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THE STRATEGIC ROLE OF DIGITAL TRANSFORMATION IN DRIVING START-UP SUCCESS: EVIDENCE FROM THE SULTANATE OF OMAN

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Abstract

This study aims to identify the major drivers and challenges influencing the success of digital transformation among start-ups in Oman, to examine the impact of digital transformation on their operational performance, innovation and competitiveness, and to propose practical strategies for enhancing the successful implementation and sustainability of digital transformation. The study adopted a quantitative, cross-sectional research design, with data collected through a structured questionnaire from 150 respondents associated with start-ups in Oman. Descriptive statistics, reliability analysis and simple linear regression were used to examine digital transformation and its relationship with start-up performance, innovation and competitiveness. The findings indicate widespread digital technology adoption among the surveyed start-ups. Digital strategy, employee readiness, investment and government support were important drivers, while digital skills and financial constraints were the major challenges. Regression results showed a strong positive relationship between digital transformation and start-up performance, innovation and competitiveness ($\beta = .915$, $p < .001$), with the model explaining 83.7% of the variance. The study provides empirical evidence on how digital transformation relates to start-up success in Oman and highlights the importance of combining technology adoption with digital skills, strategic planning, financial resources and organisational support. Strengthening digital capabilities among start-ups can contribute to employment, innovation and broader participation in the digital economy, and improving access to digital skills, training, infrastructure and financial support may help smaller ventures participate more effectively in Oman's developing entrepreneurial and technology-oriented business environment. The study contributes empirical evidence on digital transformation and start-up success in the Omani context and identifies the capability and resource constraints that need attention for digital transformation to deliver sustained value.

Keywords

Digital Transformation, Start-ups, Innovation, Competitiveness, Oman

1. Introduction

Digital transformation (DT) has become an important strategic issue for organisations operating in an increasingly technology-driven and competitive business environment. It extends beyond the adoption of individual digital technologies and involves the broader integration of digital technologies into organisational processes, capabilities, business models and interactions with customers and other stakeholders. Vial (2019) describes digital transformation as a process through which digital technologies trigger significant changes in the way organisations operate and create value. Digital transformation should therefore not be viewed simply as a technological upgrade; rather, it represents an organisational and strategic change that can influence how firms compete, innovate, serve customers and respond to changing market conditions.

The importance of digital transformation is particularly evident in the case of start-ups. Unlike established firms, start-ups generally operate with limited financial and human resources and face considerable uncertainty regarding markets, customers

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and competitors. At the same time, their relatively flexible organisational structures can enable them to experiment with new technologies and business models more quickly. Digital technologies such as artificial intelligence (AI), cloud computing, the Internet of Things (IoT), blockchain, big data analytics and digital platforms can provide start-ups with opportunities to reduce operating costs, improve decision-making, reach customers beyond traditional geographical boundaries and develop new products and services. Consequently, the ability to identify and effectively use appropriate digital technologies can become an important source of competitiveness and growth for emerging businesses (Li et al., 2018).

However, the adoption of digital technologies does not automatically result in successful digital transformation. Its benefits depend on several organisational and environmental conditions, including the availability of financial resources, managerial commitment, employee digital capabilities, technological infrastructure, organisational readiness, access to external expertise and the ability to manage resistance to organisational change. For start-ups, these challenges can be particularly significant because investments in technology must often be made while the business is still attempting to establish a viable market position and generate sustainable revenues. The strategic question is therefore not simply whether start-ups adopt digital technologies, but whether they possess the capabilities and supporting conditions necessary to convert digital adoption into improved performance and sustainable business outcomes.

The relationship between digital transformation and start-up success is also important from the perspective of innovation. Digital technologies can allow start-ups to experiment with new forms of customer engagement, automate routine activities, improve the speed of information processing and use data to understand market requirements. They may also enable businesses to develop scalable business models that can serve larger markets without requiring a proportionate increase in physical resources (Kane et al., 2019). Nevertheless, these benefits can vary considerably among firms: differences in managerial capabilities, employee skills, financial capacity, technology infrastructure and organisational culture may determine whether digital transformation becomes a source of competitive advantage or an additional operational burden. This makes it necessary to examine the factors that contribute to successful digital transformation rather than assuming that technology adoption itself guarantees start-up success.

The issue has particular relevance in the Sultanate of Oman, where digital transformation has become closely connected with the country's broader economic diversification and development agenda. Oman Vision 2040 identifies technology, knowledge, innovation, private-sector development and economic diversification as important components of the country's long-term development direction. The Government Digital Transformation Programme, known as Tahawul, is one of the national programmes supporting this direction and is intended to improve digital government services, productivity and the use of advanced technologies. According to the Tahawul programme's 2025 performance report, overall programme performance reached 94% by the end of December 2025; a total of 2,277 priority government services and automatic permits had been fully digitalised, representing 90% of the targeted services, while 3,166 priority services had completed the targeted process simplification. These developments indicate that digitalisation is increasingly becoming part of the institutional and business environment in which Omani enterprises operate.

The country's digitalisation agenda also relates to entrepreneurship and the growth of start-ups and small and medium-sized enterprises (SMEs). A stronger digital environment can create opportunities for entrepreneurs in areas such as financial technology, e-commerce, logistics, healthcare, education, tourism and other technology-enabled services. At the same time, the International Monetary Fund has noted that although Oman has made progress in areas such as internet penetration and 4G/5G coverage, further development is required in advanced ICT skills, digital innovation, e-commerce, digital infrastructure, research and development, and funding opportunities for digital start-ups and SMEs.

These observations suggest that the existence of national digital infrastructure and policy support does not necessarily mean that all businesses have an equal capacity to benefit from digital transformation.

The Omani start-up and SME environment therefore provides an appropriate context for examining the relationship between digital transformation and business success. Government initiatives and institutional support have created a more favourable environment for entrepreneurship, while increasing digitalisation is changing the way businesses interact with customers, suppliers, financial institutions, government agencies and other stakeholders. Nevertheless, research on SMEs in Oman continues to identify barriers including limited financial resources, inadequate technological expertise and awareness, infrastructure-related constraints and difficulties in implementing digital transformation (Mokhtar, 2024). The challenge facing start-ups is thus not only access to digital technologies but also their ability to develop the organisational capabilities required to use those technologies effectively. Because business survival and growth are often closely associated with the ability to respond rapidly to market changes, digital transformation can potentially improve operational efficiency, support innovation, strengthen customer relationships and enhance competitiveness; however, the extent to which these benefits are realised may depend on the start-up's internal capabilities and the external environment in which it operates.

Although existing literature has examined digital transformation, SMEs and technology adoption in different national settings, more empirical evidence is needed specifically concerning start-ups in Oman. Much of the existing discussion focuses on the general digitalisation of SMEs or on national-level digital transformation initiatives, which provides useful background but does not fully explain why some start-ups are better able than others to translate digital transformation into improved performance, innovation and competitiveness. Recent research on Omani SMEs identifies technological awareness, infrastructure, financial support and technical capabilities as important issues (Mokhtar, 2024), but further empirical investigation is required to understand how these factors operate together in determining start-up outcomes.

Against this background, the present study examines the strategic role of digital transformation in driving start-up success in the Sultanate of Oman. It focuses on three closely related issues: the factors that facilitate or constrain successful digital transformation, the effect of digital transformation on start-up performance and competitiveness, and the strategies that can strengthen the ability of start-ups to derive sustainable benefits from digital technologies. By addressing these issues within the Omani context, the study seeks to contribute to the growing literature on digital transformation and entrepreneurship while also providing useful insights for start-up founders, managers, support institutions and policymakers.

2. Problem Statement

Oman has made significant progress in establishing a supportive environment for digital transformation through national strategies, digital infrastructure, government programmes and initiatives aimed at promoting entrepreneurship and private-sector development. The progress of the Tahawul programme demonstrates the increasing institutionalisation of digital transformation in the country, while Oman Vision 2040 places technology, innovation, economic diversification and private-sector development at the centre of the country's long-term development agenda.

Despite this progress, the availability of digital technologies and government support does not necessarily translate into successful digital transformation at the start-up level. Start-ups differ substantially in their financial capacity, managerial capabilities, digital skills, access to technology, organisational readiness and ability to manage technological and organisational change. Some may use digital technologies to improve efficiency, introduce innovative products and services, reach new markets and strengthen their competitiveness, whereas others may experience difficulties in selecting appropriate technologies, financing digital investments, developing employee capabilities, integrating new

systems or managing resistance to change. Evidence from the Omani SME context has similarly identified financial constraints, limited technological expertise and awareness, and infrastructure-related issues as continuing challenges to digital transformation (Mokhtar, 2024).

The central problem, therefore, is not the absence of digital transformation initiatives in Oman but the limited empirical understanding of why and under what conditions digital transformation contributes to start-up success. Existing studies and policy discussions provide evidence of the growing importance of digitalisation in Oman, but relatively limited attention has been given to the specific factors that determine successful digital transformation among start-ups and to the extent to which such transformation improves their operational performance, innovation and competitiveness. This gap is particularly important because start-ups operate under resource constraints and high levels of uncertainty, making the consequences of ineffective digital investment potentially more significant than for larger and more established firms.

Accordingly, an empirical investigation is needed that identifies the principal drivers and challenges of digital transformation among Omani start-ups and examines whether digital transformation is associated with measurable improvements in business performance, innovation and competitiveness. Understanding these relationships can help distinguish between merely adopting digital technologies and achieving meaningful digital transformation, and can provide a basis for practical strategies that enable start-ups to use digital technologies more effectively and sustainably. The findings may therefore be relevant not only to entrepreneurs and start-up managers but also to government agencies, business-support organisations, incubators, accelerators, investors and other stakeholders involved in strengthening Oman's entrepreneurial ecosystem.

3. Research Questions and Objectives

Based on the identified research problem, the study addresses the following research questions (RQ) and objectives (RO):

- RQ1: What are the major drivers and challenges influencing the success of digital transformation among start-ups in Oman?
- RQ2: How does digital transformation affect the operational performance, innovation and competitiveness of start-ups in Oman?
- RQ3: What strategies can be adopted by start-ups and relevant stakeholders to enhance the successful implementation of digital transformation in Oman?
- RO1: To identify the major drivers and challenges influencing the success of digital transformation among start-ups in Oman.
- RO2: To examine the impact of digital transformation on the operational performance, innovation and competitiveness of start-ups in Oman.
- RO3: To propose practical strategies for enhancing the successful implementation and sustainability of digital transformation among start-ups in Oman.

4. Review of Literature

4.1 Digital Transformation and Its Strategic Role

Digital transformation has developed from being primarily associated with information technology implementation into a broader strategic issue concerning how organisations operate, compete and create value (Ebert & Duarte, 2018). Vial (2019) describes digital transformation as a process in which digital technologies trigger changes in organisations and influence the ways in which value is created and captured, distinguishing transformation from simple digitisation or the conversion of information into digital form. Verhoef et al. (2021) similarly argue that digital transformation can affect several dimensions of an organisation, including customer experience, business models, organisational structures and processes, and Nadkarni and Prügl (2021), through their review of the digital transformation literature, demonstrate that the phenomenon involves both technological and organisational dimensions and cannot be adequately understood by focusing on technology alone.

The strategic implications of digital transformation have been emphasised in the information systems and strategic management literature. Bharadwaj et al. (2013) proposed that digital

technologies have become increasingly intertwined with business strategy, creating a need for firms to reconsider the relationship between technology and competitive positioning. Matt et al. (2015) and Hess et al. (2016) emphasised the importance of developing a digital transformation strategy that connects technological initiatives with the organisation's overall strategic direction. Chanias et al. (2019) found that digital transformation strategy is not necessarily a one-time planning exercise; rather, it can develop through an iterative process of learning and implementation. Hanelt et al. (2021), based on a systematic review, concluded that digital transformation is associated with continuing organisational adaptation and changes in organisational design. These studies collectively indicate that digital transformation is better understood as an ongoing strategic process than as a single technology adoption decision.

The increasing volume of research also reflects the broadening scope of digital transformation. Kraus et al. (2022), after reviewing the development of digital transformation research in business and management, identified a wide range of themes extending across strategy, entrepreneurship, innovation, organisational change and technology management. Their findings reinforce the view that digital transformation has implications at several levels of the organisation. Organisations therefore need to consider not only which technologies to adopt but also how these technologies fit their strategies, resources, people and operating models, an issue that is particularly important for start-ups, which often have fewer resources and less established organisational structures than larger firms.

4.2 Digital Transformation and Start-up Development

Digital technologies have substantially changed the environment in which entrepreneurial activity takes place. Nambisan (2017) argues that digital technologies alter the nature of entrepreneurial processes by changing how opportunities are identified, developed and exploited. Digital entrepreneurship can therefore involve both the creation of new technology-based ventures and the use of digital technologies by entrepreneurs to develop new products, services, markets and business models (Nambisan et al., 2020). Kraus et al. (2019) similarly identified digital business models, digital technologies and new forms of entrepreneurial activity as important areas for future entrepreneurship research.

The relationship between digital technologies and entrepreneurial ecosystems is also important. Autio et al. (2018) explain that digital affordances can influence the development of entrepreneurial ecosystems by facilitating opportunity discovery, knowledge exchange and business-model innovation, consistent with the role of knowledge spillovers in entrepreneurship (Audretsch & Belitski, 2013). In a digital environment, entrepreneurs may be able to access customers, suppliers, partners, finance and knowledge beyond the immediate geographical location of the business. This can reduce some traditional barriers to entrepreneurial growth, although it does not remove the underlying resource and capability constraints faced by young firms.

Research focusing specifically on entrepreneurial SMEs provides further evidence of the importance of digital capabilities. Cenamor et al. (2019) found that digital platform capability can contribute to the performance of entrepreneurial SMEs through the development of network capabilities, and that the value obtained from digital platforms depends on how firms combine technological capabilities with their broader strategic orientation. Li et al. (2018) similarly showed that digital transformation among SME entrepreneurs involves the development of managerial and organisational capabilities. Technology adoption should therefore not be considered independently of the people, processes and capabilities through which the technology is used.

More recent research has strengthened the connection between digital innovation and entrepreneurial firms. Felicetti et al. (2024), in a systematic review, identified several major themes, including start-up collaboration networks, business-model innovation, digital platforms, digital ventures, the digital entrepreneur and digital-innovation ecosystems, indicating that digital innovation affects entrepreneurial firms at several interconnected levels. Kraus et al. (2022) further examined the

relationship between entrepreneurial orientation, digitalisation and disruptive innovation and found that the interaction between entrepreneurial orientation and digitalisation is relevant to innovation outcomes. Digital transformation can therefore provide opportunities for start-ups, but the ability to exploit them depends partly on entrepreneurial orientation and the firm's capacity to integrate technology into its business activities.

4.3 Organisational Capabilities, Technology Adoption and Digital Transformation

The resource and capability requirements associated with digital transformation can be explained through the Resource-Based View (RBV) and the Dynamic Capabilities perspective (Barney, 1991; Teece et al., 1997). Teece et al. (1997) argued that firms need capabilities that allow them to integrate, build and reconfigure resources in response to changing environments. In the digital context, this perspective suggests that technologies themselves may not provide a lasting advantage unless organisations possess the human, managerial and organisational capabilities necessary to use them effectively.

Warner and Wäger (2019) applied the dynamic capabilities perspective to digital transformation and emphasised the importance of capabilities that enable firms to sense digital opportunities, seize them and reconfigure organisational resources. This argument is particularly relevant to start-ups because their competitive position can change rapidly as technologies, customer preferences and competitors evolve. Saeedikiya et al. (2024), examining SMEs in the mobility sector, similarly found that digital transformation involves specific enablers and barriers and that firms need appropriate capabilities to obtain performance and competitive benefits from transformation, reinforcing the importance of looking beyond technology adoption towards the organisational capabilities that support effective implementation.

Digital orientation provides another way of understanding organisational readiness for transformation. Kindermann et al. (2021) conceptualised digital orientation as a strategic orientation concerned with digital innovation and transformation, linked it to organisational performance, and developed its measurement, emphasising the importance of a firm-wide orientation towards digital innovation and transformation. Digital transformation therefore requires more than isolated investments in software or hardware; it involves an organisational orientation that supports the continued use and development of digital capabilities.

Technology acceptance is also relevant because organisational transformation ultimately depends on people using the technologies introduced by the firm. Davis (1989), through the Technology Acceptance Model, established perceived usefulness and perceived ease of use as important determinants of technology acceptance, a model whose development has been reviewed by Marangunić and Granić (2015). Venkatesh and Bala (2008) subsequently extended this perspective through Technology Acceptance Model 3, providing a broader explanation of factors influencing technology acceptance and use. While these models primarily address individual technology adoption, their principles are relevant to organisational digital transformation because employee and managerial acceptance can influence whether newly introduced technologies are integrated into routine business activities.

The importance of human capabilities is further demonstrated by Scuotto et al. (2021), who found that individual digital capabilities are relevant to SME growth and innovation performance. Similarly, Eller et al. (2020) identified organisational resources and capabilities as important antecedents of SME digitalisation and linked digitalisation with financial performance. These findings suggest that financial resources, employee skills, managerial knowledge, technological readiness and organisational adaptability may jointly influence the outcome of digital transformation, and for start-ups, where financial and human resources are often constrained, these factors may be especially significant.

4.4 Digital Transformation and Start-up Success

The literature generally associates effective digital transformation with several dimensions of organisational performance, although the relationship is not necessarily automatic. Digital technologies can support process improvement, customer

engagement, innovation, market development and new business models. Verhoef et al. (2021) identified customer experience and business-model innovation among the important organisational consequences of digital transformation, while Bharadwaj et al. (2013) emphasised its implications for digital business strategy and value creation.

Evidence from smaller firms provides a more specific understanding of this relationship. Eller et al. (2020) found that SME digitalisation is associated with financial performance, although the availability of a digital strategy or employee skills alone does not necessarily guarantee improved outcomes. Scuotto et al. (2021) showed that individual digital capabilities are relevant to SME growth and innovation, suggesting that the value of digital transformation depends partly on the firm's ability to develop and utilise appropriate human capabilities, and Cenamor et al. (2019) similarly linked digital platform capability and network capability with entrepreneurial SME performance.

Recent studies provide additional evidence that the relationship between digitalisation and performance is affected by the level of organisational readiness and capability. Kallmuenzer et al. (2025) examined digitalisation adoption and performance outcomes among SMEs and identified the importance of suitable technologies and digital skills, while also pointing to organisational barriers such as risk-averse cultures and legacy systems. Sagala and Őri (2024), through a systematic review of SME digital transformation research, identified several factors associated with transformation success, including alignment between digitalisation strategy and organisational circumstances, gradual implementation and continuous learning. Their review demonstrates that digital transformation success is influenced by a combination of technological, organisational, strategic and human factors rather than by technology adoption alone.

The relationship between digital transformation and competitiveness is similarly complex. Digital technologies may improve operational efficiency and enable firms to respond more rapidly to customers and market changes, but transformation can require substantial investment, employee development, organisational restructuring and experimentation before benefits become visible. Meier et al. (2025) therefore argue that digital transformation and SME competitiveness should be considered in relation to technical, organisational and cultural factors rather than as a simple technology–performance relationship. Start-up success should consequently be assessed through several dimensions rather than through financial outcomes alone; operational efficiency, customer growth, market development, innovation and competitive advantage provide relevant indicators of the broader contribution of digital transformation.

The literature also suggests that innovation can form an important link between digital transformation and start-up success. Kraus et al. (2022) found that digitalisation and entrepreneurial orientation are relevant to disruptive innovation, while Felicetti et al. (2024) identified business-model innovation, digital ventures and digital-innovation ecosystems as major themes in research on entrepreneurial firms. Digital transformation may therefore contribute to start-up success not simply by reducing costs but by allowing firms to experiment with new products, services, customer relationships and business models, which provides a strong basis for examining start-up success through the combined dimensions of performance, innovation and competitiveness.

4.5 Digital Transformation in Oman and Research Gap

Digital transformation is particularly significant in Oman because digitalisation is closely connected with the country's broader efforts towards economic diversification, entrepreneurship, innovation and private-sector development. The development of digital infrastructure and technology-enabled services has created an increasingly supportive environment for businesses adopting digital technologies, but at the firm level the availability of digital infrastructure does not necessarily ensure that start-ups possess the resources and capabilities required to exploit it effectively.

Recent empirical research provides some evidence of this changing environment. Mokhtar (2024) examined digital transformation among SMEs in

Oman and discussed both the opportunities associated with digitalisation and the challenges affecting successful implementation. Although the study focuses on SMEs rather than start-ups, its findings are relevant because many young firms operate under similar constraints relating to resources, skills, technology and organisational readiness. The development of financial technology provides another example: Al Ghunaimi et al. (2025) examined mobile payment adoption among Omani SMEs in the context of Vision 2040 and the movement towards a cashless economy, illustrating how digital financial technologies are becoming increasingly relevant to Omani businesses. For start-ups, such developments may create opportunities for new digital business models, improved customer transactions and wider market access.

Despite the growing importance of digital transformation in Oman, more empirical research is needed that specifically examines start-ups and the ways in which digital transformation contributes to their performance, innovation and competitiveness. Recent evidence from Oman shows that entrepreneurial orientation can influence marketing performance through digital marketing capabilities and digital marketing implementation among SMEs (Al Buraiki & Nofal, 2026); however, such evidence remains focused on SMEs and specific digital marketing capabilities, leaving scope for investigating digital transformation as a broader strategic process within Omani start-ups. The literature also indicates that several factors may influence the success of digital transformation, including digital skills, financial resources, managerial capabilities, technological readiness, organisational adaptability, strategic alignment and the willingness of employees and managers to adopt new technologies, but these factors have not been sufficiently examined together within the context of Omani start-ups.

The present study addresses this gap by examining the major drivers and challenges influencing digital transformation among start-ups in Oman and assessing its relationship with operational performance, innovation and competitiveness. It further seeks to identify practical strategies that may assist start-ups and relevant stakeholders in improving the effectiveness and sustainability of digital transformation, thereby extending the existing literature beyond general discussions of digitalisation and providing empirical evidence concerning the conditions under which digital transformation may contribute to start-up success.

5. Research Methodology

This study adopts a quantitative research approach using a descriptive and correlational research design to examine the relationship between digital transformation and start-up success in Oman. A deductive approach is employed, drawing on the Technology Acceptance Model (Davis, 1989), the Resource-Based View (Barney, 1991) and the Dynamic Capabilities perspective (Teece et al., 1997) to provide a theoretical basis for examining technology adoption, organisational resources, adaptability and business performance. The study focuses on entrepreneurs and decision-makers of start-ups operating in Oman that have incorporated at least one form of digital technology into their business activities. The sampling criteria required the start-up to be legally registered in Oman, to have been operating for at least one year and to have incorporated digital technologies such as cloud systems, digital payment methods, customer relationship management systems or digital marketing into its operations. Purposive sampling was used to reach founders, co-founders, managers and other decision-makers with direct knowledge of their organisation's digital transformation activities, and a total of 150 valid responses were collected and used for the analysis.

Data were gathered through a structured online questionnaire distributed through email, WhatsApp and relevant start-up and entrepreneurship networks. The questionnaire covered demographic characteristics, digital transformation adoption, start-up success and digital transformation challenges. Digital transformation was measured using Likert-scale items covering digital tool usage, digital skills, technology integration, innovation capability and digital strategy, while start-up success was assessed through financial performance, customer growth, market development, operational efficiency and

competitive advantage. The questionnaire was reviewed for content validity and pilot-tested before the main survey.

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarise the characteristics of the respondents and the extent of digital transformation among the participating start-ups. Cronbach's alpha was used to assess the internal consistency of the measurement constructs, with a coefficient of 0.70 or above considered acceptable. Simple linear regression analysis was employed to determine the extent to which the composite digital transformation measure explains variation in start-up success, and hypothesis testing was based on the statistical significance of the estimated relationships at the 5% level. Participation in the study was voluntary, and respondents were informed of the purpose of the research and the confidential treatment of the information provided.

6. Findings

Table 1. Demographic Profile of the Respondents

Category	*Frequency*	*Percentage (%)*
Age (years)		
18–29	92	61.3
30–39	30	20.0
40–49	21	14.0
50 and above	7	4.7
Gender		
Male	102	68.0
Female	48	32.0
Education level		
Bachelor's degree	71	47.3
Diploma	48	32.0
Master's degree	19	12.7
PhD	11	7.3
Other	1	0.7
Nationality		
Omani	119	79.3
Non-Omani	31	20.7

Source: Primary data

Table 1 presents the demographic profile of the 150 respondents. The sample was relatively young, with 61.3% aged between 18 and 29 years, followed by 20.0% in the 30–39 age group. Male respondents accounted for 68.0% of the sample and females for 32.0%. In terms of education, 47.3% held a bachelor's degree, 32.0% had a diploma and 20.7% had postgraduate qualifications or other educational backgrounds. Omani respondents constituted the majority of the sample (79.3%), while non-Omani respondents accounted for 20.7%.

Table 2. Digital Technology Adoption and Technologies Used by Start-ups

Item	*N*	*Percentage (%)*
Adoption of digital technology		
Yes	127	84.7

Item	N	Percentage (%)
No	23	15.3
Technologies used		
Social media	28	18.7
Online selling or booking platform	29	19.3
Business software	93	62.0

Source: Primary data

Table 2 shows that digital technology was already widely used among the surveyed start-ups. Of the 150 respondents, 127 (84.7%) reported that their start-ups had adopted digital technologies, while 23 (15.3%) had not. Business software was the most commonly reported technology, followed by online selling or booking platforms and social media, suggesting that digital adoption among the surveyed start-ups is currently concentrated more on business operations than on customer-facing digital channels.

Table 3. Key Drivers of Digital Transformation among Start-ups in Oman

Statement	SA	A	N	D	SD
Digital strategy is a key driver	56 (37.3%)	70 (46.7%)	11 (7.3%)	11 (7.3%)	2 (1.3%)
Digital investment is a key driver	43 (28.7%)	76 (50.7%)	19 (12.7%)	9 (6.0%)	3 (2.0%)
Employee technology adoption is a key driver	53 (35.3%)	69 (46.0%)	17 (11.3%)	8 (5.3%)	3 (2.0%)
Digital skills availability is a key driver	49 (32.7%)	70 (46.7%)	16 (10.7%)	11 (7.3%)	4 (2.7%)
Financial resource availability is a key driver	55 (36.7%)	64 (42.7%)	16 (10.7%)	9 (6.0%)	6 (4.0%)
Leadership support is a key driver	57 (38.0%)	60 (40.0%)	17 (11.3%)	11 (7.3%)	5 (3.3%)
Government support is a key driver	50 (33.3%)	72 (48.0%)	11 (7.3%)	10 (6.7%)	7 (4.7%)

Source: Primary data; SA = strongly agree, A = agree, N = neutral, D = disagree, SD = strongly disagree.

Table 3 presents the main factors associated with digital transformation among the surveyed start-ups. Digital strategy received the highest level of agreement, with 84.0% of respondents agreeing or strongly agreeing that it was an important driver. Employee technology adoption and government support followed at 81.3% each, while digital skills availability, financial resources and digital investment also received relatively high levels of agreement, and leadership support was similarly viewed as important (78.0%). Overall, the responses point to a combination of strategic, human, financial and institutional factors supporting digital transformation among Omani start-ups.

Table 4. Challenges to Digital Transformation in Start-ups

Challenge	N	Percentage (%)
Lack of digital skills/knowledge	58	38.7
Insufficient budget	49	32.7
Resistance to change	26	17.3
Inadequate digital tools	17	11.3
Total	150	100.0

Source: Primary data

Table 4 identifies the main barriers reported by the respondents. Lack of digital skills and knowledge was the most frequently identified challenge (38.7%), followed by insufficient budget (32.7%). Resistance to change was reported by 17.3% of respondents, while 11.3% identified inadequate digital tools. The results therefore point mainly to human capability and financial constraints as the

two most prominent barriers to digital transformation among the surveyed start-ups.

Table 5. Impact of Digital Transformation on Start-up Performance, Innovation and Competitiveness in Oman

Impact indicator	*SA*	*A*	*N*	*D*	*SD*
Productivity improvement	47 (31.3%)	62 (41.3%)	26 (17.3%)	8 (5.3%)	7 (4.7%)
Operational efficiency	44 (29.3%)	81 (54.0%)	11 (7.3%)	10 (6.7%)	4 (2.7%)
Innovation capability	49 (32.7%)	65 (43.3%)	23 (15.3%)	8 (5.3%)	5 (3.3%)
Start-up growth	52 (34.7%)	73 (48.7%)	10 (6.7%)	9 (6.0%)	6 (4.0%)
Customer satisfaction	50 (33.3%)	59 (39.3%)	27 (18.0%)	10 (6.7%)	4 (2.7%)
Competitive advantage	50 (33.3%)	74 (49.3%)	9 (6.0%)	10 (6.7%)	7 (4.7%)
Customer responsiveness	47 (31.3%)	70 (46.7%)	17 (11.3%)	11 (7.3%)	5 (3.3%)
Overall start-up success	52 (34.7%)	72 (48.0%)	12 (8.0%)	10 (6.7%)	4 (2.7%)

Source: Primary data; SA = strongly agree, A = agree, N = neutral, D = disagree, SD = strongly disagree.

Table 5 summarises respondents' perceptions of the contribution of digital transformation to start-up outcomes. Operational efficiency recorded the highest level of agreement, with 83.3% agreeing or strongly agreeing that digital transformation improved operations. Start-up growth and competitive advantage were also strongly associated with digital transformation, with agreement levels of 83.3% and 82.7%, respectively. Positive responses were also reported for customer responsiveness (78.0%), innovation capability (76.0%), productivity (72.7%) and customer satisfaction (72.7%). Overall, 82.7% of respondents agreed or strongly agreed that digital transformation contributed to overall start-up success.

Table 6. Strategies for Enhancing Digital Transformation Success among Start-ups in Oman

Strategy	*SA*	*A*	*N*	*D*	*SD*
Addressing the digital skills gap	49 (32.7%)	69 (46.0%)	13 (8.7%)	15 (10.0%)	4 (2.7%)
Digital infrastructure access	47 (31.3%)	76 (50.7%)	13 (8.7%)	13 (8.7%)	1 (0.7%)
Technology adaptability	40 (26.7%)	72 (48.0%)	26 (17.3%)	11 (7.3%)	1 (0.7%)
Strategic partnerships	51 (34.0%)	73 (48.7%)	11 (7.3%)	14 (9.3%)	1 (0.7%)
Government support	42 (28.0%)	69 (46.0%)	24 (16.0%)	14 (9.3%)	1 (0.7%)
Digital training programmes	51 (34.0%)	71 (47.3%)	13 (8.7%)	13 (8.7%)	2 (1.3%)
Digital transformation funding	46 (30.7%)	70 (46.7%)	20 (13.3%)	13 (8.7%)	1 (0.7%)

Source: Primary data; SA = strongly agree, A = agree, N = neutral, D = disagree, SD = strongly disagree.

Table 6 presents the strategies identified as important for strengthening digital transformation among start-ups. Strategic partnerships received the highest level of agreement, followed by access to digital infrastructure and digital training programmes. Addressing the digital skills gap was also strongly supported, while government assistance, technology adaptability and funding received substantial agreement. Taken together, the responses suggest that successful digital transformation requires more than technology investment; respondents also emphasised skills development, partnerships, infrastructure, and institutional and financial support.

Table 7. Descriptive and Reliability Statistics

Construct	No. of items	Range	Mean	Std. dev.	Cronbach's alpha
Digital transformation (DT) among start-ups in Oman	9	3.22	1.88	.70	.905
Start-up performance, innovation and competitiveness success	8	4.00	2.02	.91	.967

Source: Primary data

Table 7 reports the descriptive statistics and internal consistency of the two main constructs. Digital transformation was measured using nine items and recorded a Cronbach's alpha of .905, while start-up performance, innovation and competitiveness success was measured using eight items and recorded an alpha of .967. Both values exceed the commonly used .70 threshold, indicating satisfactory internal consistency, and provide the basis for the subsequent regression analysis. In addition, 85.3% of respondents indicated that they would recommend digital transformation to other start-ups, providing further evidence of its generally positive perceived value among the surveyed firms.

Regression analysis: A simple linear regression was conducted to examine whether digital transformation predicts start-up performance, innovation and competitiveness success (Tables 8–10).

Table 8. Model Summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.915	.837	.835	.367

Source: Primary data; predictor: (constant), digital transformation (DT) among start-ups in Oman.

Table 9. ANOVA

Model	Sum of squares	df	Mean square	F	Sig.
Regression	102.512	1	102.512	757.389	< .001
Residual	20.032	148	.135		
Total	122.543	149			

Source: Primary data; dependent variable: start-up performance, innovation and competitiveness success; predictor: (constant), digital transformation (DT) among start-ups in Oman.

Table 10. Coefficients

Model	B	Std. error	Beta	t	Sig.
(Constant)	−.207	.086		−2.403	.017
Digital transformation (DT) among start-ups in Oman	1.186	.043	.915	27.521	< .001

Source: Primary data; dependent variable: start-up performance, innovation and competitiveness success.

The model was statistically significant, $F(1, 148) = 757.389$, $p < .001$, and explained 83.7% of the variance in the dependent variable ($R = .915$, $R^2 = .837$, adjusted $R^2 = .835$, standard error of the estimate = .367). Digital transformation had a positive and statistically significant coefficient ($B = 1.186$, $\beta = .915$, $t = 27.521$, $p < .001$). The results therefore provide strong statistical evidence that

digital transformation is a significant positive predictor of the combined measure of start-up performance, innovation and competitiveness.

7. Discussion of Findings

The findings indicate that digital transformation has become an important part of the business activities of the surveyed start-ups in Oman. Most respondents reported that their start-ups had adopted digital technologies, with business software being the most commonly used form of technology. The findings also show that digital strategy, employee readiness, government support, investment, digital skills, financial resources and leadership support are important factors associated with digital transformation, while lack of digital skills and knowledge and limited financial resources emerged as the main challenges. Respondents also reported positive outcomes in operational efficiency, growth, innovation, customer responsiveness and competitive advantage. These perceptions are supported by the regression results, which show a strong positive predictive relationship between digital transformation and start-up performance, innovation and competitiveness ($\beta = .915$, $p < .001$), with the model explaining 83.7% of the variance in the dependent variable. Taken together, the findings suggest that digital transformation is not simply a matter of introducing new technologies; its contribution to start-up success is closely linked to the availability of skills, resources, leadership and an appropriate strategic direction.

8. Conclusion

This study examined the role of digital transformation in the performance, innovation and competitiveness of start-ups in Oman. The findings show that digital technology adoption is already widespread among the surveyed start-ups, although the nature of adoption varies: business software was the most frequently reported technology, while social media and online selling or booking platforms were used to a lesser extent. Digital strategy, employee readiness, investment, leadership, financial resources and government support are important elements in the transformation process, whereas the lack of digital skills and knowledge and limited budgets remain significant obstacles.

The statistical findings provide further evidence of a strong relationship between digital transformation and the combined measure of start-up performance, innovation and competitiveness. The regression model was statistically significant and explained 83.7% of the variance in the dependent variable, and the digital transformation coefficient was positive and significant. The results therefore suggest that start-ups that develop their digital capabilities may be better positioned to improve operational efficiency, support innovation, respond to customers and strengthen their competitive position. Since the study is based on cross-sectional responses from 150 participants, these findings should be interpreted as evidence of a strong predictive relationship rather than as proof of a direct causal effect.

9. Suggestions

The findings point to several practical areas that could strengthen digital transformation among start-ups in Oman. First, greater attention should be given to developing digital skills and practical technology knowledge among employees, as the lack of skills was the most frequently identified challenge; start-ups could provide regular digital training and encourage employees to develop skills relevant to their specific business activities. Second, financial constraints need to be considered when planning digital initiatives. Start-ups may benefit from phased technology adoption, prioritising digital solutions that address immediate operational needs before making larger investments, and stronger leadership involvement and a clear digital strategy can help ensure that technology adoption is connected to business objectives rather than treated as a stand-alone activity.

The findings also highlight the importance of support beyond the individual start-up. Training programmes, access to digital infrastructure, strategic partnerships and appropriate government support can help smaller ventures overcome resource and capability limitations. Start-ups may therefore

benefit from collaborating with technology providers, universities, business-support organisations and other enterprises to gain access to knowledge and digital expertise, while government and entrepreneurship-support institutions could complement these efforts through targeted training, infrastructure support and funding mechanisms for digital initiatives. Such measures would help create conditions in which digital transformation can be developed as an ongoing organisational capability rather than as a one-time technology investment.

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