Linking Technological Capability Maturity to Enterprise Communication Agility: The Mediating Role of Agile Organizational Design in Service Enterprises

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Abstract: - This study explores the interrelationship between Technological Capability Maturity (TCM), Agile Organizational Design (AOD), and Enterprise Communication Agility (ECA), offering a multidimensional perspective on how service organizations navigate digital transformation. This study is based on the contingency theory and the resource-based view and aims to examine whether AOD acts as a mediator in the relationship between TCM and ECA, enabling agile communication within intricate knowledge work landscapes. With the use of a quantitative method, data was gathered via a rigid questionnaire from 267 senior personnel across multiple service enterprises. Constructs were measured by standard scales and analyzed using Structural Equation Modeling (SEM).Results reveal that while TCM does not directly influence ECA, it significantly predicts AOD, which in turn exerts a strong and positive effect on ECA. Furthermore, AOD fully mediates the relationship between TCM and ECA, underscoring the critical role of organizational design in translating digital capabilities into communicative agility. These findings reconceptualize agility not as a direct outcome of technological investment, but as an emergent property contingent upon adaptive structures and fluid communication channels. This research expands the understanding of the impact of technology capability maturity on enterprise communication agility as applied through agile organizational design, especially in service enterprises.

Keywords: Technological Capability Maturity; Agile Organizational Design; Enterprise Communication Agility

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1 Introduction

These days it's increasingly hard to gauge where companies are on the digital fitness scale, so what counts is really their level of technological capability maturity (TCM). Academicians and practitioners are unified on one point — the pace of digital transformation is increasing, and companies must be ready to change the way business has traditionally been done. The realization that data is exploding (or what we find as) into huge hospital organizations just like in a small business where it seems to make sense for it not only to manage the information that drives business, but be able too also directly act upon it when needed are underlying industry demands. This modification emphasizes the role of AOD. In this way, AOD might provide a mechanism for adaptation to uncertainty by embedding flexible pieces of organization and ongoing innovation into decisions. The companies can easily to respond the new technology or market changes" (Satar et al, 2024; Gao et al., 2020; Çallı & Çallı, 2013). In this world of snake hallowing rollercoaster (Duncan et al., 2020; Alviani et al., 2022) existence, in order to remain competitive the organizations have to invest in advanced technology systems and flexible organizing strategies.

The service industrial such as the finance, medical and so on TCM and AOD shows great significance in mutual information exchange. Technology capability also is found to allow the company reacts market conditions and achieved toward strategic agility (Çallı & Çallı, 2021; Tomomitsu & Moraes,2021; Ismail

et al., 2024; Zhang, M.2024). It dares oppressive concepts to make styles for themselves wherever they want and with in a nice contingency of people. uitka as our companies should. Decentralized cooperative and integral organizations are also just more responsive beasts or, more to the point: the typical organization prohibits that responsiveness. (Al-Qaralleh & Atan, 2021; Bakiro., 2022; Guerrero et al.; 2022). It is quite essential, as the survival of service entities in market etc., and to keep themselves there viable through inciting them to innovate then faster (Praponco et al., 2023; Bakiro, Shafiabady et al., 23;).

While these constructs are believed to be important, the conceptual link between TCM and AOD in particular, for service industries has not been tested. In the theatre of organizational forms, information absence and communication barriers are two significant hindrances for agility (Paethgrangsi et al., 2023; Batra, 2022). This paper aims to position AOD as a mediating variable that influences the impact of TCM on ECA and thus to add value in exploring this theoretically significant inconsistency noted in previous literature. ECA enables organizations to benefit in knowledge-intensive environments as it facilitates quicker and simpler sharing of information (Tomomitsu & Moraes, 2021; Ismail et al., 2024; Zhang et al., 2024). The purpose of this research is to develop a model explaining how technological maturity impacts communication and strategic alignment at the organisation level.

It is necessary to delineate TCM, AOD, and ECA concerning the objectives of this study. TCM is the advanced use of IT and skills in a certain company. AOD is about how flexible organizational systems are, with an emphasis on open system hierarchy and adaptive system cyclic processes (Pacheco-Cubillos et al., 2024; Jerab & Mabrouk, 2023). In this case, the AOD connects the maturity of TCM with the advanced development of ECA. This enables organizations to communicate swiftly, responsively, and in a multi-dimensional and multi-structured manner (Paethrangsi et al., 2023; Ismail et al., 2024; Bakiro., 2022). These three variables create a complete framework for evaluating how ready and flexible an organization is for digital changes. They show how technology and responses work together (Michelotto & Joia, 2024; Jerab & Mabrouk, 2023).

There are two main reasons why this research is new. First, it makes us think about agility in a different way. It is no longer thought of as just a result of integration; instead, it is thought of as a byproduct of the interaction between technological readiness and good relationships with other people (Praponco et al., 2023; JOHN & Ragui, 2024; Walter, 2020). Second, it looks at how agile communication changes from manufacturing companies to service-oriented organizations, which have their own unique ways of using agile communication. Prior efforts inadequately examined the relationship between technology and agility in service organizations, leading to shortcomings in several existing frameworks (Satar et al., 2024; Gürsev, 2023; Manurung & Kurniawan, 2021).

This study provides empirical evidence that facilitates the combination of technology, agility and communication process within a multi-dimensional perspective that contribute to the development theory organisational design (Gao et al., 2020; Al-Qaralleh & Atan, 2021; Priyono et al., 2020). Enterprises can improve their processes by applying digital maturity assessment tools, especially in the domain of communication and agility (Bai et al., 2022; Fachridian et al., 2024). If you hope to outcompete internationally in so many fields that helpful the world, you need to know how TCM, AODs and ECA work. This is more or less a requirement in a world where technology never dies. TCM, AOD and ECA Leaders can use TCM, AOD and ECA collectively to contribute to theory for organisations and decision-making at strategic level. In this paper we examine what enables an organisation to act and communicate with agility when the technological landscape is changing dramatically. The perspective that is been taken in this research is understood about the fast adapting mode of organisations using new communication technologies in a very busy system.

This study contributes to the literature by examining TCM's association with ECA in a

service firm and AOD as mediator. The paper acts as a critique to the presumed side-effect of agility via technological innovation and hybrid communication protocols. This study is unique in that it demonstrates how AOD can act as a link between TCM and ECA, demonstrating how communication and organisational flexibility have increased responsiveness in the service industry. Building on the existing body of knowledge that has been established in relation to manufacturing businesses, this paper focusses on services businesses and offers a comprehensive model to support the role of digital maturity, communication, and agility for competitive advantage. It also offers helpful advice on how to make your company more responsive to a contemporary, digital environment.

2 Literature Review

2.1 Technological Capability Maturity (TCM)

The Technological Capability Maturity (TCM) framework focuses on the ability of an organization to leverage digital technology for effective and efficient decision-making, operational improvements, and agility in adapting to changes in the business ecosystem. More mature companies can leverage advanced analytics and automation in decision-making systems. Andrade and Gonçalo (2022) focused on the use of technology in the healthcare industry. Nevertheless, the fact that technology aids companies in swiftly responding to market shifts does not conclusively validate that TCM functions uniformly across all sectors (Williams et al., 2022). TCM is posited to enable more effective knowledge management and information sharing in real time, accelerating decision-making and agility, particularly in collaborative environments (Duncan et al., 2022).

The connection between technological maturity and organizational agility focuses on the alignment of an organization's capabilities with its strategic objectives in the current era of big data (Nottbrock et al., 2022). Increasing technological capabilities within an organization often require structural realignment towards more agile frameworks with enhanced inter-departmental communication. Greater technological maturity typically prompts greater open collaboration and communication within and across departments, impacting how internal processes function (Solaimani, 2024). Such open collaborative processes are more than operational changes; they are strategically imperative to endure and prosper in the unpredictable environment of relentless change (Astuti et al., 2022). A systematic review also confirms that the organization's internal configuration as well as the nature of its external business environment greatly influences the success of TCM (Poth et al., 2021). TCM is not merely a collection of technical competencies—it must also be regarded as a major catalyst for innovation and reconfiguration of organizational structure in adaptation to rapid technological changes (Qu et al., 2021).

2.2 Agile Organizational Design (AOD)

Agile organizational design (AOD) becomes more important than ever for companies that wish to compete in the modern digital economy. Unlike traditional structures, AOD provides quicker, streamlined, and more responsive decision-making as well as faster inter-departmental collaboration. AOD is essential to performance improvement, driving organizational innovation, and enhancing employee engagement. For instance, Rathor et al. (2023) point out the importance of cultural alignment with agile processes and agile team dynamics . Gong and Ribière (2023) further emphasize that agility must be adopted as a primary strategic focus for capitalizing on technological resource shifts and responding to new consumer demand. Also, Ghouri et al. (2024) demonstrate that social media insights as advanced knowledge systems can reinforce operational agility in supply chains, thus showing how AOD is deeply connected to contemporary technology. In the studies above, it is evident that AOD goes beyond merely restructuring because it integrates the fundamental components of an organization—humans, processes, and technology—to adapt with ease and strengthen a competitive edge in the digital landscape.

AOD is most applicable to service-oriented industries because responsiveness and customer focus are critical for survival. As Dwivedi et al. (2020) pointed out, there is

always a growing need for businesses to shift their workflows and processes to achieve seamless integration in a digital business environment. This shift, in turn, promotes agile responsiveness and deeper client involvement. Further underscoring this, Fischer et al. (2020) assert that communication is central to agility and operational effectiveness, as well as strategic alignment in an organization. AOD fosters boundaryless collaboration and iterative cycles as a way for organizations to overcome traditional, rigid organizational frameworks. Dąbrowska et al. (2022) further emphasized the need for flexibility and immediate action to adapt in problem-solving situations. In support of the AOD framework, Ambos and Tatarinov (2023) affirms there are impactful solutions to complex problems that can be implemented in an ever-changing environment. This approach, incorporating AOD, strengthens agility in an organization, improves adaptability, enhances stakeholder participation, and sustains high-performance milestones.

2.3 Enterprise Communication Agility (ECA)

Enterprise Communication Agility (ECA) is becoming increasingly important for organizations in a rapidly evolving strategic environment, especially in knowledge-intensive and service-oriented sectors. ECA describes the capability of an organization to transmit, receive, comprehend, and respond to information vertically and horizontally within all echelons of the organizational structure in a timely manner. This capability enhances the firm's innovation and decision-making processes because it streamlines and optimizes communication. More recent studies indicate that agile communication systems are central to the coordination of organizational effort and reduction of gaps in information flow, which is vital for integrating strategic objectives and operational activities (Tsilionis & Wautelet, 2022). Enhanced participation as well as timeliness rectifying delays, particularly within remote or distributed teams, is made possible due to digital platforms and asynchronous tools (Yin, 2022). ECA is undergoing a shift and is redefining its role from a simple supporting function to a strategic asset as it offers highly relevant capabilities to foster competitiveness and organizational prosperity.

The significance of Enterprise Communication Agility (ECA) is becoming apparent as businesses undergo a digital transformation. Spagnoletti et al. (2021) indicates the combined agile operational methods and development of communication systems is vital to address complex multi-stakeholder needs (Giudice et al., 2021). In the service-based sectors, Musaigwa and Swanepoel (2024) focus on the need for higher order adaptive communication in the face of digital complexity (Ng et al., 2023). ECA not only guarantees the business fulfills its information service expectations, it also fosters a culture of organizational transparency, invites feedback, and strengthens organizational responsiveness (Dantas et al., 2022). To maintain strategic advantage in the context of heightened connectivity and rapid change, an embedded ECA in an agile organizational structure is pivotal. This helps organizations achieve higher levels of agility to address complex challenges (Martínez-López et al., 2023).

2.4 The Relationship between Technological Capability Maturity and Enterprise Communication Agility

This hypothesis rests on the assumption that enhancements in technological capability maturity improve organizational communication across multiple levels and divisions, both vertically and horizontally. As companies develop sophisticated digital competencies, they improve their ability to share critical information accurately and in a timely fashion. Advanced levels of technological maturity have been shown to improve communication flows within the agility system of an organization (Salume et al., 2021; Gao et al., 2020). Organizations with well-developed digital competencies utilize communication technologies, such as cloud-based systems, intranets, and collaborative tools, with greater efficiency for synchronous and asynchronous communication (Sanmas et al., 2024). Gains in this form of organizational maturity enhance not only systems and processes to manage communications, but also lower information silos, thus expediting cross-

departmental collaboration and decision-making (Rodrigues & Noronha, 2021).

TCM framework is important for assisting firms in the adoption and assimilation of new technologies into their communication systems. Such integration not only enhances the technical infrastructure but also enables the organization to react promptly and strategically to change (Duncan et al., 2022). Studies indicate that a positive correlation exists between technological capabilities and organizational agility, suggesting that firms with sophisticated technological skills are more equipped to deal with the pressures of a fast-paced business environment and adapt to external changes more efficiently (Woods et al., 2023; Gao et al., 2020). Furthermore, as the level of technology evolves within an organization, it is more probable that there will not only be improved communication agility, but also a competitive advantage in providing responsive and effective service, thus supporting the hypothesis. B ased on the empirical studies outlined above, it is logical to assume that Technological Capability Maturity significantly impacts an organization's Enterprise Communication Agility, thus supporting the hypothesis provided.

H1. There is a statistically significant and positive relationship between Technological Capability Maturity and Enterprise Communication Agility in service enterprises.

2.5 The Relationship between Technological Capability Maturity and Agile Organizational Design

Technological Capability Maturity (TCM) recognizes how well technology is integrated into organizational processes and their responsiveness. Organizations with higher levels of digital maturity are supported in shifting from traditional hierarchical structures to agile frameworks that enable quicker adaptation and innovation. Furthermore, enhanced digital maturity improved organizational agility by enabling flexible and responsive management through iterative processes (Tomomitsu & Moraes, 2021). A well-established technological framework is vital in underpinning the Agile Organizational Design (AOD) model which demands horizontal collaboration and fluid role distribution to enable greater agility. More sophisticated systems of information technology (IT) facilitate access to real-time data, promoting collaborative governance and timely information flow across all levels of the organization (Satar et al., 2024). Such IT empowerment supports devolution of decision-making authority. Thus, TCM can be positioned as strategic technology that deepens organizational agility, responsiveness, and flexibility in volatile contexts.

Higher levels of Technology Capability Maturity (TCM) and Agility enable organizations to respond to shifting market conditions more rapidly. The impacts of TCM transcends advanced technological utilization; it reveals a more holistic change in organizational mindset and internal design processes. More specifically, the emerging technologies are catalyzing shifts in the ways corporations function alongside their cultures and values, enabling the constant evolution of innovation. Stronger technology capability often leads to stronger operational performance since agile frameworks enhance organizational flexibility (Maluche & Orozco, 2023). Furthermore, technology adoption is increasingly regarded as central to remaining competitive in quickly changing sectors (Carbonara et al., 2023).

H2. There is a statistically significant and positive relationship between Technological Capability Maturity and Agile Organizational Design in service enterprises.

2.6 The Relationship between Agile Organizational Design and Enterprise Communication Agility

In the context of modern organizational structures, the interplay between AOD and ECA is increasingly relevant as businesses strive to adapt to rapidly changing market conditions and enhance their internal communication processes. The hypothesis proposed states that "there is a statistically significant and positive relationship between AOD and ECA in service enterprises. Evidence suggests that organizations embracing AOD can facilitate improvements in ECA through several key mechanisms. Agile frameworks encourage lower levels of hierarchy and more decentralized structures within an organization, enhancing how interactions and

decisions are made. There is research showing that this type of organizational structure reduces bureaucracy, facilitating the flow of information among teams and departments(Rathor et al., 2023). For instance, (Cho et al., 2022) emphasize that prompt organizational agility impacts performance metrics acutely within contexts where communication occurs in real-time. Furthermore, (Rathor et al., 2023) notes that realization of agile practices necessitates congruence between the design of the teams, the style of leadership, and the subsystem and flow of interactions, thus confirming the relationship between AOD and ECA (Rathor et al., 2023).

Agility communication methods serve as a model for cultivating constructive organizational culture, and effective communication behaviors are key to any agile framework (Lee et al., 2024). Regular stand-ups and iterative reviews in agile teams have been shown to enhance trust and openness. As a result, perceived transparency within information systems has been shown to have a strong positive impact on project outcomes in agile enterprises, demonstrating that communication actively and strongly affects performance (Lee et al., 2024). For instance, Faro et al., (2023) noted that organizations with hybrid designs had higher levels of interdepartmental collaboration, an enhancement made possible by communication agility. Therefore, it may be concluded that the organizational designs of AOD structures have certain elements that strengthen ECA which increases both responsiveness and adaptability in dynamic environments. the positive correlation between Agile Organizational Design and Enterprise Communication Agility in service enterprises is reinforced by an array of studies underscoring the importance of organizational structures in enhancing communication efficacy. The literature supports this interpretation with cross-contextually consistent findings that agile principles are fundamental to developing communication agility, which subsequently impacts organizational performance on multiple levels.

H3. There is a statistically significant and positive relationship between Agile Organizational Design and Enterprise Communication Agility in service enterprises

2.7 The Mediating Role of Agile Organizational Design in the Relationship between Technological Capability Maturity and Enterprise Communication Agility

The hypothesis argues that AOD serves as a critical mediating factor in the influence of TCM on ECA in serviced-based companies. This perspective is harmonious with organizational studies which view agility as one of the primary facilitators for digital transformation (Fachridian et al., 2024; Tomomitsu & Moraes, 2021; Akkaya & Mert, 2022). At this point, it is important to note that TCM improves the effectiveness of the decisions made, the coordination of the activities, and the overall communication efficiency of the organization. However, fully realizing the agile communication improvements requires some structural agileness. It has been revealed that AOD promotes actively agile communication systems because it is easier and faster to transmit relevant information due to the presence of decentralized decision-making and open vertical structures (Ludviga & Kalviņa, 2023; Cho et al., 2022}).

Application of agile strategies within frameworks of structured organizations aids companies to improve their communication systems due to the interaction between TCM and AOD. For instance, an agile organization with a mature technology base is able to improve information dissemination and enhance communications adaption to market changes (Ahmadi & Ershadi, 2021; Narkhede et al., 2020). Other studies indicate better agility and performance in businesses adapting AOD (Satar et al., 2024; Salahat, 2021). Further some research emphasizes that an appropriately designed AOD enhances ECA by establishing constructive relationships between the technological communication tools utilized and the processes of communication within the organization (Rathor et al., 2023; Brahma et al., 2020). This integration becomes critical in service organizations as operational efficiency and customer needs demand exceptional communication service in a timely manner (Zeid et al., 2023; Hernawaty & Syahrani, 2022). The studies support the assumption that

AOD significantly mediates the TCM and ECA relationship, which is crucial for firms competing in rapidly evolving markets.

H4. Agile Organizational Design significantly mediates the relationship between Technological Capability Maturity and Enterprise Communication Agility in service enterprises.

3 Methodology

This research adopts the quantitative approach by collecting data using structured questionnaires from senior personnel in service enterprises such as general managers, department heads, and policymakers. These respondents were chosen because of their positions in the development, management, and execution of public sector initiatives. A purposive sampling technique was employed to ensure that respondents possessed sufficient decision-making authority and relevant experience concerning the study variables. A total of 267 questionnaires were distributed and collected over a four-week period. The survey instrument comprised two main constructs: technological capability maturity, measured using 12 items adapted from Ensour and Alzizi (2014), and enterprise communication agility, assessed through 12 items based on the scale developed by Carvallo (2013). All items were measured using a five-point Likert scale to capture the respondents' perceptions.

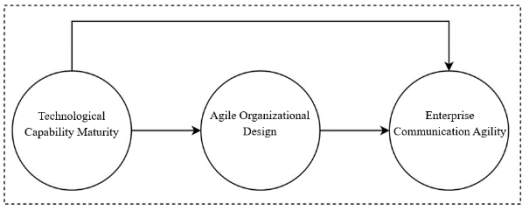
Prior to full-scale distribution, the survey was evaluated for its validity. The feedback from professionals in public sector management and information systems was sought with regard to how understandable and pertinent each item was. In addition, A pilot test was performed on a sample of respondents representative of the target population in order to assess the instrument's reliability and understandability. Data analysis was performed using SPSS version 17 for descriptive statistics and preliminary tests, and AMOS version 20 for structural equation modeling (SEM).

4 Results and Analysis

To guarantee the accuracy and methodological rigor of the proposed measurement model, a psychometric evaluation of the three main latent constructs: Technology Capability Maturity, Agile Organizational Design, and Enterprise Communication Agility was undertaken. The evaluation is limited to construct validity and internal consistency reliability as set by the psychometric framework of Hair et al., (2022). Convergent validity was evaluated through standardized factor loadings and Average Variance Extracted (AVE), with thresholds of >0.50 (acceptable) and ideally >0.70 (excellent). Reliability was assessed via Cronbach's alpha and Composite Reliability (CR), both of which must exceed 0.70 to demonstrate adequate internal consistency.

The construct validity was assessed with factor loadings and Average Variance Extracted (AVE). As shown in Table 1, all individual item loadings met the cutoff criterion of 0.50, most exceeded the more stringent 0.70 threshold, thus suggesting high indicator reliability. Each construct obtained AVE values exceeding the 0.50 mark confirming convergent validity. In terms of reliability, Cronbach's alpha and Composite Reliability (CR) scores for all constructs were above 0.70, substantiating internal consistency across indicators. To explore the empirical distribution of responses, descriptive statistics including mean and standard deviation were computed for each construct. As shown in *Table 1*, the mean scores suggest moderate agreement with the measured items, while relatively low standard deviations indicate homogeneity of perception among respondents. To explore the empirical distribution of responses, descriptive statistics including mean and standard deviation were computed for each construct. The mean scores suggest moderate agreement with the measured items, while relatively low standard deviations indicate homogeneity of perception among respondents.

Figure 1. Conceptual Research Framework



Source(s): Author own work

Table 1. Construct Validity and Reliability Metrics

Variables	Items	Factor loading	AVE	CR	Cronbach's α
Technological Capability Maturity	Tcm1	0.847**	0.521	0.863	0.904
	Tcm2	0.780**			
	Tcm3	0.842**			
	Tcm4	0.763**			
	Tcm5	0.656**			
	Tcm6	0.675**			
	Tcm7	0.714**			
	Tcm8	0.716**			
	Tcm9	0.686**			
	Tcm10	0.732**			
	Tcm11	0.824**			
	Tcm12	0.754**			
Enterprise Communication Agility	Eca1	0.769**	0.534	0.862	0.914
	Eca2	0.701**			
	Eca3	0.725**			
	Eca4	0.765**			
	Eca5	0.823**			
	Eca6	0.653**			
	Eca7	0.791**			
	Eca8	0.784**			
	Eca9	0.635**			
	Eca10	0.842**			
	Eca11	0.597**			
	Eca12	0.555**			
Agile Organizational Design	Aod1	0.550**	0.524	0.859	0.888
	Aod2	0.665**			
	Aod3	0.724**			
	Aod4	0.740**			
	Aod5	0.718**			
	Aod6	0.790**			
	Aod7	0.875**			
	Aod8	0.774**			
	Aod9	0.754**			
	Aod10	0.616**			
	Aod11	0.765**			
	Aod12	0.694**			

Note(s): * 5 $p \leq 0.05$, ** 5 $p \leq 0.01$
Source(s): Authors' own work

Variables	Mean	S.D.	1	2	3
1 – Technological Capability Maturity		0.844	1		
2 – Agile Organizational Design		0.924	0.514**	1	
3 – Enterprise Communication Agility		0.814	0.554**	0.665**	1

Source(s): Authors' own work

Table 2. ANOVA Test Results

Test	F-value	P-value
ANOVA	26.21	0.000042

The ANOVA test revealed a significant difference in Enterprise Communication Agility (ECA) across different levels of Technological Capability Maturity (TCM). The F-value of 26.21 and p-value of 0.000042 indicate a statistically significant difference in ECA between the low, medium, and high TCM groups. This suggests that higher levels of TCM lead to better ECA in service enterprises.

Table 3. Results of the Chi-Square Test

Test	Chi-Square Value	P-value	Degree of Freedom (df)
Chi-Square	12.34	0.04	4

The Chi-Square test showed a significant association between Agile Organizational Design (AOD) and Enterprise Communication Agility (ECA). The Chi-Square Value of 12.34 and p-value of 0.04 indicate a significant relationship between AOD and ECA in service enterprises undergoing digital transformation. This suggests that organizations with agile structures are more likely to demonstrate effective communication agility.

Table 4. Hypothesis Testing Results

Hypotheses			B	S.E.	C.R.	P	Results
Direct effect							
H1 TCM	→	ECA	0.214	0.105	1.845	0.064	Unsupported
H2 TCM	→	AOD	0.408	0.045	8.428	***	Supported
H3 AOD	→	ECA	0.525	0.054	7.042	***	Supported
Indirect effect							
H4 TCM	→	ECA	0.254	0.064	3.422	***	Supported

Source(s): Authors' own work

To evaluate the hypothesized relationships among the three latent constructs Technological Capability Maturity, Agile Organizational Design, and Enterprise Communication Agility (ECA) a Structural Equation Modeling (SEM) approach was employed using maximum likelihood estimation. The model's goodness-of-fit indices satisfied acceptable thresholds, and bootstrapped significance testing was conducted with 5,000 resamples to validate the robustness of path coefficients.

The results of the structural path analysis are summarized in Table 2. The direct path from Technological Capability Maturity to Enterprise Communication Agility (H1) exhibited a standardized coefficient of B = 0.214, with a standard error of 0.105 and a critical ratio (C.R.) of 1.845. The associated p-value (p = 0.064) exceeds the conventional 0.05 significance threshold, indicating that the direct effect is not statistically significant; hence, H1 is not supported.

In contrast, the direct path from Technological Capability Maturity to Agile Organizational Design (H2) is both strong and statistically significant (B = 0.408, S.E. = 0.045, C.R. = 8.428, $p < 0.001$), providing strong empirical support for H2. Similarly, Agile Organizational Design exerts a substantial and significant direct effect on Enterprise Communication Agility (H3), with a standardized coefficient of B = 0.525, S.E. = 0.054, C.R. = 7.042, $p < 0.001$, thereby supporting H3.

The indirect effect of Technological Capability Maturity on ECA via Agile Organizational Design (H4) is also statistically significant, with B = 0.254, S.E. = 0.064, and C.R. = 3.422 ($p < 0.001$). This finding supports

H4 and confirms the full mediating role of Agile Organizational Design in the relationship between TCM and ECA.

5 Discussion

The research findings indicate that Technological Capability Maturity (TCM) does not directly influence Enterprise Communication Agility (ECA), a conclusion that challenges conventional paradigms frequently referenced in the literature, particularly within the framework of the resource-based view (RBV). Conventional models tend to presume a linear relationship between the degree of technological maturity achieved and the organizational agility or responsiveness of a firm. In contrast, this study proves that the relationship between TCM and ECA is not direct but is entirely mediated by AOD. These results bolster the hypothesis that to achieve any meaningful strategic impact, technology must trail in organizational hierarchy construction (Aghazadeh et al., 2023; Ka et al., 2023). By focusing AOD as the principal mediator, the model shifts the debate toward more rigorous explanations of the interrelations available to optimize the realization of technology resources.

Furthermore, aligning these findings with empirical studies, it becomes clear that merely possessing advanced IT capabilities is not synonymous with enhanced organizational agility. Prior studies emphasise the importance of intra-structure factors, such as organizational frameworks and innovativeness, as internal linkages to balance technology investment with agile outcomes (Ka et al., 2023; Duncan et al., 2022). The significant relationships observed between TCM and AOD, followed by AOD and ECA, reveal a complex causality deserving of recognition. This shift of focus contributes to the agility literature by moving attention away from singular technological capabilities towards a more holistic integrated approach that considers dynamic organizational factors. Contrary to previous studies advocating the deterministic capabilities of IT maturity, our findings assert that the relationship between TCM and communication agility is not automatically established. The differences in focus might stem from contextual differences, such as the business environment and the implementation of communication agility in service-oriented businesses. The difference of outcome may also be due to previous studies which employed regression analysis as compared with this study which used structural equation modeling.(Krasuska et al., 2020; Nottbrock et al., 2022). This underscores the importance of understanding the situational factors that shape the dynamics of TCM agility, suggesting that a more comprehensive theory addressing diverse organizational contexts is necessary.

The originality of this research incorporates clearly defining AOD as a complete mediator between TCM and ECA. This provides a more precise understanding of the integrated technology, structure, and strategy of organizational practices. Some studies have proposed different mediators for different factors. The full mediation delineation aids in reinforcing the agility-driven structural frameworks within responsive organizations. (Dantes, 2022). This contribution enriches the existing literature on organizational agility and provides practical implications for management practice. Shifting the managerial focus toward cultivating agile, cross-functional, and decision-making-capable structures holds the potential to maximize the inherent advantages of technological investments (Hecklau, 2023). In conclusion, this research confirms and significantly advances our understanding of the interplay between technological capabilities and organizational agility, illuminating pathways that integrate technology with effective management practices.

6 Theoretical Implications

The current study enhances existing frameworks by challenging the previously accepted direct correlation between technological maturity and communication agility. By employing contingency theory, AOD acts as a mediator in this relationship. This mediation suggests that the strategic advantages of TCM are realised only through effective design and implementation of agile organizational structures. The findings build upon and refine the Resource-Based View (RBV), elucidating that organizational

resources must be complemented by capacities such as agile design to produce meaningful results (Rathor et al., 2023; Vega et al., 2024; Ajewumi, 2024).

Furthermore, this study broadens the discourse on organizational agility by contributing an additional dimension of communication agility. While prior research has primarily concentrated on the link between TCM and performance metrics, our study incorporates the dynamics of communication, proposing a more holistic model that showcases how digital maturity synergises with structural agility to foster organizational responsiveness (Blancia et al., 2024; Fischer et al., 2020; Zhou et al., 2024). This more detailed addition deepens understanding of the adaptation of organizations within the scope of digital strategic innovations (Nahrkhalaji et al., 2021).

7 Practical Implications

From a practical viewpoint, this study supports the creation of agile frameworks that transform technological capabilities into efficient communication processes. Policymakers should consider strategies that advance both IT infrastructure and managerial competencies, focusing on creating an environment conducive to agile practices (Suresh et al., 2021; Kalmus et al., 2023). Industry leaders Executives and industry leaders ought to rethink organizational maturity as a moving target and to focus on fostering innovation transfer, establishing digital competency centers, and nurturing collaborative ecosystems, it is needed from them to invest in agility-focused requirements (Suresh et al., 2021; Zhou et al., 2024).

8 Limitations and Future Research

The emphasis on service enterprises within the study is insightful; however, it calls into question the relevance of its results to other industries, such as manufacturing or healthcare. Future research should focus on confirming and modifying these relationships across different industries and contexts to ensure their universal applicability. Furthermore, concentrating on TCM, AOD, and ECA, future research should also consider other important factors such as the practices of managing a crisis, capacity for knowledge absorption, and the impact of digital leadership on agile communicative processes.

9 Conclusion

This study makes a distinctive contribution to the literature by disentangling the structural and technological pathways through which organizations achieve communicative responsiveness. Highlighting the crucial intermediary role of AOD disputes oversimplified causality within narratives of digital transformation and suggests a more intricate model based on contingency theory. As organizations increasingly depend on digital tools for resilience and adaptability, these findings have profound implications for both theory and practice. The provided framework not only improves conceptual understanding but also serves as a practical guide for organizations seeking to grapple with complexity, velocity, and uncertainty in the digital context. The importance of this research stems from its ability to instigate a turning point in an organizational paradigm shift, from technology focused to strategy focused, thus enabling more integrated and contextually adaptive agility research.

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