Navigating the Digital Transformation Landscape in Indonesia: A Qualitative Sectoral Analysis

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***Abstract*—This study explores the factors influencing digital transformation (DX) in Indonesia through a qualitative analysis of various sectors, focusing on C-level executives. It identifies seven key dimensions—Strategy, Organization and Structure, Technology, Transformation Process, Employee, Customer, and Culture—comprising thirty-two sub-dimensions that impact DX success. Validation and reliability were confirmed with a high global Alpha Biner (0.965) and semantic data alpha values (0.933 to 0.99). The cultural dimension posed the greatest challenges, with issues such as the willingness to change and social collaboration. The proposed solutions include community counseling and educational activities. The government sector faces significant DX hurdles owing to rigid structures, budget constraints, and skill gaps. This study highlights the need for sector-specific adjustments to accurately measure digital maturity and calls for further empirical research across sectors. These findings provide a framework for organizations to independently assess and enhance their DX progress.**

Keywords— Digital Transformation, Inter Coder Agreement, Qualitative Methods

I. Introduction

Digital transformation is an ongoing global development that continues to be a compelling topic of discussion. Various creations and added value resulting from successful digital transformation are becoming increasingly challenging for those who cannot respond to its demands. The IMD World Digital Competitiveness Ranking serves as a barometer of success for digital transformation worldwide. Developing countries face unique challenges in achieving successful digital transformation compared to developed countries, including issues related to infrastructure, skills, technology, and politics. Organizations and countries strive to maintain their digital competitiveness through various programs. Indonesia, currently ranked 51st among the 63 countries, is one such example. The ranking criteria are based on three main pillars: Knowledge, Technology, and Future Readiness. According to the digital transformation targets released by Wantiknas, Indonesia aims to reach the 40th position by 2024[1]. Various digital challenges are critical to achieving digital transformation (DX) in Indonesia, such as infrastructure problems, digital literacy, and data exchange (G20, 2022). Meanwhile, Indonesia had an Internet penetration rate of over 77% as of 2022 [2], [3], ranking third in Asia for Internet users[3]. Despite many ongoing transformation challenges, Indonesia has high potential for digital transformation, particularly due to its substantial Internet user base, which serves as a key gateway to digital connectivity for the population. Digital transformation offers significant opportunities and high risks for organizations [4]. Bughin and Van Zeebroeck [5] demonstrate that organizations that do not react to digital disruptions, or only partially, are likely to encounter major issues in their revenue and profits [6]. Many traditional companies are surpassed by the emergence of newer, more innovative companies [7]. The ride-hailing industry has shifted its focus to traditional taxi [8], [9],[10]. Digital transformation is a complex process that involves various interrelated factors [11], [12]. In-depth exploration is necessary to clearly understand the challenges in responding to digital transformation to achieve its success, considering the unavoidable differences in characteristics. This study specifically aimed to explore the challenges of digital transformation in Indonesia. This research uses a qualitative approach involving informants from various sectors affected by Digital Transformation, namely, the financial sector, education, health, manufacturing, and government[13]. Precisely identifying challenges allows the application of suitable strategies to enhance digital competitiveness. Given the complexity of digital transformation, this study adopts a cautious approach in determining the appropriate theories for the success of digital transformation. This study contributes by identifying the supporting factors for digital transformation. The results provide important insights for organizations to design more efficient and adaptive digital transformation strategies. This paper follows a linear structure to tackle the research questions. In Section 2, prior research on digital transformation and the methodology employed in this study are examined. In section 3, the methodology utilized in this study is expounded. Section 4 delves into the assessment of the theoretical applicability to digital transformation and the process of its exploration. Finally, in Section 5, the study's findings are summarized.

II. Literature Review

A. Digital Transformation

Digital Transformation has various definitions from different perspectives [14]. According to Schallmo [15], there is no universally accepted definition for the term "digital transformation." The term "transformation" expresses fundamental changes within an organization, impacting strategy, structure [6], and power distribution [16]. Digital transformation can be seen as a continuous process of adopting a significantly changing digital landscape to meet the digital expectations of customers, employees, and partners [14]. This adoption process must be actively designed, initiated, and executed [17]. McKinsey developed a definition stating that digital is about one process and more about how companies conduct their business [18]. DX is defined as the

achievement of disruptive technology that brings new business models and operations across all sectors [19]. Digital Transformation has become an increasingly compelling issue today, driving various interdisciplinary research endeavors. Digital transformation involves various factors. Technology plays a crucial role in the digital world [20], [21].

TABLE I. THEORIES FOR DIGITAL TRANSFORMATION

Theories	Definition	Construct	References
Rresource-based view (RBV)	The company consists of a series of resources while management research aids and limits the company's growth [22]. RBV states that a company acquires a competitive advantage to be imitated and cannot be substituted (VRIN)[23], [24].	Strategy Technology Employee (Knowledge)	[7], [25]
Configuration Theory	This theory depicts configuration as a set of mutually supportive features such as organizational structure, processes, and strategies[26]	Structure and Organization Process Strategy	[27], [28]
Dynamic Capabilities	Dynamic Capability According to Helfat and Raubitschek [29], this theory explains how companies create and sustain competitive advantage.	Strategy Process (Digitalization) Knowledge	[30], [31]
Ambidexterity Theory	Ambidexterity Theory Previous literature on digital transformation depicts the impact of digital transformation, particularly concerning company performance, where some scholars also feature ambidextrous organizations in their research[32].	Organization Strategy Customer	[33], [34]
General System Theory	General System Theory portrays organizations as social productive systems. There are three main elements in GST: input-system-output.	Input: Strategy System: Organization, Technology, People; Output: Customer, Environment: Culture,Feedback	[35], [36], [37]

The use of Information Systems as an initial step in digitizing existing processes requires minimal requirements for the use of specific infrastructure [38], such as the availability of connectivity and devices connected to the system. In addition to technology, the presence of strategy plays a crucial role in the success of Digital Transformation [19], [39]. The theories presented in Table I are generally used for research related to digital transformation. These theories describe various constructs that support digital transformation

B. Theory of Digital Transformation Approach

Digital Transformation is a complex process. Caution is needed when determining theories that can depict digital transformation. Several other theories comprehensively discuss digital transformation. Several theories address digital transformation, such as the Resource-Based View (RBV), Configuration Theory, Dynamic Capabilities Theory, and Ambidexterity Theory. These theories emphasize specific perspectives rather than overall factors. Table I presents a comparison of the theories in discussing digital transformation. Digital Transformation is a phenomenon involving a complex process that encompasses numerous factors within an organization, where humans and technology are interconnected. Based on a comparison of supporting theoretical constructs from the perspective of digital transformation, which involves various complex factors, General System Theory offers robust constructs in the relationship between humans and technology [40]. This aligns with the holistic approach of studying the interconnectedness of systems and environments, similar to Digital Transformation. Systems theory can be applied to corporate digital transformation, as systems are confronted with disruptive technology, people, and their complex relationships within organizations interacting with external factors. Therefore, the General System Theory is adopted in the study of Digital Transformation because of its strong constructs for analysing a system involving humans and technology [40].

III. RESEARCH METHODS

This study employed a qualitative approach to conduct an in-depth exploration of the challenges of digital transformation in Indonesia. This research involves several sectors that are affected by Digital Transformation, including education, finance, health, government, and industry. The questions raised are open questions in accordance with the supporting dimensions of digital transformations that have been raised: related questions about strategy, employees, business processes, technology, culture, and organization. Data collection utilized qualitative analysis, including questionnaires and interviews. Interviews were conducted with key informants from various sectors impacted by digital transformation at the chief level. The interviews were designed using open-ended questions based on the proposed dimensions. Data collection was conducted longitudinally [41]. The data were processed to enable further analysis. This study implemented research controls through several reliability measurements [42]. Validation measurements employ Inter-Coder Agreement (ICA) to test the reliability of the obtained codes with an acceptable reliability level (typically $\geqslant$ 0.8) [43]. This research utilized the Atlas.ti qualitative data analysis software tool. Atlas.ti facilitates researchers in effectively and efficiently organizing, analyzing, and visualizing qualitative data, making it more accessible and aiding in analytical discussions. Atlas.ti allows the expression of relationships between codes, concepts, and themes in various ways, with network diagrams being widely utilized [44]. The research stages are illustrated in Fig.1.

IV. RESULTS AND DISCUSSION

The Digital Transformation referred to in this study is a complex process involving various dimensions within organizations, encompassing both technology and humans. Meanwhile, Systems in General System Theory (GST) forms the root of the Information Systems discipline [45], accommodating various research objectives to analyze phenomena involving humans and technology[40]. Therefore, Digital Transformation from the GST perspective serves as the basis for further data analysis discussion in this research. The research objective is based on the phenomenon of the low

achievement of Digital Transformation, as indicated by the Digital Competitiveness Index rankings until 2022, where Indonesia ranks 51st out of 63 countries.

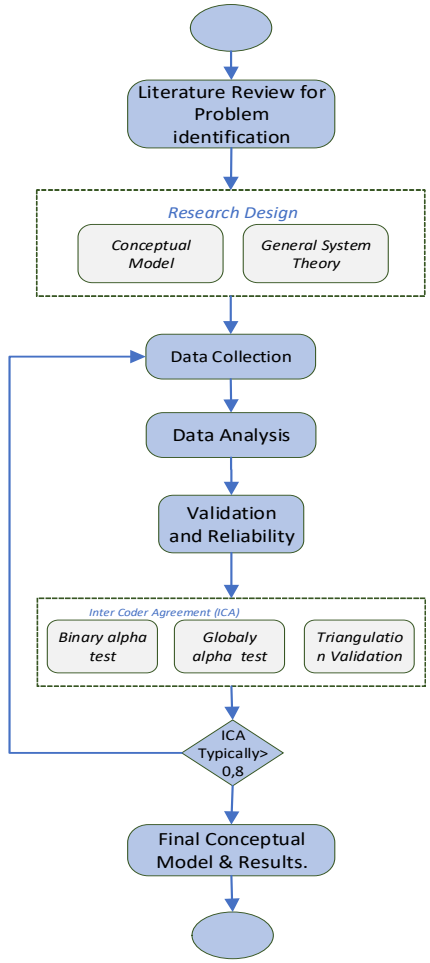

Fig. 1. Research Stages

Fig. 2. Conceptual Model

Deep exploration of the highly complex phenomenon of Digital Transformation is required to identify and understand the influencing dimensions. Hence, a qualitative research approach is necessary for this study. To initially identify the challenges faced by developing countries, especially Indonesia, seven dimensions were proposed (Fig. 2). Various holistic dimensions that influence Digital Transformation include technology, as supported by findings in academic literature [19], [39] and practitioners [46], indicating that technology is an integral part of the digital realm. Without technology, access as the initial stage towards Digital Transformation would not occur [21]. However, DX is not only about technology [20]. The success of DX aligns with strategy and governance [19], organization [47], employees [47], customers [39], [48], transformation processes [19], and culture [47]. The proposed dimensions that pose challenges to the success of digital transformation are presented in Fig. 2. The data collection for this research was conducted in two stages, namely, primary data through deep interviews and observations, while secondary data collection was obtained from various digital achievement reports. The informants in this study focused on the C level, namely informants with the "Chief" or leadership level. The selection of the informant level was based on the need for direction and a digital transformation strategy in an organization. The number of informants needed to achieve data saturation was 12-24 [49]. In this study, there were 14 participating informants, with a total of 12,063 quotations.

The coding in this study utilized the dimension data proposed in the conceptual model discussed in the previous section. In the data coding process, the researcher's understanding is required to group the significant meanings in each quotation into existing codes and add new codes that may arise as a consequence of the exploration conducted during the in-depth interview process.

TABLE II. THEME GROUPING

No	Thema	Sub Themes	References
1	Organization and Structure	Bureaucracy, Organizational Structure Management, Sustainable Learning Management, Organizational Change Management	[50], [51]
2	Technology	Information System, Security Management, Infrastructure	[19], [39]
3	Strategy	Digital Leadership, Strategy Development, Policy, Financial Analysis, Portfolio management	[19], [52]
4	Customer	Customer Engagement, Customer Experience, Customer Trust	[53], [54]
5	Employee	Skill, Awareness, Sustainable Learning, Gap Skill	[50], [55]
6	Culture	Willingness to change, Social Collaboration, Habit,	[50], [53]
7	Transformation Process	Business Process Digitalization, Business Process Vertical Integration, Business Proses Horizontal	[39], [56]

The collected data are then further processed and analyzed with the assistance of Atlas.ti tools. Various quotations with significant meanings were processed

according to thematic divisions (Table II). Informants agree that determining the right strategy through an organizational blueprint enables easier and faster implementation of Digital Transformation. This aligns with informant quotes INF.2 '*...Blueprint (strategy) is very important; if the blueprint keeps changing, it is not definitive, then it is difficult for us to translate it into IT...*" and INF.7 "*...Starting on blueprint or long-term plan (is needed in transformation) as has been done by the government that is worth emulating across ministries and possibly also companies, starting to think about an activity as a long-term series...".* The application of strategy development in organizations is reflected in the possession of clear, coherent, and actionable strategies that indicate the path and steps of digital transformation [57] [58]. Figure 3 presents quotations about Strategy Development as part of Digital Transformation.

Strategy development, according to informants, also supports the success of implementing digital transformation. Strategy development is essentially the process of creating value used for the long term in achieving business development goals; in this context, it is the development of organizations through Digital Transformation. Clarity in the transformation steps aligns with quote INF.3 "*...In taxation, the PSAP Tax Administration System Renewal is being implemented, and the goal is in 2024 (clarity of strategy).*" Strategy can be defined as an input of DX that shapes organizations and businesses in transformation [56]. The DX strategy leads to the determination of a strong vision and roadmap and inspires how existing technology can create a future with shared value [19].

Strategies should consider future developments, including legal and tax policies, financial aspects, sustainability guidelines, and government regulations [52]. All sub-dimensions described as theme groups in the strategy dimension influencing Digital Transformation are presented in Fig 4. The entire data are mapped onto the distribution of themes-subthemes existing in Atlas.ti for all dimensions of Digital Transformation. This study employed the Inter-Coder Agreement (ICA) analysis approach to test the reliability of the obtained codes with an acceptable reliability level (typically $\geqslant$ 0.8) [43]. The overall binary alpha value obtained was 0.97, indicating that the research achieved an acceptable level of reliability. After meeting the research eligibility criteria with an acceptable level of confidence, the data analysis process can be conducted and the research findings can be used for further processes. Based on numerical reliability testing, binary alpha and global binary alpha values above 0.9 were obtained, which means they exceed the required reliability threshold of 0.8 (Fig 5). In addition to validation testing using ICA, this study also includes a triangulation process. Triangulation of the questions was conducted, and consistency in the answers was obtained. After the validation test criteria were met, the research process proceeded to the findings. This finding identifies that culture poses the biggest challenge to the success of Digital Transformation in Indonesia. Culture in this research is divided into several sub-themes, including Culture in Social Collaboration, Culture in Willingness to Change, Habit, Figure, Socio-Economic, and Motivation. Therefore, to achieve successful DX, cultural barriers must be minimized. The involvement of various dimensions in this Digital Transformation aligns with General System Theory (GST), which states that digital transformation is a process of integrating various functions holistically within organizations to enhance value. According to the GST perspective, disruptive technology, humans, and the complex relationships within them are integral to digital transformation [19]. Digital Transformation involves various dimensions holistically interacting with each other. Meaningful statements about Digital Transformation are often expressed in the government sector.

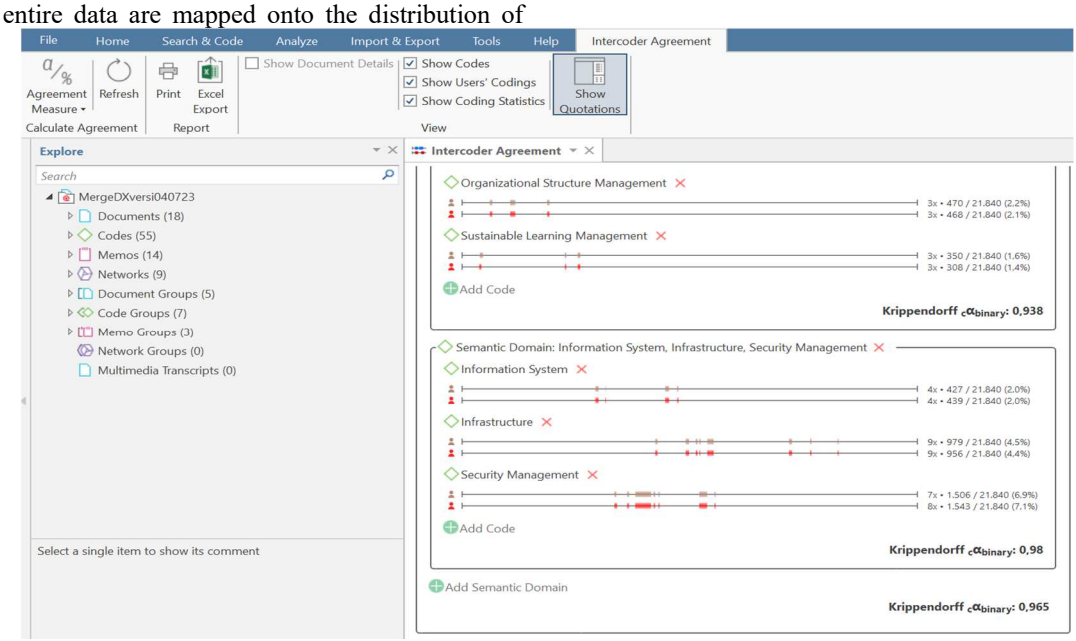

Fig. 3. Inter Coder Agreement

This indicates an ongoing process of adapting to Digital Transformation. This finding supports previous research [59], indicating a delay in government digitalization adoption compared to the private sector. According to Bretschneider and Mergel [60], this adoption delay is a phenomenon in both developed and developing countries.

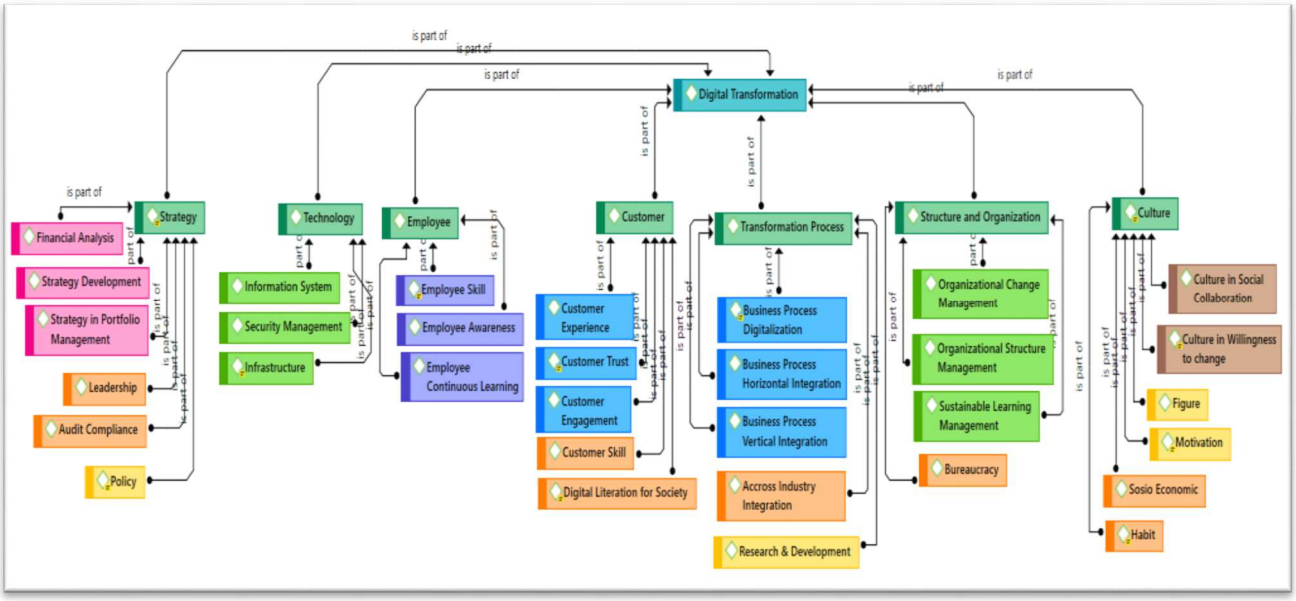

Fig. 4. Supporting Dimensions of Digital Transformation

Several factors causing this delay include a less agile organizational structure and bureaucracy, increased outsourcing, and budget incentives for technology development to external parties, resulting in reduced internal innovation capacity. This phenomenon's identification has been swiftly responded to in developed countries [61]. Meanwhile, in the private sector, digital service teams are generally led by private sector executives who bring new capabilities and skills that have been standard operating procedures in the IT industry since the 1970s but have not yet spread to the public sector. This finding also confirms previous research that Digital Transformation adaptation responds earlier/faster in other sectors such as manufacturing [62], health [63], education [64], and finance [65]. Based on the data processing and analysis, the final conceptual model is presented in Fig.5. Additional sub-dimensions have been added to the strategy dimension, namely, Leadership, Audit compliance, and policy.

V. Conclusion

The identification of factors influencing Digital Transformation in Indonesia is conducted through in-depth exploration in each sector related to digital transformation using a qualitative research approach. Profiles of C-level informants or chiefs (leaders, management) in various sectors affected by DX were selected to support the required primary data needs. To ensure the validation and reliability of the research results, confirmability tests and triangulation were conducted. Based on the test results, a global Binary Alpha of 0.965 was obtained. Meanwhile, the binary alpha test for each semantic data point ranged from 0.933 to 0.99. Values above 0.9 in these tests exceed the required reliability threshold of 0.8. This research identifies seven dimensions: Strategy, Organization and Structure, Technology, Transformation Process, Employee, Customer, and Culture, with thirty-two sub-dimensions influencing DX success. The research results indicate that the cultural dimension poses the greatest challenges compared to other dimensions. The government sector faces digital transformation challenges, whereas other sectors responded earlier to the presence of digital transformation. Several causes of these challenges have been identified, including less agile organizational structure and bureaucracy, budget incentives for technology development to external parties, reduced internal innovation capacity, reliance on external IT services without the internal capability to evaluate system functionality according to defined initial requirements, and difficulties in recruiting IT talent–skill gap. This research focuses on identifying the general digital transformation challenges in Indonesia. Therefore, there are limitations to this study, such as the need for further adjustments to measure digital maturity in specific sectors due to differences in sector characteristics that cannot all be generalized. Further research is needed to empirically test more cases in various sectors. Ultimately, the results of this research serve as a practical alternative for organizations to independently identify the initial achievement of the digital transformation process, and these measurement results can be used as a baseline to achieve a better level of maturity.

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