innovation is important and every component is influenced by real-time information flow. SvD covers digital transformation applications that enable the evolution of every component at the micro level. At the macro level, there are digital networks that determine the limits of digital transformation. SvD emphasizes that sustainability should be at the center of the design of all development caused by the mentioned real-time digital network data and micro-digital transformation. This point of view suggests that a digital transformation in which the design is sustainability-oriented will increase competitiveness by providing innovative customer satisfaction.

Figure 1: SvD (Sustainability Versus Digitalization) MODEL



Source: Developed by researchers.

5.2 Managerial Implications

The model we developed is a valuable guide for managers and practitioners of SvD accommodation services. The SvD model provides a valuable framework for appropriately managing the elements that influence the balance between digitalization and sustainability. SvD also expresses how digital transformation will be effective in the design of all dimensions in the development of new business models. Using Model SvD, managers and practitioners can design a digital transformation with sustainability at its core. We think that a new dimension (design & innovation) we have presented to the literature as a result of research findings and the model we have presented (Model SvD) will make an important contribution to the success of managers and practitioners in accommodation services in the development of micro and macro-scale digital transformation in a balanced manner with sustainability efforts.

6. LIMITATION AND FUTURE RESEARCH

This study has three main limitations that future research should address. These:

a. Literature: The literature review of the study includes the present literature existing up to the completion date.

b. Research Sample: The number and qualifications of the research sample can be defined as a constraint. The research was carried out with a total of eight participants who are tourism professionals. Although the participants have different qualifications representing various parts of the sector, the majority are from the accommodation sector and thus deal with only one industry (especially providing tourism services) and one cultural setting. Findings may not be seamlessly transferable to other service providers and countries.

c. The Conceptual Model: The proposed model is a conceptual model created according to the literature and research findings. The empirical research has not been carried out to test the model.

Regarding the above-mentioned limitations, the following can be suggested for future studies:

a. Literature: Considering that digital transformation is inevitable and developing rapidly, future research can be expanded and updated to cover the developments in this field in practice and in the literature.

b. Research Sample: Future attempts can be carried out with more participants of different qualities (transportation, entertainment, etc.) representing other parts of the tourism sector.

c. The Conceptual Model: Future research may take systematic empirical research to test the model in a quantitative aspect. By using quantitative techniques, it should be useful to test how effectively this model could be transferred into practice in tourism businesses. It is suggested that this analysis will contribute to the promotion of the model as it is open to improvement.

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