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THE IMPACT OF DIGITAL TRANSFORMATION AS A MEDIATING VARIABLE BETWEEN PRODUCTION STRATEGIES AND ACHIEVING SUSTAINABLE COMPETITIVE ADVANTAGE

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Abstract

This study examines how digital transformation affects the relation between production strategies and sustainable competitive advantage (SCA). The data is collected from 16 Jordanian pharmaceutical companies with the help of Questionnaire. Structural Equation Modelling (SEM)is used for the analysis. the finding of this study revealed that production strategies directly and positively influence SCA. It is found that digital transformation mediates the association between production strategies and SCA. This paper provides practical suggestions that pharmaceutical Businesses may gain and sustain competitive advantage via digital transformation in a challenging business environment.

Keywords: Digital transformation, strategies, production strategies, flexible production, SCA, competitive advantage.

1. INTRODUCTION

Business environments have changed significantly in recent years. These changes include a rise in new competitors, ongoing customer expectations and demands, the rapid advancement of digital technology, ambiguous health conditions and environments, and an abundance of rules, laws, and regulations (Warner & Wäger, 2019; Al-khatib and Ramayah, 2025). Enhanced company strategies and approaches may assist companies in competing with other businesses and maintaining their profits and benefits. Although management, marketing, producing, financing, and accounting activities may result in significant business strategies and approaches, one of the primary mechanisms of a firm's commercial operations is its manufacturing strategy. It is a key component of an organization's long-term competitive advantage (Rakhmonov, 2024).

A transformation process that uses resources (input elements) to create goods and added value (output) is typically referred to as production. The value-creating part of a product's life cycle is production, which comes after the planning and development stage and is followed by distribution and final consumption (Moritz 2016). For a while now, production planning has been focused on technology. The just-in-time principle, lean manufacturing, and automated job design have long been the cornerstones of industrial work. Lead times in manufacturing processes have already been shortened, and inventory management has improved, thanks to these ideas and growing mass production, which allows production to be more tightly personalized to the demands of consumers and use mass effects. As expected in the framework of Industry 4.0, the trend is towards higher levels of automation and the implementation of intelligent communication and information technologies. (Rakhmonov, 2024).

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Businesses may gain a competitive advantage in several ways by using mass production, flexible production, and continuous production. One of the main forces behind a sustainable competitive advantage is cost leadership, which is commonly linked to mass manufacturing. The goal of mass production systems is to use economies of scale to lower unit costs. A business may either provide lower prices than competitors (price advantage) or retain larger profit margins while offering comparable prices when it can produce a product in large quantities at low costs per unit. In contrast, mass manufacturing techniques may cause an emphasis on efficiency rather than innovation, which can be unfavorable in sectors where rapid innovation is essential. This might be reduced; however, if the business consistently makes investments to enhance the manufacturing procedure or broaden its range of products.

Businesses may respond quickly to constantly changing consumer needs, create a range of goods in response to shifts in customer preferences, and reduce inventory costs by using flexible manufacturing. This flexibility is a huge benefit, particularly in industries where technology and customer preferences are constantly evolving. Costs may rise as a result of the requirement to invest in flexible machinery, competent workers, and flexible procedures. Although flexibility has numerous benefits, if it is not well managed, it can be costly to sustain (Rajesh, 2021).

Industries that have a constant demand for their products and a continuous manufacturing process employ continuous production. Significant benefits in terms of reliability and effectiveness are provided by this technology, which can support maintaining a competitive advantage. The fact that continuous manufacturing is less flexible than other methods is one of its primary disadvantages. It might be difficult for businesses to change production lines to new goods or adapt to shifting consumer demands without spending large additional expenses. But if the market is constant and demand is predictable, continuous manufacturing might still be advantageous (Mehta & Choudhary, 2023).

According to Sookbumroong and Phornlaphatrachakorn (2023), a business's sustaining competitive advantage is largely determined by its manufacturing processes and methods. To ensure the sustainability and consistency of their future competitive positions, this study defines SCA (sustain competitive advantage) as a framework that fully utilizes the capital of businesses while utilizing other resources. To adjust to dynamic, rapid innovations and a constantly changing business environment, corporate organizations across all sectors and industries are now required to continuously analyze, assess, and update their sources of competitive advantage. Rapid advancements in digital technology are bringing about major and substantial changes in industrial ecosystems (Verhoef et al., 2021).

Butt's (2020) competitive advantage transforms business practices by developing and delivering digital advantages and continuously using digital technology in operational and production processes. To completely restructure the business, it converts the processes, goods, and services into software-defined assets. As a result, in highly competitive contexts, digital transformation may help businesses prosper, endure, and grow. In this area, the Jordanian government is working very hard at digital transformation and has

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created the REACH 2025 goal to digitalize every business, industry, and person. Smart specialization and demand-driven innovation, governmental innovation, technological startups and entrepreneurs, ICT expertise, capability, and ability, facilitating business environment, effective digital economy infrastructures and governance" are the seven key pillars around which this vision is built (Hervé et al., 2020).

Additionally, according to this vision, Jordan's digital economy is expected to generate up to 150,000 new employment and 5000–7000 new emerging firms by 2025. In addition, Shtawi et al., (2023) state that Jordan possesses a strong local pharmaceutical manufacturing industry that supplies up to 25% of the nation's needs. Drug distributors and importers handle the importation of the remaining pharmaceuticals. The Jordan Food and Drug Administration (JFDA) requires that all medications sold in Jordan be registered. The JFDA is a separate organization that controls medications and guarantees their price, quality, and safety. The JFDA sets the fixed national retail price for all registered drugs.

Over the previous forty years, Jordan's pharmaceutical sector has experienced remarkable growth. After taking into consideration acquisitions and restructurings during the last two years, the Kingdom now has 16 drug-manufacturing enterprises. In 2000, Jordan became a member of the World Trade Organization, which reduced industrial tariffs and export restrictions. The pharmaceutical industry plays a significant role in Jordan's economy, with almost 80% of its output going to more than 60 international markets. Elderly populations, growing healthcare demands, and improvements in medical technology have all contributed to a steady increase in the need for medicines worldwide. Jordan is a major player in both international and Middle Eastern and North African (MENA) markets because of its well-established pharmaceutical sector (Jawarneh et al., 2023). Businesses are encouraged to expand production to satisfy the growing demand from outside markets as Jordan's pharmaceutical exports rise. Pharmaceutical businesses' output rises as a result of Jordan's increased pharmaceutical exports.

Companies are encouraged to invest in innovative production technology and infrastructure upgrades by the expanding export market for Jordanian medicines. In addition to increasing the number of medications produced, these expenditures also make it possible to produce better goods that satisfy global regulatory requirements. The prosperity of the export of Jordanian pharmaceuticals also makes local businesses more competitive internationally. Companies might be able to broaden their product offerings by releasing new pharmaceuticals or focusing on other therapeutic areas as Jordan's pharmaceutical sector grows. To preserve competitive advantage, this diversity promotes ongoing production improvement in addition to increasing market share (Shraah et al., 2022).

To fulfill the rising demand worldwide, pharmaceutical businesses in Jordan are increasing their output in tandem with their exports. The difficulty, though, is in comprehending how production tactics, the function of digital transformation, and their combined effects affect Jordanian pharmaceutical businesses' long-term, sustainable competitive advantage. This leads to our problem statement: the increase in Jordanian pharmaceutical exports causes an increase in production, raising the question of how

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production strategies, mediated by digital transformation, impact a sustainable competitive advantage

This statement leads to the study question, "How can production strategies, mediated by digital transformation, help achieve a sustainable competitive advantage?" Although the potential of digital transformation for improving operational effectiveness, decision-making, and creativity is well known, less has been learned about how these production strategies specifically affect maintaining sustainable competitiveness in the pharmaceutical industry. So, the purpose of our paper is to investigate the effect of production strategy in achieving a sustainable competitive advantage for Jordanian pharmaceutical companies, with a particular focus on how digital transformation mediates this relationship. The results are intended to shed light on how production processes, enhanced by digital tools and technology, could improve competitiveness in a market that is becoming more interconnected by the day.

The paper is organized as follows:

Section 2 describes the theoretical literature; section 3 describes the methodology of our research whereas the findings and results of our research are described in chapter 4. In the end, chapter 5 concludes our research paper.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Advanced manufacturing technologies are brought together in the fourth industrial revolution to create interconnected, self-organizing, and automated production systems that require no human intervention. Pharmaceutical manufacturing workers are empowered by their expertise in the automated and digital world of industry. With an emphasis on Volvo's particular production system, Singh et al. (2023) investigated the conditions and situations in which "company-specific production systems" might boost a company's competitiveness. The study establishes and concludes that "company-specific production systems" are essential for gaining and maintaining a competitive edge in manufacturing.

The study demonstrates that while late beginnings may still catch up and obtain a competitive edge if they adopt and apply the "company-specific production systems" more quickly than their rivals, early adopters receive an instant transitory advantage. The "company-specific production systems" need to be more harmonious and well-received by other resources and stages in the corporate value chain to get a lasting competitive advantage. Another way for businesses to gain a competitive advantage is through enterprise technology. A company's technical competitiveness is mostly determined by its capacity for invention, integration of several technology streams, and manufacturing skills. The sources of technical competitiveness in manufacturing and production include technological capability and technological innovation capability (Al-Mamary et al., 2022).

The mass customizer has a perfectly flexible production technology, so it is capable of providing any kind within a product space, according to Ozdemir et al. (2022). The mass producer delivers a limited number of goods to the same space because of their more

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specialized production technique. By investing in more adaptable technology, the MP may lower its cost of variety and provide a wider range of items; at the other extreme, the MP may replicate the mass customizer's technology and provide an endless number of options. The MP selects the level of product-mix flexibility upon entrance, and the enterprises concurrently determine whether to enter the market (Atieh et, al, 2025).

The competitive benefits of a manufacturing company with mass production in the presence of market oversupply were examined by Wadea & Habib (2023). The employees of cement manufacturing companies in Egypt, which are experiencing a marketing crisis due to overstock, make up the study's population, which is based on a comparative analysis. According to the DAM (descriptive-analytical method), the study employed a survey of thirty-two people in the first half of 2022. The sample firms' marketing strategies and competitive advantages varied, according to the inferential analysis.

Continuous manufacturing offers the chance to apply this enhanced understanding of goods and procedures to apply complex production controls, resulting in consistently superior goods with less production wastage material that is not up to par and an active competitive advantage. A systems approach is necessary for the design, control, and optimization of continuous production facilities, claims Wahlich, (2021). To encourage wider adoption of continuous pharmaceutical production, regulators and the industry will need to keep learning about and gaining experience with such systems-based approaches.

Using a moderator of digital transformation, Sookbumroong & Phornlaphatrachakorn (2023) examined the impact of the development of new product capabilities on the performance of marketing and sustained competitive advantage. They researched Thailand's fast food and convenience food companies. The direct and mediating effects are tested using a structural equation model, while the moderating effects are examined using multiple regression analysis. They discovered that marketing performance is greatly impacted by sustainable competitive advantage, which also fully mediates the linkages between marketing performance and new product creation capabilities. Furthermore, digital change has a major moderating effect on the partnership's strength.

In the Indonesian context, Saputra et al. (2024) investigated the interaction among dynamic capabilities, digitalization, and competitive advantage. They discovered a positive relationship between SME competitive advantage and digitization. The study also demonstrated the important role that digitalization plays in mediating the relationships between competitive advantage, learning capability, sensing capability, and integrating capability. We have constructed the following theoretical framework and hypothesis based on our literature.

H1: Production strategy directly effects the sustainable competitive advantage in Jordanian Pharmaceutical companies.

H2: Production strategy directly affects the digital transformation in Jordanian pharmaceutical companies.

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H3: Digital transformation directly affects the sustainable competitive advantage of Jordanian pharmaceutical companies.

H4: Digital transformation has a mediating effect on the relation of production strategy and sustainable competitive advantage in pharmaceutical companies of Jordan.

The theoretical framework on the basis of the literature studied is shown in the figure 1.

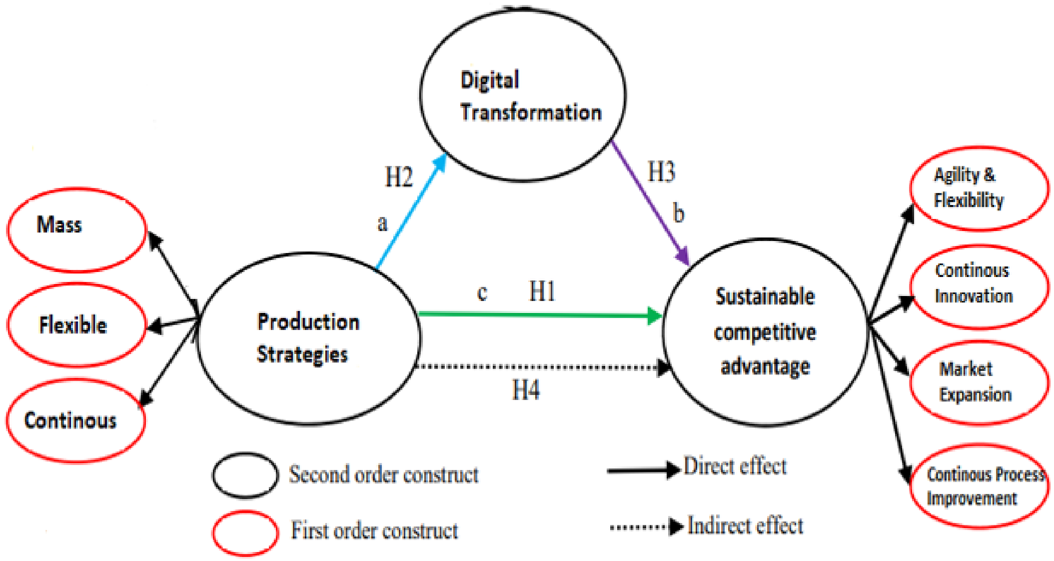

Figure 1: Theoretical Framework

3. METHODOLOGY

3.1 Population and Sampling

All of the managers of the Jordanian pharmaceutical Companies, which employs 850 workers at different employment levels, make up the study population. Jordan has sixteen pharmaceutical businesses in total. The researchers used a simple random sample that was taken out of the business. The previous research population established the sample size, which was 230 people with a 95% confidence coefficient and a 5% error. The sample of our research are indicated in the table below.

Table 1: Sample Distribution

Jordanian Pharmaceuticals production company	Total	Sample
Medical	432	115
Sales	261	84
Management and Marketing	157	31
Total	850	230

In our study, top managers represent their companies because they are experts and critical professionals who understand and are familiar with active and practical management principles to achieve sustainable competitive advantage and they are

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good representatives who can argue for their experience and have knowledge of production strategies and competitive advantage in the pharmaceutical sector in Jordan.

3.2 Data Collection

The study's questionnaire was given to the organizations manually. Five post-graduate surveyors gathered the questionnaire. Over two days, the surveyors received training on data-gathering ethics and procedures. Four months and thirteen days were spent on the entire data-collecting procedure. Between April 2024 and August 2024, the questionnaire was distributed to company executives and their subordinates. Consequently, 384 respondents in all were targeted. Merely 240 surveys were returned, indicating a 62% response rate. Ten surveys in all were rejected because of the large amount of missing data. As a result, only 230 surveys were employed, resulting in a 60% response rate. Since the non-responding pattern was discovered to be randomly dispersed among the chosen respondents, it did not exhibit any bias issues. In conclusion, we can say that the chosen sample accurately reflected the target population.

3.3 Instruments and Variables Measurement

We created a questionnaire manually to collect the needed data to investigate the purpose of the study. The three Variables utilized in this study were taken from earlier English-language publications in the same field. For this reason, the questionnaire was prepared in English. We then produced an Arabic translation of the questionnaire. It is guaranteed that all of the measuring scales showed adequate levels of validity and reliability in the original publications after they were adopted. Therefore, it was assumed that the selected measuring scales were content valid. 18 items were taken from Wadea & Habib (2023), and Ozdemir et al. (2022), to measure production strategy. According to Lee et al. (2021), these strategies are divided into three categories: continuous production, flexible production, and mass manufacturing. Five elements were taken from Nasiri et al. (2020) to study digital transformation 16 items taken from Battour et al., (2021) are used in the third section to test SCA. Agility and flexibility, continuous innovation, expansion in markets, and continual process improvement are the four areas into which sustainable competitive advantage is also divided (Battour et al., 2021). A 5-point Likert scale, where 5 is strongly agree and 1 is strongly disagree, was used to evaluate each item.

3.4 Pilot Study

Pilot testing was done on the study's questionnaire before it was finalized. Nine production-related specialists participated in a panel discussion to test the questionnaire. A few elements have been changed to accommodate their suggestions and opinions. A pilot study of the research survey was carried out following the panel discussion. Thirty respondents who were managers of a few pharmaceutical firms provided the data for the pilot research. The Cronbach's alpha test was performed to further evaluate the data and assess the survey's reliability. The alpha value was raised from 0.366 to 0.912 by removing three items from the flexible production. The alpha values are 0.892 for SCA, 0.911 for digital transformation, and 0.914 for production strategies. Consequently, 39

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components with 7 dimensions made up the finalized measurement of the suggested model. The normality problem was further examined on the questionnaire. The value of skewness, which ranged from -0.051 to +0.062, and the value of kurtosi, which ranged from -0.112 to +0.716, suggested that the data is normally distributed.

3.5 Analysis of Data

Using IBM software i.e. Analysis of Moment Structures (Amos-23) and Statistical Package for Social Sciences software (spss-23), the covariance-based SEM (CB-SEM) approach was used to assess the suggested model and the study's hypotheses. Three techniques for statistical processing were applied: SEM, CFA, and EFA. To confirm the mediation effect, h1 and h2 must exhibit substantial scores. There is a partial mediation effect if H1 has a significant impact. This method would multiply a and b in the main model to determine the mediation magnitude (see Figure 1). The VAF -Variance accounted for is used to analyze the strength of the mediator effect. According to Hair et al. (2016), partial mediation occurs when the VAF is higher than twenty percent but lower than 80 percent. Using the technique described by Hair et al. (2016), internal reliability, convergent and discriminant validity were investigated.

4. FINDINGS AND DISCUSSION

To purify the measurement, this study first performed the EFA and then the CFA. Factor loadings larger than 0.40 were used in the EFA. Additionally, all items that were loaded on more than factors or saturated were removed. Consequently, items 4 and 7 were removed from production strategies, whereas items 5, 6, and 12 were removed from the sustainable competitive advantage. The sampling adequacy was tested using the KMO and Bartlett's test and as a result, significant values of 0.920 for production methods, 0.911 for digital transformation, and 0.938 for sustainable competitive advantage were found. A seven-factor solution that explains 72.592% of the variation was obtained by EFA. To assess the validity and reliability of the seven dimensions, a first-order CFA was performed. Three dimensions were used to represent production strategies: continuous, flexible, and mass production whereas four categories were used to describe SCA: market expansion, continuous process improvement, agility and flexibility, and continuous innovation. The goodness-of-fit test results for the CFA were satisfactory. The following are the Chi-square results: CIMIND is 1.611; cfi is 0.912; tli is 0.910; rmsea is 0.048; gfi is 0.879; agfi is 0.861; IfI is 0.904; and nfi is 0.951; 4234.845; df is 2531; p is 0.000.

Table 2 shows that the average extracted variance exceeded 0.50, fulfilling the requirements for convergent validity. Furthermore, as the computed values are higher than the suggested value (0.7), the internal consistency of the variables is also verified. The correlation is below 0.85 and falls between 0.133 and 0.7111. this shows that all the constructs have discriminant validity as the external correlation is less than the interior relation value of related variables.

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Table 2: Statistical Analysis (CR; factor loading; Cronbach alpha; AVE)

Construct	Item	Factor loading	α	CR	AVE
Production Strategies			0.948		
Mass production	MP1	0.834	0.943	0.95	0.724
	MP2	0.852			
	MP3	0.786			
	MP4	0.858			
	MP5	0.779			
Flexible Production	FxP1	0.782	0.879	0.879	0.534
	FxP2	0.764			
	FxP3	0.698			
	FxP4	0.776			
	FxP5	0.762			
Continuous Production	CP1	0.811	0.908	0.899	0.642
	CP2	0.836			
	CP3	0.833			
	CP4	0.854			
	CP5	0.822			
Digital transformation	Dgt1	0.921	0.946	0.945	0.757
	Dgt2	0.953			
	Dgt3	0.930			
	Dgt4	0.917			
	Dgt5	0.944			
	Dgt6	0.936			
	Dgt7	0.899			
	Dgt8	0.904			
Sustainable competitive advantage			0.930		
Agility and Flexibility	AGTFLEX 1	0.837	0.927	0.940	0.720
	AGTFLEX2	0.782			
	AGTFLEX3	0.755			
	AGTFLEX4	0.819			
Continuous innovation	CONINV1	0.807	0.883	0.885	0.721
	CONINV2	0.778			
	CONINV3	0.845			
	CONINV4	0.861			
Market expansion	ME1	0.764	0.856	0.891	0.723
	ME2	0.692			
	ME3	0.783			
	ME4	0.861			
Continuous Process Improvement	CTPI1	0.816	0.874	0.895	0.722
	CTPI2	0.812			
	CTPI3	0.785			
	CTPI4	0.884			

4.2 Structural Model Assessment and Hypothesis Testing:

SEM is used to determine the model's efficiency and data conformance in order to evaluate the study's hypotheses. The findings of the fit indexes are $p < 0.5$. tli is 0.91; rmsea is 0.048; gfi is 0.90; agfi is 0.92; ifi is 0.910; nfi is 0.89; chi-square 4146.563; df is

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2632; p is 0.000; Cimid os 1.650; Cfi is 0.911; and tli is 0.91. Consequently, as Figure 2 illustrates, the goodness-of-fit index findings provided unquestioned evidence of a sufficient model fit to the data.

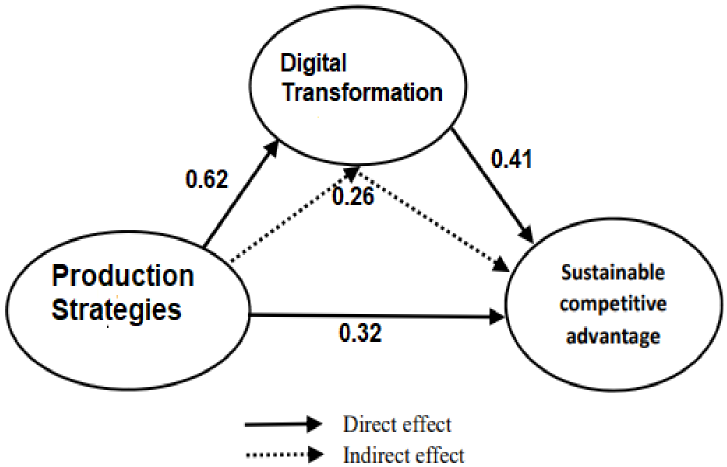

Figure 2: SEM (Structural Equation Modeling)

Table 2 shows the results of the structural model. With a 0.32 co-efficient value and a p-value 0.05, the findings show a significant direct relationship between production techniques and sustainable competitive advantage in pharmaceutical companies in Jordan. With a p-value of less than 0.05 and 0.62 co-efficient, production strategies also have a significant direct impact on digital transformation. Furthermore, with a co-efficient of 0.41 and a p-value below 0.05, digital transformation has a strong direct impact on sustainable competitive advantage. As a result, the first 3 hypothesis (h1, h2, and h3) are accepted. Furthermore, according to the results of squared multiple correlations the production strategies accounted for 44.1% of the variance in sustainable competitive advantage and 40% of the variance in digital transformation.

Table 2: Direct Effect

Variable	Path	Variable	Path	S.E.	C.R.	p-value	Finding
SCA	←	Production Strategy	0.32	0.132	3.552	***	Significant
DGT	←	Production Strategy	0.62	0.110	6.289	***	Significant
SCA	←	DGT	0.41	0.122	4.412	***	Significant

***** p-value < 0.05**

4.3 Mediation Effect

As stated previously, evaluating the effect of mediation requires examining more than one relation between two effects (direct & indirect). Table 3 displays the findings of this. The hypothesis to be tested is first presented. The null hypothesis that there is no indirect influence of production strategy on sustainable competitive advantage is rejected, as indicated by the p-value i.e. 0.000. The previous test T-value is 3.571. The size in-direct

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effect of production strategy on sustainable competitive advantage is 0.262. The indirect effect of production strategy on the sustainable competitive advantage is significant indicated by the value i.e. 0.001.

Based on these findings, the sum of the direct effect of 0.32 and the indirect impact of 0.262 would result in an overall score of 0.582, which represents the overall impact of production strategy on sustainable competitive advantage. The direct effect (0.32) divided by the total effect yields a score of 0.549 on the VAF. Therefore, the partial mediator variable (digital transformation) in Jordanian pharmaceutical firms accounts for 54.9% of the impact of production strategy on sustainable competitive advantage. Additionally, the Bias-corrected percentile approach was used to explain the validity of the fourth major hypothesis' indirect relation for both the upper and lower values, which were 0.634 and 0.218, respectively. As a result, it is regarded as being in a good range indicated in Table 3.

The findings of the following table show that h4 is accepted. Therefore, through the variable of digital transformation, production strategies indirectly affect sustainable competitive advantage. Stated differently, production strategies and sustainable competitive advantage have a causal relation through digital transformation. Our study's theoretical model is compatible with the information gathered from the target population. According to the findings, the mediator i.e. digital transformation affects the relation between production strategies and SCA.

Table 3: Testing Mediation Effect

Hypothesis	p-value	T-value	Bias-Corrected Percentile Method			Bias-Corrected Percentile Method		Test of In-direct Effect (Bootstrap Stand Error)	Result
			In-direct	Direct	Total	Upper	Lower	(TWO) Tailed Significance	
In-direct relation between Production strategy & SCA through the digital transformation as a mediating	0.000	3.571	0.262	0.32	0.582	0.634	0.218	0.001	Partial Mediation

5. CONCLUSION

The objective of our paper is to examine the relationship between production strategy (mass production, flexible production, and continuous production) and achieving sustainable competitive advantage (agility and flexibility, continuous innovation, market expansion, and continuous process improvement) in Jordanian pharmaceutical companies using a quantitative approach. According to the data, every production strategy has a positive effect on the adoption of digital transformation, highlighting their function in promoting the efficient use of digital technology. Additionally, the study discovers a strong and favorable relationship between sustainable competitive advantage and digital transformation (Saputra et al., 2024).

Additionally, the results show how digital transformation mediates the relationships between sustainable competitive advantage, flexible and continuous manufacturing, and mass production (Singh et al., 2021). In conclusion, Digital transformation has helped pharmaceutical businesses increase their competitive advantage through the use of production strategy, especially flexible manufacturing. In other words, in the case of Jordanian pharmaceutical businesses, digital transformation acts as a means through which production strategy might impact sustainable competitive advantage.

By concentrating more on digital transformation, our study effectively provides Jordanian pharmaceutical businesses with recommendations on how to sustain their competitive advantage. Additionally, companies should think of digital transformation as a tool to help them prepare for direct competition, accept risks to open up new opportunities and predict and manage changes. Furthermore, without digital transformation, Jordanian pharmaceutical businesses would not fully understand the significance of production processes in gaining a sustainable competitive advantage. By integrating digital transformation into its production strategy, Jordanian pharmaceutical businesses may attain a sustainable competitive advantage.

We primarily examined the pharmaceutical business because it represents one of Jordan's biggest production sectors. This is a highly relevant environment that might aid in understanding the connections between digital transformation, production strategy, and sustained competitive advantage. Other industries were not included in the survey, though. The utilization of cross-sectional data may make it more difficult to comprehend the dynamic interactions among the variables in the study. Digital transformation has also been investigated as a mediating component; however, due to the broad nature of the study, certain aspects were overlooked. Future research in a variety of contexts, including small- to medium-sized enterprises or other advanced nations, may employ the same theoretical paradigm. Future research may examine the dynamic relation in this theoretical framework using a longitudinal method. Furthermore, rather than using digital transformation as a mediating variable in the relationship between production processes and sustainable competitive advantage, it is recommended to use other specialist components like blockchain, artificial intelligence, etc.

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