

## **Exploring the Correlation between Project Management Skills and Entrepreneurial Skills in South African Civil Engineering**

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*This study investigates the correlation between project management competencies and entrepreneurial skills by reviewing existing scholarly literature. The central objective is to analyse the extent to which project management competencies such as planning, coordination, and execution—enhance the success of entrepreneurial ventures. Furthermore, the research examines the role of entrepreneurial skills, including innovation, risk-taking, and opportunity recognition, in facilitating effective project management outcomes. By integrating contemporary research findings regarding these two skill sets, this study aspires to offer valuable insights into how individuals can effectively harness both project management and entrepreneurial competencies to achieve their goals within the contemporary and dynamic business landscape. The study reveals a notable association between entrepreneurial skills and project management capabilities within universities, particularly in technology, engineering, and environmental disciplines. The findings suggest that modern project managers should prioritise the development of their entrepreneurial skills in conjunction with their project management skills, treating their projects as if they are their enterprises. This research delivers significant insights for practitioners, educators, and policymakers, thereby contributing to the enhancement of a robust and entrepreneurial civil engineering sector in South Africa.*

**Keywords:** *project management skills, entrepreneurial skills, entrepreneurial success, leadership skills, risk management*

### **Introduction**

The South African Civil Engineering (ECSA) industry faces a decline in skilled professionals and new entrants, causing distress for firms. This decline is linked to fewer civil engineering graduates, slowed industry growth post-2010 FIFA World Cup projects, the 2014 public sector construction cartel scandal, low fees for emerging contractors, and an ageing workforce (Alabi & Fapohunda 2021). The ECSA is prioritizing new civil engineers' recruitment, leading to a skills shortage and challenges for firms. Recruiting entrepreneurial civil engineers is essential to tackle these issues. Entrepreneurial skills, gained through education and experience, are crucial for civil engineers entering entrepreneurship (Fitriani & Ajayi 2022). Since the Project Management Institute's 1969 inception, project management skills have gained importance. However, the relationship between entrepreneurial and

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project management skills remains unclear. This study investigates this relationship among trained civil engineers in South Africa, focusing on the importance and possession of both skill sets. The research includes a literature review and aims to assess the level of project management and entrepreneurial skills among civil engineering professionals in South Africa, explore their correlation, consider demographic factors, and offer recommendations based on findings (Van der Westhuizen 2017).

The future of civil engineering in South Africa depends on evolving practices into larger ventures or staying small. This research underlines the importance of project management and entrepreneurial skills for civil engineers' success. It examines civil engineering graduates' competencies in project management skills (PMS) and essential entrepreneurial skills for career growth (Ghorbani 2023a). Globalization, transformation, and technological progress have significantly changed the engineering field, leading to a skills shortage in South Africa. The South African Institute of Civil Engineers advocates developing core entrepreneurial competencies in education (Lamola et al. 2024). Entrepreneurship involves meeting client expectations innovatively for income generation (Åström, Reim & Parida, 2022). Project management also includes entrepreneurial roles, as practitioners ensure project work aligns with beneficiaries' needs and delivers stakeholder value (Åström et al. 2022).

The research objective explores the relationship between project management skills and entrepreneurial skills in South Africa's civil engineering projects. Adopting a positivist philosophy and quantitative methods, this study examines a specific sample. The research aims to create a model illustrating the integration of project management systems and entrepreneurial skills, providing principles and outcomes for newcomers in entrepreneurial project management.

## Literature Review

### *Importance of Project Management Skills*

Project management is essential in construction, where many projects exceed budgets and timelines. Despite recommendations from engineering societies, engineering programs do not prioritise project management. Construction educators should provide practical project management experience. Core skills include planning, managing, and controlling projects as outlined in the PMBOK® Guide. Effective project management is vital across industries, enabling streamlined processes, resource allocation, risk mitigation, and strategies to reduce project failure (Ghorbani 2023b). Competent project managers foster team collaboration and clarify roles. They manage the complexities of modern projects involving various stakeholders and constraints. Research indicates organizations with skilled project managers are more likely to complete projects on time and within budget (Parsamehr et al. 2023). Professional organizations like the Project Management Institute stress the value of certification and training (Amoah & Marimon 2021). While not all projects need advanced skills, most benefit from them, and in agile settings, having a project manager enhances alignment of objectives and increases the chance of success (Zadeh et al. 2024).

*Importance of Entrepreneurial Skills*

Entrepreneurship is crucial for economic development and prosperity in any nation (Antonovica et al. 2023). It involves more than just owning and managing a business. Entrepreneurship is about turning a good idea into a profitable company, and it often requires innovation, adaptability, and risk-taking. The journey to creating a truly successful company can be challenging and full of obstacles for entrepreneurs. Some entrepreneurs quickly find investors, clients, and a customer base, while others struggle, regardless of how brilliant their idea is, to gain traction in the competitive marketplace. This is mainly because successful entrepreneurs possess certain abilities that other entrepreneurs do not (Asaadi et al. 2023).

Entrepreneurial skills are the abilities that entrepreneurs bring to the market, enabling them to identify opportunities and seize them (Marinho et al. 2014). These skills help entrepreneurs pursue success and stability in a highly uncertain and volatile business environment. One characteristic of entrepreneurs is their possession of multiple entrepreneurial skills and their ability to learn and acquire new ones as their business progresses. Entrepreneurial skills are essential for entrepreneurial success and effectiveness. It is crucial to possess them in the right way. These skills have significant implications for promoting and enhancing competitiveness, as well as insulating an enterprise from the impact of external and internal factors. They also facilitate the important drive by most businesses to engage in activities that enhance their output. This aligns with Moradi et al. (2021) proposition that the development of entrepreneurial skills can contribute to positive progress for businesses, as they constantly engage in capacity building, such as training their workforce or adopting new technologies to improve overall output.

*Common Traits between Project Managers and Entrepreneurs*

Few researchers have discovered that the "start-up" stage in project management and the stage that the entrepreneurship phenomenon embraces are the same (Kuura & Lundin 2019). The practical requirements that many start-ups and entrepreneurial companies face are what are driving the fusion of project management and entrepreneurship themes. Young entrepreneurs typically need knowledge of various processes to minimize failures (Alici & Cengizoglu 2018). Additionally, contemporary entrepreneurial ventures are often carried out as projects or project series, so many authors argue that those involved in entrepreneurship should have a good understanding of project management. Schools, which play a role in shaping these entrepreneurs, are also responsible for providing them with project management skills (Kuura & Lundin 2019).

In addition to the overlap between the PMBOK approach and the stages of the entrepreneurial process, there has been investigation into the overlap between essential entrepreneurship competencies and those included in the PMBOK. It seems that the skills sought after in project management are also highly ranked among the characteristics of successful entrepreneurs (Alici & Cengizoglu 2018). Therefore, it has been concluded that many project managers today share similarities with successful entrepreneurs. The literature is rich in references that explore the significant

similarities and common traits between entrepreneurs and project managers (Nguyen-Duc et al. 2021). Several studies emphasize the fact that project management and entrepreneurship share common ground in aspects such as risk-taking, talent identification, team management, and project planning.

### *The Role of Project Management Skills in Entrepreneurship*

The term "entrepreneurship" refers to the process of creating new businesses by identifying and exploiting business opportunities. This study examines the potential benefits of combining project management skills with entrepreneurial skills. Entrepreneurs can utilize project management skills when creating and developing a new business venture. Several authors, including Ward and Lee (2021) and Dacre et al. (2021), emphasize the importance of project management skills in increasing the chances of entrepreneurial success. Therefore, the main objective is to investigate whether project management skills are helpful in identifying and establishing a new business, and whether they can be considered entrepreneurial skills. Previous research has highlighted the significance of project management skills in entrepreneurship, as they greatly contribute to business success. Entrepreneurship is gaining recognition as a driving force for innovation, economic growth, and competitiveness. The complex social systems of entrepreneurial ecosystems, with their interconnected layers, require focused measures in different areas to foster successful entrepreneurial ventures. It has been suggested that entrepreneurs should develop specific skills, or at the very least, improve their existing skills, to minimize risks and increase the probability of success (Iqbal et al. 2022).

### *Relationship between Project Management Skills and Entrepreneurial Skills*

Project management (PM) and project procurement have become essential strategies for organizations to survive (Nguyen-Duc et al. 2021). A civil engineer with an entrepreneurial mind-set must possess the ability to recognize opportunities that require project management, innovation, and strategic thinking in the execution of feasible projects. However, civil engineering, which focuses on design and construction, is different from the role of project managers who apply project management skills to add value to civil engineering projects. Dana et al. (2021) explore the concept of entrepreneurship as an inherent talent for sustainable development, economic growth, and poverty alleviation. They suggest that this ability can be nurtured through education, mentorship, and hands-on experience, aiming to empower aspiring entrepreneurs to harness their potential and drive positive change in society.

This dichotomy is discussed by Bunton et al. (2010), who view entrepreneurship as a major skill/activity that involves an individual's personal attitude or natural ability to initiate technology development for sustainable development, inclusive economic growth, and poverty eradication. This perspective is also shared by Bendle (2010) and Amit and Zott (2001) who define entrepreneurship as the ability to innovate and take risks.

To bring clarity and inform strategy, this study examines the relationship between project management skills (PMS) and entrepreneurial skills (ES) in civil engineering. This article presents empirical evidence on the relationship between project management skills and entrepreneurial skills in the South African civil engineering (CE) industry. The study was conducted using a cross-sectional design and employed an enumerator-administered quantitative survey method. Non-probability sampling methods, specifically convenience and snowball sampling, were utilized. A structured questionnaire was developed and pre-tested to ensure reliability. The survey underwent pilot testing, item purification, external measurement model validation, and checks for common method bias. Data was analysed using descriptive statistics in SPSS.

### *The Impact of Entrepreneurial Skills on Project Management*

In the previous section, we focused on the importance of active engagement in business operations. Therefore, it may seem logical to combine the project with entrepreneurship, both theoretically and practically. Entrepreneurs have an instinct to innovate, driven by the need to make their business endeavours predictable and feasible, and to achieve their ultimate objective (Nguyen-Duc et al. 2021). This entrepreneurial instinct may have a strong impact on project managers (PMs) and project management professionals (PMPs) who perform their work simultaneously. Leon (2017) argues that the development of entrepreneurial skills would enhance the wisdom of business operations. It can motivate entrepreneurs to seek conventional training, formal education, and exposure to project management, ultimately helping them execute projects effectively.

Most projects are micro- and small-sized activities, and in these firms, the top management is usually responsible for managing or steering such projects. However, the Intuit Future of Small Business Report suggests that 83 percent of small and growing businesses are managed by individuals with critical project management skills. Similarly, the PMI reports that 88 percent of companies using high-performing project managers have enterprise-level corporate leadership to align project activities with organizational goals. Given the nature and position of top management in small firms, these important management responsibilities can be considered entrepreneurship. Based on this basic idea, it may be reasonable to believe that entrepreneurs are also recognized for the influence of their entrepreneurial skills on their project management-related activities, from a conventional perspective.

### *Entrepreneurial Skills in Civil Engineering*

Construction stakeholders have made significant progress in improving traditional construction practices over the past five decades. They have achieved this by adopting principles from the process-driven and product-oriented construction industry. Exploring the relationship between project management knowledge and entrepreneurial abilities in the construction industry is crucial to addressing unknown aspects identified in the 2010 civil engineering requirements report.

*The purpose of this study is twofold:*

- To investigate the close connection, if any, between the level of project management abilities and entrepreneurial abilities among civil engineers working in the South African construction/civil engineering industry.
- To identify the entrepreneurial abilities that civil engineers should develop, considering their foundational project management knowledge.

Civil engineers possess a wide range of skills and competencies in initiating, planning, executing, controlling, utilizing, and completing projects. However, these skills vary among individuals. It is widely acknowledged that individuals can develop these skills into comprehensive and multifaceted project management abilities. In addition to these interdisciplinary abilities, civil engineers practicing in the highly competitive and dynamic global construction environment now need to demonstrate high-level entrepreneurial attributes that can enhance their business offerings. The purpose of this study is to determine whether experienced civil engineers perceive entrepreneurial and project management knowledge as distinct from each other.

#### *Challenges in Developing Project Management and Entrepreneurial Skills*

The development of project management and entrepreneurial skills is a multifaceted process that presents several obstacles. These obstacles include the intricate nature of skills, limited resources, the ever-changing business environment, and mental barriers (Awan & Sroufe 2022). The complexity of these skills can be overwhelming for individuals and organizations, while constraints in resources can hinder their effective development. The rapidly evolving business environment also poses a challenge in keeping up with the necessary skills. Research in the field of education emphasizes the importance of training programs that encompass not only technical knowledge but also soft skills and adaptability (Caeiro-Rodríguez et al. 2021).

Business literature points out that many entrepreneurs struggle due to inadequate project management skills, leading to poor execution and resource management (Ismail Albalushi & Naqshbandi 2022). Case studies demonstrate that organizations that invest in comprehensive skill development tend to achieve better project outcomes and business viability (Zhang & Berhe 2022, Lamarre et al. 2023). The impact of these challenges may vary depending on an individual's background, prior experience, and specific organizational context. While online learning platforms have enhanced access to resources and training, their effectiveness can be inconsistent and may not cater to the specific needs of all learners. In conclusion, the development of project management and entrepreneurial skills presents a multitude of challenges, including skill complexity, resource limitations, environmental dynamics, and mindset barriers.

However, in current education, project planning is primarily associated with project management. In both project management and entrepreneurship, students need to develop skills that are beneficial for their professional development. The main objective of project management is to ensure that projects are completed within the allotted time and budget, while meeting performance and functionality

goals. Similarly, in entrepreneurship, students need to evaluate new ideas and develop a business model, including its value proposition. They also need to define the scope of work and set milestones, as well as negotiate with various stakeholders to find win-win solutions. Until now, project management and entrepreneurship have been taught separately (Hamzah & Othman 2023).

Developing entrepreneurship skills is not a straightforward process, but one strategy could be to provide students with opportunities for project-based and scenario-based learning (Boskovic et al. 2020). Similarly, project-based approaches are helpful in developing project management skills. Leung (2021) argued that, generally, students prefer technology-oriented methods and find theoretical topics less attractive. Perifanis and Kitsios (2023) recommended project-based learning with hands-on and student-centered activities to foster greater self-direction and interest in entrepreneurial studies, as they found it necessary for developing entrepreneurial skills. Another pedagogical approach is problem-based learning, which has been reported to stimulate learning motivation, responsibility, creativity, enthusiasm, and teamwork (Memon et al. 2018).

### *Examining the Introduction of Project Management in Entrepreneurship*

A project manager or entrepreneur must possess a variety of skills to be successful, according to Morgan (2018). However, many individuals lack proficiency in these skills and only reach a minimal level of competence. Additionally, professionals may mistakenly assume that students possess sufficient problem-solving and critical thinking abilities. It is important to recognize that thinking influences attitudes and behaviours and understanding the factors that shape an individual's thinking process is crucial. It is also necessary to consider different perspectives on various issues. However, it is worth noting that an individual's confidence in their lack of bias can lead to bias.

## **Research Methodology and Method**

This section discusses the design, sample criteria, and data collection methods used in a study. The research used a quantitative, cross-sectional survey design, which allows for data collection across large proportions of the population. Exploratory research commonly uses this method to establish baseline numbers, provide a snapshot of the current situation, and conduct simple research. The sample population was chosen from the probability random sample of the South African Institution of Civil Engineering (SAICE) of over ten thousand registered members. The study emphasizes the importance of appropriate data collection and sampling techniques.

The survey was utilised to collect a substantial amount of quantitative data, encompassing various measures and variables. The inferential and differential statistics, known for their effectiveness in analysing and interpreting complex data, were diligently employed for a thorough analysis (Kumar et al. 2023). To ensure representative results, a meticulous and systematic probability random sampling

technique was implemented, ensuring a fair distribution of respondents (Pawar et al. 2023).

The aim of this research was to examine the relationship between project management skills and entrepreneurial skills in the field of civil engineering. The researchers adopted a quantitative approach and randomly selected 340 engineers from a pool of over 10,000 registered engineers in the country. They conducted surveys to gather data on entrepreneurial and leadership abilities, which were subsequently analysed using statistical methods.

## Results Presentation and Interpretations

To examine the connection between project management skills and entrepreneurial skills in the civil engineering field in South Africa, the influence of project management skills on the development of entrepreneurial skills in the construction industry of South Africa was assessed on a Likert scale ranging from slightly important to extremely important. This scale was used to measure the perception of the participants. The first results were presented in Table 1.

**Table 1.** Simple Frequency Table

PRENO1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Slightly important skill	44	11.8	11.8	11.8
	Moderately important skill	2	.5	.5	12.3
	Very important skill	142	38.0	38.0	50.3
	Extremely important skill	186	49.7	49.7	100.0
	Total	374	100.0	100.0	

Source: Researchers own compilation (2023).

The frequency table displays data on the perceived significance of a skill, divided into four categories: "slightly important," "moderately important," "very important," and "extremely important." The table depicts the number of respondents who chose each category, with a total of 374 respondents. The percentages for each category are 11.8%, 0.5%, 38.0%, 49.7%, and 100%. The valid percentages eliminate any missing data and are identical to the percent column. The cumulative percentage indicates the cumulative distribution of the responses. More than 88.7% of the respondents rated the skill as "very important" or "extremely important," whereas only a small proportion rated it as "slightly important" (11.8%) or "moderately important" (0.5%). This suggests that the skill is generally considered important or very important by a substantial majority of respondents. The table offers a comprehensive insight into the perceived importance of a skill. That implies that indeed the project management skill and entrepreneurial skills and positively correlated although the causal relationship has not been established. It is thus expected from the project manager to have more entrepreneurial skill, which entails risk taking, good communications and good leadership. Now that the positive correlation is established, it is important to establish the strength of the correlation as presented in Table 2.

**Table 2. Correlation Analysis**

Symmetric Measures					
		Value	Asymptotic Standardized Error	Approximate T <sup>b</sup>	Approximate Significance
Interval by Interval	Pearson's R	.004	.054	.076	.939 <sup>c</sup>
N of Valid Cases		374			

Source: Researchers own compilation (2023).

### Correlation Analysis

The correlation coefficient quantifies the strength and direction of a linear association between two continuous variables. It is important to note that correlation does not imply causation. It is also worth mentioning that a low correlation coefficient does not necessarily imply independence between the variables, as there might still exist a non-linear relationship. In such cases, polynomial regression analysis can be employed to identify non-linear associations (Güzel et al. 2022).

Correlation analysis is a method used to determine the level of relationship between two variables. It is measured on a scale from -1 to 1 ( $-1 \leq r \leq 1$ ). The Pearson correlation coefficient R is specifically used to evaluate the strength of association between two continuous variables (Chen et al. 2009). The coefficient ranges from -1 to +1, with values closer to -1 or +1 indicating a stronger association. To assess the linearity of the relationship graphically, a scatter plot can be employed. If the data points align in a straight line, correlation analysis can be applied (Shin et al. 2023). Thus, a value of 0.004 suggests a very weak linear relationship between variables. The positive sign indicates that higher values of one variable are associated with higher values of the second variable, and vice versa (Taylor 2020). In the case of weak correlations, the inferential models used do not have enough power to fully explore the relationships between variables. The value of 0,004 shows that there indeed a very low correlation hence less than 0.2.

**Table 3. Engineering Field \* PRENO1**

Crosstab						
		PRENO1				Total
		Slightly important skill	Moderately important skill	Very important skill	Extremely important skill	
Engineering field	Construction	28	2	106	124	260
	Geotechnical	0	0	2	2	4
	Water resources	9	0	16	31	56
	Structural	7	0	18	29	54
Total		44	2	142	186	374

Source: Researchers own compilation (2023).

Table 3 reveals important insights into the link between engineering expertise and entrepreneurial skills, illustrating their interdependence within the industry. A frequency table is a useful tool for organizing and presenting data. It counts how often each value appears in a dataset. The table usually has two columns: one for the values or categories being counted, and another for the frequency or count of each value. This table summarizes and analyses categorical data. The civil engineers were categorized into construction, geotechnical, water resources, and structure.

Construction is the area with the most responses, particularly in the "very important" (106) and "extremely important" (124) categories, which indicates a strong acknowledgement of the significance of skills in this field. In contrast, the geotechnical field receives the fewest total responses (4) and does not feature in the slightly and moderately important categories, indicating a potential lack of widespread perception of the value of skills in this field or a lack of feedback in this domain. Water resources and structural fields also have noteworthy response numbers, although they are much lower than construction, and there is an emphasis on skills being "extremely important." All categories consistently perceive skills as "very important" or "extremely important," signifying a widespread agreement on the crucial role these skills play in engineering disciplines.

## Results & Discussion

Competence in project management and entrepreneurship is vital for effectively carrying out civil engineering projects in South Africa. The intricate nature of these projects, along with economic conditions, sustainability, and innovation, makes both sets of skills necessary. South Africa's complex projects, involving multiple stakeholders, tight deadlines, and regulatory compliance, require integrated project delivery methods. Successful public-private partnerships in infrastructure development serve as examples of how entrepreneurial skills enable project managers to identify innovative funding solutions and partnerships.

Given South Africa's unique socio-economic landscape, combining these skill sets is crucial for delivering projects that address community needs and comply with regulations. Professional associations such as SAICE advocate for the integration of project management and entrepreneurial skills through professional development programs and certifications. Case studies demonstrate that teams with strong entrepreneurial and project management skills achieved better outcomes by leveraging innovative solutions and techniques. Research findings show that entrepreneurial thinking often leads to better resource allocation, more effective risk management, and ultimately, project success in emerging markets.

While the correlation between project management and entrepreneurial skills is strong, their presence may not guarantee success due to factors such as market conditions, team dynamics, and external economic factors. Nevertheless, possessing both sets of skills significantly enhances the potential for successful and sustainable civil engineering projects. In highly regulated environments, market demands, and stakeholder expectations are evolving, requiring project managers to adopt entrepreneurial approaches to remain competitive and efficient. In conclusion,

project management and entrepreneurial skills complement each other in South Africa's civil engineering landscape, allowing project managers to navigate complexities more effectively, leading to successful project delivery and innovation in practice.

Civil engineering projects in South Africa can be quite challenging due to a variety of factors, including socio-economic issues, regulations, and the need for innovation. Effective project management is essential for successfully navigating these complexities. Resource management, which involves strategic allocation of time, budget, and human capital, is another vital aspect of civil engineering projects (Jain & Singh 2023). To thrive in changing market conditions, entrepreneurs must embrace adaptability and innovation (Coghlan et al. 2020). Project managers also need to be ready to confront unforeseen challenges and implement innovative solutions to achieve project objectives. Engaging effectively with stakeholders is crucial for project managers, while entrepreneurs should focus on building and maintaining relationships to take advantage of opportunities (Bahadorestani et al. 2020).

Civil engineers, particularly in South Africa where infrastructure development is crucial for economic growth, emphasise the importance of both successful project completion and entrepreneurial efforts. Integrating these skill sets can enhance project efficiency, but the degree of their connection may vary based on project size, scope, and circumstances. Smaller projects may rely more on entrepreneurial abilities, while larger ones may prioritize project management expertise. Emphasizing project management in civil engineering is crucial due to its organized characteristics, yet it's also essential to recognize the evolving nature of the field (Bentalha & Alla 2024). Creative problem solving and flexibility are necessary for addressing new challenges and seizing emerging opportunities. Without an entrepreneurial mindset, projects can stagnate and struggle to adapt. In summary, the combination of project management and entrepreneurial skills is essential for the success and long-term viability of civil engineering projects in South Africa. Integrating these two skills is crucial to propel the future advancement of the civil engineering sector in South Africa.

## **Recommendations**

In South Africa, higher education institutions should prioritise the development of project management skills among students, especially those studying engineering. One effective way to achieve this is through close collaboration with industry. Encouraging students to take on practical projects is highly beneficial as it allows them to apply their classroom knowledge and bridge the gap between theory and practice. For engineering students to truly grasp the practical value of their knowledge, it is crucial for them to have hands-on experience. This exposure to real-world working environments will also help them transition smoothly into the workforce after graduation, benefiting both the students and potential employers. In conclusion, this study emphasizes the importance of six project management skills - communication, problem-solving, resource management, leadership, decision-

making, and flexibility - for the entrepreneurial skills of civil engineering project managers in South Africa. Therefore, we propose the following recommendations to enhance the development of entrepreneurship skills among civil engineering project managers in South Africa.

## Conclusion

The research demonstrates a significant link between entrepreneurial skills and project management skills in universities, specifically in technology, engineering, and environmental departments. The findings indicate that today's project managers should focus on developing their entrepreneurial skills alongside their project management skills, treating projects as their own businesses. Project teams should support project managers in utilizing their underlying entrepreneurial skills in project management. Modern project management training and programs should incorporate entrepreneurial skills, in addition to hard and soft skills, to better equip future project managers. However, the research faces challenges such as the accuracy of data due to self-administered questionnaires and the generalizability of the population. Future research should explore project management skills and entrepreneurial skills in other fields or levels of entrepreneurship, such as civil engineering in South Africa. The findings suggest that project management skills, including leadership, communication, problem-solving, and teamwork, are applicable in any entrepreneurial field. This applicability is evident in the South African civil engineering industry, where many professionals utilize project management skills to run their firms as entrepreneurial ventures. However, it is necessary to establish a potential relationship between the utilization of project management skills and the ability to transform a civil engineering practice into a more entrepreneurial venture.

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