



Intelligent Information Systems and Firm Performance: Examining the Mediating Effect of Data Analytics Capability

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Received: 14 January 2026

Accepted: 21 March 2026

DOI: <https://doi.org/10.32479/jidsi.25192>

ABSTRACT

The present research examines the moderating effect of data analytics capability (DAC) between the relationship of intelligent information systems (IIS) and firm performance (FP). The study takes place in the manufacturing sector in the Kingdom of Jordan with the objective to gain insights into the relationship between digital intelligence infrastructure and the organizational outcomes. Direct and indirect effects were explored, and DAC is important as a mediator between IIS and FP. In the study purposive sampling was used as sampling technique. The study involved 391 respondents comprising employees from manufacturing companies directly engaged in the operational and managerial processes of the businesses. Data were analyzed by structural equation modelling (SEM) which was used to explore the direct and indirect relationships in the research model. The results indicate that IIS have positive significant effects on DAC and FP. In addition, there is a strong positive association between DAC and FP, and a moderate effect of DAC on the association between IIS and FP. Overall, this research confirms previous studies that show that IIS provide an organization with benefits both directly and indirectly by improving analytical abilities. The development of DAC is key to making the investments in digital systems tangible and sustainable for the organization. The novelty of this research is the empirical context, as manufacturing companies in Jordan were selected for analysis regarding their use of intelligent systems and how they influence the level of their performance through their analytical capabilities. The significance of data-driven decision-making is essential for sustaining competitive advantage and business growth in digitally evolving environments.

Keywords: Intelligent Information Systems, Data Analytics Capability, Firm Performance, Manufacturing Industry, Organizational Sustainability

JEL Classifications: G2, L86

1. INTRODUCTION

Today, with the digital transformation era, organizations are more and more turning to IIS for improving the quality of their decisions, operational efficiency, and general FP. The integrated digital infrastructures are those which integrate AI, machine learning and advanced information processing to facilitate real-time data-driven decision-making (Ahmad and Akbar, 2021). The implementation of such systems, however, does not necessarily mean better performance of the firm when the firm does not build complementary capabilities. An important one of these is the capability of an organization to gather, process, analyze and convert raw data into actionable insights (DAC: Nassani

et al., 2023). FP, on the other hand, is linked to the non-financial outcomes like productivity, profitability, operational efficiency, and market competitiveness (Wu et al., 2024).

This study proposes that the relationship between IIS and FP is not linear, but rather is mediated to a large extent by the mechanism of DAC. These variables are well grounded in the resource based view (RBV) and the dynamic capability theory (DCT) that focuses on the need for technological resources to be appropriately leveraged into organizational capabilities to create sustainable competitive advantage (Teece et al., 1997; Barney, 2001). In this sense, IIS offers the technological platform whereas DAC serves as the transformation engine that allows companies to make use

of digital investments. If the organization does not possess such a capability, they may fail to take advantage of the advanced systems, causing inefficiencies and potential lack of performance benefits (Almajali et al., 2025).

This research takes place in the manufacturing industry of the developing country Jordan, which is undergoing fast industrial modernization and digitalization. In Jordan, manufacturing industry is an important contributor to GDP, with an estimated contribution of about 18-20% of the national GDP and a high share of the workforce in the industry (Neiroukh et al., 2025). Despite this, the sector is still confronted with on-going issues of global competition, disruptions to the value chain and a low level of digital maturity relative to other advanced economies (Wamba-Taguimdje et al., 2020). Over the past few years, Jordanian companies have begun to invest more and more in smart systems and digital infrastructure to boost productivity and export competitiveness (Ayoub and Sopuru, 2026). Despite this, the effect of IIS on performance is not consistent, which raises the question of what is required when considering enabling capabilities like data analytics.

Existing literature shows that there is a gap in theory and empirical studies, with most studies examining the relationship between IIS and OP without considering intermediate mechanism (Obitade, 2022; Zahid, 2023), and few studies have been conducted in the context of emerging markets such as Jordan, which has been underexplored (Peng et al., 2025). Earlier research has neglected sector-specific dynamics in manufacturing, as a high reliance sector on process optimization, and often relied on cross-country aggregated data, reducing contextual specificity (Shahid et al., 2026; Garmaki et al., 2023), few studies integrated SEM-based empirical validation in Middle Eastern industrial settings, and the role of analytics capability as a dynamic transformation mechanism remains under-theorized (Qaffas et al., 2023).

The main purpose of this study is to test the direct effect of IIS on FP, and to test the mediation role of DAC in this relationship based on these gaps. Further, the study is expected to extend theory in the form of RBV and DCT when it comes to digital intelligence systems. The study also aims to offer empirical evidence obtained from the manufacturing sector in Jordan that facilitates a better understanding of the outcomes of digital transformation. This research has several dimensions. In theory, it expands the body of digital capability literature with the focus on data analytics as a key mediating process. In short, it gives managers a perspective on how investments in intelligent systems can be used effectively to enhance performance through analytics-driven decision making. Socially, it helps advance country digital transformation agendas by understanding key capability gaps in emerging economies; economically, it helps inform the economic strategy for the development of emerging economies. It is important to note that this study is contextual, as it integrates the three following elements: Intelligent systems, analytics capability, and firm performance in a single empirical framework applied to 391 responses from manufacturing companies in Jordan; this is a rare contextual contribution. This research is driven by the increasing significance of data-driven intelligence for today's industrial

ecosystems, and it fills a gap in the literature regarding the value of digital technologies for building organizational capabilities and not just for adopting the technology itself.

2. THEORETICAL BACKGROUND

This study's theoretical basis is largely drawn from RBV and DCT both of which offer a solid framework for understanding how IIS manifest in FP in the context of DAC. Theories are carefully chosen to not only account for the possession of technological resources, but also their conversion to sustainable competitive advantage in a fast-changing digital context. RBV suggests that FP should be based on valuable, rare, inimitable and non-substitutable resources, Barney (2001) while DCT elaborates this point by adding that the firm has the capability of integrating, building and reconfirming its internal and external competencies when the environment changes, Teece et al. (1997). As part of intelligent digital systems, these theories together account for the fact that technological infrastructure alone is not enough, without being supplemented by higher-order skills like DAC. This study has taken great interest in RBV as it is highly relevant to this study as IIS are strategic organization resources that can yield the performance advantage only if utilized optimally. But previous research indicates otherwise, as resource commoditization and risk of imitation is a challenge (Zahid, 2023; Phan and Teoh, 2024). This restriction is overcome by incorporating a mediating resource called DAC that converts raw data to actionable knowledge, thereby increasing the strategic value of IIS. Also, DCT can complement this theoretical model by providing an explanation of how firms continuously reconfiguring and adjusting digital resources to accommodate environmental uncertainty and technological changes (Hussain et al., 2023). In such a competitive and digitally transforming manufacturing landscape, dynamic capabilities become crucial for maintaining performance gains (Shafqat et al., 2025).

For this study, the RBV and DCT are well suited, as they connect to the asset of possession and the utilization of capabilities. RBV is valuable because it provides a rationale for the value of IIS and analytics capability, while DCT is valuable because it provides a rationale for how to deploy and continually improve these resources to support FP outcomes. The integrated perspective theory has been commonly acknowledged in the previous digital transformation studies, as researchers have highlighted the importance of complementing IT value creation with complementary organizational capabilities (Ilmudeen, 2021; Qaffas et al., 2023). Moreover, research on the use of big data in analytics shows that companies that are more capable are more successful in their decision-making quality and operational efficiency (Khaddam et al., 2023). The relationships proposed in this study model are highly supported by empirical literature. For example, Zahid (2023) and Nassani et al. (2023) illustrate that the use of IT infrastructure does increase FP with organizational capabilities. Likewise, Almajali et al. (2025) believe that Business Intelligence systems enhance performance indirectly via analytical skills. Recent research by Khan et al. (2024) and Shafqat et al. (2025) emphasizes the role of data analytics capability as an essential interlinking link between information technologies and organizational outcomes.

In the manufacturing realm, Ahmad and Akbar (2021) and Obitade (2022) agree that the use of digital technologies is a positive enabler of the supply chain and operational performance of firms only when they have advanced analytical capabilities. Furthermore, DCT studies highlight the need for ongoing development of sensing, seizing and transforming processes to enable effective use of digital technologies (Zahid, 2023). In particular, IIS could be considered a “sensor” and DAC a “seizing process” that transforms data into strategic insights. Transformation is when companies change processes as a result of data-informed decisions. Neiroukh et al. (2025) contend that the process of digital transformation is successful when dynamic capabilities are orchestrated. Further empirical findings from the emerging economies confirm this theoretical interpretation as well. Research in the developing world also reveals that digital systems have limited impact on performance without organizational readiness and analytical maturity (Bhuiyan et al., 2025; Neiroukh et al., 2025). Likewise, studies on manufacturing industries indicate that improvement in performance depends on the development of capabilities, not just technology transfer (Wu et al., 2024). These results support the mediation effect of DAC in this study quite strongly. To sum up, RBV offers the logic of “what constitutes strategic resources” (IIS and DAC), while DCT offers the logic of adaptive processes that create performance outcomes. By combining both theories, the link between digital technologies and value creation in manufacturing firms is explained. The theoretical model presented in this study was supported by a considerable amount of prior literature in the fields of IS, analytics and manufacturing research, which provides strong justification for the proposed model of IIS, DAC and FP in the context of the digitally evolving and competitive manufacturing environment in Jordan.

2.1. Intelligent Information Systems and Data Analytics Capability

IIS are well known as strategic digital infrastructures that can boost organizational capabilities by providing them with the opportunity to process data in real time, automate some processes, and support advanced decision-making (Ahmad and Akbar, 2021). In today’s digital era, IIS can be considered as the fundamental technological tools that transform the way enterprises collect, analyze, and leverage information for operational and strategic decisions (Neiroukh et al., 2025). Previous studies, however, invariably highlight the need for firms to build complementary capabilities to transform digital information into actionable intelligence (i.e., knowledge) for the emergence of positive organizational outcomes (Shahid et al., 2026). In this context, the competence of DAC becomes a crucial aspect of organizational agility, which can help companies derive value from large and intricate datasets and convert them into actionable knowledge that guides decision-making processes (Peng et al., 2025). On the RBV side, IIS can be a valuable technological resource, but the strategic value can only be realized in the way in which the firm utilizes them, which is rare and hard to imitate (Zahid, 2023). Likewise, dynamic capability logic suggests that companies need to be constantly adding and adjusting digital resources to meet the demands of the environment (Bhuiyan et al., 2025). The use of intelligent systems is also becoming increasingly important in manufacturing environments where the complexity of operation is high and market volatility is high to achieve competitive performance (Obitade, 2022). Hence,

the IIS-ACC linkage is not only technical but organizational as well, understanding how firms evolve their digital maturity to be competitive in data-driven ecosystems.

- H_1 : IIS have a positive effect on DAC.

2.2. Intelligent Information Systems and Firm Performance

As the level to which advanced information infrastructures affects strategic and operational results rises, so does FP in D-E companies (Qaffas et al., 2023). In addition to being technical artifacts, IIS also act as strategic enablers, promoting coordination, transparency and evidence-based management at various levels within the organization (Hussain et al., 2023). These systems, if implemented properly, can increase process integration, eliminate information inequality and increase the responsiveness of the management in complex business environments (Wamba-Taguimdje et al., 2020). In manufacturing environments, where efficiency, quality control, and responsiveness to supply chain needs are paramount, IIS offer a framework to enhance the overall outcomes of the organization (Khan et al., 2024). The role of such systems in performance also relies on the RBV which states that the firm’s technological resources can be valuable and utilized to provide a competitive advantage (Shahid et al., 2026). Previous research, however, shows that technology does not necessarily lead to better outcomes; sometimes technology needs to be complemented with other organizational mechanisms, including learning, coordination, and the use of information (Khaddam et al., 2023). Moreover, dynamic capability logic centres on the need for the company to continually reconfigure their digital resources to respond to environmental changes and operational requirements (Chen and Lin, 2021). In this context, IIS serve as a catalyst for optimizing efficiency, agility, and responsiveness within a firm, thereby boosting the overall firm performance in industrial competitive and data-rich environments (Qaffas et al., 2023).

- H_2 : IIS have a positive effect on FP.

2.3. Data Analytics Capability and Firm Performance

DAC is now identified as one of the key organizational capabilities that influence the value that can be extracted from digital information and turned into actionable strategy (Fosso Wamba et al., 2024). The processing and use of complex data are crucial for improving decision-making, streamlining operations, and delivering organizational results in data-rich scenarios (Peng et al., 2025). Although IIS offer the technological capabilities to create and process data, the actual process of deriving value relies heavily on the analytical maturity and interpretative readiness of the organisation (Garmaki et al., 2023). A RBV lens can be used to view DAC as a valuable and rare organizational asset that can help optimize the effective use of digital infrastructure (Qaffas et al., 2023). But previous research has focused on the need to translate resources into performance outcomes through organizational mechanisms that facilitate this transformation (Chen and Lin, 2021; Peng et al., 2025). In manufacturing settings, where precision, continuous optimization of manufacturing systems, and cost control have a significant impact, firms can leverage analytical capabilities to identify inefficiencies and

optimize production on the fly (Shahid et al., 2026). DCT also reinforces this notion by clarifying that companies need to constantly rework and redesign their analytical procedures to meet changing market and technological requirements (Ilmudeen, 2021). Strong analytical power of the organizations can be useful in detecting the signals of the market, capitalizing on opportunities that emerge, and restructuring operations in response (Phan and Teoh, 2024). Analytical capability is thus an essential mechanism which converts digital intelligence into tangible results for the organization, thus further strengthening its role in improving FP in the modern competitive environment (Zahid, 2023).

- H_3 : DAC has a positive effect on FP.

2.4. Mediating Role of Data Analytics Capability

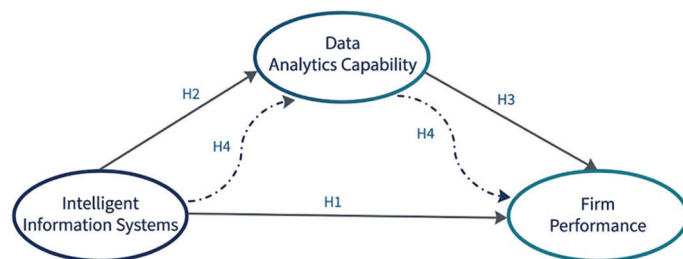
Digital technologies and organizational outcomes are now viewed as a multi-stage process in which the impact of digital technology does not necessarily translate into the effects on organizational outcomes first, but rather a complex and multifaceted process (Ayoub and Sopuru, 2026). While the technological infrastructure is important for data generation, processing and integration, IIS are not fully effective without the intermediary capability of an organization to turn information into strategic insight (Nassani et al., 2023). However, within this transformation process, DAC is a key interpretive process that helps the firms capture significant patterns, provide evidence-based decision support, and schedule the operational performance optimizations (Shafqat et al., 2025). In the context of RBV, competitive advantage may be realised when organizations utilize their technological resources, with a specific organisational capability that other organizations have found hard to copy (Hussain, 2025). But it has been consistently pointed out in the previous research that the use of digital resources, in particular IIS, is not a guarantee of good performance if it is not supported by the necessary capabilities (Qaffas et al., 2023; Mashat et al., 2024). Within the context of this work, analytical capability serves as a crucial transformation layer in translating technological input into performance output, especially in the complex manufacturing environment where the accuracy of decisions and efficiency of operation must be guaranteed (Almajali et al., 2025). DCT extends this notion by elaborating on the way companies strategically leverage, re-combine and adjust their resources in response to the fast-changing digital and market environments (Peng et al., 2025). Firms that have a high level of analytical skills are likely to be more capable of detecting opportunities, understanding the information and signal they receive and respond with changes to their processes or structures to improve adaptability and resilience (Wu et al., 2024). Empirical studies also corroborate that the relationship between information systems and FP outcomes is enhanced by the mediation of analytical capabilities in the process of creating digital value (Fosso Wamba et al., 2024; Nassani et al., 2023). The research model of the study is given in the Figure 1.

- H_4 : DAC mediates the relationship between IIS and FP.

3. METHOD AND DATA

This research used an exploratory method in analyzing implications and relationships between variables (Wu et al.,

Figure 1: Research model



2024). FP was regarded as endogenous variables and IIS and DAC as exogenous variables. DAC was a liaison between IIS and FP. The study model provided direct and indirect effects for organizational outcomes in digitally-driven environments. The research process that was used to investigate the size of relations between the variables represented by structured indicators was qualitative descriptive. The study was carried out in a number of manufacturing companies in Jordan, in which the use of intelligent systems and digital analytics is a topic of growing importance for companies looking to improve their productivity, efficiency and competitiveness. Operating in very competitive industrial markets, the organizations are under globalization, cost pressures and technological change, and digital has become a must to survive and grow. Google Forms were used to collect the data which showed to be accessible and efficient in getting responses. The study was based on the existing models and extended to incorporate literature insights to investigate the interdependency of variables (Khan et al., 2024). Empirical analysis and interpretation of the study results is organized in a way that may depend on the context of organizations, technological maturity and availability of data.

3.1. Sampling

Purposive sampling was the sampling method used in this study. Purposive sampling is a non-probability sampling that involves the selection of respondents who possess certain attributes that go in line with the research objectives (Zahid, 2023). The study sample included employees working in manufacturing companies in Jordan who directly participated in operational, analytic and decision making tasks. The first step in sampling was to establish the criteria for the respondents, which included at least 2 years working experience and staff level or managerial level, and the requirement for holding the minimum of a diploma. Initially, 480 respondents participated in the survey. A data screening was done to ensure quality and relevance of data for analysis purposes, however. Following the validation and filtering of questionnaires, 391 valid responses were included in the final data set. This refinement process improves the reliability, validity and representativeness of the data collected. The final sample is deemed to be sufficient for SEM analysis and affords a solid empirical ground for analyzing the relationship between IIS, DAC and FP in the selected industry context.

3.2. Research Instrument

A structured questionnaire was used as the main instrument for data collection in this study. The questionnaire included 19 items with a focus on important constructs (Table 1). The key attributes of IIS were integration with the systems, real-time data processing, and decision support features (Obitade, 2022; Bhuiyan et al., 2025).

DAC was assessed using indicators like data processing capability, application of analytical skills, and the effectiveness of decision support (Qaffas et al., 2023; Zahid, 2023; Mashat et al., 2024). FP was measured in terms of operational efficiency, productivity improvement and competitive performance outcomes (Garmaki et al., 2023; Neiroukh et al., 2025). There were 6 questions in DAC, 7 questions in IIS, and 6 questions in FP. The responses were measured on a 5 point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Questionnaires were sent out electronically via Google Forms to ensure that there was no need to travel to collect the data, it was made accessible and was structured in a way that would make it easier to be tabulated and analysed in a statistical way.

3.3. Data Analysis

In the present study direct and indirect effect analysis was done by using SEM technique. This study adopts the variance-based approach SEM which is constructed to examine the predicting effect of all variables. Variance-based SEM is a method to test the predictive relationship between constructs by seeing whether there is a relationship or influence between constructs (Wamba-Taguimdje et al., 2020). SEM is a regression method or path analysis that is built on measurement and structural models to analyze direct or indirect relationships between research variables (Khaddam et al., 2023). The indirect effect between IIS and FP was hypothesized to be mediated by DAC, which was believed to be strengthened by the analytical transformations. The first step is to review the research indicators whose outer loading values are ≥ 0.6 or 0.7 (Ahmad and Akbar, 2021). In the second stage, the validity and reliability are evaluated, and Cronbach's Alpha, Rho-a, and Composite reliability values are obtained which are ≥ 0.7 (Peng et al., 2025). The third stage is to test discriminant validity, and compare the values of AVEs with the values of cross loadings using the Fornell-Larcker criterion, as suggested by Wu et al. (2024) that the value of AVE must be at least 0.5 above the values of cross loadings. When the indicators are valid, reliable, and suitable as indicators, then the analysis continued to examine the implications of the research model. The fourth step is to interpret the coefficient of determination (R-square) which can take a maximum absolute value of 100% and help you understand what the variance of variance means (Khan et al., 2024). Thus, there is a strong correlation between the variables. In the fifth phase hypothesis testing was carried out with the $P < 5\%$ and T-value more than T-table, the hypotheses are accepted and the expected structural relationship was confirmed (Bhuiyan et al., 2025).

4. RESULTS

4.1. Respondent Profile

The number of respondents for this study was 391. The respondents were Jordanian manufacturing company employees in companies that have recently started to use IIS and data-driven decision process in their activities. FP is evaluated based on the usage of digital capability and the efficiency of decision making based on analytics. The respondents were classified in terms of length of service, job position, qualification, age, gender and level of digital exposure as shown in Table 2 below. The length of service is distributed as follows: 1-4 years (30%), 5-8 years (27%), 9-12 years

Table 1: Measurement items of research constructs

Constructs	Item code	Questionnaire items
Intelligent information systems (IIS)	IIS1	The organization uses advanced intelligent systems to support decision-making processes.
	IIS2	Intelligent information systems help integrate data across different departments.
	IIS3	The system provides real-time information for operational activities.
	IIS4	Intelligent systems improve the accuracy of business decisions.
	IIS5	The organization relies on digital systems for strategic planning.
	IIS6	Information systems enhance communication and coordination within the organization.
	IIS7	The system supports automation of routine business processes.
Data analytics capability (DAC)	DAC1	The organization has the ability to analyze large volumes of data effectively.
	DAC2	Data analytics is used to support managerial decision-making.
	DAC3	Employees possess strong skills in interpreting data insights.
	DAC4	Analytical tools are effectively integrated into business operations.
	DAC5	Data analysis improves forecasting and planning accuracy.
	DAC6	The organization transforms data into actionable business insights.
Firm performance (FP)	FP1	The organization achieves high levels of operational efficiency.
	FP2	Financial performance has improved due to digital systems.
	FP3	Productivity levels have increased in recent years.
	FP4	The organization maintains a strong competitive position in the market.
	FP5	Customer satisfaction has improved due to better service delivery.
	FP6	Overall business performance is enhanced through digital capabilities.

Table 2: Respondent demographic profile (n=391)

Demographic variable	Category	Frequency	Percentage
Length of service	1-4 years	117	30
	5-8 years	105	27
	9-12 years	90	23
	Above 12 years	79	20
Job position	Staff	203	52
	Supervisor	121	31
	Managerial	67	17
Educational qualification	Diploma	148	38
	Bachelor's Degree	145	37
	Master's Degree	78	20
	PhD	20	5
Age group	22-28 years	109	28
	29-35 years	98	25
	36-42 years	86	22
	Above 42 years	98	25
Gender	Male	235	60
	Female	156	40
Digital exposure to IIS	High exposure	129	33
	Moderate exposure	176	45
	Low exposure	86	22

(23%), and above 12 years (20%). Most of the job positions are at the staff level (52%) and followed by the supervisors (31%) and managerial level (17%). The educational levels of the population are characterized as: Diploma (38%), bachelor's degree (37%), master's degree (20%) and doctoral degree (5%). Age distribution includes 22-28 years (28%), 29-35 years (25%), 36-42 years (22%), and above 42 years (25%). 60% of the respondents were male and 40% female. The percentage of digital exposure to intelligent systems is as follows: High (33%), moderate (45%) and low (22%). This distribution shows satisfactory representation of workers working digitally or analytically in manufacturing. A solid understanding of the demographic structure underlies the interpretation of the relationships between IIS, DAC and FP. The second level is to interpret the statistical outputs obtained from SEM analysis.

4.2. Statistical Results

The first step is to use outer loading values to consider the research indicators. This process evaluates the appropriateness of the indicators of the research model variables. The table below shows the outer loading values. As can be seen from Table 3, all the indicators are suitable as a basis for information for the research model. All indicators fulfil the criteria of outer loading values >0.7 . In this way, all outcomes can represent their respective variables when dealing with research implications. Table 3 shows that all variables have the values of Cronbach's Alpha, rho-a, composite reliability and AVE that indicate validity and reliability. This can be seen in the Cronbach's Alpha, rho-a, and composite reliability values that are >0.8 . A determination effect between the mediating variable and endogenous variable is explained in Table 3. DAC as a mediating variable can account for the relationship between IIS and FP simultaneously by explaining 51.3% of the relationship between IIS and FP. IIS and DAC can simultaneously explain FP, accounting for 51.3% of the variance. The determination coefficients are both moderate, with R-Square being affected by all the variables of the entering constructs. Therefore, there is a possibility to add more variables that are not included in the research model.

In addition, the AVEs (Average Variance Extracted) are above 0.5. The AVE has been compared with the cross loading value to show that there is a successful discriminant validity. The table below shows the value of the discriminant validity parameter. As shown in Table 4, the values of Fornell cross-loading are more important than the values of the AVE (Average Variance Extracted). This means that the research variables are satisfactory with regard to the criterion of discriminant validity. The research data used as a basis for the information has been able to fulfill the requirements of the validity and reliability. All the research indicators are valid for carrying out the process of hypothesis testing. The last step was to test the hypotheses, whose results are presented in Table 5.

As Table 4, the Fornell's cross-loading values are higher than the AVEs (Average Variance Extracted). This means that the criterion for discriminant validity is achieved. The research data, which became the basis of the information, have fulfilled the requirements in terms of validity and reliability. Any research indicators can go to the next step of the hypothesis testing process. The last step was to test the hypotheses, whose results are presented in Table 5.

All the variables have positive effects as hypothesized as explained in Table 5. There are no hypotheses rejected, which means that there is a positive relationship between the variables. The H_1 is accepted because P-values are less than 0.05 and a T-statistic greater than T-table value (1.98). The relationship between IIS and DAC is positive, and is supported by similar statistics; the H_2 is accepted. The H_3 is accepted; so does DAC have a positive effect on FP. The H_4 is accepted if $p < 0.05$ and T-statistic $>$ T-table value (1.98). DAC acts as a predictor in the indirect effect, contributing to enhancing FP. The results of the research indicate that FP can be directly and indirectly affected by IIS and DAC. As can be seen in Figure 2, the research model, consisting of direct and indirect influences, can solve the implications for each research variable. The formulation of each relationship is affected by IIS, DAC and FP. This research finds that to attain sustainability in business, we must have strong integration of digital systems, which are oriented toward performance improvement. Analytical capability

Table 3: Measurement research model

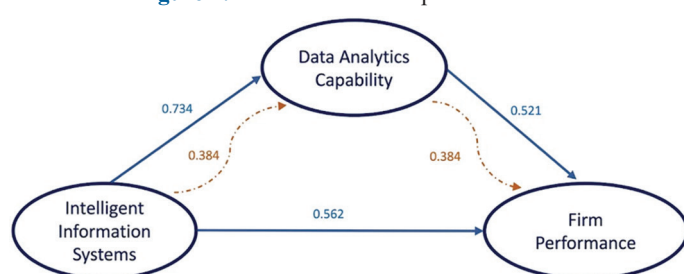
Variables	Indicator	Outer loading	Cronbach's Alpha	rho_A	Composite reliability	Average variance extracted (AVE)	R-Square
Data analytics capability (DAC)	DAC1	0.721	0.832	0.841	0.875	0.582	0.513
	DAC2	0.808					
	DAC3	0.776					
	DAC4	0.789					
	DAC5	0.812					
	DAC6	0.795					
Intelligent information systems (IIS)	IIS1	0.862	0.931	0.934	0.945	0.738	-
	IIS2	0.889					
	IIS3	0.821					
	IIS4	0.846					
	IIS5	0.873					
	IIS6	0.835					
	IIS7	0.818					
Firm performance (FP)	FP1	0.851	0.956	0.958	0.963	0.762	0.513
	FP2	0.879					
	FP3	0.866					
	FP4	0.884					
	FP5	0.812					
	FP6	0.873					

Table 4: Discriminant validity

Variables	DAC	IIS	FP
DAC	0.761		
IIS	0.718	0.842	
FP	0.702	0.689	0.879

Table 5: Hypothesis testing

Variables	Original sample (O)	T-statistics (O/STDEV)	P-value	Hypothesis
Direct effect				
IIS>FP	0.562	13.104	0.000	Accepted
IIS>DAC	0.734	27.882	0.000	Accepted
DAC>FP	0.521	9.436	0.000	Accepted
Indirect effect				
IIS>DAC>FP	0.382	8.912	0.000	Accepted

Figure 2: Research model implication value

is a balanced mechanism in creating data-driven performance outcomes. The results are backed by direct and indirect effects each variable has on FP. Digital intelligence needs to be embedded in all business processes of every organization, and the analytical skill and quality of performance are key elements. Manufacturing companies need to include intelligent systems with an emphasis on operational excellence. DAC as a mediator in indirect influence has proved that FP has to be realized in the structured analytical stages. Digital readiness can be created in an organization's process by digitalizing systems at IIS. In conclusion, FP can be directly and indirectly formed, intelligent systems play important roles in the FP.

5. DISCUSSION

The results of this study are very good evidence in the field of direct and indirect relationship between the IIS, DAC and FP, which is consistent with and extends previous studies in the field of digital transformation and information systems. The first major result shows that IIS is very effective in improving FP. This discovery aligns with previous research on the strategic roles of digital infrastructures to enhance organizational efficiency, responsiveness, and competitiveness (Ayoub and Sopuru, 2026; Neiroukh et al., 2025; Wu et al., 2024). Shafqat et al., (2025) and Ilmudeen (2021) found that the IT-based systems can positively impact performance as long as they are embedded within the organizational processes. This study, however, contributes to this relationship, by offering empirical evidence from Jordanian manufacturing firms, which is lacking in previous studies (Zahid, 2023; Khan et al., 2024). The second key finding is that IIS has a significant improvement on DAC, thus proving that intelligent

systems is one of the core enablers for the development of analytical capabilities. This finding is consistent with Phan and Teoh, (2024), who highlighted the importance of business intelligence systems to handle and analyze huge volumes of information. Likewise, Hussain et al. (2023) and Zahid (2023) concluded that the advanced digital systems enhance the data-driven capabilities in the organizations.

This study confirms that technology is not enough to ensure capability development, as suggested earlier by studies like Garmaki et al. (2023), which identified structured organizational outcomes as the basis for capability development instead of the technology output itself. This reinforces the paper of capability formation being a gradual process and not an automatic outcome of digital adoption. The third result shows how positively the DAC is related to FP, which once again supports the notion that analytical maturity is essential for the success of an organization. This result is well corroborated by Obitade (2022), and Wamba-Taguimdje et al. (2020) who all emphasized the significance of the capability of analytics for improving decision quality and operational efficiency. Likewise, Fosso Wamba et al. (2024) and Zahid (2023) verified that organizations with good analytical skills realize better performance and supply chain results. But there are some previous studies that have reported conflicting direct effects of IT on performance, Hussain (2025) and Peng et al. (2025) that this study addresses by showing that capability is a necessary transformation process. Another important contribution of this study is that of the mediating role of DAC between IIS and FP.

The results have confirmed that the impact of IIS is not directly on the performance only but is also effective under the development of analytical skills. This is consistent with the theoretical predictions of RBV that focused on capabilities-driven technological resource transformation (Bhuiyan et al., 2025). It also supports DCT, which highlights the importance of sensing, seizing, and transforming capabilities in digital environments (Mashat et al., 2024). Both Shafqat et al. (2025) and Khaddam et al. (2023) have also found similar mediating effects, where analytics capability is also found to be central to digital value creation. Nevertheless, although, previous studies, including Shahid et al. (2026), and Hussain (2025), identified indirect effects, such indirect effects have not been tested empirically in the context of manufacturing processes, especially in emerging economies. This study aims to fill this gap by delivering solid SEM-based evidence for manufacturing firms in Jordan. Furthermore, Wu et al. (2024) and Khan et al. (2024) concentrated mainly on supply chain analytics while this paper expanded the field of study to the whole FP and thus, in the long run, it has a wider theoretical applicability. Intriguingly, some contradictory results in previous studies indicated that the direct impact of IT systems on performance might be weak or inconsistent depending on the contextual and/or organizational differences (Almajali et al., 2025; Neiroukh et al., 2025). This study addresses this inconsistency by showing that the gains in performance are only possible if there is an attendant development of analytics capability. In addition, research in developing economies Zahid (2023) confirms that digital technologies need to have complementary capabilities to create value, which is also confirmed in this research context. Overall, the results align

with existing theoretical and empirical studies, and they extend and validate a full IIS-DAC-FP model. The RBV and DCT are empirically reinforced with the conclusion that the resources and capabilities need to be integrated together in order to generate better organizational results. This study, accordingly, is an addition to the existing literature that focuses on the capability-driven DT in manufacturing contexts, and it also fills contextual gaps and the inconsistencies found in previous studies (Chen and Lin, 2021; Qaffas et al., 2023).

5.1. Theoretical Contributions

Theoretically, this research is significant as it builds upon both RBV and DCT in the field of intelligent digital transformation. In an RBV frame of reference, results validate that IIS serve as strategic resources in organizations and are valuable, but not enough to guarantee superior FP. The study contributes to RBV by showing how DAC is an important complementary capability that translates technological resources into tangible organizational results, which has been a critical concern in the field of IT value realization (Khan et al., 2024). This reinforces the idea that competitive advantage is not just a matter of owning digital technologies, it's about orchestrating them (Shafqat et al., 2025). The study is theoretically enriching from a DCT viewpoint to demonstrate how firms sense, process, and transform digital information using their analytics capability to enhance performance outcomes (Fosso Wamba et al., 2024). It has validated that IIS is for sensing infrastructure and DAC is for seizing and transforming. This integration adds to the literature of digital capability by translating the dynamic capability pathways into an empirical form (Zahid, 2023). Moreover, the study confirmed the mediating role of analytics capability, which helps fill a crucial gap in the past research on IS where digital systems were directly assumed to be drivers of performance without taking into account the mechanisms of capability transformation (Mashat et al., 2024).

5.2. Practical Implications

The results of this study have practical significance for the managers and decision makers in manufacturing organizations. The results reveal that companies' investments in IIS are not enough if they fail to invest in DAC as well. Organizations need to invest in training initiatives that improve staff's analytical skills and ability to make effective use of data to get the most out of their digital investments. Analytical capabilities need to be embedded in key processes like production planning, supply chain management, and performance monitoring, which help expand the potential of IIS, enabling firms to become more responsive and efficient. Then, too, senior management need to value analytics capability as a strategic resource, not a technical task. Sustainable competitive advantage in increasingly data-driven markets can be achieved by linking digital strategy to capability development in the organization. The study further indicates that implementing digital transformation using a structured approach that focuses on capability development, not just technology, is a game-changer for competitiveness of manufacturing companies in emerging markets such as Jordan.

5.3. Social and Policy Implications

The findings from this study have significant social and policy consequences, especially for the developing economies

transitioning to digital economies. The incorporation of IIS and DAC at the societal level helps increase organizational efficiency, indirectly leading to better employment quality, more stable employment productivity and economic growth. The greater emphasis on higher-order analytical and digital skills among workers, as organizations become more data-driven, also leads to a more skilled workforce and the closing of skill gaps in new and growing labor markets. Policy-wise, governments should put all efforts into building the digital infrastructure and encouraging national strategies for analytics capability development in industrial sectors. Policy support should be provided for the development of analytical skills throughout organizations by improving digital training programmes, innovation hubs and partnerships between industry and academia. Further, industrial policies must beyond technology adoption incentives and must target capability development, so that firms can be able to effectively use the intelligent systems for economic value creation. Further, the regulation of the digital transformation can positively impact the competitiveness of manufacturing industries in international markets. Policymakers can empower companies to enhance transparency, operational efficiency, and innovation potential as a result of the creation of data-driven ecosystems. This helps to achieve broader socio-economic development objectives such as industrial modernization, sustainable economic growth in developing regions.

5.4. Teaching and Academia Implications

The findings of this study have great implications for teaching and academic research in information systems, digital transformation, and management sciences. Academically, the combination of IIS, DAC and FP offers a holistic perspective that could be integrated within the IS courses, business analytics courses and strategic management courses curriculum. It also makes students realize that technology is not enough; capability development is necessary and important, and enhances the understanding of key theoretical models, e.g. RBV and DCT. The result of this study can be applied as a case based study to show the digital system transformation into FP within an analytical competence. It strengthens the students' capacity to relate theoretical understandings and models with empirical evidence in real manufacturing scenarios. Moreover, it offers a solid basis for the teaching of SEM applications in business research, especially when dealing with analysis of the mediating relationships (Hair and Alamer, 2022). In terms of research, this study calls for more research into capability-based mediation models in digital transformation research. It emphasizes the need for information systems, analytics, and strategic management approaches to be integrated. Moreover, it helps to serve as a benchmark for doctoral researchers who study digital capability frameworks in emerging markets, such as manufacturing and industrial fields.

6. CONCLUSION

This study found that IIS play a significant role in increasing FP directly and indirectly through DAC. The empirical results validate that the use of digital systems by themselves is not enough to achieve good organizational results without having some capacity for analysis, which allows one to transform the data into actionable insights. The finding brings more credibility to the main

thesis of RBV that is the need for technological resources to be complemented with complementary organizational resources to create sustainable competitive advantage. In addition, this study validates the DCT strongly, as companies show better performance when capable of sensing, processing, and transforming digital data via an analytics-driven process. The role of DAC as a mediator between investments in digital and business value proves the significance of capability development in bridging the gap between investments in digital and business value.

The study also helps the understanding of digital transformation in manufacturing companies in Jordan, one of the emerging economies where digital technologies are being adopted, but the competency is still not fully developed. The results indicate there is a need to focus on developing the analytics capability in addition to implementing IIS to achieve the greatest benefit. In sum, the present research offers a holistic model that combines digital systems, analytical competency and FP. It provides robust theory, data and practice, which shows that sustainable performance in today's organizations is built on capability-based digital transformation, not technology alone.

This study has some limitations that present opportunities for future research, including the fact that this study is cross-sectional; therefore, the results do not account for long-term causal relationships between IIS, DAC, and FP. The study is conducted exclusively in manufacturing firms in Jordan and may not be representative of the other industries and other geographical areas. The model should be replicated in other sectors (e.g., healthcare, banking, services) and other economies (developed economies) in future studies to improve external validity. This study focuses mainly on data analytics capability as a single mediator, and the other mediators that could be included, like digital culture, organizational agility or knowledge management capability, were not considered. Future studies could combine several mediators and moderators in a more comprehensive model and should account for the potential for response bias in their data collection. Future work may involve objective performance measures or a combination of objective and subjective measures to increase accuracy. Finally, quantitative studies like a case study can give a more comprehensive understanding of how organizations can build their analytics capabilities in reality, and give a richer theoretical and practical understanding of the digital transformation process.

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