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ASSESSING ORGANISATIONAL READINESS FOR DIGITAL TRANSFORMATION: KEY ATTRIBUTES FOR INDIGENOUS SOUTH AFRICAN CONSTRUCTION FIRMS

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ABSTRACT

Digital transformation is a critical driver of efficiency, competitiveness, and sustainability in the construction industry. However, the readiness of indigenous South African construction firms for digital transformation remains underexplored. This study evaluates key attributes influencing organisational readiness for digital transformation within these firms. A structured questionnaire, developed from existing literature, was distributed to construction professionals engaged in digital technologies within Gauteng Province, South Africa. Using a purposive sampling approach, 68 valid responses were obtained from a sample of 100, resulting in a response rate of 68%. Data analysis was conducted using descriptive statistical techniques to rank critical attributes for digital transformation readiness. Findings indicate that an innovation mindset is the most crucial attribute, emphasising the importance of fostering a culture of technological advancement. Leadership commitment ranked second, highlighting the necessity of strong strategic leadership. Other key enablers include sustainability focus, data-driven decision-making, and technical skills development. This study contributes empirical insights into the organisational factors shaping digital transformation in indigenous South African construction firms. It underscores the need for fostering an innovation-driven culture, reinforcing leadership commitment, and integrating sustainability into digital strategies. These results lay the groundwork for policymakers, industry participants, and researchers to create focused strategies aimed at enhancing digital transformation preparedness in the South African construction industry.

Keywords: *Digital Transformation; Indigenous Construction Firms; Organisational Readiness; South Africa; Technology Adoption.*

1. INTRODUCTION

The construction sector is experiencing a fundamental shift driven by digital technologies that improve efficiency, productivity, and sustainability (Leong et al., 2024). Digital

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transformation (DT) involves the incorporation of advanced technologies such as Building Information Modelling (BIM), Artificial Intelligence (AI), the Internet of Things (IoT), and cloud computing into construction processes (Lanzolla et al., 2020). These innovations streamline project management, improve collaboration, and optimise resource allocation, making digitalisation a key factor in achieving competitiveness and operational resilience. The COVID-19 pandemic significantly hastened DT in the construction sector (Olanipekun & Sutrisna, 2021), forcing companies to adopt digital tools to enhance operational efficiency and ensure business continuity. (Kim et al., 2022). However, the successful implementation of digital transformation depends largely on a firm's organisational readiness, which is influenced by several key attributes.

Indigenous construction firms are critical to any country's infrastructure development, contributing significantly to economic growth, job creation, and urban expansion (Ofori, 2015). However, these firms face significant challenges and opportunities in their digital transformation journey. Many operate in a volatile business environment, characterised by fluctuating economic conditions, evolving regulatory frameworks, and limited access to digital infrastructure (Oko-Odion & Angela, 2025). While some firms have successfully integrated digital technologies such as BIM, automation, and cloud computing, a significant portion lags behind due to financial constraints, a shortage of skilled professionals, and resistance to change (Bandara et al., 2024; Windapo & Cattell, 2013).

According to Gillani et al. (2024), organisational readiness for digital transformation is shaped by key attributes such as technological infrastructure, workforce digital skills, financial investment, leadership commitment, and organisational culture. These attributes determine how well a firm can transition from traditional construction methods to digitalised operations. However, comprehensive studies assessing these readiness factors in indigenous South African construction firms remain scarce. Therefore, this study aims to evaluate the essential attributes required for digital transformation within indigenous South African construction firms. The specific objective is to:

- Evaluates key attributes influencing organisational readiness for digital transformation within the South African construction firms.

By filling this research gap, the study aims to equip industry stakeholders, policymakers, and business leaders with actionable strategies for improving digital readiness and fostering a competitive, digitally advanced construction industry.

2. ORGANISATIONAL READINESS FOR DIGITAL TRANSFORMATION IN THE CONSTRUCTION INDUSTRY

Digital transformation (DT) revolves around how organisations evolve through the integration of digital technologies, reshaping their operations and enhancing the value they deliver to customers (Hanelt et al., 2021). According to Konopik et al. (2022), the literature surrounding DT encompasses a wide range of knowledge areas. This diversity has resulted in the absence of a unified definition for the concept. Furthermore, according to Vararean-Cochisa and Crisan (2025), construction organisations are still adjusting to the transformations driven by digitalisation, leading to the absence of standardised protocols or clearly established frameworks for the structured and efficient adoption of new technologies.

Digital advancements are essential for the smooth progress of the construction industry. However, organisational readiness for digital transformation in the construction industry is a multifaceted concept that involves technological, strategic, cultural, and human resource dimensions (Trenerry et al., 2021). Research over the past thirty years indicates that nearly 70% of large system implementations fail to deliver their expected benefits within the planned timeline and budget. Importantly, more than 85% of these failures are not due to technological flaws but rather due to challenges in integrating human factors, gaining acceptance, and building commitment to effective utilisation (Erdogan et al., 2005). This underscores the significance of organisational readiness in digitalisation adoption. Therefore, understanding the concept of organisational readiness is crucial for ensuring successful implementation. Organisational readiness for change is inherently context-dependent and lacks a universally accepted definition. It is shaped by a combination of factors, including the organizational environment, the nature of the stakeholders involved, and the specific circumstances under which change is initiated (Tran et al., 2011). In general terms, readiness refers to an organisation's proactive initiatives to prepare for and implement change, particularly digitalisation advancements. Moreover, readiness is dynamic, fluctuating based on the organisation's initiatives and capacity to adapt (Li et al., 2022). Given its variability, it is essential to examine how organisational readiness manifests in construction firms.

An organisation’s technological readiness serves as a foundational pillar in determining an organization’s ability to initiate and sustain digital transformation (Nguyen et al., 2019). This encompasses not only the availability but also the maturity and integration of digital tools and infrastructures, such as Building Information Modeling (BIM) and Immersive Technologies (ImT), which are increasingly recognized as essential for enhancing construction management practices (Wong & Abbasnejad, 2025). However, technological capability alone is insufficient without strategic leadership to drive its implementation. Leadership readiness, characterized by visionary thinking and strategic orientation, also plays a crucial role in fostering digital transformation. Similarly, effective leaders cultivate leadership schemas including strategic, future-oriented, capability-based, and experimental thinking, which collectively guide digital initiatives and promote organizational adaptability (Galli et al., 2017).

In addition to technological and leadership readiness, cultural readiness emerges as a critical enabler of digital transformation. A culture that supports innovation, embraces change, and promotes digital adoption is vital for the successful integration of emerging technologies. Organisations that exhibit cultural orientations centered on production efficiency, task achievement, and openness to innovative construction processes demonstrate a higher propensity for digital integration (Zakariyyah et al., 2021). Human resource readiness centres on the capabilities, adaptability, and preparedness of an organization’s workforce to engage with digital transformation. Among the most frequently cited challenges in this domain is the technical skills gap, which poses a significant barrier to the successful implementation of digital initiatives. The ability of personnel to comprehend, adopt, and effectively utilize digital technologies is a critical determinant of transformation success (Cetindamar et al., 2021). Addressing this challenge requires a proactive approach, including sustained investment in employee training and development programs. Additionally, organizations must build strong data management competencies to support the integration and use of digital tools, thereby enhancing overall workforce digital literacy and operational efficiency. Collectively,

these attributes technological infrastructure, strategic leadership, and organizational culture, innovative mindset, sustainability focus, and skill development, form the core attributes that influence an organization's readiness for digital transformation.

Within the construction industry, firms encounter distinct challenges that impact their digital transformation readiness. Construction companies encounter distinct challenges stemming from the intense competition within the industry, the reliance on project-based frameworks, and the ongoing demand to efficiently control both time and costs. (Ibrahim, 2018). Readiness for digitalisation in construction firms involves an organisation's ability to plan and prepare for the adoption of digital tools, ensuring seamless integration into existing workflows (Tran et al., 2011). When firms fail to adequately prepare, they often experience resistance to change, implementation delays, and inefficient utilisation of new systems (Kamm, 2017). Hence, the need to assess the needed attributes of Indigenous South African construction organisations for effective and efficient digital transformation.

Table 1 shows a summary of reviews of the key attributes that shape organisational readiness, drawing on established theoretical and empirical studies across the domains of management, information systems, and innovation.

Table 1: Attributes for digital transformation

Attribute	Definition	Readiness Category	Academic Domain	Key Citations
Leadership Commitment	Top management's dedication to driving digital transformation initiatives.	Strategic Orientation	Management	Westerman et al. (2014); Kane et al. (2015)
Cultural Adaptability	Ability to evolve organisational values and behaviours.	Cultural and Operational Readiness	Management / Organisational Behaviour	Schein (2010); Tabrizi et al. (2019)
Data-Driven Decision Making	Making decisions based on data and analytics.	Technical Readiness	Information Systems	Wamba et al. (2017); McAfee et al. (2012)
Technical Skills Development	Building digital capabilities across workforce.	Technical Readiness	Information Systems / HRM	Erol et al. (2016); Khin & Ho (2019)
Collaboration and Communication	Internal knowledge sharing and teamwork.	Cultural and Operational Readiness	Management / Organisational Behaviour	Sambamurty et al. (2003)
Risk Management	Identifying and mitigating digital transformation risks.	Cultural and Operational Readiness	Management / Information Systems	
Client-Centric Approach	Aligning transformation efforts with customer needs.	Cultural and Operational Readiness	Innovation / Marketing	Verhoef et al. (2021)
Sustainability Focus	Integrating environmental and	Strategic Orientation	Sustainability / Innovation	Geissdoerfer et al. (2018)

Attribute	Definition	Readiness Category	Academic Domain	Key Citations
	social goals into transformation.			
Change Management Expertise	Managing transition and employee adaptation.	Technical Readiness	Management	Al-Mashari & Zairi (1999)
Innovation Mindset	Openness to experimentation and creative problem-solving.	Strategic Orientation	Innovation Management	Chesbrough (2003); Teece (2018)

3. RESEARCH METHODOLOGY

This research utilized a meticulous design to gather dependable and pertinent data while addressing the specific contextual limitations of the study. The target group consisted of construction professionals in Gauteng Province, South Africa, who are actively involved in the adoption of emerging technologies in construction processes. Gauteng was chosen as the case study area due to its significant number of construction projects undertaken by both government and private entities, making it an appropriate setting for examining digitalisation within the construction (Ogunbayo & Aigbavboa, 2024). However, this geographical focus presents a limitation to the study's generalizability. The findings reflect the perceptions and readiness of firms operating within Gauteng and may not fully capture regional disparities or challenges experienced by indigenous construction firms in other South African provinces, such as Limpopo, Eastern Cape, or KwaZulu-Natal. These regions may differ in terms of technological infrastructure, access to skilled professionals, and the maturity of digital adoption. Therefore, caution should be exercised in applying the results to the broader South African construction industry without further comparative studies.

Data was collected using a structured questionnaire distributed via Google Forms. This questionnaire was crafted based on existing literature concerning digital transformation in the construction field. To ensure alignment between the collected data and the study's aims, a purposive sampling method was employed. A total of 100 questionnaires were sent to professionals with proven expertise in digital transformation in the construction industry. Of these, 68 completed questionnaires were returned, yielding a response rate of 68%, indicating strong interest from the target demographic and highlighting the significance of the research topic. The questionnaire utilized a five-point Likert scale, from "strongly disagree" (1) to "strongly agree" (5), to effectively capture a detailed range of perceptions regarding organisational readiness for digital transformation. The internal consistency of the survey instrument was evaluated using Cronbach's alpha, resulting in a value of 0.834. This high reliability score, surpassing the recommended threshold of 0.7 (Tavakol & Dennick, 2011), confirms the robustness and internal consistency of the measurement tool, ensuring the reliability of the data for subsequent analysis. Data analysis was conducted using the Statistical Package for Social Sciences (SPSS), version 20. Descriptive statistical techniques, including Mean and Standard Deviation, were employed to facilitate the ranking and assessment of variables while maintaining analytical rigor without imposing excessive statistical assumptions. The combination of

a robust sampling strategy, a well-structured questionnaire, and reliable analytical techniques enhances the credibility of this study's findings.

4. FINDINGS

According to the respondents' background information, 44.12% (30) of the respondents holds BSc degree, 23.53% (16) holds honours degree, 11.76% (8) holds MSc degree, 17.65% (12) hold a post-matric certificate or diploma, and 2.94% (2) hold a PhD degree. The largest group of respondents consisted of Quantity Surveyors 58.82% (40), followed by Information Technologists 14.71% (10), Construction Project Managers 20.59% (14), and Construction Managers 5.88% (4). The data also reflects the years of experience of the respondents in using digital technologies in construction processes: 55.88% (38) have 0–5 years of experience, 29.42% (20) have 5–10 years, 8.82% (6) have 10–15 years, and only 5.88% (4) have more than 15 years of experience. The results of this investigation indicate that the participants in the survey possess a substantial level of professional expertise and academic qualifications, thereby enabling them to provide valuable insights to achieve the objectives of the research effectively.

Following a comprehensive review of existing literature, this study identified a set of attributes for digital transformation. These identified attributes were then presented to the study's target respondents for evaluation based on their perceived level of agreement. Respondents rated each indicator using a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree". Table 2 displays the ranking of attributes essential for digital transformation by indigenous South African construction firms, as assessed by the respondents. The table shows that the Innovation mindset ranked highest with a mean item score (MIS) of 4.45 and a standard deviation (SD) of 0.738. Leadership commitment came in second with an MIS of 4.04 and an SD of 0.953. Sustainability focus was third, with an MIS of 3.98 and an SD of 0.829. Data-driven decision-making ranked fourth with an MIS of 3.94 and an SD of 0.929. Technical skills development was fifth with an MIS of 3.93 and an SD of 1.012. Change management expertise followed in sixth with an MIS of 3.92 and an SD of 0.862. Cultural adaptability ranked seventh with an MIS of 3.87 and an SD of 0.913. Collaboration and communication placed eighth with an MIS of 3.85 and an SD of 0.919. Risk management was ninth with an MIS of 3.82 and an SD of 0.863, while the client-centric approach was tenth with an MIS of 3.76 and an SD of 0.902.

Table 2: Attributes for digital transformation for Indigenous South African construction firms

Attributes	MIS	Std.D	R
Innovation Mindset	4.45	0.738	1
Leadership Commitment	4.04	0.953	2
Sustainability Focus	3.98	0.829	3
Data-Driven Decision Making	3.94	0.929	4
Technical Skills Development	3.93	1.012	5
Change Management Expertise	3.92	0.862	6
Cultural Adaptability	3.87	0.913	7
Collaboration and Communication	3.85	0.919	8
Risk Management	3.82	0.863	9

Attributes	MIS	Std.D	R
Client-Centric Approach	3.76	0.902	10

MIS = Mean Item Score; Std.D = Standard Deviation; R = Rank

Further analysis of the respondents' rankings for key attributes necessary for digital transformation is visualised in the radar chart presented in Figure 1. This chart illustrates the mean ratings of various organisational readiness attributes, grouped into three major categories: Strategic Orientation (Blue), Technical Readiness (Green), and Cultural and Operational Readiness (Orange). The findings reveal that South African construction firms exhibit a higher degree of readiness in terms of strategic orientation, with the highest-rated attributes being Innovation Mindset (4.45), Leadership Commitment (4.04), and Sustainability Focus (3.98). These results suggest that many organisations are conceptually aligned with the vision of digital transformation and are led by leadership that supports innovation and long-term value creation. In contrast, the level of technical readiness was found to be moderate, as indicated by the ratings for Data-Driven Decision Making (3.94), Technical Skills Development (3.93), and Change Management Expertise (3.92). This suggests that while firms are beginning to adopt data-informed approaches and are investing in skill development, there are still noticeable gaps in technical infrastructure, capacity, and the processes required to fully support digital transformation. However, the most critical observation is the relatively low ratings in Cultural and Operational Readiness, with Cultural Adaptability (3.87), Collaboration and Communication (3.85), Risk Management (3.82), and Client-Centric Approach (3.76) receiving the lowest scores. These findings underscore a significant weakness in the internal culture, collaborative practices, and stakeholder alignment within South African construction firms. Such limitations may hinder the successful adoption and integration of digital tools and platforms across project teams and organisational functions.

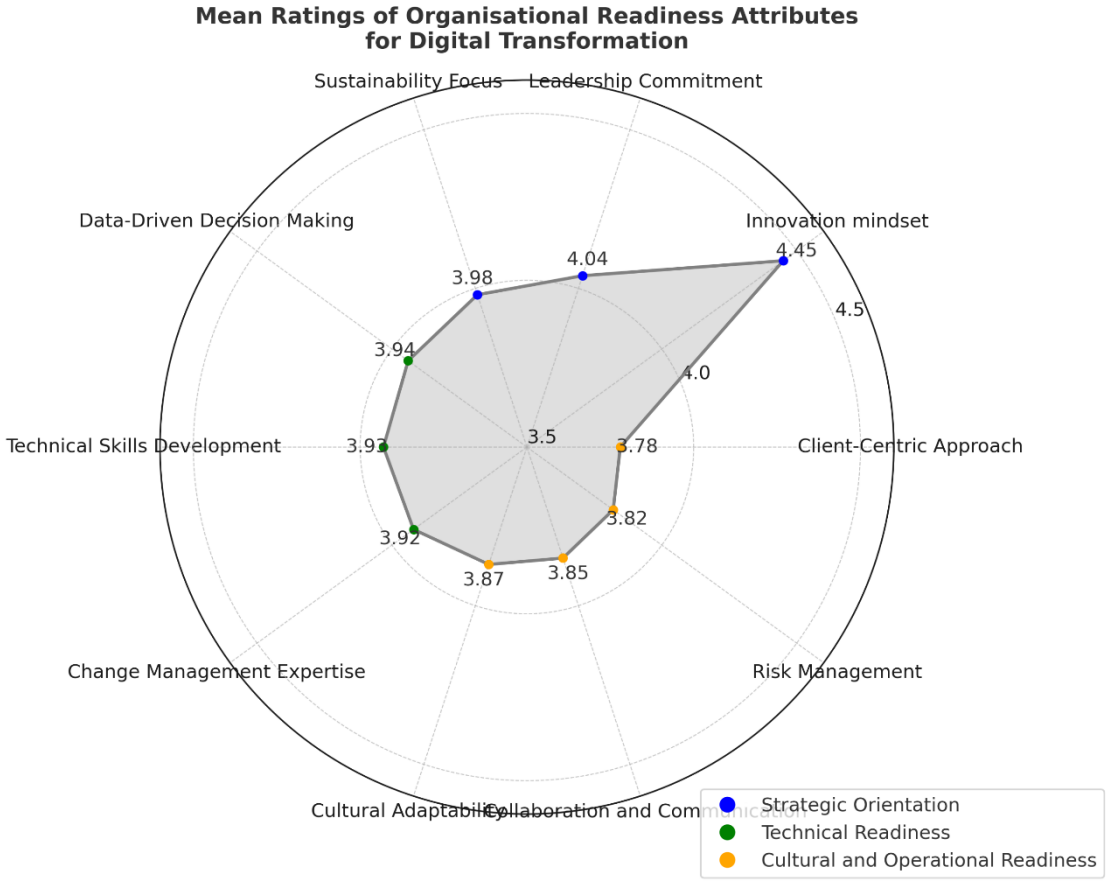

Figure 1: Attributes for digital transformation for Indigenous South African construction firms

5. DISCUSSION OF FINDINGS

The study assessed the key attributes necessary for digital transformation within indigenous South African construction firms. The results revealed that innovation mindset was ranked first, the most critical factor by the respondents, surpassing all other attributes. This finding aligns with (Demirel, 2024), who argues that an innovation mindset is an indispensable yet often invisible strategic component of digital transformation, requiring a collective commitment from leaders, employees, and organisational culture. Similarly, Joukhadar et al. (2023) demonstrated through their qualitative study that the absence of an innovation mindset amplifies the perception of complexity and uncertainty surrounding digital technologies, leading to increased technostress. Organizations that foster an innovative mindset are more capable of managing the challenges posed by digital transformation, improving their adaptability, and sustaining strategic agility in a world that is becoming increasingly digital. (Pratiwi & Justi, 2022).

The importance of leadership commitment was rated second, with MIS of 4.04 and SD of 0.953. This positions leadership commitment as the second most significant factor in driving digital transformation within indigenous South African construction firms. Leadership commitment is widely recognised as a fundamental enabler of digital transformation, as leaders set the strategic direction, allocate resources, and foster a culture that embraces technological advancements (Kane, 2019). The high MIS (4.04)

suggests that respondents view leadership as a key driver of successful digital adoption, reinforcing the argument by Hess et al. (2016) that without strong leadership, digital transformation initiatives often lack direction and fail to achieve their intended impact. According to Schiuma et al. (2022), transformational leadership is particularly crucial in guiding organisations through technological change. Leaders who are proactive, visionary, and committed to digitalisation can motivate employees, reduce resistance to change, and make sure that digital initiatives are in line with the organisation's long-term strategic objectives.

Sustainability focus, ranked third, reflects a growing trend among construction firms globally to integrate sustainability with digital transformation efforts (Kudryavtseva & Vasileva, 2021). The prioritisation of this attribute suggests that South African construction firms are becoming more conscious of the long-term advantages of adopting sustainable practices. not only for environmental outcomes but also for cost savings and regulatory compliance. This finding aligns with existing literature, which emphasises that sustainability and digital transformation are interlinked, particularly in industries like construction that have significant environmental and social impacts (Yilmaz, 2023). Furthermore, attributes like data-driven decision-making and technical skills development indicate a shift toward more strategic, informed decision-making processes as firms implement digital technologies. As suggested by Aghimien et al. (2018), data analytics and technical skills are core competencies that enhance operational efficiencies, reduce risks, and support informed project management. The implication of this result is that digital transformation in the South African construction industry is currently being driven more by strategic ambition than by operational or cultural capacity. Although there is leadership interest and a willingness to embrace innovation, the lack of cultural adaptability, weak interdepartmental communication, and underdeveloped client engagement practices may act as barriers to realising the full benefits of digital transformation.

6. CONCLUSION AND RECOMMENDATIONS

This study has provided valuable insights into the key attributes influencing digital transformation readiness within indigenous South African construction firms. The result shows that digital transformation in the South African construction industry is currently being driven more by strategic ambition than by operational or cultural capacity. Although there is leadership interest and a willingness to embrace innovation, the lack of cultural adaptability, weak interdepartmental communication, and underdeveloped client engagement practices may act as barriers to realising the full benefits of digital transformation. To address these shortcomings, stakeholders including policymakers, construction leaders, and industry training institutions should prioritise capacity-building interventions focused on organisational culture change, collaborative leadership, and human capital development. Targeted programmes such as leadership development, innovation bootcamps, cross-functional collaboration training, and digital literacy initiatives will be critical for translating strategic intentions into effective operational outcomes. By focusing on strengthening technical and especially cultural and operational readiness, the South African construction industry can position itself for a more resilient and integrated digital future. Future research should explore industry-specific challenges and opportunities related to digital transformation, ensuring a more holistic approach to technology adoption in the construction sector.

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