Digital Transformation, Innovation Efficiency, and Financial Performance: The Contingent Role of Board Technological Competence in Indian Firms.

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Abstract

This study examines the extent to which digital transformation capabilities enhance the financial performance of Indian firms, while testing the mediating role of innovation efficiency and the moderating effect of board technological competence. Data were collected online from company executives between March and September 2025. Three thousand invitations were sent via LinkedIn, 517 responses were received, and 493 valid observations were retained for analysis. The results obtained through structural equation modelling and the PROCESS macro show that digital transformation exerts a positive and significant effect on financial performance, and that this effect mainly operates through innovation efficiency, confirming that digitalization creates value when it accelerates the conversion of technological resources into profitable innovations. However, board technological competence weakens the direct effect, suggesting that a highly technophile governance stimulates prudential trade-offs that may slow down the immediate materialization of financial gains. In terms of implications, these findings demonstrate that firms must prioritize the exploitation of digitalization as a driver of innovative efficiency, and that governance must calibrate the level of technological sophistication within

the board so as not to restrain the conversion of digital transformation into observable financial value.

Keywords: *Digital transformation capabilities; Innovation efficiency; Board technological competence; Corporate financial performance; India*

1. Introduction

Digital transformation has become a central determinant of firm competitiveness and performance in an environment characterized by technological volatility, uncertainty, and rising global market complexity (Nsights, Sawy, and Pavlou 2013); (Peng and Tao 2022). The strategic integration of digital technologies including artificial intelligence, big data, the Internet of Things, blockchain, and cloud computing is profoundly reshaping business models and organizational governance. In this context, digital transformation capabilities emerge as an essential strategic lever enabling firms to mobilize, integrate, and orchestrate their digital resources in order to strengthen their economic and financial performance (Li 2018); (Warner and Wäger, 2019). However, despite the growing scholarly attention on this topic, empirical findings remain ambiguous. Some studies confirm a positive link between digitalization and performance(Zheng and Zhang 2023), while others emphasize that the impact of digital technologies depends on a firm's ability to convert such investments into sustainable competitive advantages (Jonathan and Kuika Watat, 2020); (Lee et al. 2024).

This divergence invites further examination of the mechanisms through which digital transformation effectively influences financial performance. Among these mechanisms, innovation efficiency stands out as a key channel. It reflects an organization's ability to convert technological resources and knowledge into exploitable and profitable innovations (Hagedoorn and Cloodt 2025); (Ciriello 2025). Digitalization enhances information flows, cross-functional collaboration, and execution speed, thereby reinforcing productivity and supporting long-term profitability (Nambisan 2017); (Song 2017) It becomes therefore relevant to test the mediating role of innovation efficiency in the relationship between digital capabilities and financial performance.

In parallel, value creation from digitalization also depends on corporate governance structures. The board of directors plays a central role in supervising digital transformation strategies and allocating the associated resources. Board technological competence, defined as the degree of understanding, experience, and expertise of directors regarding digital technologies, directly shapes the quality of strategic decisions and a firm's ability to exploit the full potential of

digitalization (Benlemlih, El Hiri, and Amina 2024); (Guo et al. 2020). A board endowed with strong technological competence is better equipped to identify innovation opportunities, reduce investment risks, and effectively guide digital initiatives toward value creation.

The Indian context offers a particularly relevant setting to study these interactions. India is experiencing rapid digital transformation supported by ambitious public policies such as Digital India and Make in India, which foster the digitalization of firms in industrial, financial, and technological sectors. The country is characterized by a strong heterogeneity of organizational structures, ranging from digital startups to large manufacturing firms, thus providing a fertile ground to investigate differentiated effects of digital capabilities on performance. Additionally, the Indian institutional framework, shaped by governance reforms such as the Companies Act 2013 and SEBI Guidelines, places strong emphasis on board competence in supervising technological investments and sustainable value creation.

Accordingly, this study aims to analyze the impact of digital transformation capabilities on the financial performance of Indian firms while examining the mediating role of innovation efficiency and the moderating effect of board technological competence. Positioned at the intersection of strategic finance, technological governance, and innovation management, this research seeks to enrich understanding of the conditions under which digital transformation effectively contributes to financial performance in emerging economies.

2. Literature Review

2.1. Digital Transformation Capabilities

Digital transformation capabilities refer to a firm's ability to mobilize, combine, and reconfigure its technological, organizational, and human resources in order to exploit the opportunities offered by digital technologies (Nsights, Sawy, and Pavlou 2013); (Li 2018). These capabilities include not only the possession of advanced technological infrastructures but also the strategic ability to integrate them into value-creation processes. They rely on digital culture, leadership, analytical skills, and organizational adaptability (Warner and Wäger, 2019). According to the Resource-Based View, digital capabilities constitute a rare and difficult-to-imitate strategic resource that can improve financial performance when aligned with the firm's overall strategy (Barney 1991). The Dynamic Capabilities perspective (Teece 2018) further suggests that firms must continuously transform and readjust their resource base to respond to rapidly changing environments. Digital transformation capabilities contribute to this dynamic by fostering organizational flexibility and strategic agility. Recent empirical work shows that firms

mastering digital capabilities achieve stronger operational and financial outcomes, particularly through cost reduction, productivity improvement, and the creation of new revenue streams (Zheng and Zhang 2023); (Chen and Hao 2022). However, other research highlights that the impact of digitalization on performance depends on the degree of strategic integration of technologies within business processes and on the level of digital maturity of the firm (Jonathan and Kuika Watat 2020).

2.2. Innovation Efficiency

Innovation efficiency is defined as an organization's ability to convert its investments in R&D, human capital, and technologies into successful innovations that can be measured through productivity, profitability, or market share (Hagedoorn and Cloodt 2025); (Ciriello 2025). It reflects the performance of the innovation process in terms of the ratio between inputs mobilized and outputs achieved. From a Dynamic Capabilities standpoint, innovation is a strategic renewal mechanism that ensures long-term competitiveness (Teece 2018). Digital technologies strengthen this renewal capacity by facilitating information flows, cross-functional collaboration, and speed-to-market for new products (Nambisan 2017); (Song 2017). Digital tools such as artificial intelligence and big data improve customer understanding, forecasting accuracy, and the personalization of offerings, thereby increasing the value generated by innovation (Falahat et al. 2021). Digital transformation capabilities therefore positively influence the efficiency of the innovation process. A firm with strong digital infrastructures and digital competences is better equipped to leverage internal and external knowledge, reduce development costs, and enhance the relevance of its innovations. Innovation efficiency thus becomes a key value creation mechanism linking digitalization efforts to financial outcomes (Li 2018); (Virmani et al. 2025).

2.3. Board Technological Competence

The board of directors plays a central role in strategic supervision, risk management, and sustainable value creation. Board technological competence refers to the degree of expertise, experience, and familiarity of directors with digital technologies, innovation, and their strategic implications (Guo et al. 2020); (Benlemlih, El Hiri, and Amina 2024). This competence directly shapes the quality of decisions related to digital transformation and technological investment. Cognitive governance theory (The et al. 1999) suggests that the knowledge and experience of directors determine their capacity to interpret and evaluate the opportunities and risks associated with strategic decisions. A technologically competent board enhances oversight of digital

projects, reduces information asymmetries between managers and directors, and increases the credibility of investment decisions in emerging technologies (Vintilă, Onofrei, and Vintilă 2025). The presence of directors with technological expertise also stimulates an innovation-oriented culture and strengthens strategic alignment between digital initiatives and financial objectives (Guo et al. 2020). In emerging economies such as India, where digitalization is rapidly progressing and institutional reforms reinforce transparency and board professionalization, board technological competence becomes a critical success factor for maximizing the financial returns of digital transformation.

In summary, digital transformation capabilities represent an essential strategic resource for value creation in contemporary firms. However, their contribution to financial performance does not operate in a direct and uniform way. It depends on internal organizational mechanisms such as innovation efficiency, as well as governance factors that condition the quality of implementation, notably board technological competence. Building on the Resource-Based View, Dynamic Capabilities theory, and Cognitive Governance theory, this research proposes an integrative conceptual framework to explain the interrelationships between these dimensions. The resulting model suggests that digital transformation capabilities positively influence financial performance both directly and indirectly through innovation efficiency, while board technological competence is likely to strengthen this relationship. The next section presents the conceptual model of the study and the development of the hypotheses derived from the theoretical and empirical arguments previously discussed.

3. Conceptual Model and Hypotheses Development

3.1. Digital Transformation Capabilities and Corporate Financial Performance

Digital transformation capabilities refer to a firm's ability to integrate, coordinate, and reconfigure its technological and organizational resources to exploit digital opportunities and generate business value (Nsights, Sawy, and Pavlou 2013); (Li 2018). These capabilities encompass technological infrastructure, digital skills, data analytics, and leadership commitment that collectively enhance operational efficiency and strategic agility (Warner & Wäger, 2019). According to the resource-based view (Barney 1991), such capabilities constitute strategic assets that enable firms to build sustained competitive advantages. By effectively leveraging digital tools, firms can optimize internal processes, reduce transaction costs, improve decision-making quality, and develop new sources of revenue, ultimately improving financial outcomes (Zheng and Zhang 2023). Empirical research increasingly supports the view

that digital transformation is positively associated with firm performance, particularly when aligned with strategic objectives and organizational learning (Jonathan and Kuika Watat 2020); (Chen and Hao 2022). However, the magnitude of this relationship depends on the firm's digital maturity and its ability to align technological investments with value creation mechanisms. When digital transformation is strategically integrated, it not only improves cost efficiency but also enhances revenue growth and market valuation.

H1: Digital transformation capabilities positively influence the corporate financial performance of firms.

3.2. The Mediating Role of Innovation Efficiency

While digital transformation provides the infrastructure and resources necessary for growth, its effect on financial performance often operates through the firm's innovation processes. Innovation efficiency reflects the extent to which an organization converts its innovation inputs such as R&D investments, human capital, and digital tools into successful and commercially viable outputs (Hagedoorn and Cloodt 2025); (Ciriello 2025). According to the dynamic capabilities theory (Teece, 2018), firms that are able to reconfigure and recombine their resources through digital technologies enhance their innovation efficiency, thereby improving performance outcomes. Digital technologies such as big data analytics, AI, and cloud systems facilitate rapid experimentation, reduce product development cycles, and support better customer insight, all of which contribute to higher innovation productivity (Nambisan 2017); (Song 2017). Previous research shows that firms with strong digital capabilities tend to innovate more effectively, as digital tools improve the efficiency of knowledge sharing and collaboration across functional and organizational boundaries (Falahat et al. 2021);(Li 2018). When innovation processes become more efficient, the likelihood of achieving superior financial results increases through cost reduction, faster time-to-market, and stronger differentiation.

H2: Innovation efficiency mediates the relationship between digital transformation capabilities and corporate financial performance.

3.3. The Moderating Role of Board Technological Competence

Corporate governance plays a crucial role in shaping the way firms translate their digital transformation capabilities into financial outcomes. The board of directors provides strategic oversight and resource allocation for digital investments. Board technological competence — that is, the level of expertise, experience, and familiarity of directors with digital technologies,

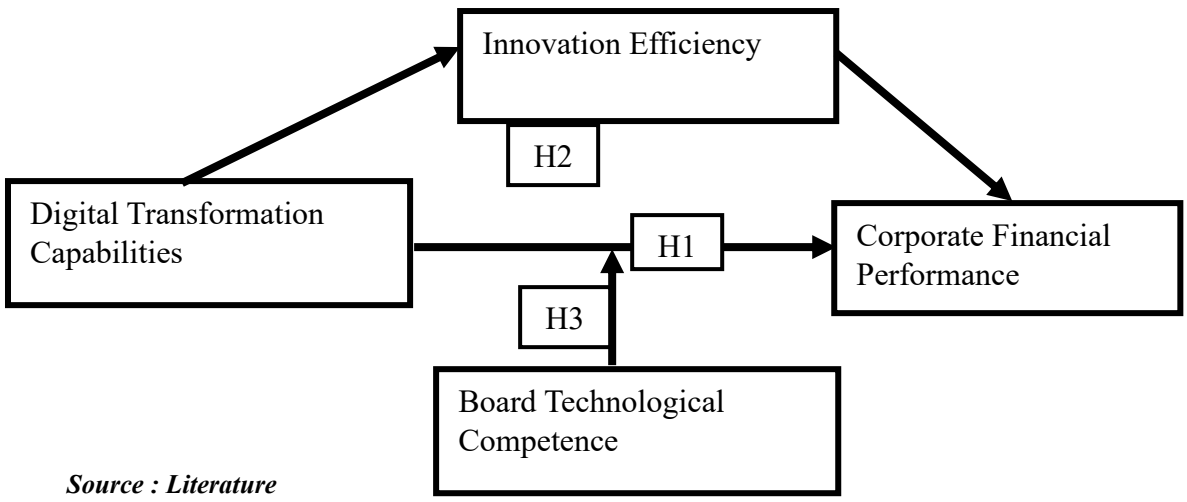
innovation, and their strategic implications — can significantly influence the success of digital initiatives (Guo et al. 2020); (Benlemlih, El Hiri, and Amina 2024). According to cognitive governance theory (The et al. 1999), the knowledge and experience of directors shape their ability to understand and evaluate the opportunities and risks associated with strategic decisions. A technologically competent board encourages better supervision of digital projects, reduces information asymmetries between managers and directors, and increases the credibility of investment decisions in emerging technologies (Vintilă, Onofrei, and Vintilă 2025). In addition, the presence of directors with technological expertise stimulates an innovation-oriented culture and strengthens strategic alignment between digital initiatives and financial objectives (Guo et al. 2020). In emerging economies such as India, where digitalization is progressing rapidly and institutional reforms reinforce transparency and professionalization of boards, board technological competence becomes a key success factor for maximizing the financial returns of digital transformation.

H3: Board technological competence positively moderates the relationship between digital transformation capabilities and corporate financial performance, such that the relationship is stronger when board technological competence is high.

❖ *Conceptual Model Presentation*

In order to clarify the theoretical relationships structuring this research, we developed a conceptual model integrating the expected links between digital transformation capabilities, innovation efficiency, board technological competence, and corporate financial performance. This model reflects the central idea that digital capabilities generate financial value only when they are effectively converted into innovation, and that this conversion is strengthened by the presence of a technologically competent board of directors. Figure 1 below presents the overall structure of these hypothetical relationships, representing the conceptual model.

Figure 1: Conceptual Model of Our Research



Source : Literature

4. Methodology

This study adopts a quantitative approach and a cross-sectional research design to empirically examine the effect of digital transformation capabilities on the financial performance of Indian firms, as well as the mediating role of innovation efficiency and the moderating role of board technological competence. Data were collected exclusively online, which today represents the most reliable, fastest, and most efficient method for reaching strategic decision-makers, particularly in contexts where senior executives prioritize digital interactions. Data collection was conducted from March to September 2025. Executives were identified and targeted on LinkedIn, which is the most relevant professional platform for approaching financial, technological, and innovation-oriented managers. In total, 3,000 invitations were sent to CEOs, CFOs, Innovation/R&D managers, and board directors of Indian firms, among whom 517 responded to the questionnaire. After data cleaning and removal of incomplete or inconsistent responses, 493 usable questionnaires were retained as the final sample for analysis. The four constructs were measured using validated scales from prior literature and assessed on a five-point Likert scale. The analyses were conducted in three stages. First, measurement validation was performed through Exploratory Factor Analysis (SPSS) and Confirmatory Factor Analysis (AMOS) to confirm psychometric validity (KMO > 0.70; Cronbach's $\alpha > 0.70$; Bartlett $p < 0.001$). Second, structural relationships between the variables were estimated through Structural Equation Modeling. Finally, mediating and moderating effects were tested using Hayes' PROCESS macro (models 4 and 1) with 5,000 bootstrap replications, allowing the estimation of direct, indirect, and conditional effects of the conceptual model.

5. Results

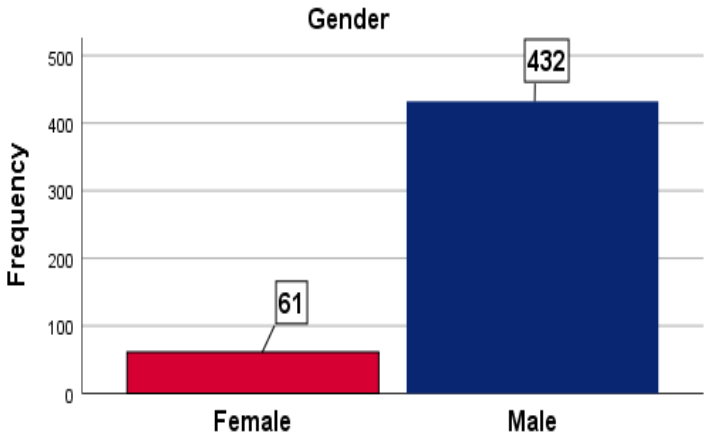
5.1. Descriptive Analysis of the Sample

Before conducting the statistical analyses and testing the hypotheses, it is essential to present the general characteristics of our sample. This step verifies the relevance of the respondents with respect to the target population of the study, as well as their adequacy with the research question. Indeed, the internal validity of a model related to digital transformation, innovation, and financial performance strongly depends on the level of experience, the position held, and the degree of strategic involvement of the participants. Therefore, describing the profile of the respondents provides a solid interpretative basis and ensures that the empirical conclusions originate from actors who are genuinely involved in strategic decision-making within the firms under study.

5.1.1. Distribution by Gender

The analysis of gender distribution shows that the sample is strongly dominated by men. As illustrated in Figure 2, 432 respondents are male compared to only 61 female respondents. This imbalance is consistent with the structure of strategic positions in Indian companies, where female representation at the executive level remains generally low. This observation confirms that most of the decision-makers involved in the digital transformation process are men, which also reflects the reality of the professional market in the industrial sectors examined.

Figure 2: Distribution graph of our sample by gender

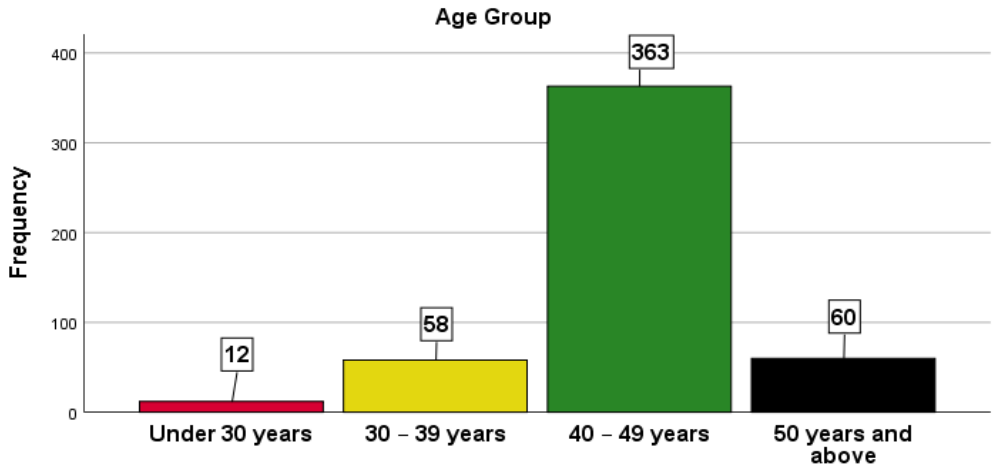


Source: Graphic from SPSS 25

5.1.2. Distribution by Age Group

The distribution by age group also confirms a sample structure strongly oriented toward mature professional profiles. As shown in Figure 3, the most represented category is the 40–49 age group with 363 respondents, followed by respondents aged 50 and above with 60 participants. Respondents aged 30–39 are relatively less numerous (58), while those under 30 are marginally represented (12). This profile indicates that the majority of participants possess advanced professional experience, which reinforces the reliability of the responses, since the assessment of digital transformation capabilities and financial performance requires a high level of decision-making maturity.

Figure 3: Distribution graph of our sample by age

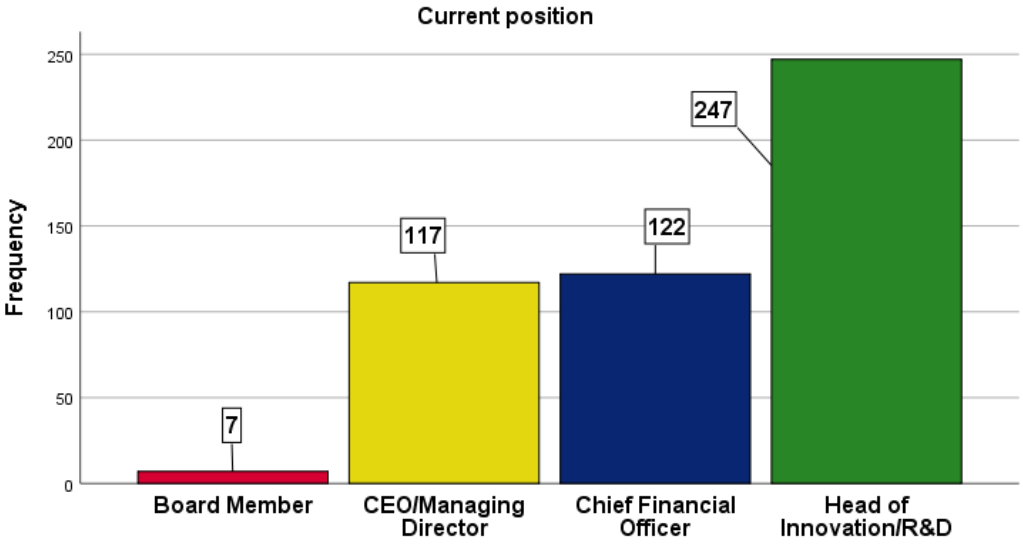


Source: Graphic from SPSS 25

5.1.3. Distribution by Current Position

The distribution by current position reveals that the sample is mainly composed of actors occupying decision-making roles directly related to innovation and financial resources. As shown in Figure 4, the most represented category is Innovation/R&D managers with 247 respondents, followed by Chief Financial Officers (122) and CEOs/Managing Directors (117). In contrast, only 7 respondents are members of the board of directors. This distribution profile confirms that the individuals surveyed are primarily operational and strategic executives involved in the implementation of digital transformation and in the allocation of technological resources, which reinforces the relevance of their responses for analysing the impact of digitalization on financial performance.

Figure 4: Distribution graph of our sample by current position

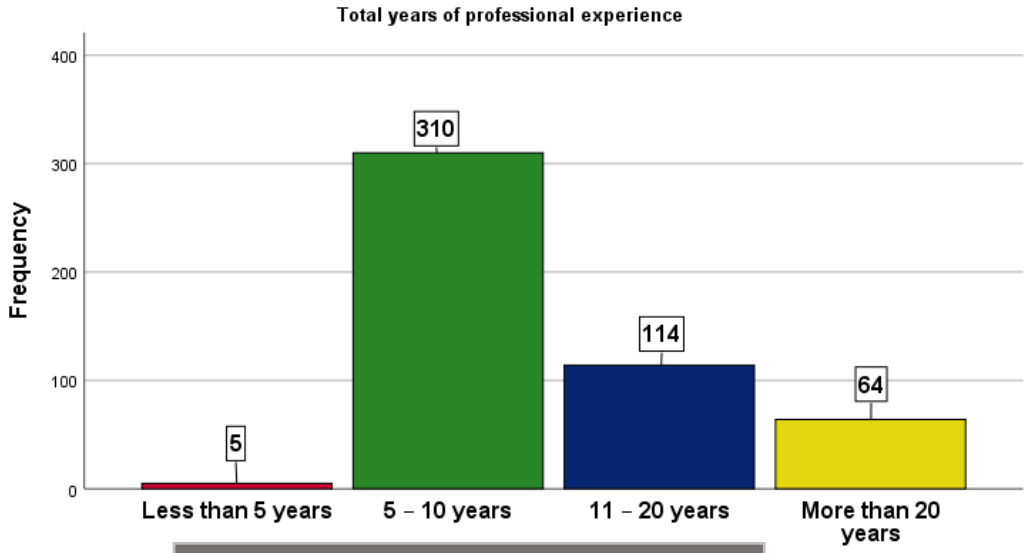


Source: Graphic from SPSS 25

5.1.4. Total Years of Professional Experience

The distribution by total years of professional experience shows that the majority of respondents possess a high level of experience. As shown in Figure 5, the most represented category is professionals with 5 to 10 years of experience (310 respondents), followed by those with 11 to 20 years of experience (114), and then those with more than 20 years of experience (64). Only 5 respondents have less than 5 years of experience. This structure confirms that the sample is composed of individuals with a relatively deep understanding of their sector and organizational dynamics, which further strengthens the relevance of their responses for assessing the impact of digital transformation on performance.

Figure 5: Distribution graph of our sample by total years of experience



Source: Graphic from SPSS 25

After this detailed presentation of the sample profile, it is now relevant to proceed to the psychometric analysis of the research variables. Accordingly, the following section presents the results of the Exploratory Factor Analysis (EFA) in order to assess the construct validity and the factorial structure of the measurement scales used in this study.

5.2. Exploratory Factor Analysis (EFA)

5.2.1. Exploratory Factor Analysis and Reliability of the Digital Transformation Capabilities Scale

The exploratory factor analysis conducted on the Digital Transformation Capabilities (DTC) variable, measured with six items, shows satisfactory results in terms of validity and reliability. The preliminary tests confirm the adequacy of the data for factor analysis, with a Kaiser-Meyer-Olkin index (KMO = 0.705, > 0.60) and a significant Bartlett's test of sphericity (p = 0.000). Internal reliability is also acceptable, with a Cronbach's alpha of 0.813, exceeding the recommended threshold of 0.70. The factor loadings range between 0.711 and 0.892, indicating that each item contributes substantially to the construct. Similarly, the extraction values range from 0.730 to 0.814, confirming that the majority of the variance of each item is explained by the extracted factor. The variance analysis shows that before rotation, the first factor has an eigenvalue of 4.563, explaining 76.05% of the total variance. After rotation, two components emerge, with a cumulative explained variance of 89.62% (51.90% for the first component and

28.32% for the second). Nevertheless, the dominance of the first factor before rotation confirms that the structure remains essentially unidimensional. Overall, these results demonstrate that the measurement scale of digital transformation capabilities (DTC) presents good validity and satisfactory reliability. The table below presents the results of this analysis.

Table 1: Exploratory factor analysis and reliability results for the Digital Transformation Capabilities (DTC) construct.

Construit	Items Codes	Loading	Extraction	KMO	Sig. (Bartlett)	Cronbach's α	Item's Number
Digital Transformation Capabilities	DTC1	0.813	0.814				
	DTC2	0.849	0.730				
	DTC3	0.711	0.738	0.705	0.000	0.813	06
	DTC4	0.892	0.795				
	DTC5	0.805	0.769				
	DTC6	0.795	0.763				

Total Variance Explained

	Initial Eigenvalues			**Rotation Sums of Squared Loadings**		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.563	76.05	76.05	3.114	51.90	51.90
2	0.814	13.57	89.62	2.263	37.72	89.62

Source: our results from SPSS 25

5.2.2. Exploratory Factor Analysis and Reliability of the Innovation Efficiency Scale

The exploratory factor analysis conducted on the Innovation Efficiency (IE) variable, measured with five items, also presents satisfactory indicators of validity and reliability. The preliminary tests confirm the adequacy of the data for factor analysis, with a Kaiser-Meyer-Olkin index (KMO = 0.767, > 0.60) and a significant Bartlett's test of sphericity (p = 0.000). Internal reliability is strong, with a Cronbach's alpha of 0.874, exceeding the critical threshold of 0.70. The factor loading coefficients show values ranging from 0.837 to 0.910, indicating that each item contributes strongly to the construct. In addition, the extraction values range between 0.718 and 0.830, confirming that the majority of the variance of each item is explained by the underlying factor. Regarding explained variance, the analysis shows that before rotation, the first factor has an eigenvalue of 3.869, representing 77.38% of the total variance. After rotation, two components emerge, explaining a total of 91.68% of cumulative variance (57.52% for the first component and 34.16% for the second). However, as with the previous construct, the strong predominance of the first factor before rotation suggests an essentially unidimensional structure. Overall, these results confirm the validity and reliability of the Innovation Efficiency (IE) measurement scale. Table 2 below presents the results of this analysis.

Table 2: Exploratory factor analysis and reliability results for the Innovation Efficiency (IE) construct.

Construit	Items codes	Loading	Extraction	KMO	Sig. (Bartlett)	Cronbach's α	Item's Number
Innovation Efficiency	IE1	0.837	0.718				
	IE2	0.899	0.824				
	IE3	0.910	0.830	0.767	0.000	0.874	05
	IE4	0.902	0.825				
	IE5	0.857	0.755				

Total Variance Explained

	Initial Eigenvalues			**Rotation Sums of Squared Loadings**		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.869	77.38	77.38	2.876	57.52	57.52
2	0.715	14.30	91.68	1.708	34.16	91.68

Source: our results from SPSS 25

5.2.3. Exploratory Factor Analysis and Reliability of the Board Technological Competence Scale

The exploratory factor analysis conducted on the Board Technological Competence (BTC) variable, measured with five items, highlights good psychometric indicators. The preliminary tests confirm the adequacy of the data for analysis, with a Kaiser-Meyer-Olkin index (KMO = 0.749, above the recommended threshold of 0.60) and a significant Bartlett's test of sphericity (p = 0.000), indicating sufficient correlations between items. The reliability coefficients reveal good internal consistency, with a Cronbach's alpha of 0.812, indicating a satisfactory level of internal coherence. The factor loadings, ranging between 0.769 and 0.824, are all above the critical threshold of 0.70, showing that each item contributes significantly to the construct. Similarly, the extraction values (0.721 to 0.864) confirm that the variance of each item is well explained by the retained factor. Regarding explained variance, the analysis shows that before rotation, the first factor has an eigenvalue of 3.779 and explains 75.58% of the total variance. After rotation, two components are identified, representing 89.54% of the cumulative variance. However, the strong dominance of the first factor before rotation suggests a conceptually unidimensional structure. In line with the literature, and given the coherent nature of the construct, BTC is therefore treated as a unidimensional construct in the confirmatory (CFA) and structural (SEM) analyses. The table below presents the synthesis of these results.

Table 3: Exploratory factor analysis and reliability results for the Board Technological Competence (BTC) construct.

Construit	Items codes	Loading	Extraction	KMO	Sig. (Bartlett)	Cronbach's α	Item's Number
Board Technological Competence	BTC1	0.811	0.755	0.749	0.000	0.812	05
	BTC2	0.779	0.864				
	BTC3	0.796	0.829				
	BTC4	0.769	0.832				
	BTC5	0.824	0.721				

Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.779	75.58	75.58	2.926	58.52	58.52
2	0.698	13.96	89.54	1.551	31.02	31.02

Source: our results from SPSS 25

5.2.4. Exploratory Factor Analysis and Reliability of the Financial Performance Scale

The exploratory factor analysis (EFA) conducted on the Corporate Financial Performance (FP) construct confirms a solid and coherent factorial structure. The Kaiser-Meyer-Olkin index (KMO = 0.810) is well above the minimum threshold of 0.60, indicating satisfactory data adequacy for factor analysis. In addition, Bartlett's test of sphericity is significant (p = 0.000), which confirms that inter-item correlations are sufficiently high to justify dimensional reduction. The factor loadings range from 0.773 to 0.819, all above the recommended threshold of 0.70 (Hair et al., 2010), demonstrating the relevance of the items in measuring this construct. Furthermore, the extraction values (0.736 to 0.838) show that the proportion of variance explained by the underlying factor is high for each item. Regarding explained variance, two components emerge, but the first represents the dominant factor. It explains 68.54% of the initial variance before rotation and 53.58% after rotation. When associated with the second component, cumulative variance reaches 81.02%, which is considered highly satisfactory in management sciences. Finally, the internal consistency of the scale is excellent, with a Cronbach's alpha coefficient of 0.912, confirming very high construct reliability. The table below presents the results of this analysis.

Table 4: Exploratory factor analysis and reliability results for the Corporate Financial Performance (FP) construct.

Construit	Items Codes	Loading	Extraction	KMO	Sig. (Bartlett)	Cronbach's α	Item's Number
Corporate Financial Performance	FP1	0.819	0.736	0.810	0.000	0.912	05
	FP2	0.773	0.838				
	FP3	0.776	0.788				
	FP4	0.786	0.835				
	FP5	0.813	0.824				

Total Variance Explained						
	Initial Eigenvalues			**Rotation Sums of Squared Loadings**		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.427	68.54	68.54	2.679	53.58	53.58
2	0.624	12.48	81.02	1.372	27.44	81.02

Source: our results from SPSS 25

5.2.5. Analysis of the Overall Model Fit

The overall adequacy of the measurement model was evaluated using several absolute, incremental, and parsimonious indices in order to ensure the structural quality of the model before moving to the structural analysis stage. As shown in Table 5 below, all the indices obtained confirm a very good model fit. The χ^2/df ratio is lower than the recommended threshold of 3, indicating an acceptable level of parsimony. In addition, the CFI and TLI values, both above 0.95, demonstrate that the model performs significantly better than the independence model. The RMSEA and SRMR values, well below the recommended limits, also confirm that the residuals between observed and estimated matrices are low. Overall, these results indicate that the measurement model presents a robust and satisfactory level of fit, and can therefore be retained for the next stage of the structural analysis.

Table 5: Detailed results of the model fit indices.

Index	Value obtained
Chi²/df	2.199
GFI (Goodness of Fit Index)	0.947
AGFI (Adjusted GFI)	0.912
CFI (Comparative Fit Index)	0.979
TLI (Tucker Lewis Index)	0.987
RMSEA (Root Mean Square Error of Approximation)	0.038
SRMR (Standardized Root Mean Square Residual)	0.049

Source: our results from Amos

5.2.6. Structural Diagram of the Model — Unstandardized Coefficients

Figure 6 below presents the initial structural representation of the research model, including the four latent constructs: Digital Transformation Capabilities (F1), Board Technological Competence (F2), Innovation Efficiency (F4), and Corporate Financial Performance (F3). This diagram highlights the theoretical relationships between the variables as well as the postulated causal links. The measurement weights of the items are fixed at 1 for factor scaling, in accordance with the recommendations of Hair et al. (2010), which allows the model to be identified. This diagram therefore represents the conceptual structure estimated without standardization, and serves as the basis for examining the structural relationships between the constructs.

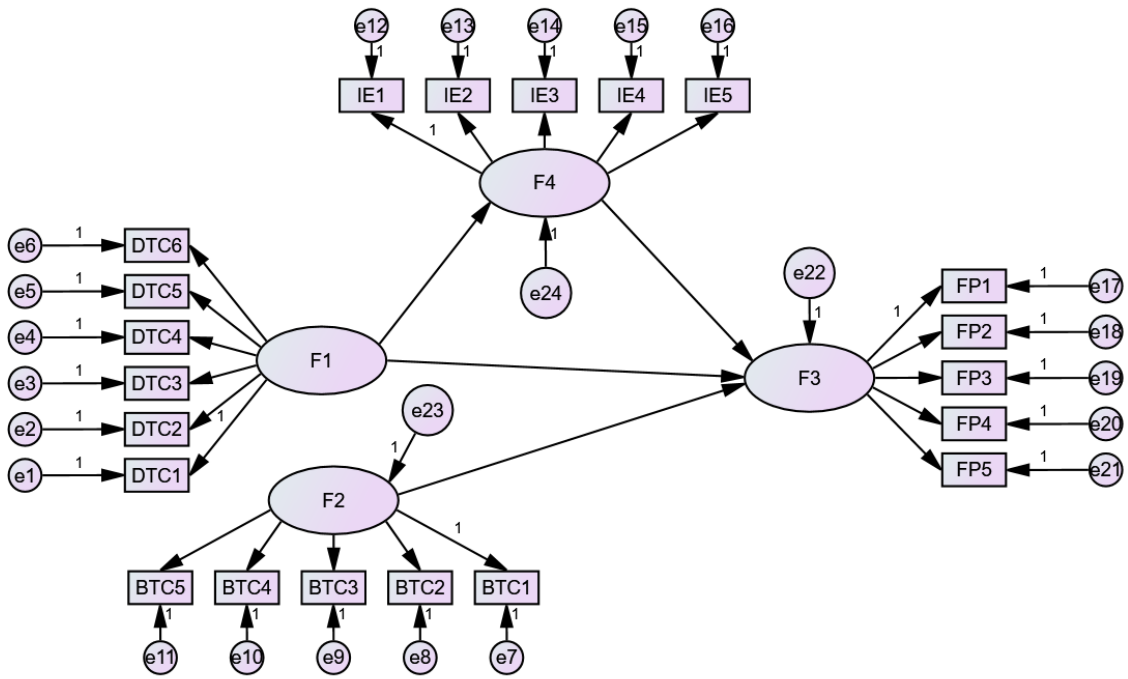


Figure 6 : Schéma structurel du modèle — coefficients non standardisés

5.2.7. Structural Diagram of the Model — Standardized Coefficients

Figure 7 illustrates the standardized version of the same structural model, with the estimated coefficients (λ) displayed on each latent–indicator path and between the latent variables. The

standardized values allow direct interpretation of the relative strength of the relationships. Overall, the factor loadings are high (often above 0.70), reflecting good convergent validity of the items. It is also observed that the structural relationships between Digital Transformation Capabilities, Board Technological Competence, Innovation Efficiency, and Corporate Financial Performance remain consistent with the theoretical model. The error values (e) show low and homogeneous residual levels, which confirms that the unexplained variance in the model is limited. This diagram visually validates the structural stability of the final standardized model.

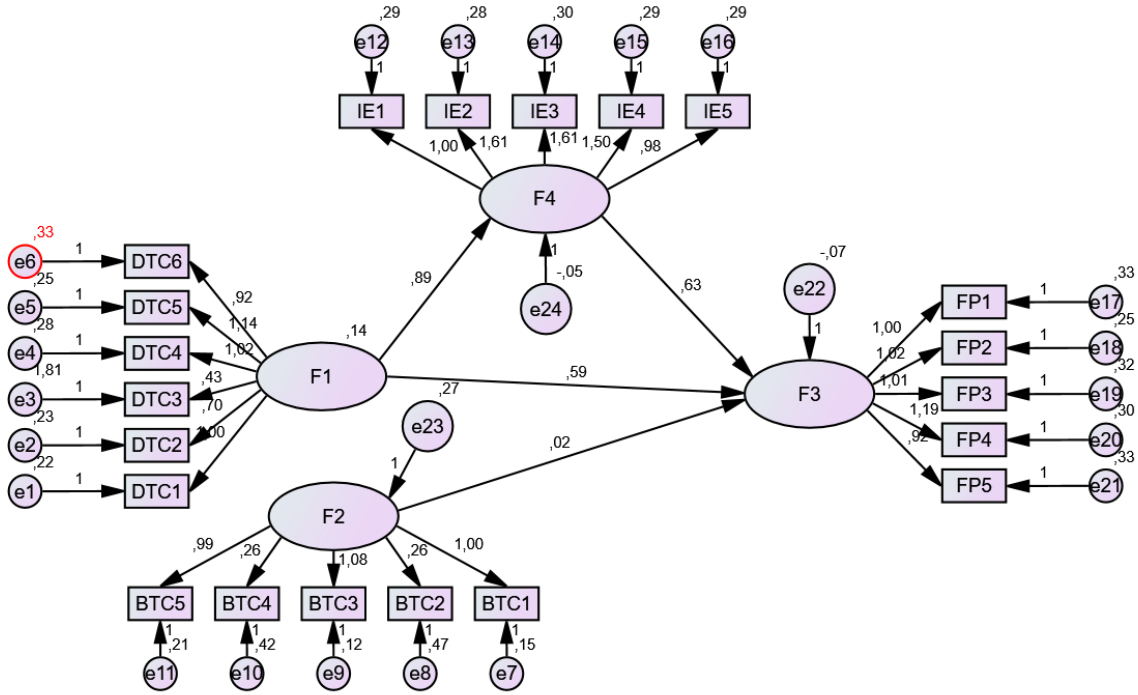


Figure 7 : Schéma structurel du modèle — coefficients standardisés

5.3. Hypotheses Testing

5.4. Global analysis of the results of hypotheses H1, H2 and H3

As presented in Table 6 below, the structural analysis reveals that digital transformation plays a decisive role in the financial performance of the firms examined. Indeed, hypothesis H1 is clearly supported, showing a direct, positive, and statistically significant effect of digital transformation capabilities on financial performance ($\beta = 0.889$; $p < 0.001$). This indicates that firms investing in digital technologies, technological integration, and the strategic use of digital

tools effectively improve their financial outcomes. Furthermore, hypothesis H2 shows that this impact does not operate solely through a direct effect. Innovation efficiency plays a strong and significant mediating role (β indirect = 0.7784; p < 0.001). In other words, digital transformation enhances the ability of firms to generate, absorb, and transform innovation, and it is this increased innovation efficiency that contributes to strengthening financial performance. However, contrary to theoretical expectations, hypothesis H3 is rejected. Board technological competence does not amplify the relationship between digital transformation and performance. Instead, the observed moderating effect is negative and significant (β = –0.2366; p < 0.001), suggesting that when a board is highly technologically competent, it may impose strategic arbitrage, constraints, or cautious decision-making that slow down the direct conversion of digital capabilities into pure financial performance. In summary, digital transformation strongly influences financial performance — both directly and indirectly through innovation — but the presence of a highly technophile board does not reinforce this link, which constitutes a non-trivial and theoretically interesting result.

Table 6: Global analysis results of hypotheses H1, H2 and H3.

H1: Digital transformation capabilities positively influence the corporate financial performance of firms.						
	Hypothesis	**Estimate**	**SE**	**CR**	**P**	**Result**
DTC → FP	H1	0.889	0.077	11.477	0.000	Supported
H2: Innovation efficiency mediates the relationship between digital transformation capabilities and corporate financial performance.						
Hypothese	**β (Indirect Effect)**	**se**	**t**	**p**	**95% Confidence Interval**	**Result**
H2	**0.7784**	**0.0298**	**26.1533**	**0.000**	[0.7199; 0.8368]	Supported
H3: Board technological competence positively moderates the relationship between digital transformation capabilities and corporate financial performance.						
Hypothese	**β (Indirect Effect)**	**se**	**t**	**p**	**95% Confidence Interval**	**Result**
H3	-0.2366	0.0242	-9.7704	0.000	[-0.2842 ; -0.1890]	Rejected

Source: our results from Amos and SPSS 25 (Hayes Macro Process)

6. Discussion

The findings of this study provide an important empirical contribution to the financial literature by showing that digital transformation capabilities constitute genuine strategic assets that generate financial returns. Consistent with the Resource-Based View ((Barney 1991), and the Dynamic Capabilities perspective (Teece 2018), the results confirm that firms that mobilize, integrate, and reconfigure their digital resources significantly improve their financial performance. This result aligns with recent studies showing that digital maturity leads to higher productivity, cost reduction, and financial value creation (Zheng and Zhang 2023); (Chen and Hao 2022).

The main contribution of this study lies in the fact that the direct effect of digitalization on performance is not the dominant pathway. Innovation efficiency constitutes the essential conversion mechanism. The results show a very strong mediating effect. This confirms that digital investments create financial value when they increase innovation returns, that is, the ability to transform technological resources into profitable innovations (Hagedoorn and Cloodt 2025); (Nambisan 2017); (Song 2017). For financial decision-makers, this means that digitalization should not be considered a financial investment in itself but rather an accelerator of innovation productivity.

An unexpected result concerns governance. Contrary to the theoretical assumption, board technological competence does not strengthen the relationship between digitalization and performance. It weakens it. This suggests that a highly technophile board may adopt more cautious arbitrage or stricter risk management standards. This phenomenon can delay the conversion of digitalization into visible financial gains (Guo et al. 2020); (Vintilă, Onofrei, and Vintilă 2025); (Benlemlih, El Hiri, and Amina 2024). In an emerging context such as India, characterized by fiscal uncertainty, financing constraints, and strong sectoral volatility, such caution may be interpreted as a rational mechanism of protection of short-term shareholder value.

7. Conclusion

In conclusion, this research provides strong empirical insight into how digital transformation translates into financial performance in firms operating in an emerging market. The results show that digitalization does not produce merely a technological effect but a measurable economic effect, which confirms the need to reposition digital transformation as a strategic financial driver at the core of contemporary firm performance.

From a theoretical perspective, this study confirms that digital transformation capabilities must be considered as strategic resources that generate financial advantages, thereby reinforcing the assumptions of the Resource-Based View (Barney 1991) and Dynamic Capabilities theory (Teece 2018). The findings show that digitalization creates financial value primarily through innovation efficiency, which extends the work of (Hagedoorn and Cloodt 2025); (Nambisan 2017); (Song 2017), and (Falahat et al. 2021) by identifying innovation as the central conversion channel through which digital inputs generate financial returns. The unexpected result regarding the negative moderating effect of board technological competence also enriches the technological governance literature, as it shows that high digital expertise is not always a performance amplifier but may sometimes act as a mechanism of financial discipline, consistent with the observations of (Guo et al. 2020), (Vintilă, Onofrei, and Vintilă 2025), and (Benlemlih, El Hiri, and Amina 2024).

From a managerial perspective, the results indicate that firms should not limit themselves to investing in technology but should focus on converting these resources into profitable innovations, confirming that the innovation axis is the operational lever that transforms digitalization into tangible financial performance (Nambisan 2017); (Song 2017); (Falahat et al. 2021). Managers must therefore prioritize execution speed, the optimization of innovation cycles, and the effective monetization of digital resources. The results also show that technological expertise at board level may induce high levels of financial caution, consistent with the observations of (Guo et al. 2020) and (Vintilă, Onofrei, and Vintilă 2025). Firms should therefore calibrate technological governance carefully so that board competence does not become an obstacle to the financial valorization of digitalization, particularly in emerging environments characterized by information asymmetries and institutional volatility.

However, this study presents several limitations. First, the analysis relies on a single country, which limits international generalization. Second, the data are self-reported, which may introduce perception bias. Third, digital expenditures are not segmented by type, although investments in artificial intelligence, cloud computing, or data analytics may generate different financial effects.

Future research could therefore segment digital investment categories to identify the most profitable technological levers. Comparative analyses between emerging and developed economies could also verify whether the negative effect of board technological competence depends on the level of institutional maturity. Finally, longitudinal research could examine how the financial effect of digitalization evolves over time, since it is likely that the financial benefits

of digitalization follow delayed trajectories linked to learning effects and technological appropriation.

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