Examining the Evolution of Digital Innovation and Its Impact on Organizational Growth

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Abstracts

Organizational operations have been modified by using the rise of digital innovation, which has increased consumer interaction, accelerated efficiency, and stimulated overall growth. But obstacles like converting organizational adoption charges and a quickly evolving era would possibly make it more difficult to generalize effects across of different sectors and ancient intervals. To overcome these constraints, a thorough examination of the impact of digital innovation on organizational growth is carried out in this study. This study investigates the connection among Digital infrastructure (DI), Digital Innovation practices (DIP), Adoption of advanced digital technologies (ADT), Leadership support (LS), Organizational growth (OG), and Employee digital capabilities (EDS) utilizing Structural Equation Modeling (SEM) and CFA test. SEM is used to evaluate the causal pathways between constructs and the connections between latent variables and their indicators. CFA is a method used to validate the dimension model by examining the relationships between observed indicators and their underlying constructs. A systematic questionnaire with a Likert scale rating was used to collect data from 600 populations. The measurement model assessed the validity and reliability of latent constructs, while the structural model analyzed the relationship between constructs based on

the proposed hypotheses. The structural model revealed that DI, LS, and ADT are positively connected to the DTP, and OG, between digital innovations on organizational growth. (β = 0.58,0.54,0.60 and 0.62,$p < 0.05$), providing well support for hypotheses 1, 2, 4, and 5. The SEM and CFA confirm the robustness of these relationships. The findings underscore the critical role of digital infrastructure and leadership in driving effective digital practices and fostering growth.

Keywords: Digital Innovation, Organizational Growth, Organizations, industrialization, Digital Innovationpractices.

Introduction

The global business landscape has undergone extraordinary change as a result of the digital era, and in need for organizations to stay competitive and experience sustained growth, they must quickly adapt to new technology developments [2]. For organizations to generate new value and possibilities, digital transformation a crucial component of this adaptation involves integrating digital technology into corporate culture, interactions with consumers, and business processes [13]. Therefore, encouraging innovation in inner firms and facilitating a successful digital transition requires powerful management. For organizations to effectively traverse the challenges of digital transformation and capitalize on the opportunities of the current generation, transformational digital leadership is crucial [14]. The effect of digitalization on companies, business structures, the economy, and current society at huge is substantial [11]. Since new patterns of utilization were made feasible by inexpensive, user-friendly networked digital technology, the content-primarily based industries have seen vast disruption to their long-status organizational systems and economic models all through the past 15 years [5]. Fig 1 demonstrates the structure of digital innovation.

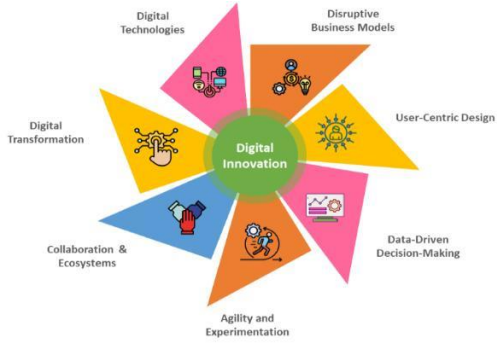

Fig 1 Digital Innovation

The effective integration of digital innovation and efficient knowledge management has become an essential aspect in today's constantly moving global business environment [1]. The speedy emergence of internationalization, the improvement of generation, and the interconnectedness of industries necessitate a comprehensive comprehension of how organizations control the complex environment [7]. The advent of digital innovation has entirely altered how companies do business around the world [6]. AI, big data analytics, and the IoT are examples of technologies that have become essential to process optimization, adaptability, and the ability to make strategic decisions [10]. At the same time, knowledge management which emphasizes the efficient use of organizational knowledge to achieve competitive advantage has developed into a strategic need [4].

Limitations of Digital innovation and its impact on organizational growth include the velocity at which generation is changing, which would possibly make the conclusions less applicable. Furthermore, the way that companies react to virtual innovation would possibly fluctuate appreciably depending on their size, location, and sector, which can restrict how extensively applicable these results possess. The constant evolution of digital tools and strategies may additionally provide demanding situations for the study in phrases of quantifying te long-term consequences of digital innovation. This research aims to provide a comprehensive analysis of how digital innovation affects organizational growth.

The remaining study elements are grouped as follows: In Phase 2, the hypothesis is developed and pertinent research is covered. In Phase 3, the methodology comprising data collection, question development, and statistical analysis was discussed. While Phase 4 presents the findings, Phase 5 concludes the research,

Related work

The scientific approach to comprehending how SA affects innovation creation and corporate digital transformation was examined in [8]. It makes use of techniques like expert evaluation, analytical ranking, generalization, and abstract logic. Based on the organizational culture, sector integration, management objective reliability, external significance, and efficiencies were key components of SA's success. The findings, SA dramatically raised and shifted the importance of digital transformation in several business domains.

The five factors these are digital demands from internal customers [17], corporate digital innovation, challenges from competitors, digital innovation management, and the needs of the modern digital age. It investigated the digital transformation of human resource management in the digital economy. It examined digital workplaces, customer service, and procedures, and emphasized that technological advances were being used for selection, training, and evaluation procedures.

The corporate innovation was impacted by the digital industry and company digitalization. [9] was examined the degree of digitalization in two firms using a game model. The findings indicated that while regional creativity might have a detrimental impact, both digitization and regional digital sector innovation could foster innovation. Higher levels of digital

industrialization in an area reduce marginal innovation effectiveness, therefore firm digitalization was especially evident in-service sectors connected to digital technology.

The digital transformation might help prefecture-level cities and A-share traded companies in China get over their innovation conundrum was examined in [18]. It demonstrated that investing in R&D does not greatly increase the TFP. Digital transformation has the potential to raise returns to scale, boost absorption capacity, and improve the quality of innovation. Through digital transformation, state-owned, technology, and growth firms were better positioned to address the innovation conundrum.

Digital transformation's impact on production as a whole of highly emitting businesses was investigated in [15]. It was discovered that boosting innovation in green technologies and socially conscious digital transformation may increase productivity. Moreover, it lessened cost persistence. It discovered that the following groups had a greater effect on productivity: state-owned heavy polluters, big firms, non-manufacturing industries, and companies with substantial environmental investment. According to the, attaining low-carbon targets through digital transformation might boost productivity and green economic development.

Employing company data from 2009 to 2019 in [3], was investigated the connection between innovation and digital transformation. Through information exchange, technical employees, and origination responsiveness, it was discovered that digital transformation fosters business innovation. They also discovered that, through overcoming the gap between various firm types, the digital revolution has a stronger influence on the creativity of non-SOEs, non-high-tech companies, and ecologically friendly organizations.

The open innovation, sustainability, and digital transformation were found in [12]. These ideas' potential to promote sustainability and open innovation was scarce, despite the rising interest in them. A survey of the literature, an assessment of scope, and a qualitative content analysis were all part of the three phases of the study's approach. The results demonstrated how digital transformation might both positively and negatively affect sustainability, especially in its environmental aspect. It also served as an enabler for open innovation and conservation.

In the agri-food industry, a framework for creating long-lasting digital innovation ecosystems was presented in [16]. The extensive public-private innovation initiatives throughout Europe that involved hundreds of different stakeholders between 2011 and 2021. The framework emphasized to consider the business and technology contexts to effectively employ IT in the agri-food industry.

Hypothesis Development

Hypothesis (H1): Digital infrastructure investment is positively connected to the effectiveness of digital innovation practices. (DI) → (DIP)

Hypothesis (H2): Leadership support for digital initiatives is positively connected to the effectiveness of digital innovation practices. (LS) → (DIP)

Hypothesis (H3): Employee digital skills are positively connected to the effectiveness of digital innovation practices. (EDS) → (DIP)

Hypothesis (H4): The adoption of advanced digital technologies is positively connected to organizational growth. (ADT) → (OG)

Hypothesis (H5): The effectiveness of digital innovation practices is positively connected to organizational growth. (DIP) → (OG)

Methodology

The main elements of the study are displayed in Fig 2, where the independent variables are Digital infrastructure (DI), Leadership support (LS), Employee digital skills (EDS), and advanced digital technologies (ADT), while the dependent variables are digital innovation practices (DIP), and organizational growth (OG). They are subsequently the primary concern of this investigation and are the result of several variables connecting.

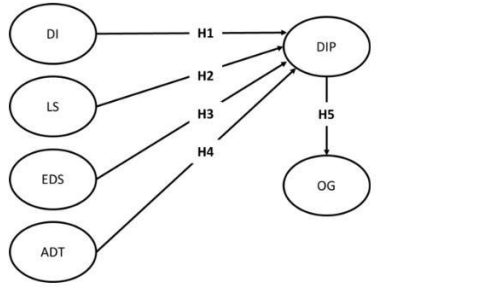

Fig 2 Conceptual framework

Data collection

The 600 participants in this study were divided into groups based on age, gender, years of experience, industry, and degree of education. Men, and women, were the categories for gender. There were age divisions for 19 to 25 and 56 and above. A doctorate, master's, bachelor's, and high school were among the several categories of education levels. Roles such as manager, specialist, technician, and executive/director were assigned to job titles. Finance, manufacturing, healthcare, and technology were among the industry sectors. From one to more than ten years, the years of experience varied. A thorough examination of the several variables influencing digital innovation and organizational expansion is made possible by this thorough demographic description. Table I shows the demographic details.

Table I Demographic details

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	250	41.7%
	Female	350	58.3%
Age Group	19 to25	80	13.3%
	26 to35	150	25.0%

	36 to 45	180	30.0%
	46 to 55	130	21.7%
	56 and above	60	10.0%
Education Level	High School	90	15.0%
	Bachelor's Degree	250	41.7%
	Master's Degree	180	30.0%
	Doctoral Degree	50	8.3%
	Other	30	5.0%
Job Title	Executive/Director	80	13.3%
	Manager	180	30.0%
	Specialist	150	25.0%
	Technician	120	20.0%
	Other	70	11.7%
Industry	Technology	200	33.3%
	Finance	120	20.0%
	Healthcare	100	16.7%
	Manufacturing	120	20.0%
	Other	60	10.0%
Years of Experience	Less than 1 year	50	8.3%
	1 to3 years	150	25.0%
	4 to 7 years	200	33.3%
	8 to 10 years	100	16.7%
	More than 10 years	100	16.7%

Questionnaire design

A total of 600 participants were determined to be suitable for the study. Creating a questionnaire with six fundamental elements is the first stage in this approach (refer to Appendix A). Demographic data about the responders is gathered in this section.

- Hypothesis (H1): Higher investment in digital infrastructure enhances the effectiveness of digital innovation practices within organizations.
- Hypothesis (H2): Leadership support positively influences the effectiveness of digital innovation practices in organizations.
- Hypothesis (H3): Employees' digital skills significantly contribute to the effectiveness of digital innovation practices.
- Hypothesis (H4): The adoption of advanced digital technologies positively impacts organizational growth.
- Hypothesis (H5): The effectiveness of digital innovation practices significantly contributes to organizational growth.

A 3-point Likert scale was used to rate 600 survey participants. The responses are several from (1) Not at all influential (3) Highly influential, (1) Not associated (3) Strongly associated, (1) No effect (5) Significant effect, (1) Not effective (3) Highly effective, (1) Not at all (3) A lot, (1) Not critical (3) Highly critical, (1) Not critical (3) Highly critical, (1) No influence (3) Significant influence, (1) No impact (3) High impact, (1) Not correlated (3) Strongly correlated.

Statistical analysis

The SEM approach was used in this inquiry to create the proposed structural model because it provides greater flexibility for data collection and sample size. Utilizing CFA, the six framework components DI, LS, EDS, ADT, DIP, and OG is investigated. We combined the analysis of the measurement model with the component assessment to prevent redundancy.

Results

I. CFA Test

CFA is used to validate the dimension model by assessing the relationships among observed indicators and their underlying latent constructs, making sure that the measures of digital innovation and organizational growth are dependable.

The measuring model of constructs like DI, LS, EDS, ADT, DTP, and OG is validated using CFA to ensure that it appropriately reflects theoretical notions. To ensure validity and reliable links between constructs, it evaluates the hypothesis fits data. Strong testing of hypotheses on the relationship between digital innovation and organizational growth is supported by this validation.

The latent concept and indicator's strength of association is represented by factor loading (λ). Higher loadings signify a more robust correlation. The accuracy of the loading factor estimation is measured by the SE. Better precision is indicated by smaller standard errors. The test of the factor loading's significance is indicated by the $t-$ value. It is computed as the factor loading divided by the standard error. The likelihood that the observed factor loading happened by chance is indicated by the p-value. A statistically significant factor loading is indicated by a lower p-value (usually less than 0.05). AVE determines how much variation, on average, a construct's indicators can capture. Values greater than 0.50 signify that the construct accounts for over 50% of the variation seen in its indicators. CR evaluates the indications evaluating a construct's internal consistency. A value of 0.70 or above has been considered acceptable. Table II shows the Reliability and validity.

Table II Reliability and validity

Construct	Indicator	Factor Loading (λ)	SE	t-Value	p-Value	AVE	CR
DI	DI1	0.78	0.05	15.60	<0.001	0.62	0.85
	DI2	0.82	0.04	20.50	<0.001		
LS	LS1	0.74	0.06	12.33	<0.001	0.58	0.82
	LS2	0.76	0.05	15.20	<0.001		
EDS	EDS1	0.80	0.05	16.00	<0.001	0.64	0.87
	EDS2	0.77	0.06	12.83	<0.001		
ADT	ADT1	0.84	0.04	21.00	<0.001	0.69	0.89
	ADT2	0.87	0.03	29.00	<0.001		
DIP	DIP1	0.85	0.04	21.25	<0.001	0.67	0.90
	DIP2	0.83	0.05	16.60	<0.001		
OG	OG1	0.79	0.05	15.80	<0.001	0.61	0.84
	OG2	0.81	0.04	20.25	<0.001		

The CFA findings are shown in table II together with the factor loadings, standard errors (SE), t-values, p-values, and model fit indices for each indicator. It offers a thorough summary of the reliability and validity of the measuring methodology, which is critical for comprehending how digital innovation affects organizational growth.

II. SEM analysis

SEM is used to evaluate the causal pathways between constructs and the connections between latent variables and their indicators. It offers a thorough framework for evaluating hypotheses on the numerous mediating elements that influence the digital innovation impacts organizational growth.

Structural model

The correlations between predictor and outcome factors on organizational growth and digital innovation can be found in the Structural Framework Table. The importance of each hypothesis is evaluated, and the direction and strength of the associations are shown by the β values. The hypothesis (DI) → (DIP) exhibits a highly beneficial influence of digital infrastructure investment on digital innovation practices, as indicated by the β value of 0.62. The predictive ability of the model is indicated by the R^2 values, which, in the case of (DI) → (DIP), indicate the percentage of variation in the dependent variable that has been clarified by the independent variable.

The effect size is represented by the f^2 values, where values such as 0.10 and 0.12 indicate medium and moderate impacts, respectively. This illustrates how much predictor factors influence outcome variables. P – values for each hypothesis are less than 0.05, indicating statistical significance and confirming the validity of the connections for the study.

A qualitative assessment of the effect size is provided by the f^2 effect column, which classifies the influence as small, medium, or big. The strength of the correlations between digital innovation practices and organizational success is shown by the final column in table IV, "result" which highlights whether each hypothesis is "Well Supported" or "Supported" based on the statistical evidence. Table III demonstrates the discriminating validity analysis. Fig 3 and Table IV display the results of the SEM technique and the output of the structural analysis among the primary constructs.

Table III Discriminating Validity Analysis

Construct	DI	LS	EDS	ADT	DIP	OG
DI	0.79	-	-	-	-	-
LS	0.52	0.76	-	-	-	-
EDS	0.54	0.51	0.80	-	-	-
ADT	0.58	0.56	0.53	0.86	-	-
DIP	0.60	0.57	0.59	0.64	0.84	-
OG	0.56	0.53	0.58	0.61	0.62	0.80

Table IV Structural framework

Hypothesis and Connections	β Values	R^2	f^2	P Value	f^2 Effect	Result
H1: (DI) → (DIP)	0.58	0.42	0.10	<0.05	Medium	Well Supported
H2: (LS) → (DIP)	0.54	0.37	0.09	<0.05	Medium	Well Supported
H3: (EDS) → (DIP)	0.50	0.34	0.08	<0.05	Medium	Supported
H4: (ADT) → (OG)	0.60	0.45	0.12	<0.05	Large	Well Supported
H5: (DIP) → (OG)	0.62	0.48	0.13	<0.05	Large	Well Supported

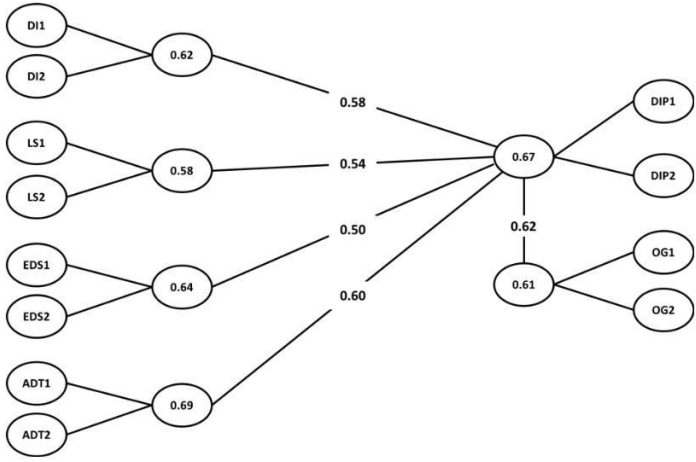

Fig 3 Evaluation of the Structural model

In Hypothesis 1 (H1), the relationship between Digital Infrastructure (DI) and Digital Innovation Practices (DIP) shows a strong positive β value of 0.58, meaning that improvements in digital infrastructure significantly enhance innovation practices. The R^2 value of 0.42 shows that 42% of the variance in digital innovation practices is explained by digital infrastructure. With an effect size (f^2) of 0.10 and a P value below 0.05, the relationship is statistically significant, and the effect size is considered medium, marking this hypothesis as well-supported.

Hypothesis 2 (H2) assesses the effect of Leadership Support (LS) on DIP, with a β value of 0.54, displaying that effective management has a strong influence on fostering innovation practices. The R^2 of 0.37 shows that 37% of the variance in DIP is explained by leadership support, and the f^2 value of 0.09 suggests a medium effect size. This pathway is also statistically huge ($P < 0.05$) and well-supported.

Hypothesis 4 (H4) investigates the direct impact of Adaptability (ADT) on Organizational Growth (OG), showing a β value of 0.60, indicating that adaptability has a significant positive effect on organizational growth. The R^2 value of 0.45 manner that adaptability explains 45% of

the variance in organizational growth, with a huge effect size ($f^2 = 0.12$) and robust statistical support ($P < 0.05$).

Hypothesis 5 (H5) assesses the influence of Digital Innovation Practices (DIP) on OG. With a high β value of 0.62, the results demonstrate that effective innovation practices have a significant impact on organizational growth. The R^2 value of 0.48 indicates that 48% of the variance in organizational growth is explained by DIP, with a large effect size ($f^2 = 0.13$). This hypothesis is also well supported with a P value below 0.05.

Conclusion

The study effectively explored the interrelationships among Digital Infrastructure (DI), Digital Innovation Practices (DIP), Adoption of Advanced Digital Technologies (ADT), Leadership Support (LS), Organizational Growth (OG), and Employee Digital Skills (EDS) through SEM and CFA. The SEM results reveal significant positive connections between DI, LS, and ADT with DIP and OG, with path coefficients of $\beta = 0.58, 0.54, 0.60$, and 0.62 respectively ($p < 0.05$), thus strongly supporting hypotheses 1, 2, 4, and 5. The CFA validates these relationships, confirming the robustness of the measurement model. These findings emphasized the essential role of digital infrastructure and leadership in driving digital innovation and organizational growth. Some of the disadvantages of the study consist of its dependence on expressed data and its ability to effect long-term relevance because of the speedy shifting generation landscape. To improve generalizability and advantage insights into how new technology affects organizational growth, future research needs to consist of longitudinal studies and growing technologies.

WORKS CITED

Aithal, P.S. "How to Create Business Value Through Technological Innovations Using ICCT Underlying Technologies," International Journal of Applied Engineering and Management Letters (IJAEML), 7(2), 232-292, 2023.

Behie, S.W., Pasman, H.J., Khan, F.I., Shell, K., Alarfaj, A., El-Kady, A.H., and Hernandez, M. "Leadership 4.0: The changing landscape of industry management in the smart digital era," Process Safety and Environmental Protection, 172, 317-328, 2023. https://doi.org/10.1016/j.psep.2023.02.014

Chen, P., and Kim, S. "The impact of digital transformation on innovation performance mediating role of innovation factors," Heliyon, 9(3), 2023.

He, Z., Huang, H., Choi, H., and Bilgihan, A. "Building organizational resilience with digital transformation," Journal of Service Management, 34(1), 147-171, 2023. https://doi.org/10.1108/JOSM-06-2021-0216

Kasula, B.Y., Whig, P., Vegesna, V.V., and Yathiraju, N. "Unleashing Exponential Intelligence: Transforming Businesses through Advanced Technologies," International Journal of Sustainable Development Through AI, ML and IoT, 3(1), 1-18, 2024.

Khanom, M.T. "Business strategies in the age of digital transformation," Journal of Business, 8(01), 28-35, 2023. https://doi.org/10.18533/job.v8i01.296

Kopackova, H., Simonova, S., and Reimannova, I. "Digital transformation leaders wanted: How to prepare students for the ever-changing demands of the labor market," The International Journal of Management Education, 22(1), 100943, 2024. https://doi.org/10.1016/j.ijme.2024.100943

Kryvovyazyuk, I., Britchenko, I., Smerichevskyi, S., Kovalska, L., Dorosh, V., and Kravchuk, P. "Digital transformation and innovation in business: The impact of strategic alliances and their success factors." 2023.

Li, S., Gao, L., Han, C., Gupta, B., Alhalabi, W., and Almakdi, S. "Exploring the effect of digital transformation on Firms' innovation performance," Journal of Innovation & Knowledge, 8(1), 100317, 2023. https://doi.org/10.1016/j.jik.2023.100317

Martínez-Peláez, R., Ochoa-Brust, A., Rivera, S., Félix, V.G., Ostos, R., Brito, H., Félix, R.A., and Mena, L.J. "Role of digital transformation for achieving sustainability: Mediated role of stakeholders, key capabilities, and technology," Sustainability, 15(14), 11221, 2023. https://doi.org/10.3390/su151411221

Phakamach, P., Panjarattanakorn, D., and Onsampant, S. "Conceptualization and development of digital leadership to drive corporate digital transformation for sustainable success," International Journal of Educational Communications and Technology, 3(2), 30-42, 2023.

Robertson, G., and Lapiņa, I. "Digital transformation as a catalyst for sustainability and open innovation," Journal of Open Innovation: Technology, Market, and Complexity, 9(1), 100017, 2023. https://doi.org/10.1016/j.joitmc.2023.100017

Rogers, D. The digital transformation roadmap: Rebuild your organization for continuous change, Columbia University Press, 2023. https://doi.org/10.7312/roge19658

Sewpersadh, N.S. "Disruptive business value models in the digital era," Journal of Innovation and Entrepreneurship, 12(1), 2, 2023. https://doi.org/10.1186/s13731-022-00252-1

Su, J., Wei, Y., Wang, S., and Liu, Q. "The impact of digital transformation on the total factor productivity of heavily polluting enterprises," Scientific Reports, 13(1), 6386, 2023. https://doi.org/10.1038/s41598-023-33553-w

Wolfert, S., Verdouw, C., van Wassenaer, L., Dolfsma, W., & Klerkx, L. "Digital innovation ecosystems in agri-food: Design principles and organizational framework," Agricultural Systems, 204, 103558, 2023. https://doi.org/10.1016/j.agsy.2022.103558

Zhang, J., and Chen, Z. "Exploring human resource management digital transformation in the digital age," Journal of the Knowledge Economy, 15(1), 1482-1498, 2024. https://doi.org/10.1007/s13132-023-01214-y

Zhuo, C., and Chen, J. "Can digital transformation overcome the enterprise innovation dilemma: Effect, mechanism, and effective boundary," Technological Forecasting and Social Change, 190, 122378, 2023. https://doi.org/10.1016/j.techfore.2023.122378