



## Research article

# Digital transformation as the driving force for sustainable business performance: A moderated mediation model of market-driven business model innovation and digital leadership capabilities

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## ABSTRACT

Global organizations are still facing challenges in achieving sustainable performance despite the surge in digital technologies. It is imperative that firms invest in digital capabilities to secure sustainable market performance in the face of a barrage of novel inventions. Today, ensuring a resilient future demands business to focus on digital ambidexterity capabilities (i.e., exploitation and exploration), digitalized strategy adoption, and digital transformation. This study investigates the intricate dynamics between digital capabilities and digitalization strategies and their impact on sustainable business performance. The research employed a questionnaire-driven methodology to gather data from managerial personnel within industries. Results show that digital exploitation and exploration capabilities significantly enhance sustainable business performance. The research also establishes the beneficial effect of adopting a digitalization strategy on business performance and innovation. Market-driven business model innovation emerges as a critical factor, not only driving sustainable performance but also serving as a mediating link between various digital strategies and business success. Moreover, the study highlights the importance of digital leadership capabilities, further strengthening the relationship between innovative business models and sustainable performance. The findings underscore the synergistic effect of digital competencies and strategic digitalization in promoting sustainable and innovative practices in today's digital-driven business landscape.

## 1. Introduction

Today, the changing business environment suggests firms evolve with new developments [1,2]. The novel digital expansions driving the market basics have raised multiple problems for global industries. Brenner and Hartl [3] claim that organizations operating in such volatility today lack defined digital capabilities and strategies, and because of this, embracing sustainable performance has become a challenge for most firms [4]. Hence, this study is innovative and encourages organizations to jump onto the bandwagon of digital transformation to secure sustainable business performance, which is the prime objective of the study.

As organizations have developed rapidly, digital transformation has become a vital tool for achieving sustainable success [5]. Busulwa [6] states that digital transformation empowering firms with new infrastructure and capabilities confirms the firm's

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sustainable performance. The firms cautiously moving towards digital ambidexterity capabilities mitigate market uncertainties by exploiting and exploring the firms' technological structure. Digital exploitation capability refers to firms' ability to re-design their current business process with novel technologies [7]. Digital exploitation capabilities help companies pursue sustainable performance [8] by updating the current business practices, such as IT skills, knowledge, and practices. Information and communication technology enables firms to process their capabilities, complementing their sustainable performance [9]. In recent years, integrating digital exploitation and exploration capabilities has become increasingly crucial for businesses' long-term survival. Levinthal and March [10] define digital exploration capability as the firm's ability to adopt new models, resources, and knowledge to improve the firm's process. This proactive approach leads firms to adopt innovative practices, which are the fundamental promoter of sustainable performance [11] and business model innovation [12].

Nowadays, new technologies are being used by companies to respond to these changes. To operate in the digitalized business market, Mikalef et al. [13] argue that new growing opportunities of digitalization have made businesses develop and recognize the market-driven data culture. The dominant way of dealing with market changes is to exploit new opportunities that allow firms to dig into innovation [14]. Market-driven business model innovation is an adaptive development that passively transforms the business assets, thus making the firms meet the market demand [15]. Market-driven model innovation refers to designing and managing the innovation process that captures the potential audience's needs [16]. It makes firms resource decisions that validate the needs of the targeted customers [17]. In particular, market-driven business model innovation is the continuous improvement of the firm's innovation process. The firm can adjust to the dynamic business world [18]. Fundamentally, it captures the onset of developments by creating value for customers. Value is derived from the stakeholder needs and market conditions. Where the digital transformation integrating the technology provides value to the stakeholder, an effective digitalized strategy [19] requires the firms to embrace technologies, supporting the firms' sustainable performance [20] at all business levels. Today, to meet the needs of today's stakeholders, a more strategic approach is needed to achieve sustainable performance. The digitalized strategy has gained much attention concerning enhanced innovation potential and sustainable performance [21].

Digital leaders play a paramount role in executing the firms' strategic plan. Effective digital leadership makes individuals identify and realize the customers' needs through the effective and efficient use of digital technology [22]. Digital leaders help firms evaluate the market portfolio that drives business innovation and sustainable performance [23]. In today's world, digital leaders lay the foundation for digital transformation, allowing them to reap sustainable performance benefits. With this, the digital leadership capability is all about creating an environment needed for digital transformation [24]. Digital leadership capability refers to a leader's ability to steer firms' business innovation with digital tools [25]. Digital leadership capabilities allow firms to embrace innovation by encompassing profound digital skills and competencies. These capabilities include proficiency in digital literacy, strategic thinking, adaptability, etc. Leaders with such capabilities deeply understand the role of evolving technologies in firms' decision-making, business models, and agility [26].

Bacca-Acosta et al. [27] assert that the technological paradox has become wilder and more versatile than ever. This research deficiency suggests that modern organizations embrace the recent advancements to achieve firms' sustainable performance [28,29]. The purpose of this study is to address this research gap by investigating an integrated set of digitalized factors which result in the sustainable performance of firms. In light of dynamic capability theory, this paper examines the relationship between digital ambidextrous capabilities (i.e., digital exploitation and exploration capabilities), digitalization strategy adoption, and digital transformation with sustainable business performance. Furthermore, it inquires the mediating role of the market-driven business model innovation and the moderating role of digital leadership capability nexus to firms' sustainable performance.

A new perspective on digitalization is presented in the following study. This study provides insight into the topics that require immediate scholarly attention. As the market needs of the business world are changing, the lack of understanding about digital transformation suggests the importance of superior IT initiatives for securing the firm's sustainable performance [30]. Previous studies have raised the importance of digitalization and technological innovation [31,32]. This study is vital in helping firms meet the needs of potential market participants. As far as we know, this is the first study to explore the mediating and moderating mechanisms between market-driven business model innovation and digital leadership capabilities. This model is relevant in today's digital economy as its findings help businesses innovate regularly, thus gaining sustainable business performance.

This study offers contemporary implications for global scholars, practitioners, policymakers, and organizations. Considering the positive role of the dimensions of digitalization, the study advised the management to configure digital resources and competencies to achieve sustainable business performance. In summary, the study outcome and findings on the key concept of digital transformation and innovation serve as a valuable resource that offers insight to individuals concerning the firms' long-term stability. Overall, the study encourages organizations to apply the lessons learned from this study and suggests they create an environment that prioritizes the benefit of digital capabilities and facets in achieving sustainable performance.

## 2. Theoretical background and hypothesis development

### 2.1. Theory of dynamic capability

As the heart of the dynamic resource-based capability theory, it is essential to explore how companies develop and alter their capabilities to achieve sustainability. To address this question, this study incorporates the theory of dynamic capabilities. Dynamic capabilities theory is the firm's ability to integrate, build, and reconfigure internal and external competencies concerning the rapidly changing environment [33]. The dynamic capabilities help the firm strategically transform its business function, thus achieving sustainable performance.

Considering the conceptual distinctiveness of this model, studying factors under this theory can help firms utilize the resources that can drive high business performance and innovation. The organization must create, extend, and upgrade digital capabilities to meet the customer demand for innovation. Innovation is the prime need of today's firms. Creating innovation requires organizations to develop distinctive resources, competencies, knowledge, and technology [34]. One of the driving forces of innovation and sustainable performance is the firm's digital capabilities, and it must develop them to adjust to the changing needs of the related markets.

This theory is well suited to examine the cause of digital transformation, market-related business model innovation, and ambidexterity capabilities. Over the years, exploration and exploitation capabilities have gained considerable interest. As the dynamic capability theory suggests, firms must recognize the business assets and capture the innovation opportunities [35]. This theory helps to understand the concept of ambidexterity directly by making us explore both the exploitation and exploration capabilities, especially regarding innovation. Taken as a whole, the digital factors examined in the light of this theory provide a window into the linkage between the digitalized strategy adoption, digital transformation, market-driven business model innovation, and firms' sustainable performance. These factors allow the firms to adjust their resource base after sensing the market needs. Overall, the concepts studied in this study provide a new perspective to the stakeholders concerning collaborated digital possibilities and their impact on firms' sustainable performance.

## 2.2. Digital exploitation capabilities

In recent years, digital technologies, such as big data, artificial intelligence, and blockchain technology, have broken all records [36]. These proficiencies in every business area have changed the way organizations operate. The unpredictable changes that are becoming more dynamic today demand businesses to exploit business opportunities with novel digital tools. Enhancing the opportunities digital technologies offer requires firms to exploit and evolve their resources [37]. The capabilities of digital exploitation that optimize firms' resources with technologies ensure the firms' sustainable growth [9]. It helps companies revise their digital choices [38]. It improves the firms' efficiency and business process, thus gaining sustainable business performance. The company's efficiency lies in enhancing each management aspect with vast technological advancements [39]. This capability makes the organization use the firm's digital resources as the prime source of sustainable performance.

The adoption of new technologies, which change the methods through which organizations function today, has made firms revise their existing models and procedures [40]. As it is critical for firms to identify the current market demand and utilize the technologies to develop a more responsive system, firms have embraced digital exploitation capability to cater to existing market demand [12]. The firm's digital exploitation capabilities rationalize the firm's adaption to market changes. It allows firms to respond quickly to market needs by effectively leveraging the organization's digital resources [41]. It radically alters the firms' current business structure, processes, services, and procedures. Given the articulation, Hossain et al. [42] state that firms' digital innovation aligns the organizational capabilities with the market demand. Hence, in the light of dynamic capability theory, the literature argues that the digital exploitation capabilities aligning the adaptability and progression of innovation improve firms' sustainable performance and market-driven business model innovation [39]. Thus, based on this assumption, we conclude:

**H1.** Digital exploitation capabilities have a positive effect on sustainable business performance.

**H1(a).** Digital exploitation capabilities positively affect market-driven business model innovation.

## 2.3. Digital exploration capabilities

In recent years, the capability of digital exploration has become imperative for dealing with the complexity of globalization. Today, where the scale of global challenges has raised multiple challenges, resource depletion and demand for innovative solutions have leveraged the new set of technologies to provide a comprehensive understanding of digital exploration capabilities [43]. The firms' exploratory capabilities continuously encourage them to acquire research, innovate, and implement technologies that facilitate the firm's sustainable growth and value for customers [32]. It allows firms to optimize their business functions with new knowledge and skills [44]. It makes firms optimize the technology to influence business sustainable performance. Advanced technological developments that transform business functions help firms achieve sustainable performance [45]. In today's era, digital exploration activities are the most efficient way of improving the firm's sustainable performance.

Given the explanation, Belhadi et al. [8] show that digital exploration capabilities allow firms to tap the new business market of diverse knowledge, innovation, and opportunities, thus promoting sustainable performance. Realizing the market change makes the firms innovate rapidly by broadening their exploration activities to increase their operational efficiency, customer service, and revenue stream [46]. Kagan et al. [47] state that the exploration capabilities help firms understand the need for evolving market demands. Exploratory capabilities promote the expansion of existing technical capabilities. The exploratory activities encourage the firms to adopt new processes catering to the needs of the mainstream market [32]. It supports the agenda of fulfilling the market requirement with new technological knowledge [48]. The literature shows that the digital exploration mechanism creates new value for customers. It offers innovative opportunities to companies that help them perform better, thus meeting the needs of the mainstream market [12].

**H2.** Digital exploration capabilities have a positive effect on sustainable business performance.

**H2(a).** Digital exploration capabilities positively affect market-driven business model innovation.

## 2.4. Digitalization strategy adoption

Businesses undergoing exhausting transformations have formed new strategies for a resilient future. In the last decades, adopting a digitalization strategy has gained fundamental importance concerning the firm's sustainability. Digitalization pushing companies to embrace new technologies has developed digitalized strategies operationalizing management activities. Digital strategies involving the transformation of the business's abilities, skills, and processes at all levels have enabled the firms to achieve sustainable performance [49]. Its potential aspects have helped managers embrace technologies that ensure firms' enduring performance. Digitalization has made firms innovate their traditional strategy with sustainable innovation [50]. Adopting a digitalization strategy has made companies streamline their operations with transformative measures that have led them to achieve sustainable performance [51].

In today's world, the firm's technological capabilities help the firm meet organizational objectives [52]. Ly [53] states that digital transformation supporting organizational agility results in building a digital strategy that leads firms toward sustainable business performance. The digitalized business strategy infusing the firms' sustainable performance enables them to swiftly adapt to the changing market dynamics [29]. By harnessing the potential of digital tools, its implementation makes the firms tap existing market opportunities. Adopting a digital strategy helps firms maintain greater adaptability to the current environment [1]. Canhoto et al. [54] show that adopting a digitalized strategy helps companies transform their functions according to market needs. The digitalized strategy is an innovative solution that resonates with the target audience. Its integration streamlines the customer experiences, enhancing organizational efficiency. According to Correani et al. [55], the digitized strategy is a roadmap that leads to innovative practices. It empowers businesses to leverage digital technology to create value for potential audiences. Hence, based on this, we conclude:

**H3.** Digitalization strategy adoption has a positive effect on sustainable business performance.

**H3(a).** The digitalization strategy adopted positively affects market-driven business model innovation.

## 2.5. Digital transformation

Achieving sustainable performance is essential to every business. This triple-bottom-line approach emphasizes the necessity of adopting digital transformation [52]. Businesses are responsible for ensuring the operations that prioritize the health and safety of society. In this regard, digital transformation is essential to contribute fully to the new economy [56]. Today, the IT developments have made the firms grow sustainably [57]. Digital transformational activities have become the core element in firms' progress in recent years. Digital transformation brings continuous innovation and changes in the firm's business model, leading to sustainable performance [29]. Digital efficiency and resources scale up business productivity, thus improving the products, services, and firms' sustainable performance [58]. Digital transformation exploiting the firm's technical resources is the fundamental way of enhancing the firm's efficiency and sustainability [59]. By harnessing this concept, organizations can streamline their operations, procedures, and capabilities, thus achieving firm-sustainable performance [60].

New technologies and data-centric approaches drive the first innovation process in today's market. Digital transformation offers numerous possibilities for businesses to think about their technical skills, knowledge, and capabilities in fulfilling the customer's wishes [61]. Fundamentally, digital transformation offers businesses countless opportunities to sustain and innovate. Digital technologies are powerful tools that help companies achieve innovative targets. Chang et al. [62] show that digital transformation strengthens business transparency and unlocks its technical capabilities, thus driving the firm's business models. Digital transformation promotes innovation and makes enterprises respond rapidly to market changes. Digital transformation is the firm's ability to re-design business components, processes, culture, and strategies to meet market needs owing to digital advancements [63]. Wang et al. [9] show that the digital transformation optimizing the firm's business processes predicts the market demand and creates value for the customers. Olsson and Bosch [64] show that the digital transformation supporting the business model innovation creates value for the customers that proactively leads them to adopt disruptive tools. Therefore, the prior literature reveals that most innovative digital solutions have affected the market dynamics, and many firms have adopted market-driven business innovation models [65] to meet the needs of existing customers. Hence, based on this notion, the hypotheses state:

**H4.** Digital transformation has a positive effect on sustainable business performance.

**H4 (a).** Digital transformation positively affects market-driven business model innovation.

## 2.6. Mediating role of market-driven business model innovation

In recent years, digitalization has set the tone for rapid changes in business models and structures [66], as per the customer's request. With the increasing degree of market openness, customer demands keep changing. This evolution encourages firms to quickly adapt to changing environments by achieving sustainable performance [14]. Customer demand is vital to digitalization, which leads firms to become the driver of sustainable business innovation [67]. The market-driven business innovation model is the new source of elevating business revenues and value. The market-driven innovation model enabler of digital transformation requires the firms to adopt new skills, competencies, and knowledge [68], which are important sources of sustainable performance. Therefore, it is confirmed that with this implementation, the companies can gain sustainable performance by innovating the existing firms' functions and processes [69]. Firms work to satisfy their customer base. The market-driven business model enables firms to radically respond to the needs of the existing customer base with technology, thus gaining sustainable performance [70]. Indeed, the digital technologies

driving the business innovation process in today's dynamic world have made digital transformation a critical factor in boosting the firm's sustainable performance. Hence, based on this view, we conclude:

**H5.** Market-driven business model innovation positively affects sustainable business performance.

To foster business operations in the 21st century, companies are increasingly prioritizing their adaptability to exploratory frameworks of innovations. The ability to adapt to customer needs requires organizations to build a sustainable system of digitalization to secure firms' sustainable performance. Jacobs and Maritz [11] show that the firms' digital exploitation capability promoter of firms' sustainable performance allows the firms to adopt digital technologies that meet the existing demand of the mainstream market. Organizations harnessing the power of digital tools increase their efficiency, innovation, and stakeholder involvement, thereby contributing to a more resilient and sustainable performance. Exploitation capabilities enable firms to optimize existing market-related knowledge to achieve sustainable performance. Fundamentally, it structures and boosts the firm's innovation and activities that improve its products and services [71]. The exploitation capabilities improve the firms' existing procedures as the market demands. The capability of digital exploitation enhances the firm's sustainable functioning in the turbulent environment of changing customer needs. Digital exploration capability, grasping the information from the external environment, helps companies identify diverse customer needs and potential market gaps, thus rapidly evolving and ensuring firms' sustainable performance [72].

The exploration mechanics also seize the market opportunities by proactively adopting innovative models of digitalization to support firms' sustainable performance [73]. Achieving the firm's sustainable performance proposes that the firms adopt the exploration capabilities to drive the market-based model innovation. The optimization of the new business processes to satisfy the needs of the customers is the utmost need of today's firms. The exploration capabilities boost the firm's operating efficiency while reducing the overall cost of the firm's innovation. It helps firms gain market information that positively affects their sustainable performance. The digital exploration capabilities supporting the business model of IT developments increase the efficiency of the firm's services at the global level [46]. These characteristics of searching and implementing new business processes and resources lay the foundation of new knowledge generation, revenue creation, and technology embracement. Ho et al. [74] state that in a world of increased uncertainty, exploration emphasizes promoting the needs of potential customers by implying a new set of innovative resources. In this context, a market-driven business innovation model fosters the firm's resilience and responsiveness by evolving the digital business landscape, owing to the existing customer demand for new technologies [47].

Indeed, digital transformation is a vital way of achieving sustainable performance. Digital technologies drive firms' sustainable performance by reducing the cost of the activity [17]. It enables firms to disrupt their existing rules and procedures and change the pattern of their business models. Proksch et al. [75] show that the novel digital change requires firms to adopt a management strategy that meets the needs of the markets. Today, digital technologies triggering market demand have made firms develop digitalized strategies supporting market-driven innovation and sustainable performance [76]. Adopting a digital strategy promotes the transition of old practices into new ones [50]. In recent years, the new wave of digitalization has made the digitalized strategy penetrate the organization's structures with a vision to support the firms' sustainable performance [77]. It has made the companies go beyond the traditional business to new models, thus securing firms' sustainable future [78].

Market-driven business model innovation, the driving force of sustainable performance, has revised firms' activities to gain sustainable performance [69]. Indeed, this new form of digitalization has changed industries by forming a positive relationship between digital transformation, innovation, and firms' sustainable performance [79]. Digital transformation plays an integral role in fulfilling the demands of the customer base [17]. The origin of the digital innovation has been traced due to the increasing digitalization. In recent years, digital transformation has become necessary to drive market demand. The market-driven innovation model demands changes in business structure, workflow, and competencies. Vaníčková and Szczepańska-Woszczyna [80] study shows that today, tapping into the potential of digitalization has become crucial for firms to meet customer demand. Lin and Mao [81] show that digital transformations shaping firms' visions, strategies, structure, processes, and capabilities have enabled the firms to adapt dynamically to the changing market conditions, thus gaining sustainable performance. Hence, based on these arguments, we propose:

**H5(a).** Market-driven business model innovation mediates the relationship between digital exploitation capabilities and sustainable business performance.

**H5(b).** Market-driven business model innovation mediates the relationship between digital exploration capabilities and sustainable business performance.

**H5(c).** Market-driven business model innovation mediates the relationship between digitalization strategy adoption and sustainable business performance.

**H5(d).** Market-driven business model innovation mediates the relationship between digital transformation and sustainable business performance.

## 2.7. Moderating role of digital leadership capabilities

Digital transformations embarking on significant disruption worldwide have changed leadership techniques based on innovation and market needs [82]. Over the years, the digital transformation evaluating the firms' business processes and services has involved establishing digital technologies in all areas of the businesses. The ever-changing establishment of digital transformation supporting the changes in digital capabilities, such as leadership, is paramount to fulfilling the customer's needs [83]. Digital leadership is vital in standardizing the IT infrastructure and firms' sustainable performance [84]. It facilitates the firm's IT skills, which is critical for

driving the firms' demand for digital products.

Today, digital transformation has considerably diverted firms' attention towards the changing marketplace demand with innovation. It has become integral to understanding the customer portfolio. Market-driven business innovation ensures the embeddedness of characteristics, such as management and technology, in a firm's sustainable performance [85]. Given the articulation, this rapidly changing business environment has made the relationship between digital leadership and technology gain scholarly importance in the prior literature [86]. Buyukbese et al. [87] show that digital leaders utilize technology to its fullest to achieve sustainable performance. Since the 20th century, digital leaders have been found to influence the organization's sustainable performance [88]. In the digital sphere, where digital transformation has created a new paradigm of digitalization, digital leadership has become the supporter of customer needs. Digital leadership makes the firms standardize the integration of the IT infrastructure, procedures, and structures as per the needs of the mainstream market [89]. It makes the firm implement change in business processes, skills, and management [90], thus gaining sustainable business performance. Indeed, digital leadership capability is a guiding light for many organizations aiming to remain agile in today's evolving business landscape [91]. Fig. 1 shows the study's theoretical framework.

**H6.** Digital leadership capabilities moderate the relationship between market-driven business model innovation and sustainable business performance.

### 3. Methodology

The data was collected via survey method with the distribution of questionnaires. A survey was conducted among the employees within the different sectors in order to collect the data. A total of 440 questionnaires were distributed among the study participants, and 319 valid questionnaires were available for the data analysis. The questionnaire response rate in this research was 72.5 %. The questionnaire consists of two sections. The first section of the questionnaire was about the participant's basic demographic information. The second section of the questionnaire focuses on the study's independent variables, which include digital exploration capabilities, digital exploitation capabilities, digitalization adoption strategy, and digital transformation. The dependent variable (sustainable business performance) and the mediating variable include market-driven business innovation and moderating variable digital leadership capabilities. A written informed consent was obtained from all study participants prior to participation in the study.

Table 1 presents demographic data across several categories for a sample of 319 individuals. It outlines gender distribution, with 56.7 % males and 43.3 % females. Age-wise, it spans four groups: 21–30 years (20.1 %), 31–40 years (30.1 %), 41–50 years (35.1 %), and 51–60 years (14.7 %). In terms of education, the respondents are divided into Bachelor's (28.2 %), Master's (40.1 %), MPhil (14.7 %), and other qualifications (16.9 %). Marital status is categorized into Single (52.7 %) and Married (47.3 %). The table also delves into companies' characteristics, detailing the age of the company (with categories ranging from 0 to 5 years to over 15 years), nature of the company (including State-owned, Private, Joint Ventures, Foreign investors, and Other), company size (from under 100 employees to

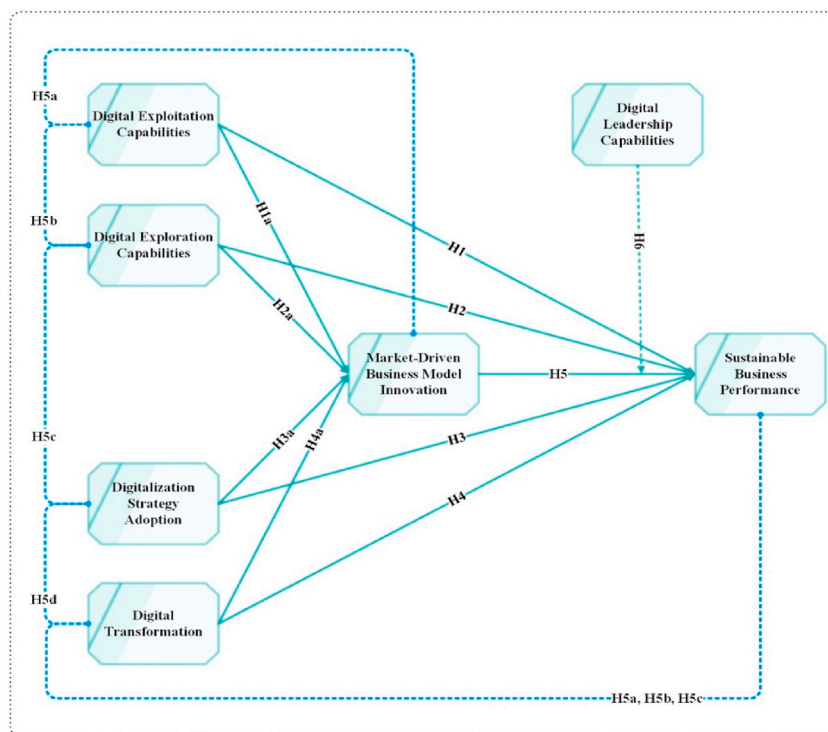


Fig. 1. Theoretical framework.

**Table 1**  
Demographic characteristics.

Items	Frequency (N = 319)	(%)
<b>Gender</b>		
Male	181	56.7
Female	138	43.3
<b>Age</b>		
21–30	64	20.1
31–40	96	30.1
41–50	112	35.1
51–60	47	14.7
<b>Education</b>		
Bachelor	90	28.2
Master	128	40.1
MPhil	47	14.7
Others	54	16.9
<b>Marital Status</b>		
Single	168	52.7
Married	151	47.3
<b>Companies' basic information</b>		
<b>Age of the Company</b>		
0–5 Years	54	16.9
6–10 Years	114	35.7
11–15 Years	103	32.3
>15 Years	48	15
<b>Nature of the Company</b>		
State-owned	40	12.5
Private	96	30.1
Joint Ventures	89	27.9
Foreign investors	65	20.4
Other	29	9.1
<b>Company Size</b>		
Under 100 Employee	59	18.5
100–500 Employee	98	30.7
501–1000 Employee	108	33.9
>1000 Employee	54	16.9
<b>Company type</b>		
IT services	47	14.7
Industrial and manufacturing	78	24.5
Consumer goods and retail	85	26.6
Healthcare	75	23.5
Others	34	10.7
<b>Digital Technology</b>		
Big Data Analysis	43	13.5
Databases	84	26.3
Cloud Computing	71	22.3
Artificial Intelligence	79	24.8
Internet of Things	42	13.2

over 1000), and company type (like IT services, Industrial and manufacturing, Consumer goods and retail, Healthcare, and Others). Lastly, it examines the prevalence of various digital technologies in these companies, such as big data analysis, databases, cloud computing, artificial intelligence, and the internet of things, offering a nuanced view of the current business and demographic landscape.

### 3.1. Common method bias

This research also applied the common method bias using Harman's single-factor approach. The variance extracted using one factor is 8.244 %, less than 50 %, indicating no common method bias in this study [92].

## 4. Results

Table 2 shows statistical measures for various constructs. Each construct is assessed through multiple items, with loadings generally exceeding the 0.7 threshold, indicating strong item reliability. The table also reports Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) for each construct, with Alpha and CR mostly above 0.7 and AVE above 0.5, adhering to the standard benchmarks for validity and reliability. The data ranges, such as the loadings for digital exploitation capabilities ranging from 0.629 to 0.892 and the Alpha for SBP at 0.929, demonstrate the variability and consistency within each construct, further validating the analytical approach used in the study.

**Table 2**  
Reliability and validity analysis.

Construct	Items	Loading	Alpha	CR	AVE
			>0.7	>0.7	>0.5
Digital exploitation capabilities	DEIC_1	0.730	0.798	0.799	0.575
	DEIC_2	0.629			
	DEIC_3	0.892			
Digital exploration capabilities	DERC_1	0.612	0.804	0.806	0.586
	DERC_2	0.760			
	DERC_3	0.898			
DLC	DLC_1	0.897	0.892	0.889	0.673
	DLC_2	0.948			
	DLC_3	0.786			
	DLC_4	0.610			
DSA	DSA_1	0.579	0.820	0.816	0.532
	DSA_2	0.644			
	DSA_3	0.812			
	DSA_4	0.848			
DT	DT_1	0.685	0.862	0.860	0.553
	DT_2	0.839			
	DT_3	0.727			
	DT_4	0.815			
	DT_5	0.632			
MDBMI	MDBMI_1	0.820	0.859	0.860	0.672
	MDBMI_2	0.864			
	MDBMI_3	0.773			
SBP	SBP_1	0.753	0.929	0.929	0.651
	SBP_2	0.771			
	SBP_3	0.885			
	SBP_4	0.815			
	SBP_5	0.824			
	SBP_6	0.783			
	SBP_7	0.811			

Table 3 offers an intricate analysis of discriminant validity for seven constructs using the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT). The values on the diagonal represent the square root of the Average Variance Extracted (AVE) for each construct. These diagonal values are vital indicators of discriminant validity, as they should be higher than the correlations (off-diagonal values) with other constructs, as per the Fornell-Larcker criterion. For instance, for Digital Exploitation Capabilities, this value is 0.758, suggesting that this construct shares more variance with its indicators than with those of other constructs.

The combination of the Fornell-Larcker criterion and HTMT provides a robust method for assessing discriminant validity in the research model. Fig. 2 shows the graphic representation of the assessment of the measurement model.

Table 4 shows the results of the direct relationships between various digital capabilities and their impact on sustainable business performance (SBP) and market-driven business model innovation (MDBMI). Hypothesis H1 explores the relationship between digital exploitation capabilities and SBP. The results indicate a Std. Beta of 0.206, a Std. Error of 0.070, a T-Value of 2.928, and a significant P-Value denoted by "\*\*\*". Hypothesis H1(a) shows the impact of digital exploitation capabilities on MDBMI, showing a slightly higher Std. Beta of 0.241, a Std. Error of 0.099 and a T-Value of 2.431, marked with a "\*" to indicate its significance.

Hypotheses H2 and H2(a), assess the effects of digital exploration capabilities on SBP and MDBMI, respectively. For SBP, the Std. Beta is 0.185, with a Std. Error of 0.072 and a T-Value of 2.579, earning a significance level of "\*\*\*". In the case of MDBMI, the Std. Beta increases to 0.275, accompanied by a Std. Error of 0.096 and a T-Value of 2.875, with a significance level of "\*\*\*".

The impact of Digitalization strategy adoption (DSA) is explored in Hypotheses H3 and H3(a), with respect to SBP and MDBMI. For SBP, the analysis shows a Std. Beta of 0.232, a Std. Error of 0.073, and a T-Value of 3.175, marked with "" for significance. The effect on MDBMI is even more pronounced, with a Std. Beta of 0.315, a Std. Error of 0.093, and a T-Value of 3.398, also indicated as highly

**Table 3**  
Discriminant validity (Fornel Larcker & HTMT).

Constructs	1	2	3	4	5	6	7
Digital exploitation capabilities	<b>0.758</b>	0.203	0.123	0.164	0.659	0.301	0.434
Digital exploration capabilities	-0.194	<b>0.766</b>	0.058	0.626	0.218	0.367	0.399
DLC	0.128	0.056	<b>0.821</b>	0.119	0.111	0.554	0.246
DSA	-0.153	0.620	0.116	<b>0.729</b>	0.217	0.395	0.417
DT	0.654	-0.213	0.114	-0.204	<b>0.744</b>	0.283	0.409
MDBMI	0.302	0.371	0.554	0.398	0.283	<b>0.820</b>	0.670
SBP	0.437	0.400	0.250	0.425	0.413	0.671	<b>0.807</b>

**Note:** "Values on the diagonal (italicized) represent the square root of the average variance extracted, while the off diagonals are correlation.



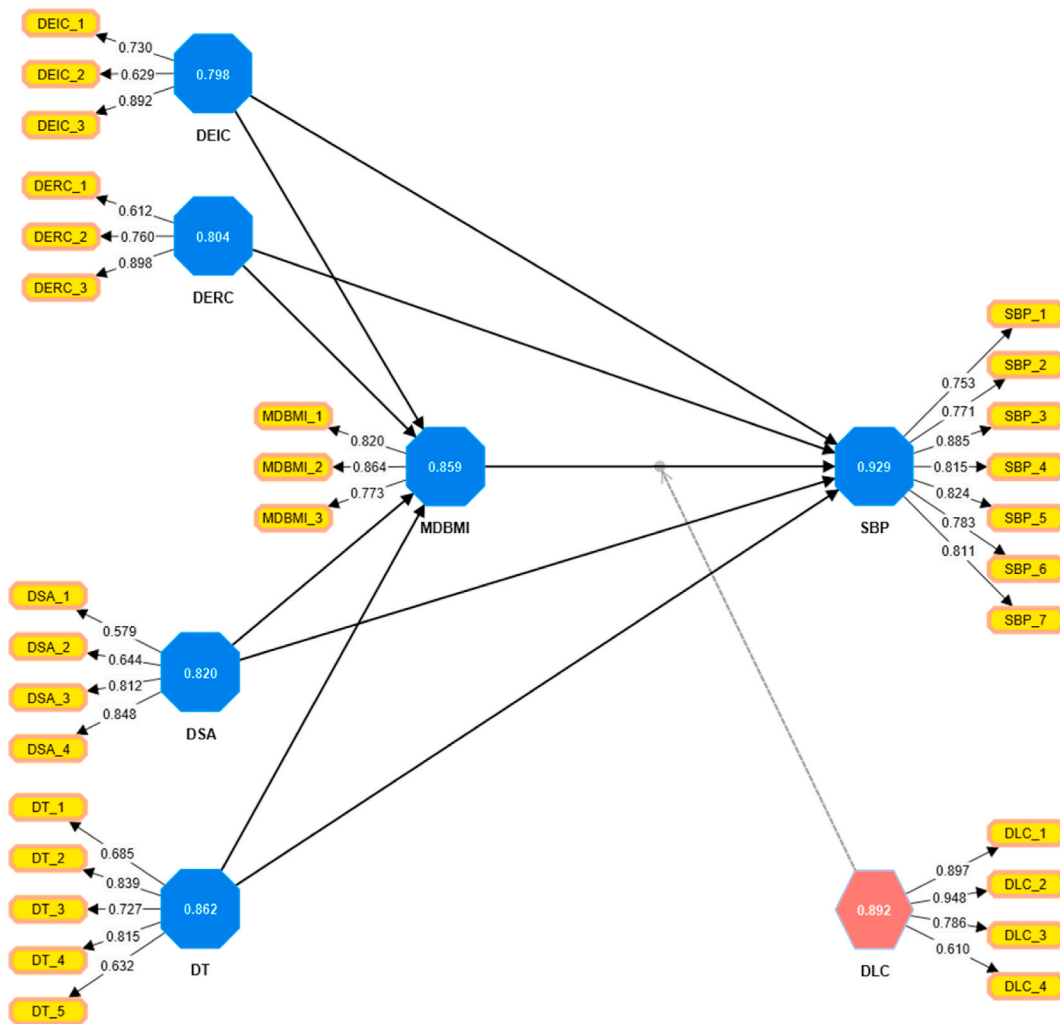


Fig. 2. Assessment of measurement model.

Table 4

Hypothesis testing- direct effect.

Hypothesis	Direct Relationships	Std. Beta	Std. Error	T- Values	P- Values
H1	Digital exploitation capabilities → SBP	0.206	0.070	2.928	**
H1(a)	Digital exploitation capabilities → MDBMI	0.241	0.099	2.431	*
H2	Digital exploration capabilities → SBP	0.185	0.072	2.579	*
H2(a)	Digital exploration capabilities → MDBMI	0.275	0.096	2.875	**
H3	DSA → SBP	0.232	0.073	3.175	**
H3(a)	DSA → MDBMI	0.315	0.093	3.398	**
H4	DT → SBP	0.230	0.070	3.292	**
H4(a)	DT → MDBMI	0.248	0.097	2.544	*
H5	MDBMI → SBP	0.398	0.097	4.110	***

\*Indicates significant paths: \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

significant.

Digital Transformation (DT) and its influence are the focus of Hypotheses H4 and H4a. In the context of SBP, DT shows a Std. Beta of 0.230, a Std. Error of 0.070, and a T-Value of 3.292, denoted with “\*\*\*” for significance. When assessing its impact on MDBMI, the results indicate a Std. Beta of 0.248, a Std. Error of 0.097, and a T-Value of 2.544, marked with a “\*”.

Lastly, Hypothesis H5 examines the influence of MDBMI on SBP, revealing a substantial Std. Beta of 0.398, a Std. Error of 0.097, and a T-Value of 4.110. This relationship is highlighted as particularly significant with a “\*\*\*” marking. Fig. 3 is a graphical representation of the structural model.

Table 5 presents the mediation effects of different digital capabilities on strategic business performance (SBP) through the lens of market-driven business model innovation (MDBMI). Hypothesis H5(a) examines the mediation effect of digital exploitation capabilities on SBP through MDBMI. The findings reveal a Std. Beta of 0.096, a Std. Error of 0.046, and a T-Value of 2.089, along with a P-Value marked with a “\*”, indicating its statistical significance at a certain level.

Hypothesis H5(b) explores the mediation effect of digital exploration capabilities on SBP, again via MDBMI. In this case, the Std. Beta is slightly higher at 0.110, with a Std. Error of 0.048 and a T-Value of 2.267, also marked shows the mediation effect of Digital Strategic Alignment (DSA) on SBP through MDBMI. The results show a notable Std. Beta of 0.126, a Std. Error of 0.047, and a T-Value of 2.651. This hypothesis stands out with a P-value significance level denoted by “\*\*\*”. Hypothesis H5d assesses the mediation effect of Digital Transformation (DT) on SBP through MDBMI. Here, the Std. Beta is 0.099, the Std. The error is 0.047, and the T-value is 2.117, marked with a “\*” to signify its significance.

Table 6 shows the results of the interaction between digital leadership capabilities (DLC) and market-driven business model innovation (MDBMI) on sustainable business performance (SBP). The findings here indicate a Std. Beta of 0.195, a Std. Error of 0.098, and a T-Value of 2.002. This interaction effect is marked with a “\*\*\*”, suggesting statistical significance. At +1 standard deviation, the impact of the interaction on SBP is quite pronounced, with a Std. Beta of 0.864 and a Std. The error of 0.069. The confidence interval for this level ranges from 0.729 to 1.000, indicating a strong effect. Fig. 4 is a graphical representation of moderation analysis.

Table 7 presents a detailed statistical analysis focusing on the relationships between various latent variables using metrics such as R<sup>2</sup>, R<sup>2</sup> Adjusted (R<sup>2</sup>Adj), and Q<sup>2</sup>, along with the F<sup>2</sup> values for specific variable relationships. Additionally, the table lists the F<sup>2</sup> values, which indicate the effect sizes of one latent variable’s influence on another. The F<sup>2</sup> values help in understanding the strength of these relationships.

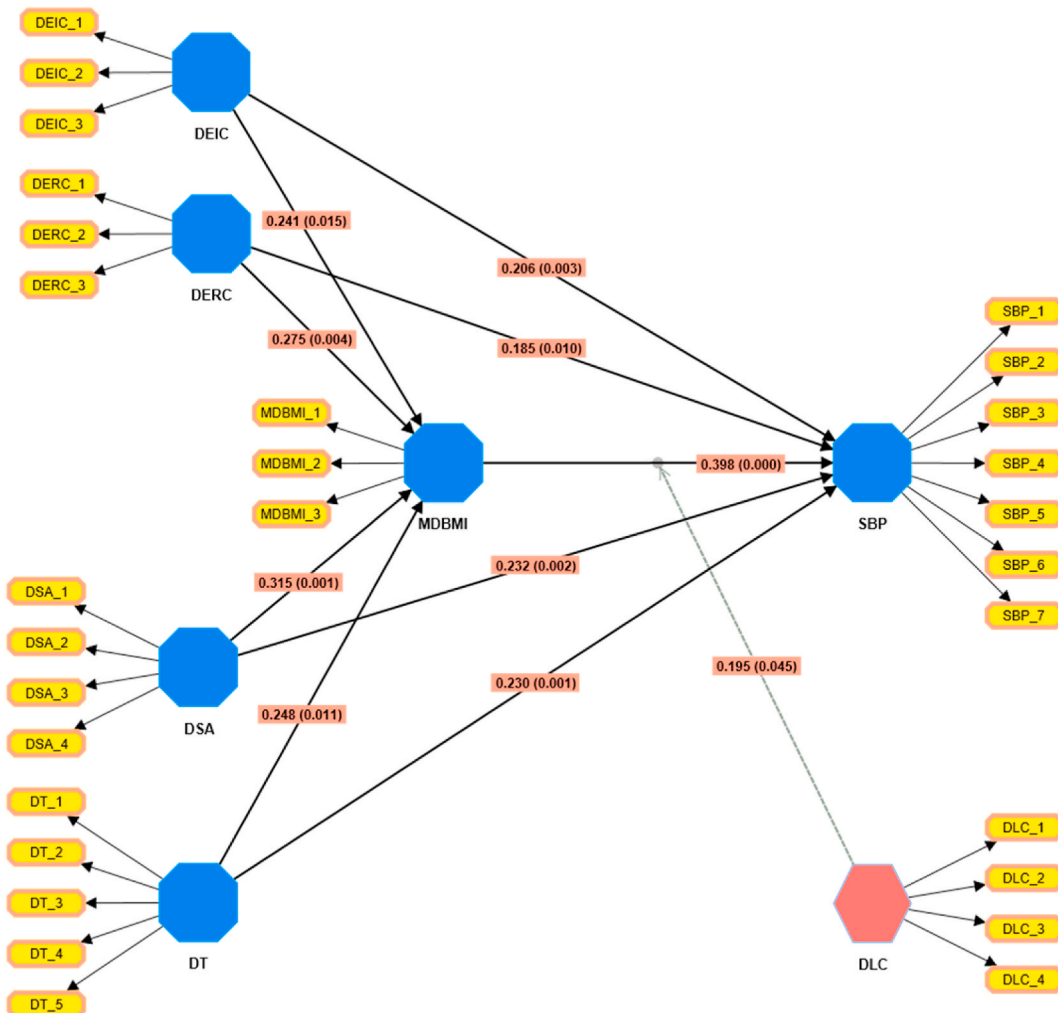


Fig. 3. Structural model.

**Table 5**  
Hypotheses testing mediation effect.

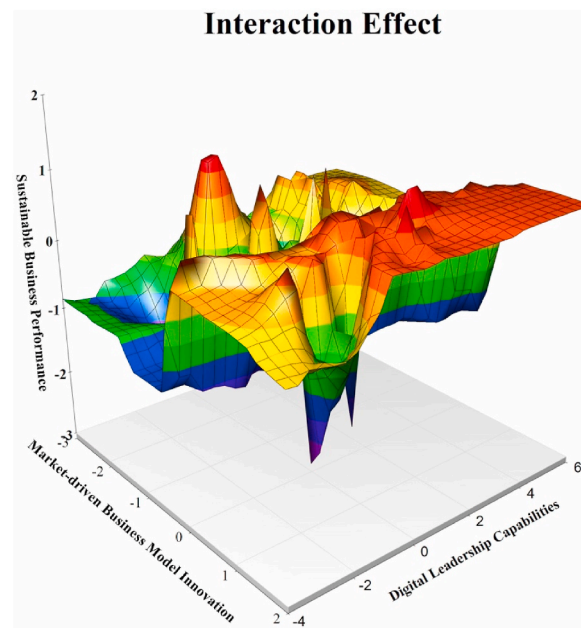
Hypothesis	Direct	Std.	Std.	T	P
	Relationships	Beta	Error	Values	Values
H5(a)	Digital exploitation capabilities → MDBMI → SBP	0.096	0.046	2.089	*
H5(b)	Digital exploration capabilities → MDBMI → SBP	0.110	0.048	2.267	*
H5(c)	DSA → MDBMI → SBP	0.126	0.047	2.651	**
H5(d)	DT → MDBMI → SBP	0.099	0.047	2.117	*

\*Indicates significant paths: \*p < 0.05, \*\*p < 0.01.

**Table 6**  
Hypotheses testing interaction effect.

Hypothesis	Interaction	Std.	Std.	T	P
	Effects	Beta	Error	Values	Values
H6	DLC x MDBMI - > SBP	0.195	0.098	2.002	*
<b>Level of the Moderator</b>		<b>Std.</b>	<b>Std.</b>	<b>Lower</b>	<b>Upper</b>
H6	+1 Std Dev	0.864	0.069	0.729	1.000
	Mean	0.630	0.050	0.532	0.728
	-1 Std Dev	0.396	0.073	0.253	0.539

\*Indicates significant paths: \*p < 0.05.



**Fig. 4.** Interaction DLC × MDBMI → SBP.

## 5. Discussion

In recent years, the digitalized business landscape has motivated firms to adopt new prospects for digitization, thus acquiring sustainable business performance [93]. Therefore, in this regard, numerous organizations have adopted ambidextrous capabilities to ensure firms' sustainable performance. The firm's ambidextrous capabilities are dynamic, which demands organizations to promote and shape the business management system to accelerate sustainable performance [94]. Today, these wide applications updating the company's internal and external resources have considerably influenced the company's vision, strategy, organization structure, and capabilities, thus improving firms' sustainable performance [8]. In this regard, we found digital exploitation and exploration capabilities to be a significant driver of firms' sustainable performance. Long-term survival indicates that the business needs to adopt digital capabilities that influence sustainable results [95] and a business innovation model. The exploitation capabilities enable the firms to improve their business processes with innovation [42]. The digital ambidextrous capabilities allow firms to revise their business

**Table 7**  
R<sup>2</sup>, F<sup>2</sup> and Q<sup>2</sup>.

Latent variables	R <sup>2</sup>	R <sup>2</sup> Adj	Q2	F2
MDBMI	0.37	0.362	0.253	
SBP	0.659	0.651	0.413	
DEIC → MDBMI				0.053
DEIC → SBP				0.064
DERC → MDBMI				0.073
DERC → SBP				0.054
DLC → SBP				0.011
DSA → MDBMI				0.096
DSA → SBP				0.087
DT → MDBMI				0.054
DT → SBP				0.081
MDBMI → SBP				0.198
DLC x MDBMI → SBP				0.062

operations to fulfil the needs of existing customers [96]. Congruent with the previous literature, our study supports the H1 and H2 (a) and concludes that deploying these digital capabilities is more than just the ability to design the firms' assets to gain sustainable results [97]. Thus, a firm willing to survive in the market must exploit and explore innovation. The firm's exploration perspective is the critical accelerator of the firm's sustainable performance [32]. As the core of modern business dynamics, it helps firms explore and innovate in all leading areas, thus gaining sustainable business performance [98]. The findings show that digital exploitation and exploration capabilities are vehicles for sustainable performance and market-driven business model innovation.

Park and Mithas [99] found firms' digital strategies to promote firms' sustainable performance. Proksch et al. [75] show that the company strategy built on digitization guides businesses to innovate dynamically to meet the needs of existing customers. In line with this, our study found the adoption of digitalized strategy to be a profound tool that influences firms' sustainable performance and market-driven business model innovation (i.e., H3 and H3a). Given this, our findings also found that digital transformation significantly contributes to firms' sustainable performance. The digital transformation is essential for upgrading and improving the firm's sustainable performance [100]. It also empowers the firms to broaden their business model innovations. By configuring the business model, the digital transformation makes the enterprise maximize the market potential, thus leading to the firm's sustainable performance [58]. During the past years of phenomenal growth in digitization, radical improvements in business technologies have fulfilled customers' needs, owing to technologies [101]. Hence, in light of this argument, our findings supporting H4 and H4a reveal that digital transformation influences the firm's sustainable performance and market-driven business innovation model.

An intelligent business gains information from the stakeholders that leverage the firm's sustainable performance [39]. According to Amankwah-Amoah et al. [102], market-driven business model innovation is a great accelerator for the firms' sustainable performance. Market-driven business model innovation enables the organization to structure its functions, supporting the firms' long-term continuity [103]. Our results showed that the digital exploitation and exploration capabilities stimulating the market-based business innovation model are well-suited concepts for acquiring firms' sustainable performance [104]. The market-driven business model innovation facilitating the exploitation and exploration capabilities stimulates the firm's sustainable performance. These capabilities enable the firms to gain access to valuable resources that enhance their sustainable performance. These capabilities emphasize creating services and designs for market development models [71]. This shows that market-driven business model innovation enhances the firm's ambidextrous market orientation. Therefore, it is confirmed that both capabilities not only provide insight into market changes but also proactively shape the industry's trends that influence sustainable performance. Also, our results revealed the digital strategy to be an important dimension of innovation and sustainable performance [105]. A market-driven innovation model providing sustainable performance [70] can help companies meet the potential demand of the customer base. Our findings show that in the world of technology, where digital transformations have made firms think about innovation integration, businesses have capitalized on customer experiences, thus reaping the benefit of sustainability.

With that, the new IT trends enabling the coming wave of digital transformations have clearly identified digital leaders to play a significant role in bringing sustainable performance [106]. Our findings supporting the previous literature show that a digital leader's transformative vision drives the business innovation model and firms' sustainable performance [23]. Digital leaders are most responsive to market demand. Digital leaders responding to customer demands shift their focus towards digitalization. This exclusive quality of digital leaders makes leaders a fundamental driver of firms' sustainable performance and market-driven business model innovation. Hence, in this regard, our study concludes the positive mediating role of market-driven business model innovation and the moderating role of digital leadership capabilities, thus by accepting the H5 (a, b, c, d) and H6. Overall, our study concludes that where the goal of the organization is to gain sustainability, the alteration in the existing market empowers the businesses to drive their sustainability. Firms integrate the digital resources more strategically to capture the customer needs. In essence, it is crucial to stay ahead of others while realizing the need for innovative model adoptions and digital capabilities to gain sustainable business performance.

### 5.1. Study limitation and future direction

With implications, the study also offers a few shortcomings. Firstly, the study takes a small sample size for investigation. This

deficiency advises future scholars to take a broader sample size, thus increasing the result's generalization. Secondly, the study focuses on a single industry only. For that, multiple industries can be studied to expand cross-border research. Thirdly, the study's topic is limited explored. The study only expands the knowledge of a few digital constructs leading to sustainable business performance. As there are more important digital drivers of sustainable performance, future scholars can grow their knowledge by investigating them empirically in their studies. With this, this current paper studies limited variables as mediators and moderators. Other constructs, such as customer satisfaction, employee IT skills, organizational culture, industrial uncertainty, green innovation process, etc., can be added to widen the understanding of this topic. Significantly, all these suggestions can help future scholars advance their knowledge on this topic. It advises the firms to study the multi-dimensional construct of digitalization contributing to firms' sustainable performance.

### 5.2. Theoretical contribution

A theoretical focus of this paper is the positive outcome of digitalized factors, which has implications for scholars, researchers, and industry practitioners across the globe. Firstly, the study tries to fill the research gap by initiating a discussion on the role of organizational ambidexterity, digitalized strategy adoption, digital transformation, market-driven business model innovation, digital leadership capabilities, and sustainable business performance. Secondly, it updates the existing literature with recent studies. Thirdly, it investigates the mediating role of the market-driven business model innovation and moderating digital leadership capability under one framework, which is also the novelty of this study.

Fundamentally, this study sheds light on the digital factors and mechanisms driving the global industries. It bridges the gap by presenting enriched literature on different digital notions, which are the prime drivers of firms' sustainable performance. In particular, the study results make worldwide scholars think about the benefits and effectiveness of these factors, especially in terms of gaining long-term sustainable growth. However, given the dynamic nature of technology and sustainable performance, this study deepens the understanding of the individuals on this topic. Its deep analysis can offer valuable insight into successful digitalization strategies that can contribute to sustainable performance. In other words, this study validates and raises the need for new research models for further investigation. Hence, based on this, researchers are advised to dig into this topic by presenting policy-relevant investigations for bringing positive change in various industries.

### 5.3. Managerial implications

The current study presents implications for organizations, managers, policymakers, and practitioners. To achieve sustainable performance, the study advises firms to use their resources to build digital competencies. The ambidexterity capability successfully promotes the firm's flexibility, thus supporting sustainable business performance. Considering the positive relationship of ambidexterity capabilities (i.e., exploitation and exploration) with sustainable performance, this study guides managers to focus on developing these capabilities in today's market of changing needs.

Additionally, this study helps firms resolve and overcome the dilemma of sustainability issues based on the factors of digitalization. The study findings show that radically integrating and optimizing new strategies for meeting the demands of existing customers improves the firms' sustainable performance. The digitalized strategy adoption focuses on maximizing the business model innovation. It is suggested that policymakers must ensure the implementation of the digitalized strategy for exploring the customer potential needs and capturing the market, thus improving the firms' sustainable performance.

Furthermore, the study findings show that digital transformation promotes the firms' sustainable performance and market-driven business model innovation. For managers, digital transformation can be an opening of new opportunities. Therefore, it suggests that firms should rely on adopting new technologies to ensure firm continuity. Since all these drivers generate positive outcomes, it is recommended that managers must promote digitalized values, norms, and capabilities in their organizations. For that, they should train their employees to carry out digitalization, thus satisfying the customers' needs. The organization should make the employees aware of the worth of designing and thinking about the organizational process. They should educate their employees regarding the importance of customers' needs. Overall, organizations should invest in technologies to transform the business functions that support the firms' sustainable performance.

## 6. Conclusion

Digital technologies have fundamentally changed the way business operates. The new developments have made the firms evolve more rapidly than ever. With firms' approaches becoming digitalized and more complex, organizations are finding it difficult to sustain themselves in today's environment. Preparing for long-term sustainability demands a profound paradigm of innovation. According to this, the companies must build scalable skills, capabilities, and processes to promote firms' sustainable performance. As per the dynamic capability theory, firms integrate, build, and reconfigure internal and external resources to achieve sustainable performance.

Hence, in this regard, the current study investigates the relationship between digital ambidextrous capabilities (i.e., digital exploitation and exploration capabilities), digitalization strategy adoption, and digital transformation with sustainable business performance. Also, it probes into the mediating role of the market-driven business model innovation and the moderating role of digital leadership capability in the context of sustainable performance. It is to be noted that the current study findings show positive results by accepting all the hypotheses. With that, the study findings made special contributions to the theory and practice, thereby becoming a valuable source of guidance for future scholars, researchers, organizations, and practitioners.

## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## CRediT authorship contribution statement

**Aixia Chen:** Supervision, Project administration, Funding acquisition, Conceptualization. **Ling Li:** Writing – original draft, Validation, Resources, Methodology. **Waseem Shahid:** Writing – review & editing, Software, Methodology, Formal analysis, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Abbreviations

DEIC	Digital exploitation capabilities
DERC	Digital exploration capabilities
DLC	Digital Leadership Capabilities
DSA	Digitalization Strategy Adoption
DT	Digital Transformation
MDBMI	Market-Driven Business Model Innovation
SBP	Sustainable Business Performance

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e29509>.

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