

Association for Information Systems

AIS Electronic Library (AISeL)

PACIS 2024 Proceedings

Pacific Asia Conference on Information
Systems (PACIS)

July 2024

Key Ambidextrous IT Governance Mechanisms Influence on Digital Transformation and Organizational Performance in Indonesian Banking and Insurance

Rahmat Mulyana
Stockholm University, rahmat@dsv.su.se

Lazar Rusu
Stockholm University, lrusu@dsv.su.se

Erik Perjons
Stockholm University, perjons@dsv.su.se

Follow this and additional works at: <https://aisel.aisnet.org/pacis2024>

Recommended Citation

Mulyana, Rahmat; Rusu, Lazar; and Perjons, Erik, "Key Ambidextrous IT Governance Mechanisms Influence on Digital Transformation and Organizational Performance in Indonesian Banking and Insurance" (2024). *PACIS 2024 Proceedings*. 7.

https://aisel.aisnet.org/pacis2024/track15_govce/track15_govce/7

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2024 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

The Influence of Key Ambidextrous IT Governance Mechanisms on Digital Transformation and Organizational Performance in the Indonesian Banking and Insurance Industry

Completed Research Paper

Rahmat Mulyana

Stockholm University

Borgarfjordsgatan 12, Kista, Sweden

rahmat@dsv.su.se

Lazar Rusu

Stockholm University

Borgarfjordsgatan 12, Kista, Sweden

lrusu@dsv.su.se

Erik Perjons

Stockholm University

Borgarfjordsgatan 12, Kista, Sweden

perjons@dsv.su.se

Abstract

Accelerating digital transformation is imperative for incumbent organizations facing technological disruptions, fierce competition, and shifting customer behavior. However, governance challenges in digital transformation have hindered success in many cases. Building on prior studies, there is still a need to identify and measure the influence of key ambidextrous (agile-adaptive and traditional) IT governance mechanisms on digital transformation and organizational performance. A survey was conducted with 389 respondents in the Indonesian banking and insurance industry, and the data was analyzed using SEM-PLS. The study has revealed that boards and executives, strategy and architecture, data and information, and internal and external collaborations, strongly impact digital transformation, while development and operations, risk and audit, and talent and culture, are showing a moderate influence on digital transformation. Whereas digital transformation strongly influences organizational performance. Moreover, this study provides practical insights to guide organizational leaders in making informed resource decisions by using the 34 validated indicators.

Keywords: Key Ambidextrous IT Governance Mechanisms, Digital Transformation, Organizational Performance, Survey, Structural Equation Modelling with Partial Least Squares (SEM-PLS), Indonesia.

Introduction

Many established firms have accelerated their digital transformation journeys due to disruptive innovation, which is fueled by the usage of digital technology in enterprises, competition from emerging digital companies, and shifts in stakeholder behavior (Warner & Wäger, 2019). Moreover, the path taken by regulators (Hafnawi, 2021) and the global adjustments brought about by the COVID-19 pandemic (Soto-Acosta, 2020) have elevated the significance of digital transformation. "A fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key

resources and capabilities, aiming to radically improve an entity [e.g., an organization, a business network, an industry, or society] and redefine its value proposition for its stakeholders" is the definition of **digital transformation** given by Gong and Ribiere (2021, p. 12). **Digital technologies**, on the other hand, are described as "the combination of information, computing, communication, and connectivity technologies" (Bharadwaj et al., 2013, p. 1). They comprise both emerging and established technologies, such as artificial intelligence, virtual and augmented reality, drones, and robotics, as well as frequently used business technologies, such as social networks, mobile technologies, cloud computing, big data, and the Internet of Things (Spremic, 2017, p. 215).

Obwegeser et al. (2020), however, have demonstrated that numerous failures in digital transformation investment can be attributed to "poor governance". Additionally, prior research has shown that IT governance benefits from optimizing risk and resources for value realization (Vejseli & Rossmann, 2017). Nonetheless, concerns have been raised about traditional IT governance's efficacy in the digital age (DeLone et al., 2018). To answer the digital challenges, previous research of Mulyana et al. (2021) and Jewer and Van Der Meulen (2022) has identified the IT governance mechanisms that influence digital transformation. This research has reviewed literature to highlight **processes, structures, and relational** mechanisms. These mechanisms are crucial for enabling both business and IT stakeholders to fulfill their responsibilities in support of digital transformation journey.

In the following step of the research by Mulyana et al. (2022), a panel of experts from the Indonesian banking and insurance industry was consulted. As a result, prior findings were validated and new IT governance mechanisms that influence digital transformation were identified. This expanded set of mechanisms includes agile-adaptive and traditional ones, including the mechanisms' perceived effectiveness and ease of implementation (Mulyana et al., 2022). Afterwards, the study of Mulyana et al. (2023) further measured the influence extent of both types of mechanisms, resulting in the moderate influence from both type of mechanisms on digital transformation, and the strong influence of digital transformation on organizational performance.

In the research of Mulyana et al. (2023), **agile-adaptive IT governance mechanisms** are defined as "a method to facilitate quick responses and the ability to deal with complex societal issues involving many stakeholders, diverging interests, and uncertainty (Janssen & Van Der Voort, 2020, p. 1)." Whereas **traditional IT governance mechanisms** "is an integral part of corporate governance, for which the board is accountable, that involves the structure (i.e., Chief Information Officer, CIO), processes (i.e., IT strategic planning), and relational mechanisms (i.e., IT leadership) that enable both business and IT stakeholders to execute their responsibilities in support of business/ IT alignment and the creation and protection of IT business value", according to De Haes et al. (2020, p. 3).

In an earlier study, (Mulyana et al., 2024) has delved into investigating the key ambidextrous IT governance mechanisms that influence a successful digital transformation in an Indonesian bank that has been acknowledged receiving many awards in the journey, including the impact of its digital transformation and organizational performance. In this study, "successful" are represented by performance indicators that, when fulfilled or exceeded, show that the company has successfully pursued the aims and objectives specified in its digital transformation strategy (Barthel, 2021). According to Mulyana et al. (2024), **ambidextrous IT governance** refers to, "a synergistic combination of agile-adaptive and traditional IT governance mechanisms that balance the dynamic of exploration by flexibility-innovation-adaptability and exploitation by stability-control-efficiency that allow organizations to optimize their digital and IT risks and resources toward value realization." The essential IT governance mechanisms for a successful digital transformation and organizational performance achievements are referred to as "**key**" since they form the basis of the ambidextrous model, which enables organizations to adjust to rapidly evolving digital environments while preserving stability and control. Moreover, **Digital and IT (DIT)** is a ambidexterity of digital initiatives (exploration) to leverage digital technologies to transform the business process, products/services, and customer experience by focusing on agility, flexibility, and innovation, with IT initiatives (exploitation) aiming at managing and optimizing the technology infrastructure and operational systems like server, network, database, focusing on stability, control, and efficiency (Mulyana et al., 2024).

While prior studies have shed valuable insights, there is still a need to validate and measure the influence extent of the previously found key ambidextrous IT governance mechanisms on the organizational performance in the broader context of the Indonesian banking and insurance industry to increase

generalization, mediated by their digital transformation. The research strategy employed in this study was a **survey**. It is important to continue carrying out this survey within the Indonesian banking and insurance industry since financial technology's fierce competitiveness has a big influence on the industry (Gomber et al., 2018). Assessing this impact will demonstrate the pertinent significance of the key ambidextrous IT governance mechanisms, digital transformation, and organizational performance. Furthermore, Indonesia was selected because of its significance as one of the 20 largest country economies worldwide, which is expected to have the highest digital economy growth among the nations of Southeast Asia, with a projected value of USD 146 billion (Google et al., 2020). Thus, the purpose of this study was to answer the following **research question**: “*To what extent do the key ambidextrous IT governance mechanisms influence digital transformation and organizational performance in the Indonesian banking and insurance industry?*”

Theoretical Foundation

The foundation of the ambidextrous IT governance concept is the **ambidexterity** and corporate **governance** theories. The ambidexterity theory posits that for an organization to attain a competitive advantage, it is critical to strike a delicate balance between exploration and exploitation, as outlined by (March, 1991). This theory is developed into IT ambidexterity/bimodal that emphasizes how applicable it is to the rapidly developing field of digital technology and IT (DIT), by providing two distinct modes: **exploration** is concerned with the discovery of new knowledge, technologies, and markets, while **exploitation** pertains to refining existing competencies and leveraging current resources for efficiency and stability (Horlach et al., 2017; Lee et al., 2015). Given the disruptive nature of digital technology, characterized by numerous investment failures, understanding and navigating the complexities of the digital transformation journey necessitates IT ambidexterity (Davenport & Westerman, 2018; Obwegeser et al., 2020). Moreover, the corporate governance theory, as elucidated by Tricker (1984), forms the foundation of **ambidextrous IT governance** within the broader framework of corporate governance. This approach encompasses the integration of people, processes, and relational ambidextrous mechanisms, offering a robust solution for managing the complexities of digital transformation (Jöhnik et al., 2022; Mulyana et al., 2022, 2023, 2024; Vejseli et al., 2022).

The Key Ambidextrous IT Governance Mechanisms Influence on Digital Transformation

An in-depth case study has shown the importance of seven **key ambidextrous** agile-adaptive and traditional IT governance mechanisms for a successful digital transformation and organizational performance achievement (Mulyana et al., 2024). There is a need to validate and measure the key ambidextrous IT governance mechanisms' extent of influence on digital transformation and organizational performance in the broader context of the Indonesian banking and insurance industry to increase generalization. The related concepts will be discussed further in the following sections.

Board and Executive Key Mechanisms Influence on Digital Transformation

According to prior research, there are board-level supervisory and management and executive-level business and digital & IT (DIT) that act as the key mechanisms (Mulyana et al., 2024). Both levels play vital roles in leading the related key processes to govern and manage digital transformation (Caluwe et al., 2021). Moreover, both levels also need to equip transformational leadership (Winasis et al., 2021) and entrepreneurial leadership (Utoyo et al., 2020) to motivate employees to embrace changes and drive innovations toward a successful transformation.

H1: Board and executive mechanisms positively influence digital transformation.

Strategy and Architecture Key Mechanisms Influence on Digital Transformation

The second key mechanisms which considered important for digital transformation are the strategy and architecture (Mulyana et al., 2024). Strategy is important to direct action to achieve goals, based on the referenced architecture (Chantias et al., 2019). Moreover, we need cross-functional office structures such as transformation office and DIT steering committee to prioritize and monitor the key processes for business and digital & IT portfolio and their performance consecutively (Horlach et al., 2017). Likewise, enterprise

architecture management and its function are also important factors for digital transformation (Hanschke et al., 2015).

H2: Strategy and architecture mechanisms positively influence digital transformation.

Talent and Culture Key Mechanisms Influence on Digital Transformation

Subsequently, the next key mechanisms are the talent and culture that consist of key structures and processes to develop the essential digital and IT competencies from personal to organizational capability (Mulyana et al., 2024). Moreover, reinventing talent management with digital skills is required in the digital age (Mihalcea, 2017). Talent management also needs to be supported by a digital and IT mindset and behavior toward organizational culture to survive in the digital transformation journey (Kiefer et al., 2021).

H3: Talent and culture mechanisms positively influence digital transformation.

Data and Information Key Mechanisms Influence on Digital Transformation

The fourth key mechanisms for digital transformation are data and information (Mulyana et al., 2024). There are also two related important structures, which are data management and information security functions. The first is essential to manage the data assets and capabilities toward data-driven products for staying competitive (Krumay & Rückel, 2020), whereas the second role is to protect the digital assets from security risks (Raza et al., 2019).

H4: Data and information mechanisms positively influence digital transformation.

Development and Operations Key Mechanisms Influence on Digital Transformation

Next, development and operations are the fifth key mechanisms that are important to deliver digital and IT products and services in digital transformation (Mulyana et al., 2024). The related key structures build and run the solution collaboratively in an ambidextrous way. The agile-adaptive process is employed for speed and adaptability when needed (Hemon et al., 2020), while the traditional approach is utilized for stability and security. Each way is supported by related infrastructure (Tai et al., 2019).

H5: Development and operations mechanisms positively influence digital transformation.

Internal and External Collaborations Key Mechanisms Influence on Digital Transformation

The next key mechanisms are the internal and external collaborations (Mulyana et al., 2024). Internal refers to the cross-functional collaborations between all related key structures to manage the strategic alignment of digital transformation initiatives to work towards a common goal (Weritz et al., 2020). External collaboration is facilitated through partnerships with various entities, including startups, government agencies, and other relevant parties, thereby creating a digital ecosystem (Helfat & Raubitschek, 2018).

H6: Internal and external collaboration mechanisms positively influence digital transformation.

Risk and Audit Key Mechanisms Influence on Digital Transformation

Furthermore, risk and audit mechanisms are the last key mechanisms that are important for digital transformation (Mulyana et al., 2024). According to the three-line of defense (TLOD) of enterprise risk management best practice (Davies & Zhivitskaya, 2018), the 1st line is risk owner management, 2nd line is the support from risk and compliance management, and the 3rd line is audit management. Not only DIT risk but also DIT audit is considered essential for digital transformation (Aditya et al., 2018).

H7: Risk and audit mechanisms positively influence digital transformation.

Digital Transformation Influence on Organizational Performance

Based on the insight from a prior study (Mulyana et al., 2024), five important dimensions of digital transformation influence organizational performance. First is the digital transformation strategy dimension to prioritize initiatives for digital transformation (Chanias et al., 2019). Second is the strategic alignment dimension to enable product, quality, and market synchronization from strategic to operational level

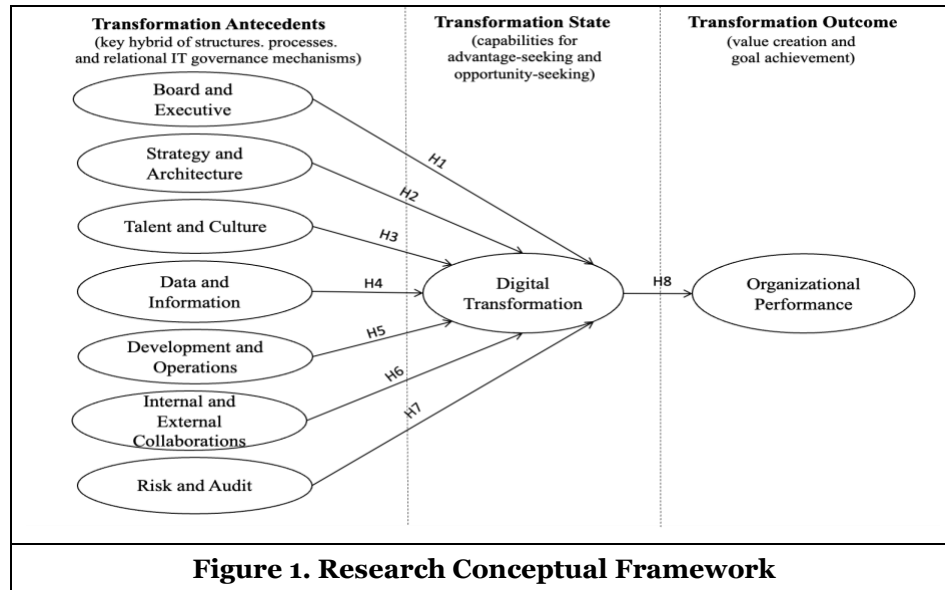
(Gurbaxani & Dunkle, 2019). Third is the digital and IT assets dimension to streamline business processes with digital automation (Tsou & Chen, 2021). Fourth is the digital and IT knowledge and capability dimension to better understand customers and products for transformation (Khin & Ho, 2019). Lastly, the digital and IT innovation culture dimension encourages new business models and process improvement (Kiefer et al., 2021).

Moreover, there are four organizational dimensions that are influenced by digital transformation (Mulyana et al., 2023, 2024). Firstly, the operational excellence dimension benefits from automated business processes, enabling faster decision-making (Ping-Ju Wu et al., 2015). Secondly, the customer experience dimension improves brand image through digital delivery (Vial, 2019). Thirdly, the industry presence dimension, manifested in digital network coverage and ecosystem (Zhu et al., 2022). Lastly, the financial return dimension by seeing the growth in transaction volume and sales (Vejseli et al., 2022).

H8: Digital transformation positively influences organizational performance.

Research Conceptual Framework

Based on the previous theories and concepts, a research conceptual framework has been developed and is displayed in Figure 1.



As shown in Figure 1, the **transformation antecedents** are the seven key ambidextrous IT governance mechanisms in the left area, that is, board and executive, strategy and architecture, talent and culture, data, and information, development and operations, internal and external collaborations, also risk and audit. The key ambidextrous IT governance mechanisms hypothetically indirectly influence the organizational performance as the **transformation outcome**, mediated by the digital transformation in the center area as the **transformation state**. Therefore, all the mentioned mechanisms' influence extents on digital transformation are evaluated through H1-H7. Likewise, the digital transformation influence on organizational performance is evaluated through H8. The possibility of **direct influence** is also being examined.

Moreover, the seven key ambidextrous IT governance mechanisms contained lower-order indicators that consist of structures, processes, or relational mechanisms. Likewise, the digital transformation and organizational performance constructs also contained dimension indicators. There are 35 indicators as the corresponding **measurement items** shown in Table 1 as a basis for the survey instrument items.

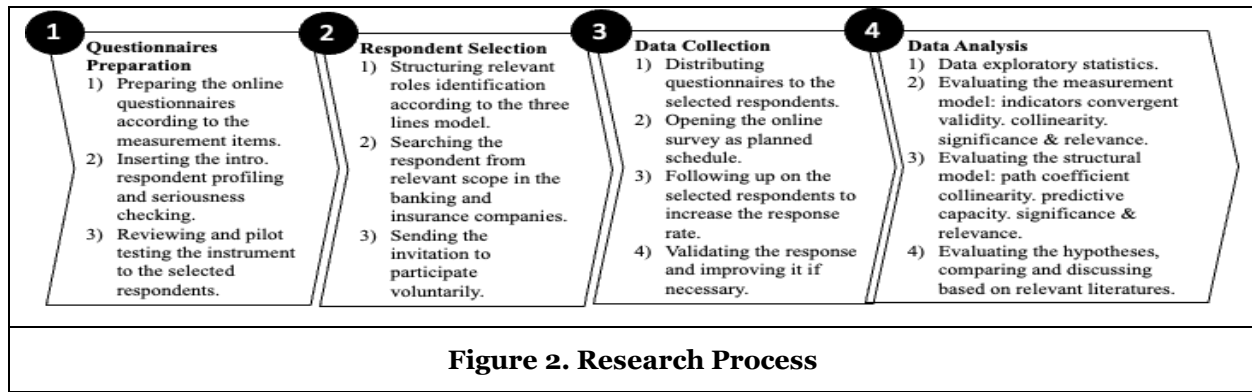
Table 1. Constructs and Corresponding Measurement Items		
Constructs	Measurement Items	References
ITG1-Board and Executive	P1-Board Governance, P2-Executive Governance, S1-Board, S2-Executive, R1-DIT Transformational and Entrepreneurial Leadership.	(Haffke et al., 2016), (Utoyo et al., 2020), (Winasis et al., 2021), (Caluwe et al., 2021), (Mulyana et al., 2021, 2022, 2023, 2024)
ITG2-Strategy and Architecture	P3-Strategy and Performance Management, P4-Enterprise Architecture Management, S3-Cross-functional Office, S4-Enterprise Architecture Function.	(Hanschke et al., 2015), Horlach et al. (2017), (Chanias et al., 2019), (Mulyana et al., 2021, 2022, 2023, 2024)
ITG3-Talent and Culture	P5-DIT Talent and Culture Management, S5-DIT Talent and Culture Function, R*-DIT Mindset, Behavior & Culture	(Mihalcea, 2017), (Kiefer et al., 2021), (Mulyana et al., 2021, 2022, 2023, 2024)
ITG4-Data and Information	P6-Data Management, P7-Information Security Management, S6-Data Management Function S7-Information Security Function	(Raza et al., 2019), (Krumay & Rückel, 2020), (Mulyana et al., 2021, 2022, 2023, 2024)
ITG5-Development and Operations	P8-DIT Development Management, P9-DIT Operations and Infrastructure Management, S8-DIT Development Function, S9-DIT Operations and Infrastructure Function	(Tai et al., 2019), (Hemon et al., 2020), Wiedemann (2018), (Mulyana et al., 2021, 2022, 2023, 2024)
ITG6-Internal and External Collaborations	R2-Cross-Functional Collaborations, R3-External Collaborations	(Helfat & Raubitschek, 2018), (Weritz et al., 2020), (Mulyana et al., 2021, 2022, 2023, 2024)
ITG7-Risk and Audit	P10-DIT Risk and Compliance Management, P11-DIT Audit Management, S10-DIT Risk and Compliance Function, S11-DIT Audit Function	(Aditya et al., 2018), {Davies, 2018 #1410}, (Mulyana et al., 2021, 2022, 2023, 2024)
DT-Digital Transformation	DT1-DT Strategy, DT2-Strategic Alignment, DT3-DIT Assets, DT4-DIT Knowledge and Capability, DT5-DIT Innovation Culture	(Gurbaxani & Dunkle, 2019), (Tsou & Chen, 2021), Cegarra-Navarro et al. (2016), Khin and Ho (2019), (Mulyana et al., 2021, 2022, 2023, 2024)
OP-Organizational Performance	OP1-Operational Excellence, OP2-Customer Experience, OP3-Industry Presence, OP4-Financial Returns	(Ping-Ju Wu et al., 2015), (Vial, 2019), (Vejseli et al., 2022), (Zhu et al., 2022), (Mulyana et al., 2023, 2024)
Notes: ITG=IT Governance, DT=Digital Transformation, OP=Organizational Performance, DIT=Digital and IT, P=Process, S=Structures, R=Relational, R*=later will be removed because of the collinearity issue		

Lastly, **control variables** may be necessary to determine the influence on organizational performance, as Chan and Reich (2007) noted. Organization size and industry type are two instances of related control variables (Ping-Ju Wu et al., 2015). Since the survey is conducted in banking and insurance, which are related to the same financial industry, the **organization size** is the sole control variable.

Research Methodology

Research Strategy

A survey is the most suitable research strategy for testing theoretical relationships and interactions between variables when using a significant amount of quantitative data, according to Denscombe (2021). Therefore, we investigated in the manner depicted in Figure 2.



Moreover, LinkedIn profiles, ISACA members in Indonesia, and related bank and insurance databases from the Indonesian Financial Services Authority (OJK) were sought to find respondents. ISACA is the largest worldwide association for professionals working in IT governance, risk management, compliance, and cybersecurity. To standardize the sample quality, the invited respondents were carefully selected based on their relevant **experience** and **competencies** in Indonesian banking and insurance. Potential respondents were made aware of the goals of the study and the format of the questionnaire before they took part in it. They were made fully aware that participation in the survey was entirely **voluntary** and that they might refuse to participate if they didn't think they qualified to respond to it. The study has been conducted from August 2023 to February 2024.

Based on Denscombe (2021) and Oliver (2003), the **ethical standards** for appropriate research were adhered to perform this study. Four guiding principles were observed to achieve this goal: abstaining from dishonesty; operating with scientific integrity; safeguarding participant interests through voluntary contributions; and abiding by laws and organizational standards.

Data Collection Method

Our conceptual model in Figure 1 and measurement items in Appendix A, were developed based on the prior studies shown in Table 1. Afterward, the data was collected through a survey with respondents selected from the banking and insurance industry experts in Indonesia. Given our particular field of study, random sampling was ruled improper for this research (Denscombe, 2021). Therefore, purposive sampling was used. The respondents' selection was carried out in compliance with the Three Lines of Defense (TLOD) enterprise risk management best practice (Davies & Zhivitskaya, 2018), from the **supervisory board** (commissioner), **management board** (director), and **three lines of management**: the business & IT executive management (1st line, risk owner), and the risk & compliance management (2nd line, supporter) & internal audit management (3rd line, evaluator), as shown in Table 2.

Organization Type	Sample Size	%	Organization Size	Sample Size	%	Organization Size (cont.)	Sample Size	%
Bank	217	55.8	>5000	86	22.1	251-1000	98	25.2
Insurance	172	44.2	1001-5000	178	45.8	100-250	27	6.9
Respondent's Years of Experience	Sample Size	%	Respondent Last Education	Sample Size	%	Respondent Job Level	Sample Size	%
>30	41	10.5	Doctoral	10	2.6	Supervisory Board	7	1.8
21-30	167	42.9	Master	98	25.2	Management Board	137	35.2
10-20	181	46.6	Bachelor	281	72.2	Three Lines Management	245	63.0

Based on the year 2023 statistics from the Indonesian Financial Services Authority (OJK), there were 119 banks (commercial banks, sharia commercial banks, and regional development banks) and 152 insurance companies (general insurance, life insurance, reinsurance, mandatory insurance, and social insurance) that

relevant to the research scope. The research scope is a category of large bank and insurance companies (not SMEs) subject to the IT governance and risk management regulations from the OJK that require more mature IT governance practices. With a total of 271 respondents from banks and 172 from insurance, with a confidence level of 95%, the **Margin of Error (MoE)** value is 0.6% for banks and 0.8% for insurance, which are below 5% and considered adequate for this research (Kotrlík & Higgins, 2001).

For the online survey **pre-test**, we have randomly selected 30 respondents from the invitation list. To address any issues identified, the questionnaire was slightly modified before the link was sent to 527 selected respondents. To filter out pointless responses, a **dummy question** was also inserted into the demographic questions. A sixty-day online survey was performed, yielding 394 completed questionnaires, which indicates a commendable **response rate** of 74.8% (Sivo et al., 2006). However, there were five incomplete responses, resulting in a final count of 389.

Data Analysis Method

To measure the influence extent or causal prediction of various constructs and indicators from the survey data, the Structural Equation Modelling with Partial Least Squares (SEM-PLS) was determined suitable. **SEM-PLS** was chosen for this research because it has a better tolerance for non-normality with a small sample size. It can perform better in addressing multicollinearity issues, and can be used to analyze multi-construct models (Hair et al., 2019). We chose **formative** over reflective measures because we are interested in capturing the various facets of the organizational governance and management components that collectively contribute to the overall construct (Petter et al., 2007).

Moreover, as advised by Hair et al. (2019), the data analysis was completed in two stages: first, by assessing the **measurement model**, and then, by analyzing the **structural model**. Since all our constructs are formative, we evaluated the indicator collinearity, statistical significance & relevance, and indicator outer loading (if necessary). In the second step, the structural model was assessed based on these criteria: predictive capacity, control variable, explanatory strength, path coefficient relevance and significance, and mediation analysis. The data analysis was performed using SmartPLS Professional version 4.

Results

According to Hair et al. (2019), analyzing the statistics of collinearity and looking at the path coefficients should be the first step. To run the PLS-SEM algorithm, a path-weighting option was selected with a maximum iteration size of 10,000. The significance was then determined using a **bootstrapping** technique with the same maximum number of iterations. The results are shown in Figure 3.

Measurement Model

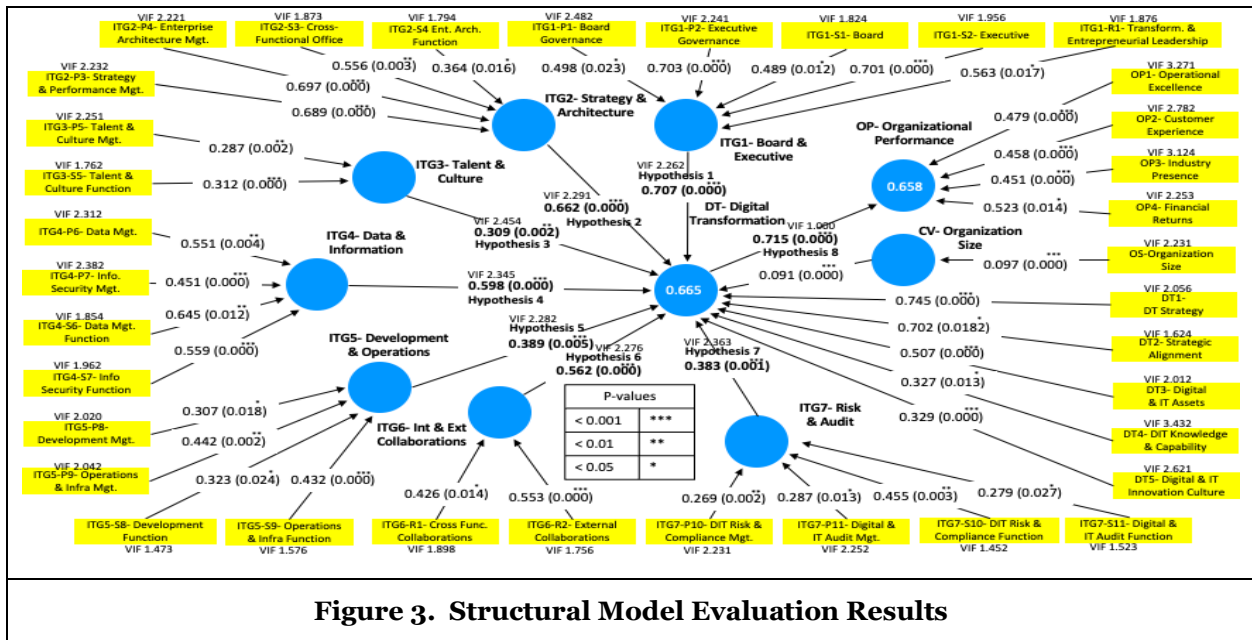
To investigate the measurement models, the Variance Inflation Factor (VIF) **collinearity** statistics computation was first carried out (Hair et al., 2019). The aim was to determine whether any formative indicator might be influenced by other formative indicators related to the same construct. We discovered that the VIF values for 1 of 35 indicators marked by R* "DIT Mindset, Behavior & Culture" was more than 5.0, and was therefore eliminated. Whereas the rest 34 indicators were less than 5.0, indicating the absence of any collinearity issues. Then, by analyzing the t-values, we looked at the **statistical significance & relevance** of the indicator weights. The results indicated that the weight in 23 out of 34 categories looked to be substantial at 1 percent, above the threshold point of 2.576. However, 11 indicators did not meet the threshold. As advised by Hair et al. (2019), the exceptions are not necessarily poor quality indicative. Thus, we evaluated the **outer loadings** of the 11 indicators to determine the formative indicators' absolute contribution to their respective constructs. Therefore, we were able to keep all 34 indicators because the results were more than 0.50.

Structural Model

The structural model evaluation results and the constructs are depicted in Figure 3. Initially, the predictive capacity of the model was evaluated. Unlike other structural equation modeling techniques, SEM-PLS estimations are based on the variance (Wong, 2013). Then, no significant value (0.091) was found during the organization size control variable investigation. Next, the relationships in the theoretical model were

tested by calculating the R2. According to Hair et al. (2019), a model's **explanatory strength** is shown by its R2 values, which range from 0 to 1. (i.e., 0.75 = substantial, 0.5 = moderate, and 0.25 = weak). The results seem to explain the "moderate value" of the two constructs, which are the key ambidextrous IT governance mechanisms with R2=66.5%, and digital transformation with R2= 65.8%, as is shown in Figure 3.

Afterward, we evaluated the **path coefficient** relevance as the strength of interaction between variables. According to Cohen (2013), the relevance can show if a prediction power is small (more than 0.1 but less than 0.3), moderate (more than 0.3 but less than 0.5), or strong (0.5 or higher). As shown in Figure 3, each path in our theoretical model is significant and therefore, our **theoretical model is validated**.



Nevertheless, as shown in Table 3, the degree of influence for each path relationship appears to differ. The digital transformation dimensions appear to be "**strongly**" influenced by the four key mechanisms, which are the board and executive ($\beta=0,707$), strategy and architecture ($\beta=0,662$), data and information ($\beta=0,598$), and internal and external collaborations ($\beta=0,562$). Moreover, three key mechanisms seem to influence digital transformation "**moderately**", which are talent and culture ($\beta=0,309$), development and operations ($\beta=0,389$), and risk and audit ($\beta=0,383$).

Furthermore, the organizational performance appears to be "**strongly**" influenced by the digital transformation ($\beta=0,715$). In addition, the p-values of all eight path coefficients indicate **statistically significant**. Therefore, the eight path coefficients and p-values indicating all the hypotheses (H1-H8) are possibly **accepted**, as shown in Table 3.

Hypotheses & Path	Path Coeff. (β)	P-Value	Decision
H1: board and executive → digital transformation	0.707	0.000	accepted
H2: strategy and architecture → digital transformation	0.662	0.000	accepted
H3: talent and culture → digital transformation	0.309	0.002	accepted
H4: data and information → digital transformation	0.598	0.000	accepted
H5: development and operations → digital transformation	0.389	0.005	accepted
H6: internal and external collaborations → digital transformation	0.562	0.000	accepted
H7: risk and audit → digital transformation	0.383	0.001	accepted
H8: digital transformation → organizational performance	0.715	0.000	accepted

To ensure the acceptance, a mediation analysis was carried out to verify the significance of the direct and indirect effects of the exogenous construct, based on Hair et al. (2019). As shown in Table 4, the **significant indirect effect** of the seven key ambidextrous IT governance mechanisms via digital transformation was confirmed by $\beta > 0.3$ with significant statistics of p-value < 0.001 .

Path	Direct Effect	P-Value	Significance (p<0.05)	Indirect Effect	P-Value	Significance (p<0.05)
board and executive → organizational performance	0.024	0.107	No	0.517	0.000	Yes
strategy and architecture → Organizational performance	0.029	0.143	No	0.456	0.000	Yes
talent and culture → organizational performance	0.077	0.164	No	0.313	0.000	Yes
data and information → organizational performance	0.031	0.121	No	0.434	0.000	Yes
development and operations → organizational performance	0.063	0.148	No	0.351	0.000	Yes
internal and external collaborations → organizational performance	0.043	0.115	No	0.471	0.000	Yes
risk and audit → organizational performance	0.066	0.152	No	0.383	0.000	Yes

On the contrary, all the direct effects are considered insignificant with $\beta < 0.3$ with insignificant statistics of p-value > 0.05 . Consequently, a "full mediation" relationship takes place, as mentioned by Hair et al. (2019). Therefore, **H8 is also supported**.

Discussion

A previous study (Mulyana et al., 2023) demonstrated the influence of both agile-adaptive and traditional IT governance mechanisms on organizational performance, fully mediated by digital transformation. The study was carried out using an empirical survey conducted in the Indonesian banking and insurance industry. Subsequently, another prior study (Mulyana et al., 2024) has identified the implementation of the seven most influential ambidextrous IT governance mechanisms influencing successful digital transformation, based on an in-depth case study in an Indonesian bank. Based on those two studies, we believe that this study **contributes** to research by validating and generalizing the conceptual model and measuring the extent of influence from the seven key ambidextrous agile-adaptive and traditional IT governance mechanisms on digital transformation and organizational performance in the context of the Indonesian banking and insurance industry. The study provides 34 validated indicators as guidance for implementing the key IT governance mechanisms to achieve success in digital transformation.

As illustrated in Figure 3, within the context of large banks and insurance companies in Indonesia, the key ambidextrous IT governance mechanisms at the **board and executive** levels exhibit the highest level of influence, with a coefficient of $\beta=0.707$ (**strong**). The results further highlight those executive structures (such as CEO, CDITO [digital and IT], CDO [digital], CIO, and others) along with their processes, as well as the transformational and entrepreneurial leadership relational mechanism, exert strong influences as key mechanisms. In contrast, board structures (commissioner/non-executive directors) and their processes demonstrated a moderate level of influence. Caluwe et al. (2021) emphasize the need for a certain level of board-level IT competence to support board roles in IT governance, particularly in reducing information asymmetry between boards and executives. This facilitates better evaluation of IT decisions, provides related advice and counsel, and facilitates the provision of IT resources. At the executive level, Haffke et al. (2016) underscore the importance of the five role types of CDOs and their implications for the CIO role in digital transformation. Additionally, the key mechanism includes the significance of transformational and entrepreneurial leadership in increasing employee engagement during digital transformation and enhancing innovation performance in a disruptive environment, as revealed by Utoyo et al. (2020) and Winasis et al. (2021). This study contributes to existing knowledge by emphasizing that the board should focus on evaluating, directing, and monitoring the resource, risk, and value optimization of the ambidextrous of digital initiatives as an exploration approach to provide agility, flexibility, and innovation, with IT initiatives as an exploitation approach to provide stability, efficiency, and control. Meanwhile, the

executive should focus on planning, building, running, and monitoring ambidextrous initiatives in digital transformation.

Subsequently, the second most influential key ambidextrous IT governance mechanism on digital transformation pertains to **strategy and architecture**, with a coefficient of $\beta=0.662$ (**strong**). The strategy and performance, along with enterprise architecture (EA) management processes, exert strong influences as key mechanisms, including cross-functional offices. In comparison, the EA function demonstrates a moderate level of influence. In prior research, Chaniyas et al. (2019) analyzed a case study in developing a strategy to support digital transformation by combining the bottom-up/informal approach as a more productive source with the vision, championship, and guidance from top management. Meanwhile, Hanschke et al. (2015) revealed the collaboration of enterprise architects with agile development teams in using the agile method to develop architecture deliverables. The importance of an ambidextrous approach was also confirmed by Horlach et al. (2017), who discovered the various modes in IT bimodal/ambidexterity implementation, perceived as inevitable for digital transformation. This study extends this comprehension by introducing the importance of high-level cross-functional structures such as the digital transformation office and digital and IT (DIT) steering committee to manage the strategy and performance of digital (exploration) and IT (exploitation) initiatives in digital transformation. The objectives of digital initiatives are to leverage digital technologies in transforming business processes, products/services, and customer experiences, while IT initiatives aim to manage and optimize foundational technology like servers, networks, databases, and other operational systems. EA encompasses various architectures such as business, data, application, and technology.

Moreover, the third most influential key ambidextrous IT governance mechanism on digital transformation is related to **data and information**, with a coefficient of $\beta=0.598$ (**strong**). The data management processes and structure, along with the information security function, exhibit a strong influence as key mechanisms. Additionally, the information security management process demonstrates a moderate level of influence. Previously, Krumay and Rückel (2020) revealed the influence of digitalization on data governance and management by identifying the relationship between the governance of corporate, IT, data, and application, with data architecture and quality. Meanwhile, Raza et al. (2019) discovered the inherent tensions between the security prevention mode to manage known risks and the security response mode to cope with emergent risks. This study contributes to a deeper understanding of the importance of data management and its related functions in handling data ownership, structured/unstructured data types, metadata, data references, master data, data quality, transactional data, and analytics to support the ambidextrous of digital and IT initiatives in digital transformation. Likewise, it emphasizes the significance of information security management and functions in managing information confidentiality, integrity, availability, and privacy.

Furthermore, the fourth most influential key ambidextrous IT governance mechanism on digital transformation is **internal and external collaborations**, with a coefficient of $\beta=0.562$ (**strong**). While external collaboration exerts a strong influence as a key mechanism, cross-functional collaborations demonstrate a moderate level of impact. In prior studies, Weritz et al. (2020) argued that cross-functional collaborations are one important capability to support digital transformation by allowing new ways of thinking, developing analytical skills, and fostering cooperation between internal units. Meanwhile, Helfat and Raubitschek (2018) also revealed the importance of organizational capability as a platform leader in orchestrating the digital ecosystem of value creation. Likewise, this research emphasizes the significance of internal collaborations through tribes, squads, centers of excellence/task forces/working groups, and external collaborations with third parties to leverage external resources, including expertise and related technology, in developing mutually beneficial relationships of DIT initiatives in digital transformation.

The fifth key ambidextrous IT governance mechanism, which exhibits a **moderate** level of influence on digital transformation, is the **development and operations** with $\beta=0.389$. All four development and operations management processes and functions also exhibit a moderate level of influence as key mechanisms. Previously, Hemon et al. (2020) emphasized the importance of skills and collaboration patterns towards DevOps as an agile development and operations approach. Additionally, Wiedemann (2018) elaborated on the essential skills to strengthen DevOps teams, including full-stack development, analysis, and functional skills. Tai et al. (2019) also argued the importance of a flexible IT infrastructure that can directly facilitate coaligned digital innovation through ambidexterity to reap the benefits of digital technologies. Furthermore, this study argues for the importance of ambidextrous approaches to manage two modes of development: digital (exploration) and IT (exploitation). The exploration mode is to develop

the digital IT assets. For example, the development of customer-facing applications by an agile/scrum approach with agile structures such as product leadership (manager, owner), specialized business resources (domain expert), and technical resources (engineer, scrum master, architect, user experience). While the exploitation mode is to develop IT assets. For example, the development of high-risk and tightly coupled backend systems by SDLC/waterfall approach with traditional structures like project manager, business analyst, system analyst, developer, tester, and technical writer in digital transformation. This includes the importance of release/deployment management from development to the operations environment. Additionally, the study emphasizes the importance of managing operations and infrastructures through the management of availability, capacity, configuration, change, incident, problem, change, service, and support of digital assets (exploration) and IT assets (exploitation) in digital transformation. Subsequently, operations are supported by the operations manager, service desk, technical support, database administrator, system administrator, and network administrator functions.

The sixth key ambidextrous IT governance mechanism, which is **risk and audit** with a coefficient of $\beta=0.383$, demonstrates a **moderate** level of influence on digital transformation. The digital and IT risk and compliance function, as a key mechanism, exhibits a moderate level of influence, while both the digital and IT risk and compliance and the digital and IT audit management processes and functions have a weak level of influence. Previously, Aditya et al. (2018) emphasized the importance of top management commitment to strengthen the IT audit's relevance, forward-looking perspective, and risk-focused approach in supporting digital transformation. Similarly, (Davies & Zhivitskaya, 2018) revealed the benefits of adding more flexibility to corporate governance structures between risk owners, risk and compliance management, and internal audit. Despite the urgency of risk-taking and an entrepreneurial mindset in digital transformation, this study highlights the importance of balancing both value creation and asset protection by managing estimated risks (opportunity vs. threat). The weak influence measurement result is likely because agile risk and audit management in Indonesia is still a relatively new practice, and there are also regulatory obstacles that tend to be more traditional, considering the systemic effects as inherent risks in this industry.

Finally, the seventh key ambidextrous IT governance mechanisms, encompassing **talent and culture** with a coefficient of $\beta=0.309$, exhibit a **moderate** level of influence on digital transformation. The talent and culture function, as a key mechanism, demonstrates a moderate level of influence, while the corresponding process has a weak level of influence. Mihalcea (2017) highlighted that in this digital age, organizations should focus on reinventing themselves at a structural level finding the right balance to develop their digital skills and create a shared culture to embrace digital technologies. Similarly, Kiefer et al. (2021) encouraged organizational cultures that foster digital innovations. Despite the importance of talent and culture management processes and related structures highlighted by this study, the weak result in the process measurement suggests that implementing cultural changes suitable to support digital transformation is challenging and take a longer time to achieve the outcome.

This study aligns with the findings of the previous case study (Mulyana et al., 2024) and identifies and measures **five dimensions of digital transformation**. However, this approach differs from the study of Gurbaxani and Dunkle (2019), which employed six dimensions of digital transformation. The results also align with the role of digital transformation as a fully mediated construct influencing organizational performance (Mulyana et al., 2023) and demonstrate a strong sequential influence from the dimensions of digital transformation strategy ($\beta=0.745$), strategic alignment ($\beta=0.702$), to digital and IT (DIT) assets ($\beta=0.507$). As emphasized by Chanias et al. (2019), digital transformation strategy is a key concern for many organizations, given the transformative impacts of digital technologies on both internal and external aspects of the organization. Moreover, this study argues that the strategy may take various forms, such as a combination of digital strategy and IT strategy containing vision, mission, and strategic initiatives to prioritize the portfolio and investment, equipped with performance indicators. Strategic alignment, similar to business-IT alignment, is critical for product, quality, and market alignment (Ping-Ju Wu et al., 2015). Lastly, Tsou and Chen (2021) underscored the necessity of digital technology assets for firms to enhance their performance. Furthermore, this study adds that an ambidextrous of digital technology assets for exploration and IT assets for exploitation is essential, as discussed earlier. Meanwhile, the other two dimensions, DIT knowledge and capability ($\beta=0.327$) and DIT innovation culture ($\beta=0.329$), exhibit a moderate influence. Khin and Ho (2019) highlighted the importance of digital knowledge and capability for digital transformation, and Kiefer et al. (2021) emphasized the significance of a digital innovation culture.

Finally, this study argues for the need for digital knowledge, capability, and innovation in exploration approaches, in conjunction with IT for exploitation.

Prior studies (Mulyana et al., 2023) have employed **four dimensions of organizational performance** to measure digital transformation achievements, consistent with the approaches of Ping-Ju Wu et al. (2015); Vejseli et al. (2022); Zhu et al. (2022). Similarly, this study has considered the dimensions of operational excellence ($\beta=0.479$), customer experience ($\beta=0.458$), and industry presence ($\beta=0.451$), and found that all of them have exhibited a moderate influence. However, the fourth dimension of organizational performance, which is financial returns, has demonstrated a strong influence ($\beta=0.523$), and the path coefficient results are consistently aligned with the influence levels observed in the previous research (Mulyana et al., 2023).

Conclusion

This research has validated the seven key ambidextrous agile-adaptive and traditional IT governance mechanisms and found their influence on digital transformation and organizational performance within large Indonesian banking and insurance companies. To enhance the model's generalizability in the banking and insurance industry, four indicators were reduced, resulting in 34 indicators, as opposed to the initial 39 found in a prior case study (Mulyana et al., 2024). The indicators comprising eleven key IT governance processes, eleven key IT governance structures, three key relational IT governance mechanisms, five digital transformation dimensions, and four organizational performance achievement dimensions, were involved (See Appendix A). The influence extent was measured through a survey and the data was collected from 389 selected respondents from large Indonesian banking and insurance companies. The findings revealed that four key ambidextrous IT governance mechanisms (board and executive, strategy and architecture, data and information, and internal and external collaborations) strongly influence organizational performance, fully mediated by digital transformation. Meanwhile, the remaining three mechanisms (development and operations, risk and audit, talent and culture) exhibit a moderate influence. Additionally, digital transformation strongly impacts organizational performance achievements. This study provides practical insights that can help the companies engaged in digital transformation by using these indicators for measuring the influence of the key ambidextrous IT governance mechanisms on digital transformation factors and organizational performance achievements. It aims to guide organizational leaders in making informed resource decisions. However, given the study's limitations, caution is advised in interpreting the findings, considering the use of cross-sectional survey data from the Indonesian banking and insurance industry, and the potential biases introduced by the purposive sampling method. Therefore, future research could replicate the study by exploring different industries, countries, or regions to enhance the generalization of this study's findings.

Appendix A - Instrument Items

ITG1	Board and Executive Ambidextrous Mechanisms that Influence Digital Transformation	SD	D	N	A	SA
P1	Our company has implemented board-level processes to evaluate, direct, and monitor the resource, risk, and value optimization of digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P2	Our company has implemented executive-level processes to plan, build, run, and monitor the resource, risk, and value optimization digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S1	Our company has board-level structures (non-executive director/ commissioner) to evaluate, direct, and monitor the resource, risk, and value optimization of digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S2	Our company has executive-level structures (CEO/ CDITO/ CDO/ CIO/ CTO/ CISO/ other chief level) to plan, build, run, and monitor the resource, risk, and value optimization of digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R1	Our company leaders have a transformational and entrepreneurial vision, good communication, sharing the inspiration and motivation to think creatively, drive innovation, embrace changes, and manage risks to perform digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITG2	Strategy and Architecture Ambidextrous Mechanisms that Influence Digital Transformation	SD	D	N	A	SA
P3	Our company has implemented processes to manage the strategy and performance of digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P4	Our company has implemented processes to manage the enterprise architecture (business, data, application, technology, security) of digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S3	Our company has cross-functional structures (DT Office/ DIT Steering Committee) to manage the strategy and performance of digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S4	Our company has unit/ function structures to manage the enterprise architecture (business, data, application, technology, security) of digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITG3	Talent and Culture Ambidextrous Mechanisms that Influence Digital Transformation	SD	D	N	A	SA

Key Ambidextrous IT Governance Mechanisms Influence on Digital Transformation

P5	Our company has implemented processes to manage the talent/ human capital (DIT-related competencies) and organizational culture to perform digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S5	Our company has unit/ function structures to manage the talent/ human capital (DIT-related competencies) and organizational culture to perform digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R*	Our company has talent with a DIT mindset, ethics, and behavior to perform digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITG4	Data and Information Ambidextrous Mechanisms that Influence Digital Transformation	SD	D	N	A	SA
P6	Our company has implemented processes to manage the data and information (ownership, structured/ unstructured, metadata, reference, master data, quality, transactional, analytics) for digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7	Our company has implemented processes to manage the data and information security (confidentiality, integrity, availability) and privacy for digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S6	Our company has unit/function structures to manage the data and information (ownership, structured/ unstructured, metadata, reference, master data, quality, transactional, analytics) for digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S7	Our company has unit/function structures to manage the data and information data and information security (confidentiality, integrity, availability) and privacy for digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITG5	Development and Operations Ambidextrous Mechanisms that Influence Digital Transformation	SD	D	N	A	SA
P8	Our company has implemented processes to manage the development of digital assets (exploration, by agile/ scrum) and IT assets (exploitation, by SDLC/ waterfall) in DT, including release/ deployment from development to operations environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P9	Our company has implemented processes to manage the operations and infrastructures (availability, capacity, configuration, change, incident, problem, change, service, support) of digital assets (exploration) and IT assets (exploitation) in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S8	Our company has unit/ function structures to manage the development of digital assets (exploration: product leadership [manager, owner], specialized business resources [domain expert], technical resources [engineer, scrum master, architect, user experience]) and IT assets (exploitation: project manager, business analyst, system analyst, developer, tester, technical writer) in DT, including release officer/ deployer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S9	Our company has unit/ function structures to manage the operations and infrastructures (operation manager, service desk, technical support, database administrator, system administrator, network administrator) of digital assets (exploration) and IT assets (exploitation) in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITG6	Internal and External Collaborations Ambidextrous Mechanisms that Influence Digital Transformation	SD	D	N	A	SA
R2	Our company has implemented internal collaborations (tribe, squad, center of excellence/ task force/ working group) to bring together cross-functional stakeholders to work towards a common goal to perform digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R3	Our company has implemented external collaborations to leverage outer resources (expertise and technology) to develop mutually beneficial relationships in building the ecosystem for digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITG7	Risk and Audit Ambidextrous Mechanisms that Influence Digital Transformation	SD	D	N	A	SA
P10	Our company has implemented risk and compliance management processes (identification, assessment, treatment, monitoring, review, communication, reporting, and recording) at strategic, project, and operational levels, to manage the digital (exploration) and IT (exploitation) risks in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P11	Our company has implemented audit management processes (planning, risk assessment, evidence gathering, testing, analysis, communication, reporting, follow-up resolution) to evaluate the adequacy of risk-based control implementation related to the digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S10	Our company has unit/ function structures (risk owners, risk officers, compliance officers, risk committee/ oversight) to manage the digital (exploration) and IT (exploitation) risks in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S11	Our company has unit/ function structures (internal auditor) to evaluate the adequacy of risk-based control implementation related to digital (exploration) and IT (exploitation) initiatives in DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DT	Digital Transformation Dimensions Influenced by IT Governance	SD	D	N	A	SA
DT1	Our company has a better DT strategy (digital business and IT strategy) to develop vision, mission, and strategic initiatives to prioritize the portfolio, investment, and performance indicator of the digital (exploration) and IT (exploitation) programs in DT, driven by the ambidextrous IT governance mechanisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DT2	Our company has a better strategic alignment of product, quality, and market from business strategy toward digital (exploration) and IT (exploitation) products/services delivery in DT, driven by the ambidextrous IT governance mechanisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DT3	Our company has adopted digital assets (mobile & wireless, artificial intelligence, big data, mining, analytics, cloud, and emerging technologies, etc.) and IT assets (software, hardware, network, data center, disaster recovery center, etc.) that facilitated the new or improved business processes to deliver competitive products/services in DT, driven by ambidextrous the IT governance mechanisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DT4	Our company has better digital and IT organizational knowledge and capability that facilitated supplier interaction, provided products/services know-how, and improved customer understanding, driven by the ambidextrous IT governance mechanisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DT5	Our company has a better digital and IT innovation culture that encourages new business models and process improvement for value creation, driven by ambidextrous IT governance mechanisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP	Organizational Performance Dimensions Influenced by Digital Transformation	SD	D	N	A	SA
OP1	Our company has a better operation through automated, efficient, secured business processes, and faster turnaround times supported by data-driven decision-making, because of DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP2	Our company has a stronger brand image, larger customer base, and higher customer experience from omnichannel delivery that attracted new customers and retained the existing, ones because of DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OP3	Our company has a larger business network coverage and better industry collaborations and digital ecosystem, because of DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OP4	Our company has a better financial return from the higher income growth, sales volume, and transaction value, because of DT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Notes: ITG=IT Governance, DT=Digital Transformation, OP=Organizational Performance, DIT=Digital and IT, P=Process, S=Structures, R=Relational, SD (Strongly Disagree), D (Disagree), N (Neutral), A (Agree), SA (Strongly Agree)						

References

- Aditya, B. R., Hartanto, R., & Nugroho, L. E. (2018). The Role of IT Audit in the Era of Digital Transformation. *IOP Conference Series: Materials Science and Engineering*, 407(1).
- Barthel, P. (2021). What is meant by digital transformation success? Investigating the notion in IS literature. *Wirtschaftsinformatik*, Virtual.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital Business Strategy: Toward a Next Generation of Insights. *MIS Quarterly*, 37(2), 471-482.
- Caluwe, L., De Haes, S., Wilkin, C., & Huygh, T. (2021). How Boards of Directors Can Contribute to Governing IT. Proceedings of the Hawaii International Conference on System Sciences (HICSS), Hawaii, USA.
- Cegarra-Navarro, J. G., Soto-Acosta, P., & Wensley, A. K. P. (2016). Structured knowledge processes and firm performance: The role of organizational agility. *Journal of Business Research*, 69(5), 1544-1549.
- Chan, Y. E., & Reich, B. H. (2007). IT alignment: what have we learned? *Journal of Information Technology*, 22(4), 297-315.
- Chantias, S., Myers, M. D., & Hess, T. (2019). Digital transformation strategy making in pre-digital organizations: The case of a financial services provider. *Journal of Strategic Information Systems*, 28(1), 17-33.
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences* (Second ed.). Academic press.
- Davenport, T. H., & Westerman, G. (2018). Why so many high-profile digital transformations fail. *Harvard Business Review*(March 2018), 1-5.
- Davies, H., & Zhivitskaya, M. (2018). Three Lines of Defence: A Robust Organising Framework, or Just Lines in the Sand? *Global Policy*, 9, 34-42.
- De Haes, S., Van Grembergen, W., Anant, J., & Huygh, T. (2020). *Enterprise governance of Information Technology: Achieving alignment and value in digital organizations* (3 ed.). Springer.
- DeLone, W., Migliorati, D., & Vaia, G. (2018). *CIOs and the Digital Transformation: A New Leadership Role* (1 ed.). Springer.
- Denscombe, M. (2021). *The good research guide : research methods for small-scale social research projects* (Seventh ed.). McGraw Hill.
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services [Article]. *Journal of Management Information Systems*, 35(1), 220-265.
- Gong, C., & Ribiere, V. (2021). Developing a unified definition of digital transformation. *Technovation*, 102, 1-17.
- Google, Temasek, & Company, B. (2020, 10 November 2020). *e-Conomy SEA 2020: At Full Velocity - Resilient and Racing Ahead*. Retrieved 15 December 2021 from https://www.bain.com/globalassets/noindex/2020/e_conomy_sea_2020_report.pdf
- Gurbaxani, V., & Dunkle, D. (2019). Gearing up for successful digital transformation. *MIS Quarterly Executive*, 18(3), 209-220.
- Haffke, I., Kalgovas, B., & Benlian, A. (2016). The role of the CIO and the CDO in an organization's digital transformation. Proceedings of the International Conference on Information Systems (ICIS), Dublin, Ireland.
- Hafnawi, B. (2021). Regulating Digital Transformation: Technologies, Scenarios, and Contracts. In *Innovative and Agile Contracting for Digital Transformation and Industry 4.0* (pp. 161-183). IGI Global.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2-24.
- Hanschke, S., Ernsting, J., & Kuchen, H. (2015). Integrating agile software development and enterprise architecture management. Proceedings of the Hawaii International Conference on System Sciences (HICSS), Kauai, USA.
- Helfat, C. E., & Raubitschek, R. S. (2018). Dynamic and integrative capabilities for profiting from innovation in digital platform-based ecosystems. *Research Policy*, 47(8), 1391-1399.
- Hemon, A., Lyonnet, B., Rowe, F., & Fitzgerald, B. (2020). From Agile to DevOps: Smart Skills and Collaborations. *Information Systems Frontiers*, 22(4), 927-945.
- Horlach, B., Drews, P., Schirmer, I., & Boehmann, T. (2017). Increasing the Agility of IT Delivery: Five Types of Bimodal IT Organization. Proceedings of the Hawaii International Conference on System Sciences (HICSS), Waikoloa.
- Janssen, M., & Van Der Voort, H. (2020). Agile and adaptive governance in crisis response: Lessons from the COVID-19 pandemic. *International Journal of Information Management*, 55, 1-7.
- Jewer, J., & Van Der Meulen, N. (2022). Governance of Digital Transformation: A Review of the Literature. Virtual.
- Jöhnk, J., Ollig, P., Rövekamp, P., & Oesterle, S. (2022). Managing the complexity of digital transformation—How multiple concurrent initiatives foster hybrid ambidexterity. *Electronic Markets*, 1-23.
- Khin, S., & Ho, T. C. F. (2019). Digital technology, digital capability and organizational performance: A mediating role of digital innovation. *International Journal of Innovation Science*, 11(2), 177-195.
- Kiefer, D., Van Dinther, C., & Spitzmüller, J. (2021). Digital Innovation Culture: A Systematic Literature Review. In (pp. 305-320). Springer International Publishing.
- Kotrlik, J., & Higgins, C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information technology, learning, and performance journal*, 19(1), 43.

- Krumay, B., & Rückel, D. (2020). Data governance and digitalization - A case study in a manufacturing company. Proceedings of the Pacific Asia Conference on Information Systems (PACIS), Dubai, UAE.
- Lee, O. K., Sambamurthy, V., Lim, K. H., & Wei, K. K. (2015). How does IT ambidexterity impact organizational agility? *Information Systems Research*, 26(2), 398-417.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71-87.
- Mihalcea, A. (2017). Employer branding and talent management in the digital age. *Management Dynamics in the Knowledge Economy*, 5(2), 289-306.
- Mulyana, R., Rusu, L., & Perjons, E. (2021). IT Governance Mechanisms Influence on Digital Transformation: A Systematic Literature Review. Proceedings of the Americas Conference on Information Systems (AMCIS), Virtual.
- Mulyana, R., Rusu, L., & Perjons, E. (2022). IT Governance Mechanisms that Influence Digital Transformation: A Delphi Study in the Indonesian Banking and Insurance Industry. Proceedings of the Pacific Asia Conference on Information Systems (PACIS), Virtual.
- Mulyana, R., Rusu, L., & Perjons, E. (2023). How Hybrid IT Governance Mechanisms Influence Digital Transformation and Organizational Performance in the Banking and Insurance Industry in Indonesia. Proceedings of the International Conference on Information Systems Development (ISD), Lisbon, Portugal.
- Mulyana, R., Rusu, L., & Perjons, E. (2024). The Key Ambidextrous IT Governance Mechanisms for a Successful Digital Transformation: Case Study of Bank Rakyat Indonesia (BRI). *Digital Business*, 4(2), 1-17.
- Obwegeser, N., Yokoi, T., Wade, M., & Voskes, T. (2020). 7 key principles to govern digital initiatives. *MIT Sloan Management Review*, 61(3), 1-9.
- Oliver, P. (2003). *The student's guide to research ethics*. Open University Press,.
- Petter, S., Straub, D. W., & Rai, A. (2007). Specifying Formative Constructs in Information Systems Research. *MIS Quarterly*, 31(4), 623.
- Ping-Ju Wu, S., Straub, D. W., & Liang, T.-P. (2015). How Information Technology Governance Mechanisms and Strategic Alignment Influence Organizational Performance: Insights from a Matched Survey of Business and IT Managers. *MIS Quarterly*, 39(2), 497-518.
- Raza, H., Baptista, J., & Constantinides, P. (2019). Conceptualizing the role of IS security compliance in projects of digital transformation: Tensions and shifts between prevention and response modes. Proceedings of the International Conference on Information Systems (ICIS), Munich, Germany.
- Sivo, S., Saunders, C., Chang, Q., & Jiang, J. (2006). How Low Should You Go? Low Response Rates and the Validity of Inference in IS Questionnaire Research. *Journal of the Association for Information Systems*, 7(6), 351-414.
- Soto-Acosta, P. (2020). COVID-19 Pandemic: Shifting Digital Transformation to a High-Speed Gear. *Information Systems Management*, 37(4), 260-266.
- Spremic, M. (2017). Governing digital technology – how mature IT governance can help in digital transformation? *International Journal of Economics and Management Systems*, 2, 214-223.
- Tai, J. C. F., Wang, E. T. G., & Wang, K. (2019). A model of coaligned digital innovations: The roles of flexible IT Infrastructure and ambidextrous IS process innovations. *Proceedings of the 23rd Pacific Asia Conference on Information Systems: Secure ICT Platform for the 4th Industrial Revolution, PACIS 2019*.
- Tricker, R. I. (1984). *Corporate governance: Practices, procedures, and powers in British companies and their boards of directors*. Gower Publishing Company, Limited.
- Tsou, H.-T., & Chen, J.-S. (2021). How does digital technology usage benefit firm performance? Digital transformation strategy and organisational innovation as mediators. *Technology Analysis & Strategic Management*, 1-14.
- Utoyo, I., Fontana, A., & Satriya, A. (2020). The role of entrepreneurial leadership and configuring core innovation capabilities to enhance innovation performance in a disruptive environment. *International Journal of Innovation Management*, 24(06), 2050060.
- Vejseli, S., Rossman, A., & Garidis, K. (2022). The Concept of Agility in IT Governance and its Impact on Firm Performance. Proceedings of the European Conference on Information Systems (ECIS) Timisoara, Romania.
- Vejseli, S., & Rossmann, A. (2017). The impact of IT governance on firm performance: a literature review. Proceedings of the Pacific Asia Conference on Information Systems (PACIS), Langkawi, Malaysia.
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, 28(2), 118-144.
- Warner, K. S. R., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, 52(3), 326-349.
- Weritz, P., Braojos, J., & Matute, J. (2020). Exploring the Antecedents of Digital Transformation: Dynamic Capabilities and Digital Culture Aspects to Achieve Digital Maturity. The Americas Conference on Information Systems (AMCIS), Virtual.
- Wiedemann, A. (2018). IT Governance Mechanisms for DevOps Teams - How Incumbent Companies Achieve Competitive Advantages. Proceedings of the Hawaii International Conference on Systems Sciences (HICSS), Waikoloa, USA.
- Winasis, S., Djumarno, D., Riyanto, S., & Ariyanto, E. (2021). The effect of transformational leadership climate on employee engagement during digital transformation in Indonesian banking industry. *International Journal of Data and Network Science*, 91-96.
- Wong, K. K.-K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, 24(1), 1-32.
- Zhu, H., Dai, Y., & Wan, F. (2022). Understanding Digital Capabilities and Their Impact on Firm Performance. Proceedings of the Pacific Asia Conference on Information Systems (PACIS), Virtual.