

# CURRENT AGILE COMPETENCY AMONGST IT PROJECT MANAGERS: A SOUTH AFRICAN PERSPECTIVE

**ABSTRACT:** The Fourth Industrial Revolution (4IR) is engendering a profound transformation in the manner in which individuals experience their daily lives, engage in employment, and establish connections with others. The successful adoption of this new transformation paradigm necessitates the acquisition and application of fresh proficiencies by information technology project managers and professionals. IT project managers play a crucial role in the execution and oversight of Digital Transformation initiatives. However, their proficiency in particular areas may be deficient as a result of the swift advancements in technology. This argument holds particular significance for developing countries like South Africa, as they face the imperative of swiftly adjusting and embracing novel digital company skills to sustain competitiveness within the contemporary Digital Global Economy. The Agile methodology has been acknowledged as a crucial enabler for the success of significant Digital Transformation Projects. This study investigates the existing levels of Agile proficiency among IT project managers and professionals in South Africa who bear the final responsibility for overseeing digital projects in the contemporary digital economy. The results suggest that there is a low level of formal Agile training among IT managers and professionals in South Africa, despite a perceived positive correlation between Agile proficiency and the success of Digital Transformation projects. Furthermore, the level of women's involvement in the information and communication technology (ICT) industry in South Africa has maintained a modest status since 2018 up till the present day. The researcher's analysis suggests that the limited adoption of formal Agile training among IT professionals responsible for overseeing Digital efforts in South Africa could potentially be a contributing factor to the elevated incidence of IT project failure. Consequently, it is imperative for all stakeholders to promptly address this issue by implementing necessary corrective measures.

**Keywords:** Agile, Project Manager Competencies, Fourth Industrial Revolution, Digital Transformation

## 1. Introduction

The advent of technology has brought about a significant transformation in the way businesses and society operate, leading to a disruption of traditional approaches in the development and delivery of goods and services both in South Africa and worldwide. The current technological shift, commonly referred to as the Fourth Industrial Revolution (4IR), is leading to a greater dependence of businesses on technical advancements in order to create and enhance valuable products and services. The process of innovation plays a crucial role in driving ongoing progress by using opportunities that enable organisations to gain a competitive advantage and differentiate themselves in the market (Shanmuganathan, 2018). Technological progress serves as a key catalyst for organisational strategic reactions in the context of Digital Transformation (DT), which is vital for maintaining competitiveness and ensuring existence (Kozarkiewicz, 2020).

The implementation of Information Technology (IT) initiatives remains challenging and exhibits a low rate of success (Khoza & Marnewick, 2020). Based on the

findings of the Standish Group's 2015 Chaos study, it is reported that just 29% of projects are deemed effective (Standish Group, 2015). The KPMG study conducted in 2019 provides evidence for the low success rate mentioned, specifically in the context of project management. According to the report, the overall success rate of projects stands at a mere 19% (Wagner, 2019). Furthermore, the aforementioned study conducted by KPMG in 2019 highlights that a significant proportion of participants, specifically 30%, do not employ any specific project management approach. It also suggests that Agile methodology presents a viable substitute for traditional project management methods, which are perceived as less effective in the current rapidly evolving digital landscape (Wagner, 2019).

The success of initiatives can be influenced either directly or indirectly by the level of competence in project management (Tabassi et al., 2016). Insufficient focus on the competencies of project managers across the various stages of project management is a significant contributing factor to project failures (Mansourimoayyed, Colabi, &

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Semiari, 2020). Furthermore, the lack of capable managers and inadequate utilisation of project management techniques are substantial factors that contribute to financial and human resource deficits in national endeavours (Mansourimoayyed et al., 2020). There is a favourable association between project management culture, which comprises project management methodologies, and the achievement of project success (Bezdrob, Brkić, & Gram, 2020). The results of the research indicate that Agile software development initiatives exhibit a 28% higher level of effectiveness compared to typical waterfall software development projects (Khoza & Marnewick, 2020).

The motivation behind this study stems from the recognition that knowledge and competency are not fixed entities, but rather require ongoing enhancement in response to the dynamic and interconnected nature of our fast-evolving environment (Buha, Lečić, & Bjegović, 2022). Digital competences have not been officially integrated into current project management standards. This study posits that South African project managers responsible for executing Digital Transformation projects encounter comparable systematic and expeditious alterations in digital skill prerequisites, akin to those experienced by their counterparts in the global digital landscape. However, the level of preparedness among IT project managers in effectively executing Digital Transformation initiatives, which are designed to improve organisational performance and ultimately contribute to the growth of the South African economy, remains unclear. This is concerning given the persistently high failure rate associated with such projects. The lack of comprehension regarding the present level of preparation underscores a deficiency in understanding within this domain. Hence, it is imperative to analyse the current proficiency landscape of IT project managers in relation to Agile methodologies within the context of the South African setting.

This section provides an overview of the theoretical framework pertaining to the competency of IT project management, the occurrence of IT project failure, and the implementation of Digital Transformation initiatives. Section 2 provides an overview of the study problem and presents the research statement. Subsequently, the subsequent sections, namely sections 3, 4, 5, and 6, encompass the literature reviews. Section 7 of the paper elucidates the research methodology employed to conduct the quantitative study. Section 8 provides an overview of the primary findings of the study in connection with pertinent literature, while Section 9 delves into a comprehensive analysis and interpretation of the study's results. Section 10 encompasses the concluding remarks, an outline of suggested recommendations, and a comprehensive

account of the limitations.

## 2. Research problem and statement

IT projects persistently face challenges resulting in a notably low rate of success. Recent research has revealed a significant correlation between the use of project management techniques and the achievement of project success (Bezdrob et al., 2020). According to Bezdrob et al. (2020), there is a suggested correlation between project management culture and the achievement of project objectives. In contrast Mohale (2018), emphasises the significance of project management expertise as a critical determinant of success. The concern of insufficient project management has been raised by Verner, Sampson, and Cerpa (2008). The impact of project management expertise on project success has been discussed by Mohale (2018). There is a scarcity of empirical research examining the Agile capability of IT project managers in South Africa. The research conducted by Mbelli and Hira (2016) examined the perspectives of South African project managers towards Agile methodologies. Nevertheless, the study conducted by Erasmus, Joseph, and Marnewick (2016) failed to assess the existing level of Agile proficiency among IT project managers in South Africa. Silva and Pejic-Bach (2019) conducted a study to examine the existing assistance and training provided to IT project managers in order to gain a deeper understanding of the elements that contribute to their success. However, the study fails to acknowledge the increasing demand for Agile project managers. Carl Marnewick and Annlizé L Marnewick (2019) assert that Agile methodologies are being employed by project managers in South Africa to effectively manage projects within the context of the Fourth Industrial Revolution (4IR). The achievement of success in Agile methodologies requires the adoption of a distinct leadership approach. The paper does not present any empirical evidence regarding the proficiency of project managers in Agile methodology within the context of South Africa. Agile methodologies are deemed more suitable for adaptable project contexts, such as those commonly encountered by South African companies, due to their predictive nature (Whitney & Daniels, 2013).

According to Wagner (2019), Agile methodology is widely adopted by organisations either as the primary strategy or in conjunction with established methodologies. Despite the mounting empirical evidence about the escalating adoption of Agile methodology in IT projects and its favourable impact on the success of such projects, a dearth of empirical evidence pertaining to the assessment of competency levels among IT project managers in South Africa was discovered. The level of preparedness among

South African IT project managers to execute IT Digital Transformation projects using Agile methodology in the context of the fourth industrial revolution remains largely uncertain. Consequently, this research holds significant relevance and urgency.

## 3. The Difficulty with IT Projects IT Project Failure

The occurrence of IT project failure is a well-established phenomenon. Silvius and Schipper (2018) assert that the prevalence of IT project failure might be attributed to inadequate technology appraisal and suboptimal development approach. Chiyangwa and Mnkandla (2018) assert that the selection of inappropriate techniques in the context of IT development projects can result in the failure of said initiatives. According to Chiyangwa and Mnkandla (2018), there are multiple factors that contribute to the failure of initiatives. Numerous scholarly investigations and experts in the field have provided evidence suggesting that the utilisation of Agile methodologies enhances the likelihood of achieving success in IT projects. Empirical evidence suggests that Agile software initiatives exhibit a 28% higher level of effectiveness compared to traditional waterfall software projects (Khoza & Marnewick, 2020). IT projects have a crucial role in facilitating strategic transformations within firms, including the implementation of Digital Transformation initiatives that are essential in today's rapidly evolving market (do Vale, Nunes, & de Carvalho, 2018). A number of academics have conducted extensive research on the factors contributing to the low success rate of information technology projects. There is a consensus among scholars regarding the different and intricate nature of IT projects in comparison to other types of projects. IT project managers must possess the necessary competencies to effectively navigate the intricate nature of ever-evolving IT projects. The significance of information technology necessitates a thorough examination of literature pertaining to the difficulty of IT projects.

### IT Project Complexity

Information technology (IT) efforts exhibit characteristics of unpredictability, riskiness, and complexity (Lei et al., 2022). The factors encompassed in this category consist of technical unpredictability, distinctiveness, interdependency, uniqueness, strategic purpose, and the complexity of corporate operations (Wu, Eom, & Song, 2019). In addition to their inherent complexity, IT efforts need to be executed within an environment characterised by unpredictability (Anantatmula, 2010). The management and execution of projects are influenced by the complexity of IT projects (Morcov, Pintelon, & Kusters, 2020). The advent of the Fourth Industrial Revolution (4IR) has led

to a notable rise in technical intricacy. Consequently, this heightened complexity has resulted in increased uncertainty regarding project outcomes. As a result, the field of IT project management has undergone significant evolution in order to effectively address these challenges (Camci & Kotnour, 2019).

### Level of Complexity

In a study conducted by Zaman (2021), a notable correlation was discovered between the level of complexity in IT projects and their success rates while employing the Agile methodology. The assertion is supported by Zaman's (2021) research, which demonstrates that the implementation of Agile methodologies facilitates users in managing the intricacies associated with IT projects through the process of breaking down tasks into smaller, more manageable components. The intricate nature of IT projects necessitates that IT project managers possess a wide range of skills and competencies. In the research of Morcov et al. (2020) as well as Wu et al. (2019), it is argued that sophisticated information technology (IT) efforts require specialised knowledge and skills that differ from traditional approaches. This section will examine the existing literature pertaining to the competence of IT project management. The Dimensions of Competency refer to the various aspects or components that contribute to an individual's proficiency or capability in a particular area.

### IT Project Management Competency

Competency is "an individual's fundamental trait that is directly connected to effective performance in a job or situation" (Ribeiro, Amaral, & Barros, 2021). Competency can be defined as a comprehensive amalgamation of interconnected abilities, knowledge, tools, and procedures (Joseph & Marnewick, 2018). The utilisation of Agile approaches is becoming necessary for significant strategic IT undertakings. According to Ribeiro et al. (2021), project managers are required to possess novel behavioural, contextual, and technical proficiencies in response to the Fourth Industrial Revolution (4IR). Gaining a comprehensive understanding of the ways in which IT project management facilitates the process of digitalization is of utmost importance. Insufficient project management procedures and managers lacking proper training contribute to substantial financial and human resource deficits (Mansourimoayyed et al., 2020). It is necessary for project managers who possess the necessary qualifications to effectively oversee projects with the aim of achieving organisational objectives and maintaining a competitive edge. Based on Mansourimoayyed et al. (2020), it is imperative for a manager to acquire expertise in their respective domain. In order to be effective, IT project

managers must acquire a range of abilities (Silva & Pejic-Bach, 2019). The requisite skills for IT project managers exhibit variability. Lundqvist (2018) provides definitions for the key elements of technical expertise, planning proficiency, strategic orientation, and stakeholder-centric approach. In his work, Vazirani (2010) differentiates between emotional, cognitive, and relational management skills. There is a consensus among scholars that the IT project manager assumes the role of the primary catalyst for the project's progress (Gruden & Stare, 2018). The skill set of an IT project manager include both hard and soft talents. These hard and soft skills are utilised in a complementary manner. The existing body of scholarly work fails to adequately address the matter of insufficient female representation, which stands at a mere 40%, within the information and communication technology (ICT) sector. This discrepancy has been well-documented in a comprehensive report titled "Women in Tech in South Africa" published by PwC in 2018 (PWC, 2018). Based on the findings of the study, enhancing the involvement of women in the field of Information and Communication Technology (ICT) has the potential to enhance collective intelligence and team performance.

#### **Hard Skills and Soft skills of an IT Project Manager**

According to Anantamula (2010), project managers are supposed to perform the functions of planning, organising, and controlling as outlined in management theory. According to Ribeiro et al. (2021), IT project managers are responsible for managing several aspects such as funds, time, risk, scope, and procurement. The skills in question have been identified as project management skills, as stated by Silva de Araújo and Pedron (2015). IT project managers are required to perform tasks beyond their fundamental responsibilities (Wu et al., 2019). According to Wu et al. (2019), possessing abilities in evaluation, guidance, and interpersonal activities, including dispute resolution, is essential for project managers. Project managers are required to possess leadership qualities, the ability to motivate others, and effective coordination skills (Luțaș et al., 2020). The significance of an IT project manager's personality and behavioural competencies is underscored by de Araújo and Pedron (2015). Lundqvist (2018) asserts that effective communication and strong leadership abilities are crucial in the realm of project management. The significance of leadership behavioural competency has been overlooked in prior research (Alvarenga et al., 2018). The proficiency in both technical and interpersonal competencies of an IT project manager plays a crucial role in shaping the execution and outcome of digital initiatives. In a diverse array of situations and activities (Ribeiro et al., 2021) *During this 4IR, IT project*

*managers' performance must therefore be reviewed.*

#### **The Relationship Between IT Project Manager competency and Digital Transformation projects. Digital Transformation (DT)**

The Fourth Industrial Revolution (4IR) refers to a paradigm shift that is enabled by digital technologies (Speringer & Schnelzer, 2019). Digital Transformation refers to the process of converting tangible products and services into their digital counterparts (Kokolek, Jakovic, & Curlin, 2019). The phenomenon of globalisation and the dynamic nature of business settings necessitate organisations to adapt and engage in innovative practises (Chauke, 2020). The Fourth Industrial Revolution (4IR) pertains to the process through which technological advancements bring about significant transformations in various facets of society and industry (Philbeck & Davis, 2018). The process of Digital Transformation played a crucial role in the disruption of industries during the Fourth Industrial Revolution (4IR). According to Tommasi (2018), projects serve as the fundamental basis for all advancements. As firms undergo Digital Transformation, they adopt new technologies through the utilisation of Agile methodologies, which serve as the foundation of the Fourth Industrial Revolution (Annize L Marnewick & Carl Marnewick, 2019). As stated by Cohen (1995), when projects increase in significance, it becomes imperative for project managers to enhance their individual and collective skills. The subsequent section delves into the correlation between Agile methodologies and the execution of Digital Transformation initiatives.

#### **Agile Methodology Competence and Digital Transformation Delivery**

According to Kose (2021), strategic Digital Transformation projects are placing more emphasis on the significance of adaptive approaches and Agile practices. In the words of Jackson (2019), there is consensus among prior scholars about the inclusion of specific digital skills in the development of competencies. Following the findings of Fachrunnisa et al. (2020), it can be inferred that the implementation of Agile leadership inside organisations has the potential to enhance their Digital Transformation efforts. Kunaka (2019) asserts that organisational leaders, particularly those spearheading initiatives related to Digital Transformation, are required to possess the agility and capacity to adapt promptly. According to Kunaka's (2019) survey, participants hold the belief that the utilisation of Agile practices is necessary for IT projects within the organisational context. In order to attain digital leadership, companies must develop novel skills and capabilities (Abedin, N.B.). According to a study conducted by Nadeem et al. (2018), it was found that... In order to

adequately equip Digital Transformation leaders for the establishment of a Digital economy, it can be argued that the development of innovative approaches is necessary to formulate new competency models that effectively incorporate Agile methodology (Smirnova, Zaychenko, & Bagaeva, 2019) *a huge amount of work has appeared in the literature [3-12] ...1. Emotional intelligence. 2. Systematic, flexible thinking ...[10] Schwaferts, D., & Baldi, S. (2018).*

#### **Adaption of IT Project Manager competency to Digital Transformation Projects**

IT project management involves the utilisation of specialised knowledge and competencies by professionals in order to optimise the likelihood of achieving success in a project. The growing prevalence of IT Digital Transformation initiatives necessitates the possession of IT Project Management capabilities and proficiencies in order to effectively adjust (Rush & Connolly, 2020). According to Nkgoeng's (2016) research, the selection of project managers should be based on their skill set. The phenomenon of globalisation necessitates the establishment of novel educational benchmarks (Softysik et al., 2020). The utilisation of digital technologies has a profound impact on the requisite competencies for the successful execution of projects. In order to enhance IT project management skills and competences, it is imperative that they align with the pace of technological advancements in the field, specifically with regards to Digital Transformation (DT). Silvius and Schipper (2018) argue that there is a need to adapt project management practises, methodologies, and theories in order to align with the evolving characteristics of projects. As stated by Softysik et al. (2020), education plays a crucial role in enabling the mitigation of risks in IT projects. According to the aforementioned study, Agile methodologies facilitate organisational agility and adaptability within a dynamic and fiercely competitive business landscape. However, the current analysis does not acknowledge or quantify the significance of implementing Agile methodology by IT project managers in the context of Digital Transformation (DT) projects as a critical competence in the Fourth Industrial Revolution (4IR). The subsequent section critically examines the perspectives of many authors regarding the comparison between Agile methodologies and traditional approaches. This study also investigates the rationale for the necessity for IT project managers to possess proficiency in Agile methodologies.

#### **The Case for Agile Methodologies in IT Project Manager Competence**

##### **Agile Methodologies vs Waterfall Methodologies**

In the field of IT project management, there are two distinct techniques: the old plan-driven or waterfall methodologies, and the more recent Agile or adaptive methodologies (Thesing, Feldmann, & Burchardt, 2021). In order to expedite the process of corporate Digital Transformation, many Agile techniques, including Scrum, Extreme Programming, and Kanban, have been identified as the recommended methodology (Annize L Marnewick & Carl Marnewick, 2019). According to Silvius and Schipper (2018), Agile methodology is considered more suitable for Design Thinking (DT) projects compared to other approaches due to its higher level of adaptability. The statement is substantiated by the research conducted by Meenakshi, Singh, and Agrawal (2020). In the work of Meenakshi et al. (2020), it is argued that plan-driven methodologies are not consistent with the evolving needs of clients and end-users. The failure rate of IT projects has increased due to the incongruity between plan-driven methodologies and emerging digitalization trends, as well as the dynamic nature of evolving expectations (Philbeck & Davis, 2018). Considering the findings of Philbeck and Davis (2018), it can be inferred that the implementation of Agile Project Management practises is associated with a decrease in project failure rates. In line with the findings of Meenakshi et al. (2020), Agile processes provide superior performance compared to traditional development methods (Philbeck & Davis, 2018), it is contended that plan-driven methodologies can remain applicable in the context of significant IT projects, provided that a comprehensive understanding of the end user's complete requirements is achieved.

##### **Agile vs waterfall success rate**

Agile methodologies are extensively employed in various industries, with a success rate of 77% (Rush & Connolly, 2020), which contrasts with the 54% success rate observed in plan-driven initiatives (Carl Marnewick & Annize L Marnewick, 2019). Based on the findings of Khoza and Marnewick (2020), it has been shown that Agile projects exhibit a success rate of 88.2%, which is much higher compared to the success rate of 47% observed in waterfall initiatives. In contrast, according to Woźniak (2021), the author asserts that despite the advent of novel methodologies like Agile, the rates of success for IT projects have exhibited a lack of progress. Woźniak (2021) recognises the increasing significance of Agile in the delivery of IT projects and asserts that the chosen methodology

plays a crucial role in shaping the course of an IT project. In the research conducted by Dhir, Kumar, and Singh (2019), it was found that the scrum methodology exhibited superior performance when compared to the conventional waterfall and spiral techniques. Based on a study conducted by Ambysoft in 2018, it was found that 55% of the participants perceived Agile initiatives to be effective, whereas just 29% believed the same for traditional projects (Ambysoft, 2018). The existing body of literature demonstrates that Agile IT initiatives have a higher rate of success. The assertions made by the writers of these publications do not purport that Agile is supplanting waterfall methodology; rather, they posit that Agile is assuming greater significance in the realm of IT projects.

**IT Project Manager Competency Standards and Frameworks**

This section provides an overview of the prevailing Project Management certifications that are widely acknowledged. Professional certifications for project managers serve as a means to showcase the proficiency of project managers in various project management methodologies (Lundqvist, 2018). Luṭaş et al. (2020) make a substantial contribution to the domain of project management. According to Stainier and De Jaegere (2020), Project Managers receive certification from many professional organisations on a global scale. The initial standard refers to a manual on project implementation techniques and the proficiencies of project managers, as presented by the Project Management Institute (PMI) (Project Management Institute, 2017). The Project Management Body of Knowledge (PMBOK®) recently published a companion book titled “The Agile Practise Guide,” which serves as a testament to the growing emphasis on Agile methodologies (Ribeiro et al., 2021). The IMPA Competency Baseline (ICB4) is a European standard that has been developed and is provided by the Internal Project Management Association (IPMA) (IPMA, 2015). P2M (Japan, 2016) has also developed a competency model specifically tailored for project managers. Currently, there is a lack of established standards or norms pertaining to large-scale and disruptive IT Digital Transformation initiatives. Joseph and Marnewick (2018) argue that there is a need for the redesign of credentials in order to ensure the continued professionalisation of project management.

The next section outlines the research approach adopted for this study to answer the research questions and ultimately reach the aim of the study.

**4. Method**

A study was done employing a simple random sample technique on a population of IT professionals who reported their geographical location as South Africa. The study focused on participants' self-reported level of engagement in overseeing IT projects, rather than their job title as “IT project manager” or “project manager,” which was not taken into account.

Correlation analysis and descriptive statistics were employed in the study to address the research inquiries. i) What is the present degree of competence exhibited by IT project managers in South Africa in relation to Agile methodologies? ii) To what extent are IT project managers adequately equipped to carry out Digital Transformation initiatives? iii) This inquiry seeks to explore the correlation between the proficiency levels of IT project managers in Agile methodology and their impact on the successful execution of Digital Transformation projects. The aforementioned methodology was considered satisfactory in order to provide an unbiased assessment of the present proficiency levels in Agile methodologies among IT project managers and experts in South Africa. The research was carried out in the form of a cross-sectional study, with an electronic survey as the primary method for data collection. The utilisation of the survey method proved to be an effective approach for gathering data from a diverse group of IT experts and IT project managers located throughout South Africa. The study encompassed individuals of all genders, with diverse levels of expertise and educational backgrounds in the field of information technology. Subsequently, the data underwent data analysis procedures to facilitate the examination and presentation of the data, employing Excel and SPSS version 27.

The following section outlines the findings of the study.

**5. Data analysis**

This section provides an analysis and synthesis of the study's key findings. A total of 73 replies were collected. However, a total of 61 responses, accounting for 83.5% of the sample, were fully completed. Conversely, the remaining 12 responses, representing 16.5% of the sample, were only partially completed. As a result, these incomplete responses were excluded from the data analysis to maintain the validity and reliability of the results. Consequently, solely responses that have been totally completed, amounting to 83.5%, are utilised in the data analysis conducted for this particular chapter and the overall research study. Upon collating the comprehensive

responses, they were arranged in a Microsoft Excel spreadsheet to facilitate the development of graphs. Additionally, SPSS version 27 was utilised for the purpose of statistical manipulation.

**Internal consistency**

Table 7.1 displays the outcomes of the internal consistency test conducted on the data collection instrument. The reliability of the instrument was assessed using Cronbach's alpha coefficient. A dependability coefficient of 0.70 or above is generally regarded as acceptable (Author, Year). Table 7.1 provides a summary of the dependability of each scale with respect to the components of the questionnaire.

Table 7.1: Reliability analysis

Main Theoretical Variables	Valid N	Items Used	Cronbach's α
Whole Instrument	58	43	0.968**
1. IT Project Manager Competencies	61	15	0.941**
2. Expected Competencies	61	5	0.877**
3. IT Project Manager Key Attributes	61	4	0.745**
4. Competency and Digital Transformation Projects	60	10	0.903**
5. Competency and Agile Methodologies	58	9	0.921**

\*\*Significantly acceptable reliability

**Biographical data of respondents**

Prior to doing an in-depth examination of the data, preliminary distributions were generated using the biographical profiles of the study participants. The descriptive technique was employed to characterise the biographical variables in the study.

**Percentage distribution by gender**

The demographic composition of the participants indicates that 62.3% of the respondents are male, while 37.7% are female, as depicted in Figure 7.3. The findings align with 2018 research by PwC that presents the gender distribution in the ICT sector in South Africa at a ratio of 2:3 or 40% to 60% (Wagner, 2019). The results indicate a lack of significant progress in addressing the involvement of women in the information and communication technology (ICT) industry in South Africa from 2018 until the present day.

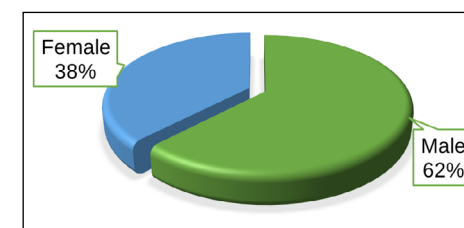


Figure 7.3: Distribution of respondents by gender

The reliability coefficients for the research instruments, namely IT Project Manager Competencies (Alpha=0.941), expected competencies (Alpha=0.877), IT project manager key attributes (Alpha=0.745), competency and Digital Transformation Projects (Alpha=0.903), and competency and Agile Methodologies (Alpha=0.921), demonstrate acceptable levels of reliability according to Cronbach's alpha. The research instrument exhibited a high level of reliability, with a coefficient of 0.968. The Cronbach's alpha analysis suggests that the study instrument employed for data collecting exhibits a high level of reliability, so implying that the obtained results can be considered reliable as well.

**Percentage distribution by role**

The responsibilities of the responders are depicted in Figure 7.4. Based on the graph, a majority of the respondents (49.18%; n=30) are individuals employed in the field of information technology. Among the 61 participants, it was found that 13 individuals (21.31%) held the position of IT manager, whereas 6 individuals (9.84%) were identified as project managers. Out of the total number of respondents, a small proportion of three individuals (equivalent to 4.92%) were identified as project leads. Additionally, seven respondents (4.8%) indicated that they held responsibilities other than project leads. Notably, only one respondent (1.64%) self-identified as an IT project manager. In the findings of Cabot and Gagnon (2021), the data suggests that a significant proportion of the participants in the study are professionals in the field of information technology. These individuals are experiencing job growth and are more engaged in efforts related to Digital Transformation. The engagement of the respondents in the field of information technology suggests that the responses can be deemed reliable.

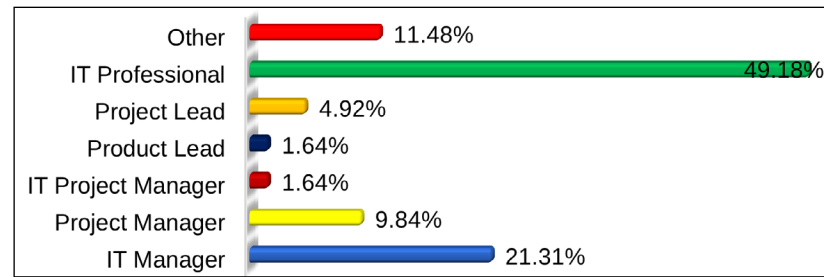


Figure 7.4: Distribution of respondents by role of participants

**Percentage distribution by educational qualifications**

Based on the data presented in Figure 7.5, a majority of the participants (40.98%, n=25) possessed an undergraduate degree. In contrast, a total of 19 respondents, constituting 31.15% of the sample, possessed a diploma. Additionally, 6 respondents, accounting for 9.84% of the sample, held either a grade 12 certificate or an honours degree. A mere

4.82% (n=3) of the participants have a master's degree. Approximately 55.74% of the participants possessed university degrees. The findings of this study support the claims made by Cabot and Gagnon (2021) regarding the growing appeal of digital occupations that necessitate self-directed learning and specialised expertise among IT professionals, including individuals who do not possess a college education.

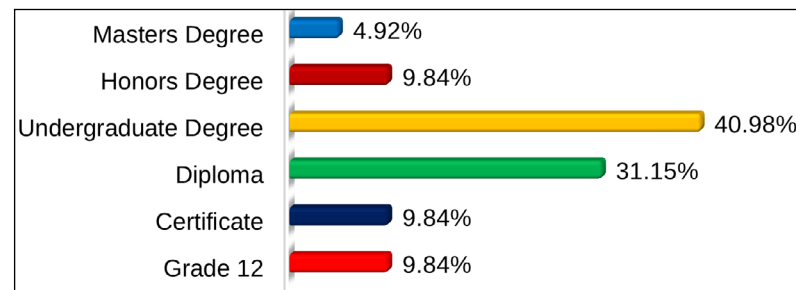


Figure 7.5: Percentage distribution by educational qualifications

**Percentage distribution by years of experience**

Figure 7.6 illustrates the distribution of responders based on their years of experience. The majority of participants (27.87%) possessed a professional background spanning from 4 to 7 years, whereas 26.23% reported having 8 to 11 years of experience. Out of the total sample size, ten participants (16.39%) reported having 0 to 3 years of professional experience,

whereas just two individuals (3.28%) indicated having 20 years or more of work experience. The findings indicate that a significant majority of the participants, specifically 83.61%, possess a professional background in the field of information technology (IT) for a duration exceeding three years. The trustworthiness of the respondents' responses can be inferred based on the participants' IT experience.

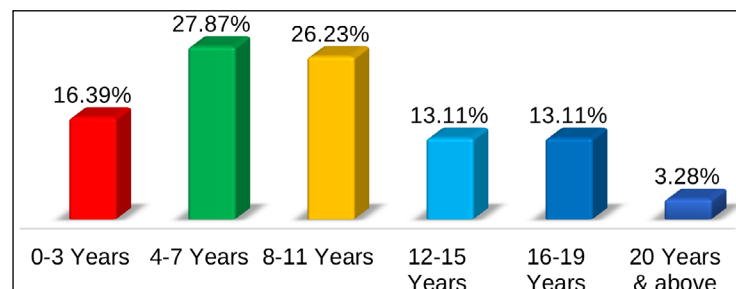


Figure 7.6: Distribution of respondents by years of experience

**Inferential analysis on perceptions of respondents on the objectives of the research instrument.**

The primary aim of this part is to elucidate the principal aims of the investigation. The objective of this study is to assess the level of readiness among IT project managers in South Africa to effectively carry out Digital Transformation projects. This will be achieved by evaluating their proficiency in Agile techniques. To effectively address the research aim, this section will analyse the subsequent research objectives: i) In order to gain insight into the present proficiency levels of IT project managers in South Africa regarding Agile methodology ii) To assess the level of readiness among IT project managers in effectively implementing Digital Transformation initiatives. iii) The objective of this study is to examine the correlation between the proficiency levels of IT project managers in Agile methodology and their ability to successfully execute Digital Transformation projects.

refers to a person or entity that is not specified in Narciso The term "Cerpa" refers to a specific concept or entity, but further information In their study titled "The Significance of Agile Skills in Facilitating Digital Transformation," Eng Chew Nadeem et al. (2018), shed light on the crucial role played by Agile skills in the process of Digital Transformation. A total of 14.75% of the participants in the study had experienced scrum training, while the remainder of the participants had taken different trainings related to Agile methodology, as illustrated in Figure 7.7. Based on the data, it can be inferred that a significant proportion of IT project managers and IT workers in South Africa lack formal training in Agile methodologies. However, it is significant that 70% of the participants stated that they hold the responsibility of spearheading digital initiatives, while 76.7% claimed responsibility for executing specific components of such projects. Based on a study conducted by Khoza and Marnewick (2020), it was shown that software projects utilising Agile methodologies exhibit a 28% higher rate of success compared to initiatives employing traditional approaches. Hence, it may be inferred that the absence of formal Agile training among IT professionals responsible for overseeing the implementation of digital projects, either partially or entirely, maybe a contributing factor to the occurrence of IT project failures in South Africa.

**The current competency level of IT project managers in South Africa in Agile methodologies**

The distribution of responders with respect to formal training in Agile is depicted in Figure 7.7. The findings indicate that a significant proportion of the participants (63.93%) lacked formal education or training in Agile methodology, which contradicts the claims made by Kose (2021), Fachrunnisa et al. (2020), Kunaka (2019), and Nadeem Babak. The term "Abedin"

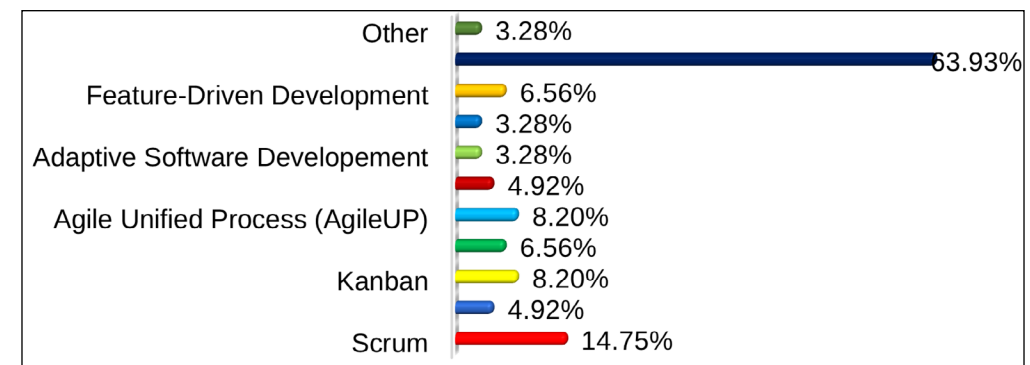


Figure 7.7: Percentage distribution by formal training

**The preparedness of IT project managers in executing Digital Transformation projects.**

The researchers employed a non-parametric Chi-square test and a one-sample Wilcoxon signed-rank test to assess the overall preparedness of the participants in identifying IT project management competency and executing Digital Transformation projects. This part was dedicated to meeting the

stated objective by providing a response to the research question posed. What is the prevailing attitude among participants regarding the assessment of competency in IT project managers and the implementation of Digital Transformation projects?

Initially, a comprehensive descriptive analysis was

performed, encompassing the computation of participants' perspectives on certain matters and the determination of their general perception regarding the proficiency of IT project management and Digital Transformation endeavours (see to Table 7.8). The items were assessed using a Likert scale ranging from 1 to 5. A non-parametric Chi-square test was conducted to assess the statistical significance of the participants' overall perspective. In order to achieve this objective, the Likert scale was reduced from a range of 5 to a range of 3. The chi-square test was conducted in order to compare proportions. The results of the Chi-square test are presented in Table 7.8. The sample size (N) was 42, with a percentage of 70.0%. The chi-square value was calculated to be 37.200, and the p-value was determined to be 0.0001. The p-value was employed in order to provide statistical assurance on the degree of statistical significance observed in the results of this study. A P-value of 0.05 or lower implies statistical significance, while a P-value beyond 0.05 provides substantial support for the null hypothesis (Mcleod, 2023). All of the P-values observed in the study are below the threshold of 0.05, so suggesting that the results possess statistical significance.

A significant majority of participants (n=46; 76.7%; chi-square=50.700; p=0.0001) bear responsibility for various areas of their organization's Digital Transformation endeavours. Given the respondent's active involvement in the implementation of Digital Transformation projects, their responses can be

considered reliable in drawing conclusions regarding such projects. The statistical significance of these findings is evident when comparing them to the percentage of persons, specifically 63.93%, who reported having no formal training in Agile methodologies. Hence, it can be inferred from the results that a significant proportion of IT project managers (63.93%) in South Africa, who are involved in leading or delivering Digital Transformation projects (70% and 76.7% respectively), may lack the necessary readiness to effectively implement Agile methodologies in such projects. The data presented in the study provides substantial evidence to support the conclusion that Digital Transformation projects constitute the majority of IT projects within the organisation (n=45; 75.0%; Chi-square=46.900; p<0.0001), hence corroborating the claim that Digital Transformation projects are seeing significant growth (Rush & Connolly, 2020). A substantial subset of participants (n=36; 59.0%) expressed the belief that their Agile training has equipped them with the requisite skills to successfully execute Digital Transformation initiatives. The aforementioned moderate viewpoint is indicative of the participants' little exposure to formal training in Agile methodologies. Nevertheless, it provides support for the assertion that Agile methodologies assist IT project managers in effectively managing evolving requirements and complicated situations (Khoza & Marnewick, 2020; Morcov et al., 2020; Zaman, 2021).

Table 7.8: Non-parametric Chi-square results on the general perception of participants regarding the identification of IT project manager competency and Digital Transformation projects.

Item	Do you agree with the following statements?	Disagree	Neutral	Agree	Chi-Square
1	I am responsible for leading Digital Transformation projects in my organisation.	N=6 (10.0%)	n=12 (20.0%)	n=42 (70.0%)	37.200
2	I am responsible for the delivery of parts of Digital Transformation projects in my organisation.	N=7 (11.7%)	n=7 (11.7%)	n=46 (76.7%)	50.700
3	Digital Transformation is part of my organisation's business strategy.	N=2 (3.3%)	n=6 (9.8%)	n=53 (86.9%)	79.115
4	Digital Transformation projects make up most of the IT projects in my organisation.	N=7 (11.7%)	n=8 (13.3%)	n=45 (75.0%)	46.900
5	Agile is used to deliver Digital Transformation projects in my organisation.	N=4 (6.6%)	n=21 (34.4%)	n=36 (59.0%)	25.213
6	My training in Agile gives me the competencies I require to deliver Digital Transformation projects.	N=4 (6.6%)	n=21 (34.4%)	n=36 (59.0%)	25.213
7	It is highly likely that the number of Digital Transformation projects in my organisation will increase in future.	N=3 (5.0%)	n=7 (11.7%)	n=50 (83.3%)	67.900
8	Competency in Agile plays an important role for the successful delivery of Digital Transformation projects.	N=1 (1.6%)	n=16 (26.2%)	n=44 (72.1%)	46.852
9	My organisation understands the importance of Agile for the delivery of Digital Transformation projects.	N=4 (6.6%)	n=17 (27.9%)	n=40 (65.6%)	32.689
10	The overall competency of IT project managers in hard and soft skills has a substantial influence on the way Digital projects are executed and the chances of success.	N=4 (6.6%)	n=7 (11.5%)	n=50 (82.0%)	65.148

N=61, Statistically significant differences (\* p<.05). Statements were rated on a 3-point scale from 1 (disagree) to 3 (agree).

**The relationship between the competency levels of IT project managers with Agile methodologies and the delivery of Digital Transformation projects.**

A statistical analysis was performed using a non-parametric Chi-square test and a one-sample t-test to determine the overall perception of IT project managers with Agile competencies and their effectiveness in executing Digital Transformation projects. This section was dedicated to addressing the research question: "What is the overall perception of participants regarding IT project managers with Agile competencies and their performance in executing Digital Transformation projects?"

The study examined the overall perspectives of participants about the competence of project managers, the use of Agile approaches, and the implementation of Digital Transformation projects. This was accomplished by analysing frequencies and percentages. Table 7.10 presents the overall perceptions of participants about the skill of IT project managers and the benefits of Agile methodology. The response option of "strongly disagree" was situated at the lower extremity of the rating scale, then succeeded by the option of "strongly agree." In general, the participants reached a consensus regarding the assessment of participant proficiency and the use of Agile approaches. The study employed a non-parametric Chi-square test to evaluate the presence of statistically significant evidence in favour of the stated hypothesis. In order to provide assistance, the 5-point Likert scale was modified to a 3-point Likert scale. The responses categorised as "strongly disagree" (SD) and "strongly agree" (A) were consolidated into a single category

labelled as "strongly agree" (SA), resulting in a total of three responses in the "strongly agree" category. The state of neutrality persisted. The state of neutrality remained unaltered. No statistically significant differences were seen in the proportions among the specified groups, therefore rendering the use of a Chi-square test unnecessary.

According to the data presented in Table 7.10, a majority of the participants expressed agreement with the notion that the utilisation of Agile methodology facilitates the ability of IT projects to effectively respond and adapt to evolving needs. The chi-square value was found to be 74.983, with a p-value of 0.0001. The utilisation of Agile methodology has the potential to assist project managers in effectively managing the intricacies associated with IT projects (n=51; 86.4%; chi-square=75.288; p < 0.0001). The aforementioned studies conducted by Zaman (2021), Khoza and Marnewick (2020), Kunaka (2019), provide additional evidence that reinforces prior research on the efficacy of Agile methodologies in managing IT projects characterised by dynamism and complexity. Based on the findings from a significant majority of participants (n=48; 78.7%; Chi-square=57.672; p < 0.0001), it can be concluded that possessing Agile project management abilities is of utmost importance in ensuring the success of Digital Transformation initiatives. The findings indicate that, based on the responses of 32 participants, approximately 52.5% of them agreed that their respective organisations possess IT executives who demonstrate competence in Agile approaches. This result was statistically significant, as evidenced by a chi-square value of 17.148 and a p-value of 0.0001.

Table 7.10: Non-parametric Chi-square results on the general perception of participants regarding IT project manager's competency and Agile methodologies.

Item	Do you agree with the following statements?	Disagree	Neutral	Agree	Chi-Square
1	The use of Agile methodology enables IT projects to adapt to the changing requirements.	N=3 (5.1%)	n=5 (8.5%)	n=51 (86.4%)	74.983
2	The use of Agile methodology enables project managers to deal with the complexity of IT projects.	N=2 (3.4%)	n=6 (10.2%)	n=51 (86.4%)	75.288
3	The IT project manager's competency in Agile is important for the successful delivery of a Digital Transformation projects.	N=3 (4.9%)	n=10 (16.4%)	n=48 (78.7%)	57.672
4	IT leaders with Agile training are better equipped to execute Digital Transformation projects than those who do not have Agile training.	N=2 (3.3%)	n=14 (23.0%)	n=45 (73.8%)	48.426
5	My organisation has IT leaders who are sufficiently competent in Agile methodologies.	N=6 (9.8%)	n=23 (37.7%)	n=32 (52.5%)	17.148
6	In general, more training is required for IT leaders in Agile in my organisation.	N=1 (1.6%)	n=14 (23.0%)	n=46 (75.4%)	52.754
7	More training is required in Agile methodologies to meet the demands of the Digital Transformation projects in my organisation.	N=1 (1.6%)	n=12 (19.7%)	n=48 (78.7%)	59.443
8	My organisation recognizes the need for Agile training to enable Digital Transformation of the organisation.	N=1 (1.6%)	n=14 (23.0%)	n=46 (75.4%)	52.754
9	Agile is currently being used for the delivery of Digital Transformation projects in my organisation.	N=6 (9.8%)	n=20 (32.8%)	n=35 (57.4%)	20.689

N=61, Statistically significant differences (\* p<.05). Statements were rated on a 3-point scale from 1 (disagree) to 3 (agree).

The findings indicate that the participants hold a distinct favourable impression of the correlation between IT project managers possessing Agile competencies and the successful implementation of Digital Transformation initiatives. The findings additionally demonstrate that slightly more than half of the organisations surveyed (57.4%) are presently utilising Agile methodologies for executing Digital Transformation initiatives. Moreover, a significant majority of respondents (78.7%) express the belief that additional training in Agile practises is necessary to effectively address the requirements of Digital Transformation projects within their respective organisations.

## 6. Discussion

The findings of the study indicate that the level of female participation in the field of information technology has exhibited stability over the period spanning from 2018 to 2021, as evidenced by the fact that only 37.7% of the survey respondents identified as women. The findings align with a survey conducted by PwC in 2018, which indicated that the male population in the field of Information and Communication Technology (ICT) in South Africa surpasses that of females by a ratio ranging from two to three (PWC, 2018). The results indicate that minimal or negligible advancements have been made in the realm of female representation within the information and communication technology (ICT) sector in South Africa, with no significant development observed since 2018.

The data reveals that a significant proportion of respondents (75%) reported that Digital Transformation projects constitute the majority of IT projects within their respective organisations. Furthermore, a substantial majority (86.9%) indicated that these projects are incorporated into their organisations' strategic plans. However, it is significant that the prevalence of formal Agile training among IT project managers and professionals in South Africa is relatively low, standing at 37.07%. Moreover, a sufficient body of data exists to raise scepticism regarding the preparedness of South African IT project managers and professionals in undertaking Digital Transformation initiatives, mostly attributed to their relatively limited exposure to Agile training. The aforementioned conclusion is derived from statistical data, which indicates a disparity between the respondents' perception (78.7%) of the indispensability of Agile skills for the successful implementation of Digital Transformation projects and the comparatively lower levels of Agile training seen. Consequently, the researcher's analysis leads to the

conclusion that a significant proportion of IT project managers and professionals in South Africa hold the belief that the implementation of Agile methodologies in Digital Transformation initiatives enhances the likelihood of achieving favourable outcomes. However, it is noteworthy that the existing provision of formal training aimed at equipping these individuals with the necessary skills to effectively execute Digital Transformation initiatives is inadequate. This research contributes to the existing body of literature aimed at comprehending the array of abilities necessary for the contemporary day. The study conducted by Annize L Marnewick and Carl Marnewick (2019) presents evidence that supports the assertion of the continued necessity to enhance project management skills in South Africa throughout the Fourth Industrial Revolution (4IR). There is an ongoing beneficial relationship between Agile approaches and the success of projects (Radhakrishnan et al., 2022). Nevertheless, it is important to note that this study does not propose the abandonment of traditional project management competencies. It was observed that certain traditional project management activities were still being performed when implementing Agile approaches in project execution (Shastri, Hoda, & Amor, 2021). This highlights the necessity of integrating Agile approaches with conventional ones, rather than project managers solely opting for one methodology over the other.

In order to enhance the efficacy of IT projects and Digital Transformation initiatives in South African enterprises, it is imperative that equal emphasis be placed on training IT professionals and project managers in Agile methodologies alongside traditional approaches.

## 7. Conclusion, Limitations, and Recommendations

The present study attempted to evaluate the existing levels of competence among IT project managers and professionals in South Africa with regard to Agile methodologies. The existing levels of competence among IT project managers and experts in South Africa in the context of Agile methodologies are currently deficient. In the current era, South African firms rely on skilled IT professionals to gain a competitive advantage by implementing strategic Digital Transformation initiatives. This comprehension offers helpful perspectives on the key areas of focus for enhancing organisational competency among individuals responsible for implementing Digital Transformation efforts.

Hence, the limited prevalence of formal Agile training among IT professionals responsible for overseeing digital initiatives in South Africa potentially plays a role in the occurrence of IT project failures. Consequently, it is imperative that all stakeholders adopt prompt remedial measures.

## 8. Recommendations

This study has provided a valuable contribution to the ongoing discourse surrounding the necessary skills and abilities related to the Fourth Industrial Revolution (4IR) within the field of project management. The demand for IT project managers to effectively execute Fourth Industrial Revolution (4IR) initiatives is growing, as these projects are frequently intricate and subject to fast evolving requirements. It is advisable for South African enterprises to utilise the outcomes of this study in order to establish a strategic plan for the training and development of IT project managers and IT professionals within their respective organisations. This will enable them to effectively prepare for the implementation of their Digital Transformation initiatives. There is a suggestion to expand the existing competency criteria of traditional project management institutions in order to include Agile as an integral component of their fundamental techniques. The third recommendation entails the promotion and encouragement by IT professional groups for its members to enhance their skill set through the acquisition of Agile competence training and certification. In order to enhance the capabilities and readiness of IT project managers and professionals in South Africa, it is imperative for project management institutions, organisations, and enterprises to collaborate and foster the development of Agile proficiency within this cohort.

## 9. Limitations and Future Research

The research conducted in this study is subject to some constraints due to its specific focus on South Africa. As a result, the generalizability of its findings to a wider audience may be limited. The study did not examine the application of Agile methodology across various sectors of the South African economy due to time constraints. Furthermore, the study failed to consider additional competencies essential for IT project managers in the context of the Fourth Industrial Revolution (4IR) that go beyond the conventional skill set, including digital competencies. Further investigation is warranted to assess the extent of Agile proficiency among IT project managers in various sectors and regions within South Africa. The horizontal measurement can also

serve as a means to monitor the advancement of Agile competency training, enabling the assessment of the pace of Agile adoption. In addition to Agile, many studies have identified additional competencies, including digital intelligence. Further investigation is necessary to explore the cumulative impact of these competencies on the overall competency of IT project managers. Further investigation is necessary to analyse the persistent underrepresentation of women in the information and communication technology (ICT) industry in South Africa

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