

Determining the level of Innovative thinking skills of SME owners in South Africa

ABSTRACT

Aims: The study aimed to assess the level of innovative thinking skills among SME owners in South Africa's construction and manufacturing industries and explore its impact on SME longevity.

Study design: The study employed a quantitative design, focusing on 204 SME owners from the construction and manufacturing industries in South Africa, selected via quota sampling. Data was collected through an anonymous online questionnaire, which assessed the participants' levels of innovative thinking. The analysis, conducted using Python software, aimed to determine the prevalence of these skills and their implications for the longevity of SMEs.

Place and Duration of Study: The study was conducted in South Africa, focusing on the construction and manufacturing industries. The data collection and analysis took place over a period of two years June 2020 and July 2022.

Methodology: The study employed a quantitative approach, using quota sampling to select 204 SME owners from the construction and manufacturing industries in South Africa. Data was gathered through an anonymous online questionnaire and analyzed using Python software to assess innovative thinking levels.

Results: The results indicated that SME owners in both the construction and manufacturing sectors exhibited moderate levels of innovative thinking. This suggests that while innovative thinking is present, there is potential for further development to enhance SMEs' competitive edge and long-term viability.

Conclusion: The study concludes that while SME owners in South Africa demonstrate moderate levels of innovative thinking, there is significant room for improvement. Enhancing these skills could play a crucial role in boosting the competitive advantage and sustainability of SMEs. It is recommended that SME owners integrate innovative thinking more deeply into their management practices to effectively navigate complex challenges.

Keywords: Managerial Cognitive ability, Innovative thinking, SME Management, Longevity, Competency, Entrepreneurial skills, Management

1. INTRODUCTION

One of the most important skills for any business manager to possess is innovative thinking. This is because changes become a constant element of the daily lives of most managers and business owners. The ability to think strategically and solve problems is vital for managing smaller businesses. Managerial cognitive competencies describe a set of skills that allow an individual to understand the knowledge and abilities necessary for performing a specific task or activity within a specific function or job (Nirachon et al., 2007). These skills are important for the success and survival of small businesses. The problem is that very few studies in South Africa have investigated the longevity of SME where innovative thinking skills were considered a factor. Therefore, the reviewed literature revealed that innovative thinking is a cognitive competency that is likely to be one of the factors needed by SME owners to effectively manage their businesses.

2. LITERATURE REVIEW

2.1 Innovation thinking

Innovation has been highlighted as basic for the twenty-first century as they drive organizational victory in numerous divisions (Audretsch et al., 2006; Yusuf, 2007; Ferreira et al., 2017). Moreover, in times of emergency, innovation has been distinguished as an effective trigger for the versatility of small businesses and the financial improvement in both, particularly the manufacturing and service sectors (Forsman, 2011, Uçaktürk et al., 2011, Nah and Siau, 2020). In this manner, in today's fast-paced, high-pressure innovative environment, basic considering, the foremost critical aptitude set a trend-setter require, decides success or failure (Lefler, n.d.). Agreeing to Whitney (2015), innovators utilize basic considering standards to accurately recognize the issue to be fathomed; failure to do so makes a frail establishment on which the consequent steps of the advancement prepare rest perilously. Successful innovators are basic masterminds who take calculated risks. Although an innovator's ability to solve challenges can be significantly reliant on their creativity, a closer examination of the innovation process reveals that creativity is only one of many elements in the equation of successful invention (Whitney, 2015)

2.2 Managerial cognitive ability

Helfat and Peteraf (2015) introduced the concept of "managerial cognitive ability" which emphasizes the fact that abilities include the ability to perform not only physical but also mental activities. Managerial cognitive ability refers to the ability of an individual manager to perform one or more mental activities that involve knowledge (Helfat and Peteraf, 2015). Such opportunities provide management with a basis for seizing opportunities and responding to new threats. In addition, managers with cognitive skills can produce accurate analysis that affects forecasts and performance (Caughron et al., 2013; Partlow et al., 2015). Cognitive ability can also help business owners structure business concepts and strategies and improve organizational performance (Kor and Mesko, 2013). Thus, managerial cognitive competencies are critical for solving challenges common to most SMEs and are essential for small business performance and survival. This study then sees innovative thinking as a cognitive ability needed by SME managers to solve complex problems.

2.3 Managerial cognitive ability: innovative thinking

A person's cognitive abilities lay the foundation for his innovative abilities. Such cognitive abilities include intelligence, persistence, creative thinking, and even pattern recognition. (Mayfield, 2011). So, based on that, it could be said that innovation is one of the most important factors in coming up with solutions that create capabilities. Mayfield (2011) also says that a person's cognitive abilities are the way they use what are usually considered mental abilities. In addition, Mayfield (2011) claims that people with certain personality types are also more innovative. People with more creative personalities also tend to be more innovative. The characteristics that promote innovation are openness to new ideas, persistence, self-confidence, ambiguity, independence and originality. There are also personal characteristics that reduce a person's tendency to innovate. These include authoritarianism and rule orientation. It is believed that personality, like cognitive abilities, is relatively stable in a person and therefore is not subject to much change. Thus, small and medium-sized enterprises (SMEs) with difficult problems can benefit from skills such as innovation and creative thinking.

2.4 Innovative thinking and SMEs , Survival and Success

In the management literature, innovations have the potential to yield changes in firms, allowing them to exploit new market opportunities to generate returns. These opportunities stemmed from industry variations and uncertainties, the need for novel and reshaped processes, incongruences, unexpected events, or factors external to organisations (demographic changes), perceptions and the introduction of new knowledge (Drucker, 1985). An organisation's ability to innovate is a determining factor for its survival and success (Doyle, 1998; Quinn, 2000). Innovation may be present in various forms, such as product or process innovation, radical or incremental innovation, and administrative or technological innovation (Zaltman et al., 1973; Utterback, 1994; Cooper, 1998). The authors emphasised the importance of different dimensions. Schumpeter (1934) suggested a range of possible innovative alternatives: developing new products or services, developing new methods of production, identifying new markets, discovering new sources of supply and developing new organisational forms.

Miller and Friesen (1983) focused on four dimensions: new product or service innovation, methods of production or rendering of services, risk-taking by key executives, and seeking unusual and novel solutions. Capon et al. (1992) adopted three dimensions of organisational innovativeness: market innovativeness, the strategic tendency to pioneer and technological sophistication. From their research of various sources, Wang and Ahmed (2004) identified five main areas determining an organisation's overall innovativeness: product innovativeness, market innovativeness, process innovativeness, behavioural innovativeness, and strategic innovativeness. **Error! Reference source not found.** provides

a summary of researchers, emphasising these different dimensions. In line with these perspectives, Wang and Ahmed (2004) defined organisational innovativeness as an organisation's overall innovative capability to introduce new products to the market or open new markets by combining strategic orientation with innovative behaviours and processes.

Table 1 Dimensions of organisational innovativeness

Author	Product	Market	Process	Behaviour	Strategic
Schumpeter (1934)	X	X	X		
Miller and Friesen (1983)	X		X	X	X
Capon et al. (1992)		X			X
Avlonitis et al. (1994)	X		X	X	X
Subramanian and Nilakanta (1996)			X		
Hurley and Hult (1998)				X	
Rainey (1999)				X	X
Lyon et al. (2000)	X		X		
North and Smallbone (2000)	X	X	X	X	

Source: Wang and Ahmed (2004)

According to Wang and Ahmed (2004), the five aspects listed in Table 1 are interconnected. Product innovativeness and market innovativeness are closely related as they have an external focus and are market-driven. In contrast, behavior and process innovativeness have an internal focus and emphasize the importance of product and market innovativeness. Strategic innovativeness showcases an organization's capacity to identify external opportunities promptly and align them with internal capabilities to introduce innovative products and enter new markets or market segments. Product and market innovativeness encompass process, behavioral, and strategic innovativeness. Collectively, these five aspects represent an organization's overall innovativeness.

Productivity growth, the main driver of new economic growth, is heavily influenced by technological advancements according to Solow (1957) and Maddison (2007). Business innovation occurs when a company implements new processes, services, or products to bring about positive changes. Innovation can provide a competitive edge, and sustained innovation is found in the organization's structure as highlighted by Kay (1993). Damian's (2011) definition of innovation, sourced from the Merriam-Webster Dictionary, refers to the introduction of something new, whether it be an idea, process, or product. Companies understand the importance of innovation and value employees' creative thinking as a source of new ideas (Amabile et al., 1996).

In 1962, Everett Rogers introduced the diffusion of innovations theory, which serves as a basis for comprehending the adoption of innovation and influencing an individual's decisions regarding innovation. This theory was developed to explain how an idea or product gains momentum and spreads through a specific population or social system over time. As a result of this diffusion, individuals within a social system begin to incorporate a new idea, behaviour, or product into their lives. Rogers' theory consists of four main elements: the innovation itself, the communication channels used to disseminate information about the innovation, the social system surrounding the adopters and non-adopters of the innovation, and the duration it takes for individuals to progress through the adoption process. Adoption refers to when a person engages in a different activity than they had done previously, such as purchasing or using a new product or adopting a new behaviour. Straub (2009) defined adoption as the integration of innovation into an individual's life and diffusion as the collective adoption process over time. The essential aspect of adoption is that the individual must perceive the idea, behaviour, or product as novel or innovative, which enables diffusion to occur. By examining the interaction between these components, one can gain insight into why an individual decides to adopt and innovate or not according to Straub (2009).

The open innovation model allows companies to incorporate external knowledge and expertise into their innovation process, enhancing their offerings, reducing costs, and managing risks more efficiently according to Granstrand (2011).

Additionally, this model entails strategic, controlled information exchanges with individuals outside the organization's boundaries to integrate their resources and knowledge into the organization's innovative process. Innovation theorists depict the innovation process as consisting of two stages. In the first stage, an idea is created (initiation), and the second stage involves the actual implementation of the idea (application) as mentioned by Martins & Terblanche (2003). According to Csikszentmihalyi (1996), individuals must have access to a certain domain and a desire to understand how to operate within its parameters before introducing a creative variation. Those inclined to innovate typically possess personality traits that support rule-breaking and early experiences that motivate them to do so. Successfully convincing a team about the benefits of a new concept is a crucial aspect of personal creativity. Caraballo and McLaughlin (2012) argued that innovation arises when individuals use a creative process to address a specific need, emphasizing that innovation is rooted in the very essence of humanity. Moreover, innovation commences with a novel idea and culminates in a marketable product or service. Innovation involves more than just new concepts; it encompasses innovative technologies, novel operational methods, and fresh management paradigms as outlined by Caraballo & McLaughlin (2012). Wang and Ahmed (2004) created a model of organizational innovativeness in order to effectively evaluate an organization's ability to innovate. They discovered that this model encompasses the key aspects of innovative capability and provides an overall picture of an organization's capacity to generate innovative ideas. The organizational innovativeness model considers an organization's strategic direction as a crucial element of its innovation capability and indicates a forward-thinking perspective (Wang and Ahmed, 2004). Additionally, the model includes a general element of organizational innovativeness along with five specific components that offer a comprehensive evaluation of an organization's innovative capacity. This study applied this model to assess the innovativeness of small and medium-sized enterprises (SMEs). The importance of organizational innovativeness or innovative capability in achieving a competitive edge should be given more focus. The ability of an organization to innovate is crucial for its survival and achieving success according to Doyle (1998) and Quinn (2000).

2.5 The significance of innovative thinking for SMES

Innovation scholars outline the innovation process as consisting of two stages. The first stage involves generating an idea (initiation), while the second stage involves implementing the idea (application) (Martins & Terblanche, 2003). Csikszentmihalyi (1996) claimed that individuals must have access to a domain and a desire to learn its rules before introducing a creative variation. Those inclined to innovate typically possess personality traits that support rule-breaking and early experiences that fuel this desire. A crucial aspect of personal creativity is the ability to persuade a team about the merits of a new idea. According to Caraballo and McLaughlin (2012), innovation occurs when individuals use a creative process to address a specific need, starting at a very human level. Additionally, innovation commences with a new idea and concludes with a marketable product or service. Innovation encompasses more than just new ideas; it also includes new technologies, operational methods, and management paradigms (Caraballo & McLaughlin, 2012).

According to Schumpeter (1988), the entrepreneur is a key figure who aims to generate higher profits, cultivate innovation, and drive economic growth. The significance of entrepreneurs in fostering innovation was underlined by Bayarçelik et al. (2014), who showed that leadership practices are crucial for organizational innovation. Definitions of entrepreneurs often include the introduction of new or improved products, production techniques, processes, markets, sales methods, distribution channels, financing methods, technologies, organizational structures, administrative procedures, and communication methods, as well as the potential to create new industries. Past studies have suggested that successful entrepreneurs tend to be more innovative compared to non-entrepreneurs. The next section focuses on measuring innovative thinking within organizations.

In conclusion, the importance of organizational innovation or innovative capability for gaining a competitive edge deserves careful consideration; an organization's ability to innovate is a critical factor for survival and success.

2.6 Organizational innovativeness construct measure

Organizational innovativeness (OI) has commonly been viewed as a positive aspect of organizations that can manifest in different ways in various organizational settings. For instance, innovativeness is described by Lumpkin and Dess (1996) as the inclination of a firm to embrace and endorse new ideas, novelty, experimentation, and creative processes that could lead to the development of new products, services, or technological processes. Garcia and Calantone (2002) emphasized the concept of 'newness' in innovativeness, stating that it involves the ability of innovation to impact a firm's existing marketing resources, technological resources, skills, knowledge, capabilities, or strategy. While there have been various definitions, most definitions of OI focus on the number of innovations implemented. Ruvio et al. (2013) highlighted OI as a key concept in academic research and managerial practice, often operationalized as the number of innovations adopted by organizations.

Ruvio et al. (2013) proposed a five-dimensional construct of OI - creativity, openness, future orientation, risk-taking, and proactiveness - which represents the organizational climate in terms of generating ideas and innovating continuously.

Their research supported the conceptualization and operationalization of OI, validated in multiple countries like Norway, Israel, and Spain, offering new insights and potentially guiding strategic managerial decisions. The reliability of the instrument was high, with Cronbach's alpha coefficient ranging from 0.82 to 0.88 (Ruvio et al., 2013). The model fit statistics also indicated a good fit ($\chi^2 = 517.30$ [d.f. = 127, $p = .00$]; NFI = .91; NNFI = .93; CFI = .93; RMSEA = .05) (Ruvio et al., 2013).

3. DATA ANALYSIS

The researcher used Python 3.12.2 to analyse the quantitative data collected from the questionnaire, specifically focusing on determining the mean scores for innovative thinking in both manufacturing and construction industries. The questionnaire consisted of 21 items related to innovative thinking, each rated on a 5-point scale with higher scores indicating greater innovative thinking abilities. Initially, the researchers utilized descriptive statistics to profile the participants. They then calculated the mean scores, using both mean and standard deviation, to assess the innovative thinking skills of small and medium enterprises (SMEs) owners. The mean scores were calculated separately for the construction and manufacturing sectors. To determine the innovative thinking level of SME owners, the data was extracted from an excel document, imported into Python 3.12.2 through VSCode, and frequencies were calculated. The obtained scores were then categorized based on innovative thinking skills categories as presented in Table 2.

Table 2 SME business Owners Innovative Thinking Skills.

Category	Total	Percentage
Excellent	Between 98 and 105	>94
Moderate	Between 78 and 98	75
Poor	Below 52.5	<50

4. RESULTS AND DISCUSSION

The survey was sent to 3 000 recipients, of whom 842 (28%) opened it. Of those who opened the email, 216 completed the surveys in full, representing a response rate of 7.2%. Out of 216 completed surveys only 206 were considered valid for data analysis. A comparison between of innovative thinking was done between two sectors. Of the 206 participants, 99 (49%) were from construction sector and 105 (51%) from the manufacturing sector. As depicted in Table 2, the mean years in operation 21.4 years, mean headcount 106.55 and mean yearly gross turnover of R65 816 041.72. The respondents' designations, owners represented the highest number, followed by managing directors, directors, and CEOs. The research shows that the respondents were at a strategic level of the organization and, therefore, competent to comment on the various measures addressed the questionnaire, with longevity, headcount and turnover showing the desired stages of longevity of the organizations.

Table 3 Descriptive statistics (longevity, turnover, headcount)

		Current estimated yearly gross turnover (Rands)	Number of employees in the organisation	Longevity (months)
N	Valid	204	204	204
Mean		65 816 041.72	106.55	257.25

Table 4 summarizing the innovative thinking item values and their frequencies. The results show the frequencies of pertaining the data of manufacturing and construction sector set of information. The item that has highest agreement is: "In this organisation we are constantly looking to develop and offer a new or improved service", for both construction and manufacturing sectors, followed by "In this organisation managers are expected to be resourceful problem solvers" item.

Table 4 Frequency distribution of statement related to Innovative thinking.

			SD	D	N	A	SA
CRE ATI VIT	1	In this organisation creativity is encouraged	0	4	10	75	117

	2	In this organisation managers are expected to be resourceful problem solvers	0	2	7	72	125
	3	In this organisation we are constantly looking to develop and offer a new or improved service	0	2	10	63	131
	4	In this organisation, our ability to function creatively is respected by the leadership	1	1	13	69	123
	5	In this organisation, managers are encouraged to use original approaches when dealing with problems in the workplace	2	2	21	76	103
OPENESS	6	This organisation is always moving toward the development of new answers	0	4	21	80	101
	7	In this organisation, assistance in developing new ideas is readily available	0	4	34	80	88
	8	This organisation is open and responsive to changes	0	1	4	18	77
	9	Within this organisation, managers are always searching for fresh, new ways of looking at problems	1	2	3	4	5
FUTURE ORIENTATION	10	This organisation establishes a realistic set of future goals for itself	1	4	33	92	76
	11	This organisation effectively ensures that all managers and employees share the same vision of the future	2	2	37	86	79
	12	This organisation conveys a clear sense of future direction to employees	1	4	49	69	82
	13	This organisation has a realistic vision of the future for all departments and employees	3	9	40	82	72
RISK TAKING	14	This organisation believes that higher risks are worth taking for high payoffs	8	20	52	67	59
	15	This organisation encourages innovative strategies, knowing well that some will fail	1	11	42	78	72
	16	This organisation likes to take big risks	1	41	66	43	37
	17	This organisation does not like to "play it safe"	19	42	67	46	32
PROACTIVENESS	18	In this organisation managers are constantly seeking new opportunities for the organisation	0	10	41	87	68
	19	In this organisation managers take the initiative in an effort to shape the environment to the organisation's advantage	0	10	41	87	68
	20	In this organisation managers are often the first to introduce new services	2	18	57	73	56
	21	In this organisation managers usually take the initiative by introducing new administrative techniques	4	16	63	68	55

Table 5 displays the descriptive statistics regarding innovative thinking levels of SME business owners. The participants consisted of 99 for the construction sector and 105 for the manufacturing sector. In these results, the summary statistics are calculated separately by sector. The results showed that the construction sector (82.08) exerted higher innovative thinking skills than the manufacturing sector (80).

Table 5 Descriptive Statistic: Innovative Thinking

	N Statistic	Minimum statistic	Maximum statistic	Mean		Std deviation statistic	Skewness statistic	Kurtosis statistic
				Statistic	Std error			
Manufacturing Sector								
Innovation	105	2	5	4.02	.060	.620	-.259	.526
Construction Sector								
Innovation	99	2	5	4.14	.073	.729	-.548	.110
Both Sectors								
Innovation	204	2	5	4.08	.047	.676	-.385	.214

The results in Table 5 show the mean skewness and kurtosis for innovative thinking. Skewness was -0.259, while Kurtosis was 0.525; therefore, the skewness and kurtosis of the innovation was within acceptable limits for manufacturing sector. In addition, skewness was -0.548, while Kurtosis was 0.110; therefore, the skewness and kurtosis of the innovation was within acceptable limits for construction sector. And finally, skewness was -0.385, while Kurtosis was 0.214; therefore, the skewness and kurtosis of the innovation was within acceptable limits for both sectors.

5. CONCLUSION

This article discussed a cognitive competency that managers can utilize to solve intricate problems. The main goal was to assess the innovative thinking abilities of small and medium enterprise (SME) owners in South Africa. The study was conducted with 204 SME owners from the construction and manufacturing industries using quota sampling. The findings revealed that the construction industry demonstrated higher innovative thinking skills (82.8) compared to the manufacturing sector (80). The combined innovative thinking score for both sectors was 81.6. This emphasizes the importance of managerial cognitive competencies in addressing common challenges faced by SMEs and their impact on business performance and survival. The study highlighted that innovative thinking is a crucial cognitive competency for problem-solving. The results indicated that SME owners perceive themselves as innovative thinkers, underscoring the significance of innovative thinking skills for their businesses. Testing the level of innovative thinking skills among SMEs can help integrate this competency as a strategic resource in management practices. Therefore, to enhance their competitive advantage and long-term viability, small and medium-sized enterprises (SMEs) are advised to utilize their innovative thinking abilities. It is important for SME owners to incorporate innovative thinking into their management capabilities in order to tackle challenging issues effectively.

CONSENT

Informed consent was obtained from all participants prior to their involvement in the study. Each participant was provided with detailed information about the study's purpose and their rights. Confidentiality and voluntary participation were emphasized throughout the data collection process.

ETHICAL APPROVAL

The study received ethical approval for the use of the questionnaire, which was obtained from its original author.

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