

## Article

# Digital Transformation and Competitive Advantage in the Service Sector: A Moderated-Mediation Model

Maha Shehadeh <sup>1,\*</sup> , Ahmad Almohtaseb <sup>2</sup>, Jehad Aldehayyat <sup>2</sup>  and Ibrahim A. Abu-ALSondos <sup>3</sup>

<sup>1</sup> Department of Finance and Banking Sciences, Faculty of Business, Applied Science Private University, Amman 11931, Jordan

<sup>2</sup> Department of Business Administration, Faculty of Business Administration and Economics, Al-Hussein Bin Talal University, Ma'an 71111, Jordan

<sup>3</sup> College of Computer Information Technology, American University in the Emirates (AUE), Dubai 503000, United Arab Emirates

\* Correspondence: ma\_shehadeh@asu.edu.jo

**Abstract:** Digital transformation is important not only in the manufacturing sector but can also help service-based organizations to achieve competitive advantage. Therefore, this study has examined the impact of digital transformation on competitive advantage and the mediating role of entrepreneurial orientation. Innovation capability is considered a moderator between digital transformation and competitive advantage. The data for the research were gathered from service companies in Jordan, and AMOS was utilized for the analysis. The results revealed that digital transformation not only influences competitive advantage but also affects entrepreneurial orientation. Entrepreneurial orientation significantly mediates the relationship between digital transformation and competitive advantage. In addition, innovation capabilities moderate the relationship between digital transformation, competitive advantage, and entrepreneurial orientation. Innovation, production, and operational managers as well as owners of service companies can use the results of this research as a guideline for policy-making in order to develop a competitive advantage.

**Keywords:** digital transformation; entrepreneurial orientation; innovation capabilities; business transformation



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## 1. Introduction

Digitalization in business is considered a part of industry 4.0, and it is rapidly changing the business environment. Moreover, it is creating challenges for many companies, and to survive in the competitive digital environment, companies should verify their capabilities and digital readiness [1]. Many organizations are also realizing the importance of and need for digitalization but some of them lack sufficient knowledge to initiate digital transformation [2]. Digitalization is distinct from digital transformation, as it focuses on the processing of information and analysis of digital data usage to improve workflows via automation of existing processes [3]. Digitalization merely improves certain defined or specific processes whereas digital transformation is a broader process which extends across different companies and systems allowing the grouping of all types of digitalization and digital solutions [4]. Verhoef et al. ([5], p. 889) defined digital transformation as “a change in how a firm employs digital technologies, to develop a new digital business model that helps to create and appropriate more value for the firm”. It should also be noted that digital transformation as a concept is not limited to employing modern digital technologies such as artificial intelligence, big data, cloud computing, biometrics and other important technologies [6], but there are several dimensions of digital transformation that must also change in order to reach the level of digital maturity and thus achieve competitive advantage [7], including; first: Customers. Following a digital transformation strategy means moving to a customer-first approach [8] (customer-centric). Second: The services

and products provided by companies must evolve through the transformation to modern digital business models concerned with innovation and creativity. Third: The strategy, as previous studies and international reports emphasize the importance of a strategy for digital transformation that leads companies and institutions towards leadership and creativity. Fourth: Organizational culture and customer culture. This is an important element for success in the digital transformation journey, as senior management and employees must be supporters of digital transformation. In addition, the need to change the culture of customers who are still afraid of dealing with companies that provide digital services due to fear of the risks of cyberattacks [9].

The vision of digital transformation focuses on increasing job creation and enhancing economic development in key knowledge sectors, and for this reason the governments of all countries in the MENA region, as policy makers and champions of innovation and technology adoption, are emphasizing the development of incentive/implementation plans for digital transformation [10]. Within this region, the government of Jordan is putting particular effort into digital transformation and has developed the vision (REACH2025) to virtually digitalize every company, sector, and individual. This vision is based on seven important dimensions, which are “smart specialization and demand-driven innovation, public sector innovation, tech start-ups and entrepreneurs, ICT skills, capacity, and talent, enabling business environment, smart digital economy infrastructure, and governance”. This vision also highlights that by 2025, the digital economy of Jordan will have created up to 150,000 additional jobs and 5000 to 7000 new emergent businesses will have come into existence [11]. In addition to this vision, the Ministry of Digital Economy and Entrepreneurship (MoDEE) of Jordan is working on digital transformation, and is the implementing agency for the Youth, Technology, and Jobs (YTJ) project which aims to expand digitized government services in the country and enhance digital income opportunities [12].

Teece [13] explained dynamic capabilities as change-enabling agents that allow “management to develop conjectures about the evolution of consumer preferences, business problems, and technology; validate and fine-tune them, and then act on them”. Similarly, Helfat et al. ([14], p. 4) defined dynamic capability as “the capacity of an organization to purposefully create, extend, and modify its resource base”. As a dynamic capability, digital transformation can enable companies to achieve a competitive advantage. The Internet of Things (IoT), big data analytics, and cloud computing are key technologies for digitalization that can enable organizations to explore new opportunities for the execution of customer-oriented business models and to provide value to the firm [5] in creating a competitive advantage [15]. Rha and Lee [16] discussed digital transformation in detail and explained that it influences value chain operations in service firms, but did not describe how this transformation can generate a competitive advantage for service firms. In addition, Martínez-Caro et al. [17] observed that the discussion concerning the impact of digital transformation on a firm’s competitive advantage is in the early stages and that there is no research seeking to identify the influence of digital transformation on a firm’s competitive advantage. In the context of current research, digital transformation is operationalized as a dynamic capability and change process leveraging digital technologies, instruments, capabilities, and business models to develop a competitive advantage.

Digitalization has changed the business environment of many industries [18], but digital transformation has helped businesses to leverage knowledge and integrate it into all their areas for new value creation and enhancement of engagement [3]. Moreover, it has changed the entrepreneurial activities of enterprises [19] and made them more entrepreneurship-oriented. In the literature on strategic management, the notion of entrepreneurial orientation has been considered an important resource for the achievement of competitive advantage [20], as cited in [21]. The dependency on existing processes and asset base can enable entrepreneurial organizations to access the opportunities generated by a dynamic operating environment and the dynamic capabilities can in turn help the firms to seize new opportunities and renew the existing asset base. Thus, in a turbulent business environment, entrepreneurial behavior can develop a competitive advantage [22]. The

adoption of digital technologies can influence the creation of economic sustainability and social value for SMEs, and entrepreneurial orientation can moderate this relationship [23], but it is important to show that digital transformation together with entrepreneurial orientation can help service-based companies generate a competitive advantage.

The research on organizational policy in the context of multi-sided platforms has indicated that there are three types of relevant dynamic innovation capabilities: environmental scanning, integrative capabilities, and sensing capabilities [24]. Tronvoll et al. [25] revealed that digitalization enables service innovations. In order to accelerate entrepreneurial transformation, corporate entrepreneurship is closely linked with closer “cooperation and exchange between incumbents and start-ups” [26]. Entrepreneurial start-ups are perceived as precursors of digital transformation and are recognized as having faster innovation capabilities [27]. Thus, innovation capabilities can moderate the relationship between digital transformation and entrepreneurial orientation. It is also important to highlight the moderating role of innovation capabilities in the relationship of digital transformation with competitive advantage. In today’s business world, organizations must transform themselves digitally to remain competitive and grow [28], and digital transformation not only influences performance to generate competitive advantage but also enhances entrepreneurial orientation and introduces innovation capabilities.

The first and most important objective of this study was to analyze the influence of digital transformation on competitive advantage, as this transformation is now considered an important topic/factor impacting Jordan’s service sector [29]. The service sector firms in Jordan have been reluctant to adopt digital transformation because of a lack of capability or knowledge but they are aware of its importance. Thus, they have to focus on digital transformation in order to attain a competitive advantage. This research takes the view that organizational and environmental factors affect dynamic capabilities and competitive advantage [30], and these factors can be entrepreneurial orientation and innovation capabilities. Therefore, the second objective of this research was to examine the role of digital transformation in relation to competitive advantage in terms of how it mediates the role of entrepreneurial orientation and innovation capabilities. Thirdly, the study aimed to investigate the moderating effect of innovation capabilities on the relationship between digital transformation and entrepreneurial orientation.

## 2. Literature Review

Digitalization can significantly contribute to the economy by producing growth in GDP. The IMF [31] reported that in the transitional economy of Jordan, a 10% increase in digitalization could contribute to a 0.59% increment in GDP. Digital transformation in Jordan has the potential to create a digital economy by 2025 that will enable the manufacturing sector in particular to increase its productivity [32]. Many studies on digital transformation have focused on the manufacturing sector [33–37] but the implementation of digital transformation in the service sector has emerged as an important research area and many studies are now focusing on it [38]. In manufacturing companies, digital transformation can involve the automation of delivery or processes but in the service sector, it can digitize and improve communication and contact with the customer [39]. In Jordan, the service sector is facing many challenges because of a lack of capability to manage the risks of digital transformation [29]. However, according to Rashwan and Kassem [39], service firms which have the knowledge and ability to manage digital transformation can acquire a competitive advantage because well-implemented digitalization can facilitate the development of dynamic and agile capabilities to deliver services or products that meet customer needs [13,40].

The theory of dynamic capabilities developed by Teece [13] is considered a suitable theory for determining the performance of a firm; the theory states that dynamic capabilities are a new source of competitive advantage and that firms can use their available internal and external resources to address the environmental changes. In addition, Zhou [28] examined the relationship between marketing agility (i.e., dynamic capability) on performance

together with the mediating role of innovation capabilities (i.e., ordinary capability) and found that dynamic capabilities and ordinary capabilities can improve performance. Therefore, this study focused on the theory of dynamic capabilities to link digital transformation with the competitive advantage of service-based organizations in Jordan as although this sector significantly contributes to the GDP of the country [41], the literature has ignored the issues faced by this sector.

### 2.1. Digital Transformation and Competitive Advantage

The foundation of digital transformation is based on three pillars: the first is customer experience digital transformation, the second is operational process transformation, and the third is business model transformation. Therefore, in the current competitive environment, companies interested in digital transformation should focus on these pillars. Companies also need to digitally transform themselves in new and incremental ways to remain competitive [28]. This transformation is based on utilization of new information technologies to achieve comprehensive upgrade and transformation across different industries [42].

Digital transformation changes the value creation processes for service firms and the operational process for manufacturing firms in order to obtain competitive advantage, and dynamic capabilities are therefore essential for implementation of these changes [43]. Many studies concerning dynamic capabilities have linked the concept with performance and digital transformation capability based on three important dynamic capabilities: digital sensing, digital reconfiguring, and digital acquisition. Digital technologies influence the strategic development of firms and the digital transformation of organizations creates a competitive advantage [44]. The concept of digital transformation is very similar to some other relevant concepts set out in Figure 1 below.

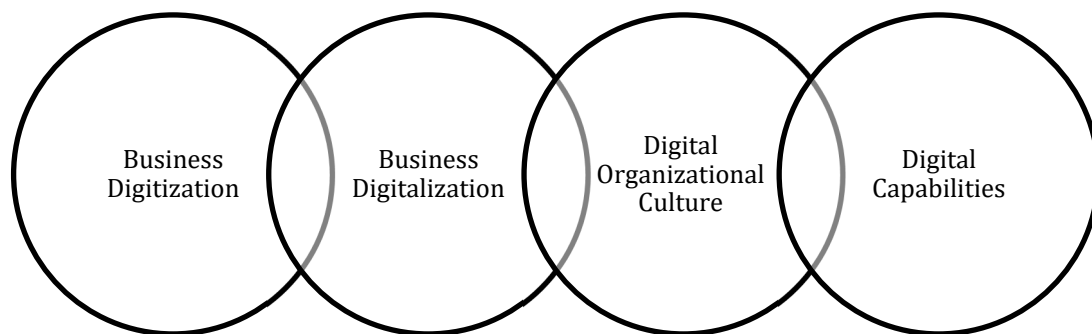


Figure 1. Other related concepts [17,45–47].

Martínez-Caro et al. [17] highlighted the need for technology in the achievement of competitive advantage and concluded that firms should focus on digital technologies including computing, information combinations, and connectivity technologies to achieve sustainable competitive advantage. Furthermore, these digital technologies play a significant role in the strategic development of companies, and digital transformation can help companies to create a competitive advantage [44]. Additionally, Verhoef et al. [5] mentioned that the aim of digital transformation is to provide more value to firms and that it can also create a competitive advantage [48]. Xue et al. [42] stated that to gain a sustainable competitive advantage, organizations have to change the original logic of their service, and promote digital transformation in all contexts including operations, structure, and strategy-making.

According to Schwertner [49], companies that consider technologies such as cloud, big data, social technologies, and mobile to be important parts of their infrastructure will be more profitable and have a bigger market valuation in comparison with their competitors. These technologies are a key driver and instrument for attaining a competitive advantage through digital transformation. There are many studies focusing on the significance of digital transformation but there remains a need to uniformly define digital transformation [50] and examine its role regarding competitive advantage in the context of the service sec-

tor. Therefore, to investigate the role of digital transformation with regard to competitive advantage, the following hypothesis was developed:

**Hypothesis 1 (H1).** *Digital transformation is positively tied to competitive advantage.*

## 2.2. Entrepreneurial Orientation as a Mediator

Strønen [51] defined digitalization as “the use of digital technologies and digitized data to impact how work gets done, transform how customers and companies engage and interact, and create new digital revenue streams”. Digital transformation is similar to digitalization. This transformation is linked to some important factors including value creation, supply chain management, digital strategy, and, in particular, entrepreneurship [50]. Furthermore, entrepreneurial resources have great significance within organizations as they can foster creativity, improve foresight, and develop new opportunities [52] and transformations. Today, companies are transforming their businesses and adopting digital technologies to compete in the digitally connected global economy. In addition, increased digitalization of functions leads to greater entrepreneurial behavior that will ultimately help companies to make strategic decisions [10]. Similarly, Ritala et al. [53] predicted that when firms reach their digital strategy goals, the entrepreneurial attitude of their employees is instrumental.

Businesses regard entrepreneurial orientation as important to remain successful in an environment of high competition and a rapidly changing landscape of technological innovation [54]. Thus, digital transformation can be an effective approach to improving entrepreneurial orientation [55].

In the context of rapid change, the theoretical lens of “dynamic capability” is appropriate [13]. Dynamic capabilities enable the change in businesses by allowing “management to develop conjectures about the evolution of consumer preferences, business problems, and technology; validate and fine-tune them, and then act on them” [13], and in this research, the focus is on the dynamic capability leading to competitive advantage and entrepreneurial orientation. This capability is digital transformation, as [56] highlighted that a digital transformation capability is a special form of dynamic capability. Digital capabilities have the potential to transform entrepreneurial resources into new products with the help of entrepreneurship orientation [57]. Thus, digital transformation can influence organizational orientation such as ambidextrous innovation orientation [58] and entrepreneurial orientation. Many previous studies have focused on the effects of digitalization on different aspects, such as internationalization [59,60], performance [61,62], and business model innovation [63], but none of them have integrated the concept of entrepreneurial orientation [59]. It is expected that digital transformation can lead to entrepreneurial orientation, and therefore we developed our second hypothesis:

**Hypothesis 2 (H2).** *Digital transformation is positively tied to entrepreneurial orientation.*

Song et al. [64] demonstrated that entrepreneurial behaviors enable companies to gain valuable insights from networks to explore business opportunities and that entrepreneurial orientation helps them to gain a competitive advantage [65]. Similarly, Zeebaree and Siron [66] showed the significant influence of entrepreneurial orientation on competitive advantage. Many studies have demonstrated the influence of entrepreneurial orientation on performance [67–70]. These findings are consistent with RBV which contends that the competitiveness of a firm emanates from its specific capabilities and resources [71]. Therefore, it is to be expected that entrepreneurial orientation can enable service-based companies in Jordan to develop a competitive advantage.

Herve et al. [59] explained that there is a need to analyze how the use of digital technologies can support entrepreneurial behaviors. Furthermore, entrepreneurial orientation is linked with the degree of digitalization of SMEs and their overall performance [72]. Practitioners and researchers are uncertain when, how, and under what particular con-



ditions the adoption of digital technologies can facilitate the sustained growth of start-up enterprises [73]. Dynamic capability can act as an intermediate variable between entrepreneurial resources and firm performance [74]. Moreover, entrepreneurial orientation and dynamic capabilities, both are composed of entrepreneurial resources that help organizations in developing new ideas for new product creation [57] which can lead to competitive advantage [75]. Therefore, entrepreneurial orientation can mediate the relationship between digital transformation and competitive advantage. Moreover, it is important to highlight the role of digital transformation in entrepreneurial orientation which can influence competitive advantage [43] but there is still limited literature highlighting the role of digital transformation on entrepreneurial orientation and the relationship between entrepreneurial orientation and competitive advantage. Entrepreneurial orientation can be influenced by digital transformation and lead to competitive advantage; thus, it is considered a potential mediator in the relationship of DT and CA. Therefore, this research predicted that entrepreneurial orientation mediates the relationship between digital transformation and competitive advantage, developing the third and fourth hypotheses below:

**Hypothesis 3 (H3).** *Entrepreneurial orientation is positively tied to competitive advantage.*

**Hypothesis 4 (H4).** *Entrepreneurial orientation mediates the relationship between digital transformation and competitive advantage.*

### 2.3. Innovation Capabilities as a Moderator

The measurement of a firm's innovativeness or propensity to innovate is always important. Businesses and academics frequently struggle to understand this "capacity to innovate," yet many business thought leaders place it at the top of their list of priorities [76]. Yang [77] highlighted that this ability to innovate is improved by digital transformation which also enhances the differentiation of products and services. Similarly, Nwankpa and Roumani [78] found a positive relationship between digital transformation and innovation which positively enhanced company performance. Digital transformation is a special dynamic capability and innovation capability is an ordinary capability; the combination of these capabilities can generate better performance [79] leading to a competitive advantage.

Innovation thinking capability is an important organizational capability for digital transformation and it is important for organizations to develop this capability from the start of their digital transformation journey [80]. Many studies have highlighted the influence of digital transformation on competitive advantage and innovation capabilities but they have neglected the moderating effect of innovation capabilities on digital transformation and competitive advantage. Therefore, this study predicted that innovation capabilities could act as a moderator in the relationship between digital transformation and competitive advantage. Thus, we developed the fifth hypothesis:

**Hypothesis 5 (H5).** *Innovation capabilities moderate the effect of digital transformation on competitive advantage.*

Within organizational innovation in general, product innovation is considered an important element of entrepreneurial orientation, and this orientation positively affects sustainable competitive advantage [81]. Entrepreneurial marketing positively affects competitive advantage through innovative capability [82]. Fan et al. [83] identified a positive relationship between entrepreneurial orientation and firm performance and highlighted that this relationship is mediated by social media adoption. Furthermore, innovation capabilities significantly moderate the effect of social media adoption on the performance of SMEs.

Innovation is only sufficient for success in business but it also needs an entrepreneurial approach to recognizing the opportunities that can be used through innovation to provide successful outcomes [84]. Thus, innovation capabilities can strengthen the relationship between digital transformation and entrepreneurial orientation.

Digital technologies positively influence entrepreneurial orientation [10] and it is important to highlight how this relationship can be further strengthened. Therefore, this research predicted that innovation capabilities moderate the relationship between digital transformation and entrepreneurial orientation. To examine this moderation effect, we developed the sixth hypothesis:

**Hypothesis 6 (H6).** *Innovation capabilities moderate the effect of digital transformation on entrepreneurial orientation.*

The literature referred to above has focused on the relationships established by this research. The relationships are presented more clearly in the research model presented below (see Figure 2).

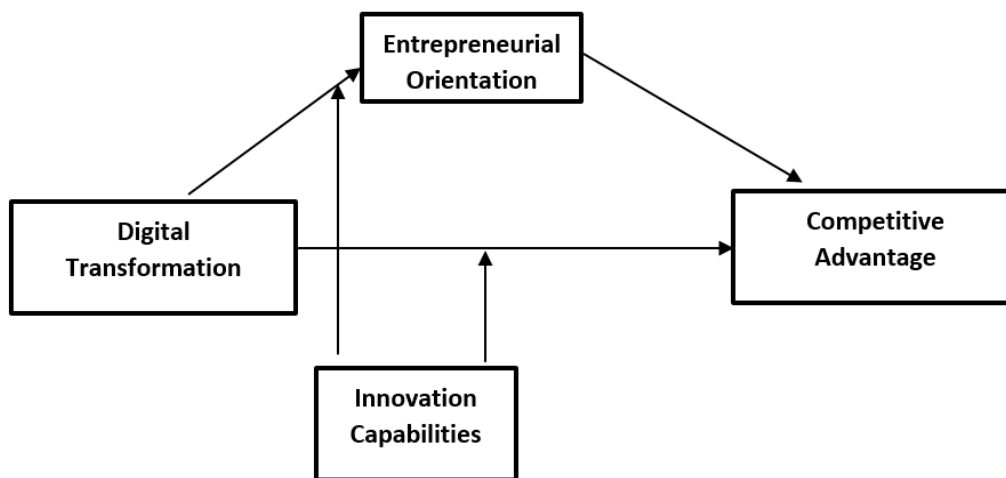


Figure 2. Research Model.

### 3. Methodology

#### 3.1. Population and Sample

The study population included all Jordanian service firms with 20 or more employees. According to the Department of Statistics, there are 2571 service firms with 20 or more employees across Jordan. Initially, 600 firms were selected for data collection, and the team of authors together with two research assistants contacted the human resource departments of the selected firms to obtain permission for data collection from their management-level employees. Only companies focusing on digital transformation were considered for the study and the respondents were the senior/management-level employees. After permission was obtained, questionnaires in the English language were distributed to respondents. The study sample was selected using the nonprobability purposive sampling technique, because in such sampling the respondents are selected on the basis of interest, credentials, or typicality [85]. Only those respondents were considered who could answer the study questions. In this study, we considered firms which were focused on digital transformation and questionnaires were sent to relevant managers, and therefore purposive sampling was considered appropriate.

Two months later (January and February 2022), the authors and two research assistants collected 386 responses out of the 600 distributed questionnaires, from which 15 responses were excluded from the final data analysis because of missing data. As a result, there were 371 final responses, a successful response rate of 62%. There were no financial incentives given to respondents but encouragement and support were provided to ensure full and prompt responses. Table 1 presents the characteristics and demographics of the responding firms.

**Table 1.** Characteristics and demographics of responding firms.

Service Type	No. of Firms
Health Care	63
Education	69
Hotels and Tourism	85
Transportation	22
Technology and Communication	35
Utilities and Energy	21
Commercial Services	30
Financial and Insurance	25
Others	21
Demographics	Numbers
Gender	349 Males, 22 Females
Education	79 Postgraduates, 181 Masters, 111 Bachelor degree holders
Experience	231 (10 years), 140 (less than 10 years)

N = 371.

### 3.2. Research Instrument and Measurements

The research data were collected using a printed paper-based questionnaire. To ensure the validity of the questionnaire, all items were adopted or adapted from past valid studies. The main reason for adopting measurements from different sources is to avoid or minimize the common method variance (CMV) bias. As Chang [86] explained, collecting different measurements from different sources is the best way to avoid or reduce CMV bias, and therefore measures for independent and dependent variables(s) should be collected from different sources. Before finalizing the questionnaire for data collection, expert opinions were also obtained, as suggested by Goodrich [87]. Expert opinion is required to ensure face validity. Three experts were consulted: two subject specialists and one experienced person from the industry.

Li [88] developed the scale for digital transformation by adapting four items from the study of [89]. In addition, Nwankpa and Roumani [78] adopted the three-items-based scale from [90]. Our research adapted both scales and presented a modified scale for digital transformation based on seven items because previous scales were insufficient to explore the broad concept of digital transformation.

The construct of innovation capabilities was measured using a five-item scale adopted from the study of [91]. Entrepreneurial orientation was measured using an eight-item measurement scale developed by [92]. A six-item measurement scale was used to measure the construct of competitive advantage by adopting it from the study by [93], which was originally developed by [71,94]. The number of items were different for each construct because they were either adopted or adapted from previous valid studies. Furthermore, it was not essential that the number of items in every construct is equal. All items used in the developed final scale were measured using the five-point Likert scale ranging from “strongly disagree” to “strongly agree”.

The survey consisted of three sections. The first section provided information about the research and the second section contained questions related to demographics. Questions related to the variables under consideration were in the third section.

## 4. Results

### 4.1. Data Normality

Data normality was tested using Skewness and Kurtosis values as recommended by [95], and the results are presented in Table 2. Kline [95] suggested that Kurtosis values below 10 and Skewness values below 3 indicate data normality. The study results revealed that all Skewness values ranged between  $-1.341$  and  $-0.164$ , whereas the range of Kurtosis values were between  $-1.631$  and  $1.479$ , both of which satisfy these data normality criteria. Furthermore, the mean values, as shown in Table 2, indicated that all values ranged



from 3 to 4 on the five-point Likert scale, indicating the respondents' trend towards the agreement side.

**Table 2.** Data normality test and descriptive statistics.

Variables	Min.	Max.	Mean	S.D	Skewness	Kurtosis
Digital Transformation	2.14	5.00	3.806	0.660	−0.187	−1.106
Entrepreneurial Orientation	1.00	5.00	3.071	1.045	−0.172	−1.008
Innovation Capabilities	1.00	5.00	3.018	1.288	−0.164	−1.631
Competitive Advantage	1.00	5.00	3.993	0.836	−1.341	1.479

N = 371.

#### 4.2. Sampling Adequacy

The study utilized Kaiser–Meyer–Olkin (KMO) and Bartlett's Test of Sphericity to determine sampling adequacy. According to Hair et al. [96], if the value of the KMO index is 0.80 or higher, the sampling adequacy is excellent. The KMO results presented in Table 3 show that the value of the KMO index was 0.938, which is higher than the recommended minimum criteria of sampling adequacy recommended by [96]. Moreover, the suitability of factor analysis is confirmed by the significant results from Bartlett's Test of Sphericity as recommended by [97]:  $X^2 = 7086.780$ ;  $df = 325$ ;  $p < 0.001$ .

**Table 3.** KMO and Bartlett's Test.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy	0.938
Approx. Chi-Square	7086.780
Bartlett's Test of Sphericity	df
	325
	Sig.
	0.000

N = 371.

#### 4.3. Factor Analysis

The majority of applications of factor analysis are exploratory which means that the goal is to highlight the relationships underlying a set of variables. Therefore, Exploratory Factor Analysis (EFA) can be used [98]. In this research we conducted EFA and the results are shown in Table 4. The results showed excellent loading for all the items used (0.675–0.899), hence no item was dropped from the final analysis. All the loading values were above 0.6 which indicates a high convergent validity [99]. In addition, when all the items were loaded in a single factor the total variance obtained by extracting the sum of the square of the loadings was 39.973, which is less than 50%, as recommended by [100] for common method bias.

**Table 4.** Exploratory Factor Analysis.

Variables	Items	Loadings	AVE
Digital Transformation	In our company, we aim to digitalize everything that can be digitalized.	0.758	0.510
	In our company, we aim at achieving information exchange with digitality.	0.703	
	In our company, we aim to create stronger networking between the different business processes with digital technologies	0.718	
	In our company, we collect massive volumes of data from different sources	0.675	
	Our firm is driving new business processes built on technologies such as big data, analytics, cloud, mobile and social media platform.	0.758	
	Our firm is integrating digital technologies such as social media, big data, analytics, cloud and mobile technologies to drive change.	0.692	
	Our business operations are shifting toward making use of digital technologies such as big data, analytics, cloud, mobile and social media platform.	0.688	

Table 4. Cont.

Variables	Items	Loadings	AVE
Entrepreneurial Orientation	Innovations are appreciated above everything else	0.899	0.797
	We emphasize R&D, technological leadership and innovativeness instead of trusting only those products and services, which we have traditionally found to be good	0.873	
	We emphasize risk taking	0.875	
	In our company, many people want to take risk	0.880	
	Within the last five years, we have brought several new products or services to the market	0.893	
	We intend to get into markets before our competition	0.874	
	We are typically ahead of competitors in presenting new products or procedure	0.879	
Innovation Capabilities	In our company people want to be first in the markets	0.866	0.742
	There is a constant generation of new service ideas in this firm	0.857	
	We are constantly searching for new ways of doing things	0.851	
	There is creativity in our methods of operation	0.861	
	This enterprise is usually a pioneer in the market	0.853	
Competitive Advantage	This firm is able to introduce new products/services every five years	0.840	0.567
	My organization’s services are better than its competitors	0.728	
	My organization’s R&D capabilities are better than its competitors	0.776	
	My organization’s managerial capabilities are better than its competitors	0.813	
	My organization’s profitability is better than its competitors	0.687	
	My organization’s image is better than its competitors	0.727	
	My organization’s competitive advantage is better than its competitors	0.780	

N = 371.

Confirmatory factor analysis (CFA) was used to test the reliability and validity of the measurement model via SPSS-AMOS version 24, and the results are presented in Table 5. Instead of focusing on Cronbach’s alpha coefficient, the reliability was measured using composite reliability (CR) values, which were higher than 0.70 (0.879~0.969). Cronbach’s alpha coefficient is commonly used for examining the reliability of scales but it is criticized for underestimation of true reliability, and thus composite reliability is more commonly used for calculating reliability in structural equation modeling [101].

Table 5. Validity Analysis.

Variables	CR	AVE	MSV	1	2	3	4
1—Digital Transformation	0.879	0.51	0.308	<b>0.714</b>			
2—Innovation Capabilities	0.935	0.742	0.322	0.348 ***	<b>0.861</b>		
3—Competitive Advantage	0.887	0.567	0.308	0.555 ***	0.444 ***	<b>0.753</b>	
4—Entrepreneurial Orientation	0.969	0.797	0.322	0.407 ***	0.568 ***	0.371 ***	<b>0.893</b>

N = 346; diagonal values in bold are square root of AVE; \*\*\*  $p < 0.001$ .

According to Nunnally and Bernstein [102], CR values must be greater than 0.70 for construct reliability. In our study, all the values were above 0.70 (see Table 5). Construct validity was tested by examining both convergent and discriminant validities as recommended by [96]. Convergent validity was determined from the values of Average Variance Extracted (AVE), which should be greater than 0.50 [103]. The CFA results showed that all AVE values were greater than the cut-off criterion of 0.50. Furthermore, when the values of the square root of AVE is higher than the correlation values of the constructs, and the Heterotrait–Monotrait Ratio (HTMT) values are less than 0.90, discriminant validity is confirmed [104,105]. The study results revealed that the correlation values of the constructs were less than the values of the square root of AVE, and the HTMT values were also less than 0.90 (see Table 6), which indicated excellent discriminant validity.

**Table 6.** HTMT Analysis.

Variables	1	2	3	4
1—Digital Transformation	-			
2—Innovation Capabilities	0.347	-		
3—Competitive Advantage	0.560	0.446	-	
4—Entrepreneurial Orientation	0.406	0.570	0.373	-

N = 371.

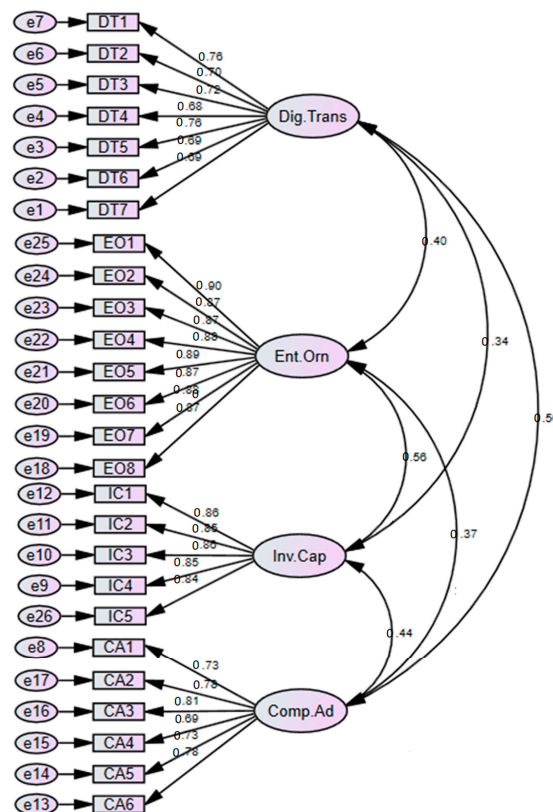
4.4. Measurement Model Fitness

Anderson and Gerbing [106] recommended that before proceeding to hypotheses testing, measurement model fitness should be assessed. The measurement model has four latent variables: digital transformation, innovation capabilities, entrepreneurial orientation, and competitive advantage. CFA was conducted to test the model fitness and the results are presented in Table 7. Following the criteria for model fitness recommended by [107], the most commonly used fitness indices were used, i.e., Chi-square ( $\chi^2/df$ ), the Tucker-Lewis index (TLI), the Comparative Fit Index (CFI), the Incremental fit index (IFI), and Root Mean Square Error of Approximation (RMSEA). The results revealed excellent model fitness of the four-factor measurement model, satisfying all the criteria ( $\chi^2/df = 2.46$ , RMSEA = 0.065, IFI = 0.93, TLI = 0.94, and CFI = 0.93). Figure 3 presents the AMOS output of the measurement model.

**Table 7.** Measurement model.

Measurement Model	$\chi^2$	DF	$\chi^2/df$	RMSEA	IFI	TLI	CFI
4-Factor Hypothesized Model	720.27	293	2.46	0.065	0.93	0.94	0.93
Model Fit Criteria [34]			<3.00	<0.08	>0.90	>0.90	>0.90

N = 346.



**Figure 3.** Measurement model.

#### 4.5. Hypotheses Testing

The study hypotheses with direct and mediating effects were tested using the structural equation modeling (SEM) technique, whereas those with moderation effects were tested using a slope test with the Hayes process macro.

Our study hypothesized three direct relationships, one indirect/mediating relationship, and two moderating relationships. The direct effect results are presented in Table 8, and showed a significant and positive relationship between digital transformation and competitive advantage ( $\beta = 0.496$ ;  $p < 0.001$ ), and digital transformation and entrepreneurial orientation ( $\beta = 0.367$ ;  $p < 0.001$ ). There was also a significant and positive relationship between entrepreneurial orientation and competitive advantage ( $\beta = 0.344$ ;  $p < 0.001$ ). These significant results lead to the acceptance of hypotheses H1, H2, and H3.

**Table 8.** Test of hypotheses (direct effect).

Relationships	Estimate	T	<i>p</i>
H <sub>1</sub> —Digital Transformation → Competitive Advantage	0.496	10.59	***
H <sub>2</sub> —Digital Transformation → Entrepreneurial Orientation	0.367	7.33	***
H <sub>3</sub> —Entrepreneurial Orientation → Competitive Advantage	0.344	6.80	***

\*\*\*  $p < 0.001$ ;  $N = 346$ .

The mediating effect of entrepreneurial orientation on the relationship between digital transformation and competitive advantage was also tested and the results are presented in Table 9. The results indicated that entrepreneurial orientation had a significant mediating effect ( $\beta = 0.087$ ;  $CI = 0.037\sim 0.158$ ) although there was a partial mediation effect because the direct effect of digital transformation on competitive advantage was also highly significant. However, hypothesis H4 is also accepted.

**Table 9.** Test of hypotheses (indirect effect).

Relationships	Indirect Effect	S.E	LLCI	ULCI
H <sub>4</sub> —Digital Transformation → Entrepreneurial Orientation → Competitive Advantage	0.087	0.031	0.037	0.158

$N = 371$ ; LLCI = lower limit confidence interval; ULCI = upper level confidence interval.

#### 4.6. Moderation Analysis

Innovation capabilities were tested as a potential moderator of the relationship between digital transformation and competitive advantage, and between digital transformation and entrepreneurial orientation. Results for the moderation effect of innovation capabilities on the relationship between digital transformation and competitive advantage are shown in Table 10 and the slope of the relationship is presented in Figure 4. The results revealed significant moderation with significant  $R^2$  change and F statistics. Moreover, the slope of the relationship as shown in moderation graph 01 (Figure 4), reveals that competitive advantage is high when innovation capabilities are high and digital transformation is low, compared with the situation of low innovation capabilities. However, when both innovation capabilities and digital transformation are high, the competitive advantage will be highest, as we predicted in H5.

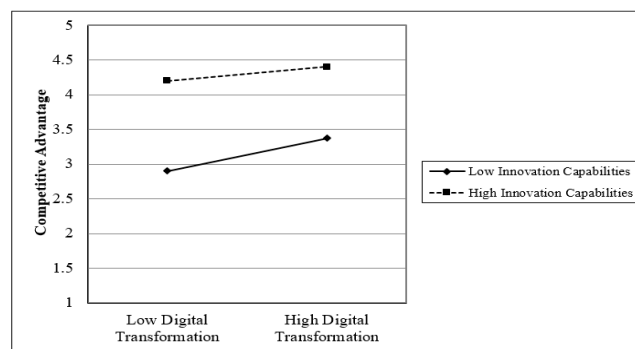
Results with regard to the moderation effect of innovation capabilities on the relationship between digital transformation and entrepreneurial orientation are shown in Table 11 and the slope of the relationship is presented in Figure 5. These results revealed the significant conditional effect of digital transformation on entrepreneurial orientation in the presence of innovation capabilities as moderator. The unconditional interaction results showed significant  $R^2$  change ( $0.018$ ;  $p < 0.05$ ) and F-Statistics (7.41). The conditional effect in the case of low interaction was  $0.238$  ( $p < 0.05$ ), at moderate interaction  $0.368$  ( $p < 0.001$ ), and there was a higher effect for high interaction ( $0.498$ ;  $p < 0.001$ ). The slope of the relationship also confirmed the significant moderation effect because where innovation capabilities were high, even with low digital transformation the entrepreneurial orientation

was higher compared with high digital transformation combined with low entrepreneurial orientation. As a result, hypothesis H6 is also accepted.

**Table 10.** Conditional effects of the focal predictor at values of the moderator.

DV: Competitive Advantage				
Test(s) of highest order unconditional interaction: (X*W)				
R <sup>2</sup> -change = 0.08 ***				
F Statistics = 45.01				
Moderator: Innovation Capabilities	®	p	95% CI	
−1 SD	0.117	0.16	−0.045	0.492
Mean	0.481	<0.001	0.370	0.591
+1 SD	0.845	<0.001	0.699	0.990

\*\*\* p < 0.001; CI = confidence interval.

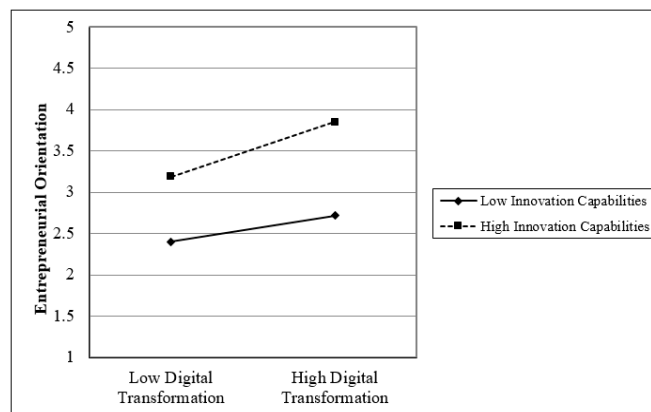


**Figure 4.** Moderation graph 01.

**Table 11.** Conditional effects of the focal predictor (digital transformation) at values of the moderator (innovation capabilities).

DV: Entrepreneurial Orientation				
Test(s) of highest order unconditional interaction: (X*W)				
R <sup>2</sup> -change = 0.018 *				
F Statistics = 7.41				
Moderator: Innovation Capabilities	®	p	95% CI	
−1 SD	0.238	<0.05	0.047	0.492
Mean	0.368	<0.001	0.223	0.513
+1 SD	0.498	<0.001	0.286	0.709

\* p < 0.05; CI = confidence interval.



**Figure 5.** Moderation graph 02.



## 5. Discussion

The implementation or utilization of modern information technology is becoming an important criterion for the development of organizations, but the associated requirements and implications of adopting this technology create challenges for the majority of organizations. However, despite these challenges, organizations are motivated to deal with modern information technology in order to maintain competitiveness in their business sector. Moreover, organizations are spending a lot of money on information technology [29] as they continuously confront new types of transformation, and in particular “digital transformation”, which is linked with the emergence of digital technologies that change operational processes [108]. The digitalization of businesses supports flexibility of information systems and operational processes [109] and has enhanced innovation in organizations [40] by making them entrepreneurship-orientated and accelerating their innovative capabilities. Many studies on digital transformation have focused on manufacturing companies [17,76] but ignored its applications and implications in the service sector. In Jordan, this sector contributes 67% to GDP [110] but faces challenges from intense competition, and the most prominent of these challenges is attaining competitive advantage.

This research has focused on the least explored area of digital transformation: the service sector. It has therefore significantly contributed to the literature on digital transformation, entrepreneurial orientation, innovation capabilities, and competitive advantage.

Our research has conceptualized digital transformation as a process of change leveraging digital technologies, instruments, capabilities, and business models in order to develop a competitive advantage. Dong et al. [111] examined digital transformation in the service sector and explained that organizations were investing more in digital technologies to enhance the overall customer experience or improve their operational efficiency. Investment in digital technologies or emphasis on digital transformation can help service-based companies to gain a competitive advantage over their rivals. Therefore, the first hypothesis of this research (H1) aimed to investigate the positive relationship between digital transformation and competitive advantage. The results supported this hypothesis and revealed that, in the same way as manufacturing companies, service-oriented companies in Jordan should also focus on digital transformation to achieve a competitive advantage. These results are consistent with the findings of Kretschmer and Khashabi [112] who demonstrated that in this turbulent market environment, digital transformation is becoming an important driver of competitive advantage.

The second hypothesis of this study (H2) was developed to examine the positive effect of digital transformation on entrepreneurial orientation. Rha and Lee [16] conducted a review on research trends in the digital transformation of the service sector and pointed out that this transformation had not influenced the value chain operations of manufacturing companies but it significantly affected service organizations. Furthermore, the substantial development of digital technologies has enabled product-oriented firms to focus on digital servitization by developing service-oriented business models. Our research suggests that, in addition to service orientation, firms should have an entrepreneurial orientation that is generated by digital transformation. To the authors' knowledge, this is the first study that has quantitatively examined the relationship between digital transformation and entrepreneurial orientation. Previously only Herve et al. [59] highlighted the fact that companies with greater interest in the digitalization of their functions will also favor entrepreneurial behavior to a greater extent, and thus a high degree of digitalization will lead to entrepreneurial orientation. In addition, our research has revealed that digital transformation helps service-based organizations of Jordan to achieve a competitive advantage both directly and indirectly (i.e., with entrepreneurial orientation). The third hypothesis (H3) aimed to identify the positive relationship between entrepreneurial orientation and competitive advantage. The results highlighted the significance of studying entrepreneurial orientation as it helps in attaining competitive advantage. These results are supported using a study by Bambang et al. [113], who found that sustainable competitive advantage could be achieved by implementing spiritual marketing and improving entrepreneurial orienta-

tion. The fourth hypothesis was designed to analyze the mediating role of entrepreneurial orientation between digital transformation and competitive advantage. The findings supported the hypothesis and found that entrepreneurial orientation acts as a significant mediator in the relationship between digital transformation and competitive advantage. Thus, service-based organizations in Jordan should implement digital transformation and become entrepreneurially oriented in order to achieve competitive advantage.

Dynamic capability significantly influences performance and this relationship can be mediated by ordinary capability (i.e., innovation capability) [28]. However, this study considered innovation capability as a moderator in the relationship between digital transformation and competitive advantage, and between digital transformation and entrepreneurial orientation. According to Rha and Lee [16] there is an urgent need for research concerning service innovations and digital technologies as they can create a competitive advantage for firms in this digital era. This was the reason for H5 and H6, and the results lead to acceptance of both these hypotheses. If a company has greater innovation capabilities, these capabilities strengthen the relationship of digital transformation with competitive advantage and entrepreneurial orientation.

### *Implications*

Today, many companies, managers, and particularly researchers are involved in digital transformation [114] as it is an inevitable trend in enterprise development [26]. Furthermore, it impacts the competitiveness of the company through cost reduction, efficiency, and innovation [111,115]. Thus, this research has attracted the attention of researchers and academicians by highlighting the significance of digital transformation and entrepreneurial orientation and associating them with the competitive advantage of service-based companies in Jordan. There is sufficient literature on digital transformation but its application and significance to the service sector have been overlooked. This study has therefore made a significant contribution to the literature on digital transformation, entrepreneurial orientation, innovation capabilities, and competitive advantage, in the following ways.

Firstly, based on the theory of dynamic capabilities and Resource-Based View (RBV), in this research we designed a framework to show the predictors of competitive advantage. RBV has relevance when considering the influence of organizational capabilities on performance [116], and dynamic capabilities are required by organizations for digital transformation [43]. In addition to dynamic capabilities, ordinary capabilities also enhance performance [117]. Similarly, Zhou [28] indicated that innovation capability was ordinary capability and identified its positive relationship with the financial performance of companies. Hence, this research has significantly contributed to the literature on dynamic capability (i.e., digital transformation) and ordinary capabilities (i.e., innovation capability). Furthermore, it investigated the relationship between dynamic capability and the competitive advantage of service-based companies in Jordan.

Secondly, there is a paucity of literature on the relationships highlighted by this research, and the findings of our study are a perfect literature source for future studies. The study has contributed to the literature on entrepreneurial orientation and innovation capabilities in the context of service-based companies. Entrepreneurial orientation is regarded as a mediator between digital transformation and competitive advantage. In addition, innovation capability was found to be as a moderator in the relationships between digital transformation, competitive advantage, and entrepreneurial orientation. The findings revealed that digital transformation together with entrepreneurial orientation can help service-oriented organizations to achieve a competitive advantage.

Thirdly, this research highlighted all the possible factors that can help service-based organizations in Jordan to develop a competitive advantage and improved performance. Thus, the findings of this study can aid researchers in developing guidelines or strategies.

The study also indicated that through successful digital transformation, managers of service companies can expect to gain a competitive advantage over their rivals. Appropriate entrepreneurial orientation and innovation capabilities can also play an important role in

the survival of service companies. Therefore, managers should design high quality digital transformation strategies that will lead to competitive advantage through entrepreneurial orientation and innovation capabilities. It is important for service company managers who are focused on the future of the firm and wish to achieve competitive advantage to understand the importance of digital transformation and the need to balance innovation capabilities. Therefore, in terms of practical implications, this research suggests that managers, owners, and executives in service-based companies should focus on digital transformation and entrepreneurial orientation in order to gain a competitive advantage. Many studies have focused on digital transformation in the manufacturing sector but there is still a lack of literature in the context of the service sector. Therefore, this study is particularly important for practitioners in service companies, and the findings can help managers to develop policies for the achievement of competitive advantage in this competitive digital era.

## 6. Conclusions

Digital transformation is generally considered important in the manufacturing sector, but this research has focused on its application in Jordan's service sector. The study revealed that it is important for service-based companies to focus on digital transformation and entrepreneurial orientation in order to achieve competitive advantage. Furthermore, they require innovation capabilities, as these strengthen the relationship of digital transformation with competitive advantage and entrepreneurial orientation.

The research has revealed important factors that can help service-based firms to gain a competitive advantage, but it has some limitations, and future studies can consider these as recommendations. Firstly, the study considered service-based companies only, and future studies could focus on the manufacturing sector or compare findings from both. Secondly, this research was country-specific, as the data were gathered from Jordan, but future studies could focus on any other developing or emerging countries that are still in the initial stages of digital transformation. Thirdly, in terms of design, this research has measured digital transformation, entrepreneurial orientation, innovation capability, and competitive advantage via subjective scores from managers of service-based companies. Although many methods were used to avoid the shortcomings of subjective data in questionnaire collection and data processing, deviation from the actual is inevitable. Future studies could combine objective and subjective data to improve the reliability and accuracy of the research. Fourthly, only one dynamic capability and one ordinary capability were discussed, and studies in the future could introduce other organizational capabilities that could contribute to competitive advantage. It is recommended that strategic agility be included as a dynamic capability that significantly influences performance [118].

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