ASSESSING THE LEVEL OF INNOVATION PRACTICES IN BUILT PROJECTS TO CREATE VALUE FOR THE MARKET AND TO ENSURE SUSTAINABILITY AND RECOVERY OF THE CONSTRUCTION INDUSTRY WITHIN A RECESSION; THE CASE OF J.C VAN DER LINDE AND VENTER PROJECTS IN THE TSHWANE REGION.

Research Report

Presented to the

Graduate School of Business Leadership

University of South Africa

In partial fulfilment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

University of South Africa

MARJORIE IRIS NIEMAND

SUPERVISOR

DR NYAMAGERE GLADYS SOSPETER

DECLARATION

I hereby declare that the mini dissertation submitted for the Master's Degree in Business Administration at the University of South Africa is my own original work, and has not previously been submitted to any other institution of higher education. I further declare that all sources cited or quoted are indicated and acknowledged by means of a comprehensive list of references.

07/01/24

…….. ……

Marjorie Iris Niemand Date

ACKNOWLEDGEMENTS

I hereby wish to thank the following people for the contribution in this worthwhile endeavour:

1. Dr Nyamagere Gladys Sospeter for the support, guidance and motivation to finalise the research.
2. Pieter Venter and Jacque Du Preez for always believing in me and assisting me throughout this journey.
3. My mother Leonie Iris Billings my mentor and my role model.

May God bless you all abundantly and Thank You.

ABSTRACT

Due to a weak economic climate, it has become increasingly difficult for construction companies to sustain their business and stay competitive by using innovation in their daily operations. Hence, the construction sector is lagging in innovation, it has become increasingly important to look at innovative strategies to stay competitive. The study examines the opinions of employees in JC van der Linde and Venter Projects, and their assessment of the significance of the use and relevance of innovation strategies in the construction sector. The data collected in respect of employees' perceptions of innovation suggest the importance and relevance thereof. An explanatory research design was adopted where the primary instrument for data collection was a questionnaire. A sample of 75 employees were collected from a target of 236 employees in different construction project sites in Tshwane region.

The study found respondents understood the importance of innovation, but lacks understanding of how innovation frameworks fit into the organisation as the organisation lacks a formal innovation framework linked to strategic priorities. The study is therefore in agreement that the industry is slow to innovate A synthesis of expertise is needed in different domains to grow and innovate the company. This is a major concern that must be addressed at a strategic level as innovation have to be initiated from a managerial with clear strategic innovation plans incorporated in the strategic plan of the company. The study recommends that construction firms must invest in research and development to exploit the potential of innovation for organisational growth and sustainability.

The study concludes that innovation must form part of a strategic plan and driven by top management for it to be effective. Implementation of any innovation plan can only be instituted from the top, hence if innovation plans are not formalised it will not be effective without a formal framework. Therefore, it is recommended that the 70/20/10 rule of innovation must be incorporated into strategic objectives to make innovation part of a formal process, which can be measured in terms of Key Result Areas (KRAs) in the form of a Balanced Scorecard.

Key words: Strategic innovation, Incremental innovation, Disruptive Innovation, Strategy innovation, Competencies

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

CIDB - Construction Industry Development Board

BSC - Balanced Scorecard

KRA - Key Result Area

CIB – International Council for Research and Innovation in Building and Construction

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Global survey results show that the customer is in the driver's seat and to create value for the market companies must innovate and continuously improve their processes, products, and services. However, innovation is not a domain on its own, but forms part of strategic management. Hence businesses must include innovation practices in their strategic plans to ensure value creation for the market to stay and grow in business.

According to the CIB (International Council for Research and Innovation in Building and Construction the construction faces industry challenges due to lack of innovation. The McKinsey report {2015} estimates 98% construction project managers struggles with cost overrun and delays which can cause damage to a construction company's reputation. Hence, to stay in business, making a profit often must be a rather urgent priority (Foster 1969; Williams 2005). According to the CIB organisation the lack of investment in innovation creates lost opportunities and reduced growth.

FNB senior financial analyst Thanda Sithole state that along with weaker power generation and manufacturing yield, which separately contracted by 1.1% and 1.3% in February, it is evident that the South African economy experienced a mild technical recession between the fourth quarter of 2022 and the primary quarter of 2023. Due to this reason in South African the economic outlook remains bleak despite the GDP hike. Furthermore, the construction industry is placed under severe pressure by globalization, loadshedding, unemployment, labor protests and climate change. There is an increase in contractors performing poorly and abandoning construction projects in South Africa and economic recovery is urgently needed (West,2023).

West (2023) state the government supports acceleration of economic recovery by adopting and investing in a Construction Industry Recovery Plan (CIRP). The CIRP focuses on innovative practices to streamline processes in the construction industry for companies to stay in business. Research found construction companies who are investing in innovation strategies outperform their counterparts as much as 48% on revenue and 15% on net margin.

The purpose of this topic will be to explore how J. C van der Linde & Venter Projects, as one of the largest three construction companies in the Tshwane region, stays in business despite an economic downturn. The main aim of this research topic will be to look at the use of innovation frameworks as lack of investment in innovation leads to reduced growth of the construction sector,

A study population of approximately 236 employees was targeted in J,C van der Linde and Venter Projects and a random sample of 100 employees were selected from the target population to complete the questionnaires ; 80 questionnaires were received back from respondents in the study, which was a response rate of 31,7%;75 questionnaires were analyzed and 5 questionnaires were rejected due to incomplete information, An explanatory and research design were adopted. Descriptive statistics were used to analyze the data.

1.2 PROBLEM STATEMENT

West (2023) state that the government are concerned about the increase in poor performance of contractors and abandonment of construction projects and is looking at a legal framework to collaborate partnerships with the private sector to capacitate contractors with the necessary skills to stay in business The government is also concerned about lack of innovation in construction as too many contractors are abandoning projects The aim of government is to build capacity within the construction industry to stimulate the economy. This study will examine innovation practices in the construction company J.C van der Linde and Venter Projects who stay viable despite a technical recession and poor weather conditions due to climate change. Considering the challenges that the construction industry is facing, innovation is important to sustain and deliver built projects on time.

1.3 RESEARCH OBJECTIVE

The main objective of the study is to assess the level of innovation practices in built projects to ensure value creation and market sustainability in a recession, The Case of J. C Van Der Linde & Venter Projects in The Tshwane Region.

1.4 RESEARCH QUESTIONS

The study will attempt to answer the following research questions:

1. To determine the current state of innovation practices and strategies with regards to building projects in J.C van der Linde and Venter Projects.
2. To explore reasons for developing and implementing innovation processes within J.C van Der Linde and Venter Projects.
3. To determine the information needs and challenges regarding innovation practices within J.C van Der Linde and Venter Projects
4. To identify solutions and recommendations that can be used for the adoption, and implementation of innovation strategies within the J. C van der Linde and Venter Projects.

1.5 ABBREVIATED LITERATURE REVIEW

To determine the current state of innovation solutions practices and strategies with regards to building projects within J.C van der Linde and Venter Projects.

Innovation practices are currently lagging with more than ten years as there is an increase in contractors abandoning building projects (West,2023)

Smyth, Razmdoost & Kasuma (2016) found that opportunities to innovate and create value are largely overlooked by management It is further argued that management in construction firms must invest and increase awareness of innovation with an equal focus on project and client management.

There are two types of innovation namely incremental and disruptive innovation. Ellis (2022) state construction innovation technologies such as artificial intelligence are progressing at a rapid speed and the industry must supply resources to advance construction technology, which is a part of disruptive innovation.

Schultz (2020) do not support this argument as he mentions that changes start more with improvement of internal operations, which targets incremental innovation. Schultz {2020) argues as technology are becoming more relevant it is evident that the construction industry must look at incremental innovation firstly as the industry is still lagging in technology adoption. Change in the industry is less likely to happen by using

disruptive innovative technologies and will focus more on continuous improvement with small incremental changes due to the cost factor of technology.

To explore the reasons for developing innovation processes within J.C Van Der Linde and Venter Projects.

Innovation is important to grow a company and create value for customers. Rojas and Liu (2015) state value creation in the construction industry is a strategic issue that needs to be addressed by organizations through resource exchange, information sharing and team collaboration to improve project value. Construction companies has been growing very slow and there is a big demand for innovation as it is a low margin industry. Fossum (2018) argues that construction companies lack proper innovation management capabilities and therefore pay a huge price if they only rely on incremental improvements (small-scale changes) in daily operations. Construction companies cede control of the innovation process which could boost their profit margins and stay competitive.

Hence, if construction companies want to survive within a difficult economy, the construction sector needs to identify new innovative business models. Globally the world has changed drastically. The COVID pandemic not so long ago caused the world to transform majorly. Economically business activities suffered and decreased as a result thereof (Ngarava,2022)**.** noted South Africa was declared a State of National Disaster due to the COVID-19 pandemic, instituting a nationwide lockdown on 26 March 2020. This pandemic is still affecting the economy till date and the economy are projected to see an especially pronounced growth slowdown, from 2.7 percent in 2022 to 1.3 percent in 2023. In a plausible alternative scenario with further financial sector stress, global growth declines to about 2.5 percent in 2023 with advanced economy growth falling below 1 percent (Gourinhas,2023).

In addition, electricity supply shortages have constrained South Africa’s growth for several years. Rolling scheduled power cuts (load-shedding) started in 2007 and have intensified exponentially, reaching close to 9 hours daily in 2022.

The GDP is a tool that helps with the measurement of economic activity that is a prominent macroeconomic statistic and is based on industry-level data which, in turn, originates from the production and other data sourced directly from South African

companies. The COVID-19 crisis has weakened an already fragile economy. South Africa's growth underperformed during the past decade: GDP per capita was already lower in 2019 than in 2008. Unemployment remains high, at around 35%, and youth unemployment even exceeds 50%. In the meantime, spending pressures are mounting to close the financing gap in health, infrastructure and higher education. To finance those needs while putting public finances on a more sustainable path, which is key to restore confidence, spending efficiency should improve and be accompanied with increased government tax revenues (Kirsten,2023)**.**

Kirsten (2023) argues that South Africa's real GDP growth was 0.2% in 2019. The pandemic and the containment measures to curb the spread of the virus further damaged the economy. Real GDP contracted by 8.2% in 2020, the result of a decline in construction, transport and communication, manufacturing, and mining. Due to the above-mentioned reasons innovation strategies will be needed to curb the damaging effects of the pandemic, recession and economic issues.

To determine challenges when adopting innovation to achieve market sustainability and competitiveness at J.C Van Der Linde and Venter Projects.

According to Laura Wood there is a gap in the South African construction industry as it has been declining from 2017. The South African Recession has affected the industry so much so that in 2019 it caused a 3.3 decrease within the industry. This decline is attributed to an economic slowdown, coupled with weak consumer and investor confidence, affecting public and private sector investments in construction projects. The negative impact will persist as the industry continues to be hit hard by the impact of high national debt, labor shortages, and little infrastructure spending amid a depressed economy (Wood,2023).

The construction industry has continued to slowdown in 2020 due to the COVID-19 pandemic, a strict nationwide lockdown imposed on March 26, and a grim economic outlook. Industrial value added at constant prices in 2010 fell by 5.3% year-on-year in the first quarter of 2020 (Zingani 2020). The industry did contract further in the following quarter as most construction activity was temporarily halted in April and May

as operations were only allowed to resume in June. A decline in building permits for residential and non-residential buildings weighed on industry output in the short and medium term.

Whilst considering those changes market sustainability and competitiveness still needed to be achieved. Sustained competitiveness means being competitive and able to survive in the long term. If companies want to be successful it is recommended that frameworks (internal controls and external influences) be developed. This will enable individuals and companies to succeed now and, in the future (Gupta,2020)**.** Sustainable competitiveness is the ability of companies, sectors, individuals and countries to create frameworks (policies, regulations, management tools, visions) that can generate income. Sustainability and competitiveness are the key dimensions to successful strategic positioning. (Hough, 2011) explains: “Strategy is about creating unique and valuable positions that encompass different sets of activities.

The strategic fit of many activities is fundamental not only to achieve a competitive advantage, but also to the sustainability of that advantage. Competitors are more interested in achieving a set of interrelated activities than simply mimicking a particular business approach, adapting process technology, or replicating a set of product features (Gupta,2020). Market sustainability and competitiveness is not just based on activity systems or positions based on individual activities (Hough, 2011).

To identify solutions and recommendations that can be used for the adoption, and assessment of innovation strategies within the organization.

Employing innovative and unique solutions are crucial to the future of the industry building projects are unique as research shows innovation is important to provide solutions to unique challenges that occur on site in the form of logistics, health and safety, people management, training and development or planning (Dale:2007). When considering the decline in the construction industry it has become evident for one to survive there will need to be innovative strategies implemented. This adoption of innovation strategies is being done by numerous organizations such as Samsung, Apple, Tesla, and Google. All are worldwide leading organizations in innovation strategies.

When measuring the adoption, acceptance, and success of innovation strategies it must be understood that innovation is not a domain of expertise on its own as it is interrelated by looking at several factors such as organizational capabilities/competencies, workplace culture, customer service etcetera as will be discussed in the next chapter.

1.6 RESEARCH METHODOLOGY

The target population of approximately 236 employees and a random sample of 100 employees were selected from J.C van der Linde and Venter Projects with a response rate of 31,7% (75 employees). An explanatory and research design were adopted. Descriptive statistics were used to analyze the data. The study used both primary and secondary data. According to Garg (2016:69) primary data refer to data which are collected for the first time and secondary data refers to information collected prior to a study by someone else. The study used a descriptive research design as the study examined the current adoption of innovation strategies by J.C van der Linde and Venter Projects. A cross-sectional survey design, using a questionnaire was used to gather primary data. Primary data were analyzed quantitatively using descriptive statistics and frequency distribution. Secondary data were collected by analyzing texts from newspaper articles, journals, books, company websites, reports as well as relevant legislation.

1.6.1 Quantitative Research Approach

This study is quantitative as questionnaires were utilized. The questionnaire will consist of closed-ended questions. The near finished questions can be replied with clear one-word answers or phrases. This will make it simple for the respondents to provide their answers. The closed finished questions will be advantageous and make it simpler to classify and gather answers together.

1.6.2 Population and Sample Framework

The target group will be employees of J.C Van Der Linde and Venter Projects.

1.6.3 Sample and Sample Type

Steps to this specific approach will be propelled by intensive quantitative techniques that not only clarify the much-needed designs, but also help to give a better illustrated image of what is required. Accidental/convenient/opportunity sampling was chosen as it is a non-probability sampling technique. It could be a sort of non-probability inspecting that includes the test being drawn from that specific portion of the populace that's available. Subjects are selected because of their convenient accessibility and availability (Boxhill, Chambers, Wint & Eleanor, 1997).

1.6.3 Data Collection Method

Primary data collection methods were used by means of questionnaires.

1.6.4 Data Analysis Methods, Techniques, and Instruments

The collected data were analyzed using quantitative approaches. Descriptive analysis of primary data was done using Excel; Frequency tables and graphs were used to present the data for easy interpretation. Descriptive data collected were coded according to emerging themes and included in the quantitative data.

Secondary data on current national and international innovation framework approaches were studied using document analysis. Annual reports from the company website, books, articles, and journals were analyzed to gain an insight into the topic.

1.6.5 Validity and Reliability

According to Saunders (2016:202) the concepts of validity and reliability are important considerations in the method and construction of measurement instruments. Reliability is the degree to which a measurement presents highly similar and uniform results each time when measures are taken in the same situation. Cronbach's alpha coefficient, which is a widely accepted measurement for reliability testing, was used to establish the reliability of instruments used in this study. The research instrument, a survey, consist mainly of objective items and open-ended questions of a factual nature. Such

items are unlikely to threaten the reliability of the instrument or introduce the risk of bias when analysing and interpreting the results of the study.

Validity is the strength of our conclusions, inferences or propositions (Saunders, 2016:202). Content validity is a measure of the extent to which information gathered utilising a specific instrument relates to a specific domain or content of a particular concept. It refers to how adequately the questionnaire covers the research questions. To ensure content validity of the research instrument the researcher will request guidance from the supervisor to ensure that the questionnaire measured the intended objectives of the study and that data collected would be valid and accurate.

1.7 ETHICAL CONSIDERATIONS

All respondents were dealt with in a dignified way. respectful manner. Confidentiality will be maintained throughout the study and beyond. Ethical clearance for the study were sought and obtained from the Research Ethics committee of the University of South Africa and the approved research protocol were followed to ensure that no harm came to research participants. The researcher obtained an introductory letter authorizing participation from a director at J.C van der Linde and Venter Projects. Participants were informed of the nature and purpose of the research and only voluntary participation will be encouraged. Participants were allowed to provide information without any inconvenience and interference in their daily tasks. Respondents were allowed a reasonable time to fill in questionnaires, which were collected in person on-site by the researcher.

1.7.1 Informed Consent

Informed and written consent were granted by the director of J.C van der Linde and Venter projects. The management were fully aware of the questionnaires handed out to the employees as all processes were thoroughly communicated to them.

1.7.2 Protection from harm

Participants were not subjected to any physical or mental discomfort.

1.8 SIGNIFICANCE OF THE STUDY

The construction industry in South Africa is lagging in the implementation of innovation practices (West,2023). Davis et al, (2018) argues that numerous studies in relation to construction innovation exist, but limited research is available into understanding how innovation is perceived, assessed and conceptualize in the construction industry. This study will contribute to the assessment of adoption in relation to innovation strategies in the construction industry for value creation. The study will also contribute to the body of knowledge in the adoption of innovation strategies in the construction industry as there is still limited research in this field.

1.9 OPERATIONAL DEFINITIONS

Strategy: defines management's action plan for running the business and conducting operations (Hough et al.,2011:5)

Value chain: is identifies the primary activities that create customer value and the related support activities (Hough et al.,2011:125)

Business model: explains the rationale behind why a company's business approach and strategy will be a moneymaker. Absent the ability to make a profit, the strategy is not viable, and the survival of the business is in question (Hough et al.,2011:8}.

Innovation: Is defined as successful exploitation of new ideas leading to the creation of a new product, process, or service. Innovation is not just radical or major technological advances, but also small-scale changes/ and/ or improvements (Tidd & Bessant, 2013:19).

Strategy innovation: Strategy innovation is the capacity to re-conceive the existing industry model in ways that create new value to customers, wrongfoot competitors and produce new wealth for all stakeholders (Gary Hamel 1998:8).

Incremental innovation: Incremental innovation is the continual refinement of your existing products, processes, or services within a relatively stable competitive environment. Driving small changes that improves innovation (Tidd & Bessant, 2013:27).

Disruptive Innovation: is the focused exploitation of emerging technologies aimed at the radical reinvention of industries or the displacement pf incumbent products or service offerings (Tidd & Bessant, 2013:27).

Value Creation: is the process of creating additional value for stakeholders by providing products or services that meet their needs and expectations (Hough et al.,2007:31}.

Core Competency: is a knowledge, skill and their application that is vital to the success of the business, A core competence resides in the intellectual capital of a company and not in its assets (Hough et al.,2011:114}.

1.10 ORGANIZATION OF THE STUDY

The study comprises of five chapters and is organised as described below:

Chapter 1: Introduction and Background

Chapter 1 gives a brief description of the study by presenting the problem statement, research question, definitions, and significance of the study.

Chapter 2: Literature Review

Chapter 2 provides the literature review and theoretical framework of the study in addition it also explores innovation frameworks adopted internationally examined current best practices.

Chapter 3 Research design and methodology

Chapter 3 presents detailed information about the research design of the study. Describes the research methodology, including the sample strategy, data collection instruments, validity, reliability, the process of data collection and the data analysis method.

Chapter 4: Data collection and data analysis

Chapter 4 provides and explains the results of the study based on the analysis of the collected data.

Chapter 5: Conclusion and recommendations

Chapter 5 discusses and reviews the general findings of the study and presents, limitations, implications, and recommendations for future studies.

1.11 CHAPTER SUMMARY

This chapter highlights challenges experienced by companies in the construction industry. A fast-changing society and advancement requires the construction industry to adapt and innovate to procure a competitive advantage in a global economy. Management of construction companies are compelled to innovate to bring forth innovation in their strategic priorities of plans to grow the company and stay sustainable to create value to their customers. Chapter two will present the literature reviewed and a theoretical framework for the study which will be discussed in detail in the next chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

There is an urgent need to stimulate innovation in the South African construction industry to maintain and provide economical infrastructure as well as sustain and create value and gain competitive advantage. The construction industry suffered R68 billion in economic loss (Matoma,2023). He argues the adoption of innovation is critically low in the South African construction industry due to several critical barriers such as high cost, limited knowledge, time requirements, fear of change, lack of interest, nature of construction and lack of team dynamics.

Sacks et al {2020) states adoption of digital information tools in the construction sector provides an opportunity for the birth and growth of construction companies that specialize in applications of technologies to design and construction. On a global front it is evident construction companies are adopting innovative technologies to improve operational efficiency and create value for its clients globally. (Ellis 2022) indicates that construction tech funding increased with a 100% in 2021 from 2020. She states that firms who adopt innovative technologies outperform companies with as much as 48% on revenue and 15% on net profit.

(Mckinsey 2017) the construction industry is very slow to innovate and adopt new approaches globally. West (2023) state South African contractors abandon projects and infrastructure is lagging with 10 years posing a serious threat to the growth and development of the country.

Innovation must be a strategic priority and resources must be made available for innovation to be effective. Buy-in must be obtained from management as the environment must support change. Hence, organisations should develop a framework to innovate and develop a business as new ideas are not sufficient to create value for the market {De Beer & Louw,2008}.

For the purposes of this study, two types of innovation namely incremental and disruptive innovation will be reviewed. According to Ellis (2022) construction innovation technologies such as artificial intelligence are progressing at a rapid speed and the industry must supply resources to advance construction technology, as

construction is moving to disruptive innovation. Schultz (2020) do not support this argument as he mentions that changes start more with improvement of internal operations gradually, as construction projects requires funding and construction projects demand huge budgets.

Schultz {2020) argues as technology are becoming more relevant that the construction industry must look at incremental innovation and not disruptive innovation, as the industry is still lagging in technology adoption. Change in the industry is less likely to happen by using disruptive innovative technologies without a proper knowledge base established. Therefore, this argument is supported for the construction industry in South Africa of continuous improvement with small incremental changes in technology due to the cost factors as government recently accepted a Construction Recovery Plan to support the industry (West,2023). Liang et al. (2023) states construction practitioners is keener to accept incremental innovation where changes are minimal and less risky and resist disruptive innovations.

Davis et al. (2018) argues that numerous studies on construction innovation is found, but limited research is available into understanding on how innovation is perceived, assess, and conceptualise in the day-to-day operations of the construction industry. The findings conclude that internal organisational and process innovation account for most improvements identified in construction. Internal processes and refinement of processes which forms a part of incremental innovation.

This chapter defines and examines incremental innovation as a point of departure and targets the internal arrangements of a company to create value for the market. The first section reviews the models and theories for assessment of incremental innovation with regards to construction firms. The construction firm, J C van der Linde and Venter Projects will be used as a case study to assess the level of innovation in building projects to create value to the market in the Tshwane region as the company increased its profit margin from R1 billion to R1,5 billion despite a difficult economy.

2.2 CONCEPTUAL FRAMEWORK

Innovation requires a strategy. Innovation cannot be applied on its own and it must form part of a strategic management process. Resources and capabilities must be created before a company can embark on incremental innovation to sustain value or create new value for the market. The organisation must create the necessary climate and organisational culture to ensure internal arrangements are conducive for incremental innovation.

2.2.1 Porters value chain model

The value chain analysis was introduced by Michael Porter in 1985 and is a strategic analytical tool which is applied in strategic decision making to create value for the market.

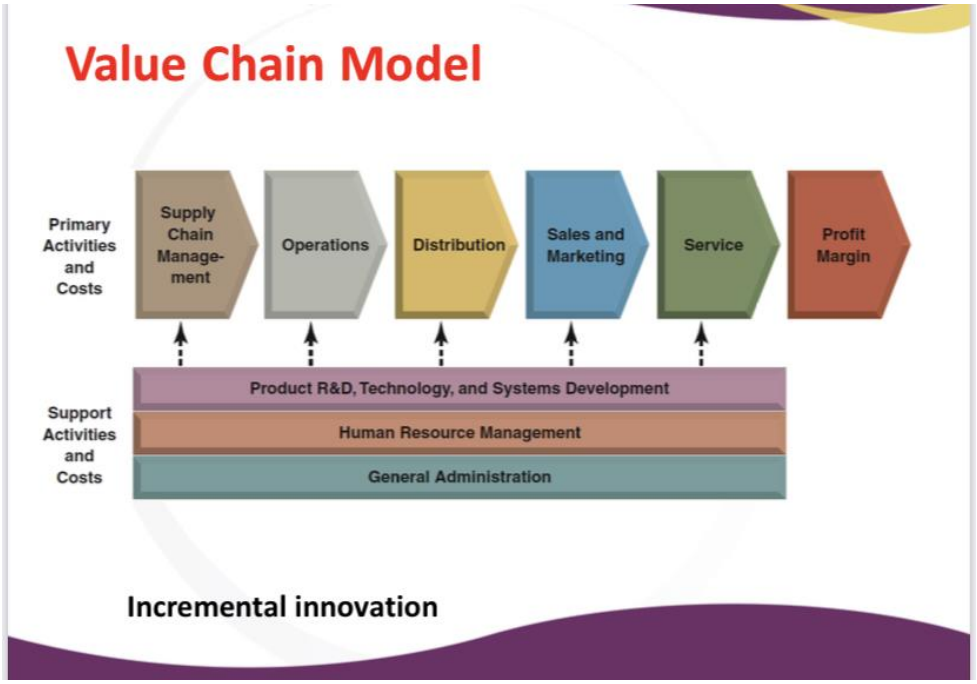


Figure 2-1 Porters Value Chain Model (Hough:2011)

2.2.1.1 Incremental innovation

This study will use the Porters Value Chain model as a point of departure to analyse the internal operations of a company to identify which sections (value chain) add value or not add value to its products, processes, and services by improving its internal

operations. A stable environment is needed for the company to target their value chain. Any organisation has a value chain. Value creation must cut across all functions of an organisation.

The Porters value chain divides activities into two categories namely primary and support activities. All primary activities together with support activities, will either add value to the customer through its operation or diminishing value to the market. Primary activities do not happen without support activities Companies successfully analyses these activities so that they can create and sustain value to the market through innovation in areas where they want to compete.

2.2.1.2 Primary activities

Contribute to create value in a direct manner and consists of:

Inbound logistics: involves receiving and storing of raw materials and their usage in manufacturing as required internally. Companies can improve relations with suppliers to add additional value to inbound logistics.

Operations: relates to the process of transforming raw materials into a finished product. Operational systems could be improved to add additional value.

Outbound logistics: concerns warehousing and distribution of the finished good/service.

Marketing and sales: refer to the marketing strategy and implementation thereof to communicate the marketing message to the relevant customer segmentation and the increase of sales.

Service: refers to after sales care to the customer.

2.2.1.3 Support Activities

Consists of functions and activities that are intended to assist primary activities.

Infrastructure: refers to the company's organisational structure, its departments and committees, organisational culture etc. Organisations can add value by optimising how all support departments must operate.

Human Resource Management: This activity refers to the quality of all primary activities that will make HR effective for any organisation such as recruitment, performance management and training etc.

Purchasing: is the acquisition of relevant resources for the organisation e.g., it includes all activities the company performs to get materials at lower prices

Technological development: refers to managing all hardware, software, procedures, and employee knowledge the company needs to transform raw materials into finished goods. Applying latest technology developments can add value to the company's primary activities.

Perera and Gunathilake (2018) argues the generic Porters value chain model must be readjusted when it is applied to the construction as the construction companies find it difficult to differentiate between value added activities with non-value-added activities.

2.2.2 Customer matrix model

Louw et al., 2018 argues to turn an innovation project into a marketable product customer needs and trends must be proactively managed to stay competitive in the market.

The customer matrix is a strategic tool for innovation link to your marketing process and informs the decision-making process as to what services or products to improve your value proposition to the customer. To sustain value through innovation companies must be a first mover to target their market, grow their networks and build their competencies. Understanding the needs of the customer and interacting regularly with the customer by means of customer surveys assist contractors to improve their level of service and measure performance (Karna et al.,2009).

The customer matrix is all about perception which exists in the mind of the customer. The customer perceives two things total benefits (financial as well as non-financial) and total cost (financial and non-financial) e.g., letting customers wait is perceived as a cost to the detriment of the customer. Where cost exceeds the benefit value is not

added and where the benefit exceed cost value is added. However, price and value are perceived in the mind of the customer and it's not actual.

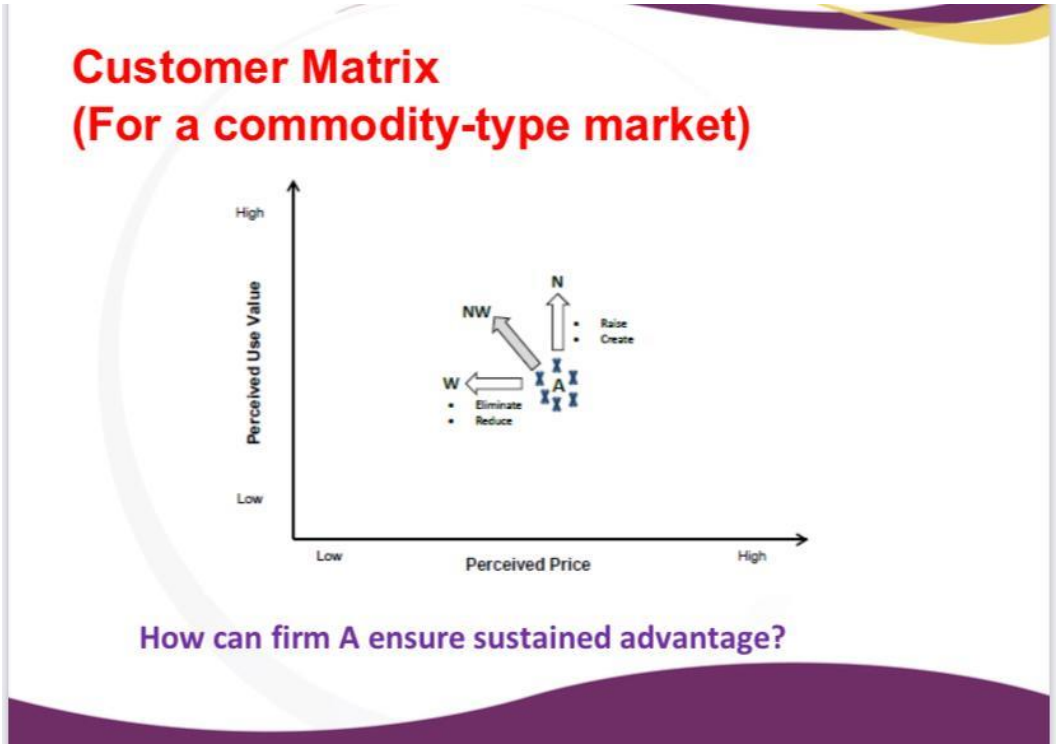


Figure 2-2 Customer matrix model (MBA5901 class notes,2023)

If a company wants to create value by means of incremental innovation and it will move West (price is perceived as lower by the customer). Where a price is perceived as lower in price it will help a company to sustain competitive advantage and eliminate competition. A reduced price targets a value chain and forms part of incremental innovation which targets the value chain model.

If a company wants to create value by means of disruptive innovation it will move North. New value is created, or existing value is increased. Disruptive innovation targets the business model. Normally organizations don't take both directions due to resources and capabilities. It will create the first minimal changes (incremental innovation). The customer matrix informs strategic decision-making and guides the organization whether to embark on incremental or disruptive innovation.

Based on studies the construction industry needs to look at incremental innovation (moving in a West direction) firstly and will target gradual improvement of its value chain to create a knowledge and value for the market, thereafter it can move North.

Karna et al. (2009) states customer satisfaction was measured in the construction industry and found that different factors have an impact as to how quality is perceived by the customer. It emphasizes the importance of communication in project management to improve their level of service. The study found that contractors should improve their central processes.to ensure that customers are satisfied. The study found customer satisfaction has been acknowledged but little attention has been paid to the development of customer satisfaction.

2.3 CONCEPT 3: ALIGNING COMPETENCIES WITH YOUR CAPITAL BASE

Innovation and business success requires a three-point strategy: 1. get in early 2. grow networks before competitors arrive 3. grow core competencies to stake out a defensible position in the marketplace in the new economy, innovation means much more than the development of new products and services. Successful innovation projects require the right innovation capabilities in organisations to enable long term survival in the market (Louw et al 2018)

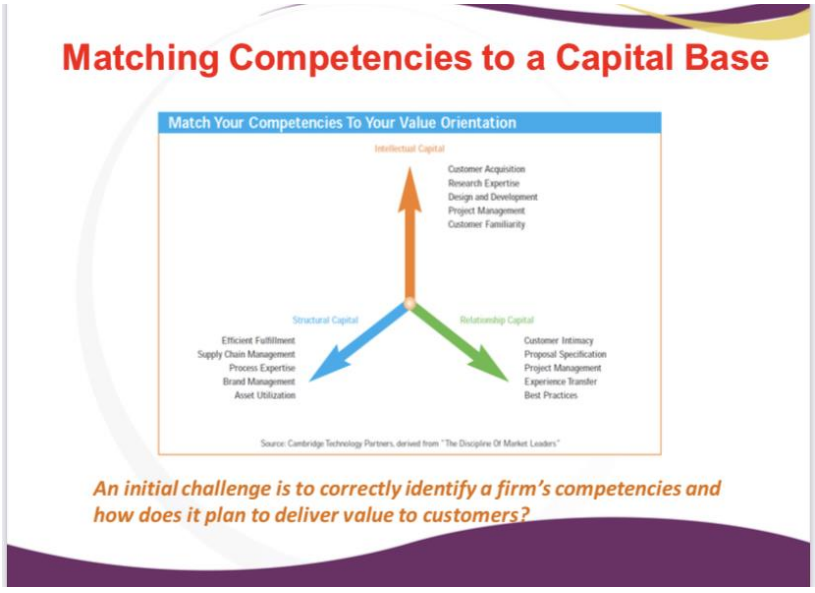


Figure 2-3 Competencies to a capital base (Cambridge Technology Partners,2000)

The type of value orientation and required competency capital base must be designed and aligned to add value and defend a strategic market position. Incremental innovation (focusing on process improvement and product refinement) which is of relevance to construction, would require more of a structural competency capital base and less of the other competency capital bases. Disruptive innovation (focusing on changing business models or reinventing product categories) would require more of an intellectual competency capital base and less of the other competency capital bases.

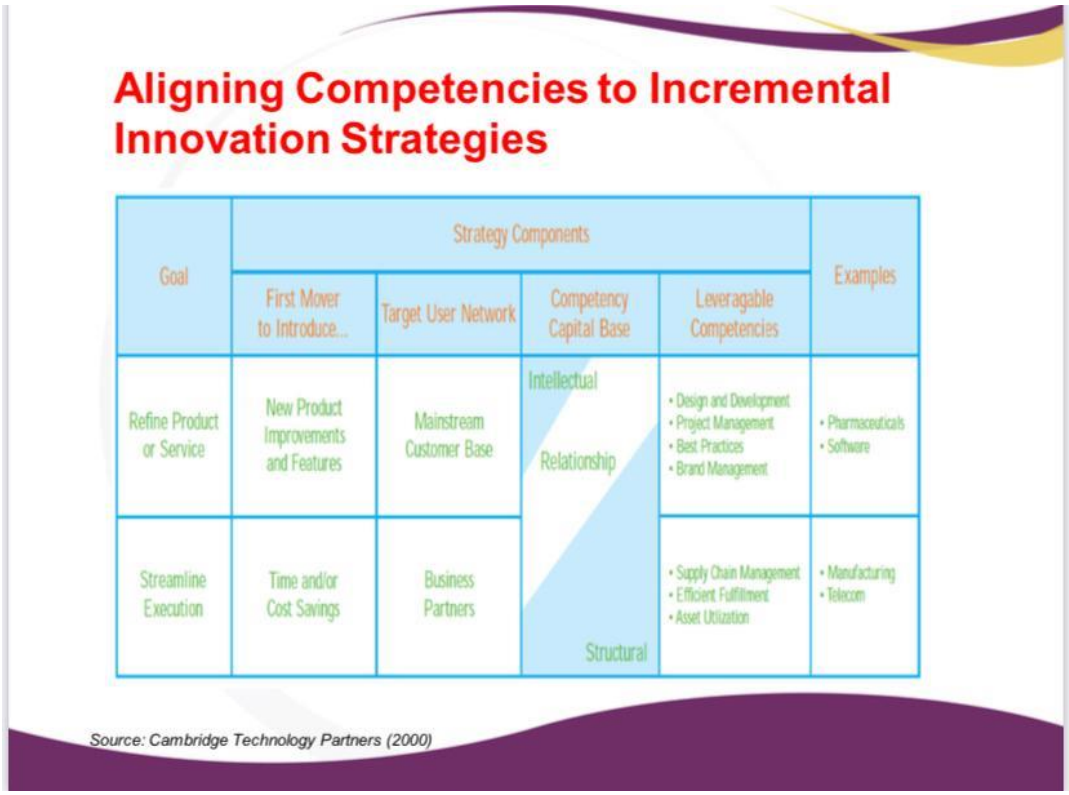


Figure 2-4 Incremental Innovation Strategies

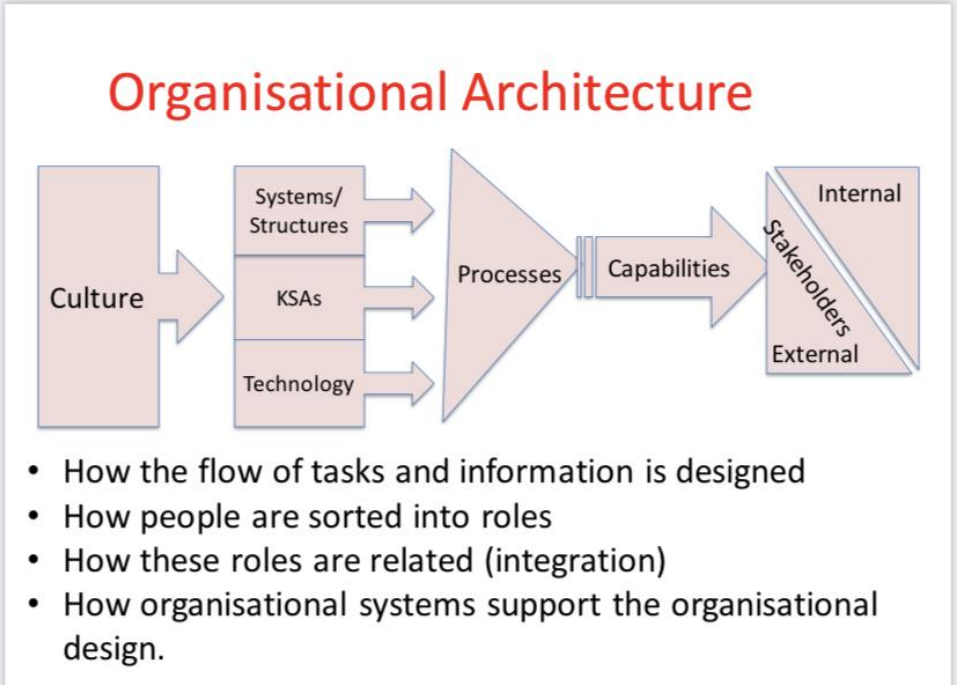
Organizational capabilities emerge as the combined expertise of its employees and resources i.e., in the context of construction, companies must leverage assets and collaborate with its business partners to save on time and cost to stay ahead in and streamline execution.

These competencies are not visible. This forms the DNA of the organization and is not easy to measure, hence managers neglect to pay sufficient attention to them (Smallman and Ulrich,2004). This collective expertise is important to improve market value to build the company-s reputation in the mind of the customer and increase investors' confidence.

Smallman and Ulrich (2004) identifies eleven organizational capabilities for well managed companies: includes talent, speed, shared mindset, and coherent brand identity, accountability, collaboration, learning, leadership customer connectivity, strategic cohesion, innovation, and efficiency. Where companies lack these competencies (or resist change), it can lead to competitive disadvantage.
A capabilities audit is critical to identify company identify gaps where a company must improve and develop capabilities that will support overarching strategic priorities.

2.4 ORGANIZATIONAL STRUCTURE

A culture of innovation encourages employees to think creatively and explore new ideas to develop new products and/or refine service and processes to give a competitive edge to the company. The organizational structure should be designed to be conducive for innovative thinking. Du Preez and Louw (2008) states an innovation management model specifically need to use road mapping for planning and deploying innovation within a collaborative deployment environment. Innovation needs to be planned carefully and the organisation should have a strategic vision of how a business should grow.



1

Figure 2-5 Organisational Architecture (MBA5901 class notes,2023)

2.5 ORGANIZATIONAL PERFORMANCE MEASUREMENT IN INNOVATION

Innovation Management is lacking in construction companies, and this can only be achieved if management makes it part of a strategic objective by mapping out the process on a strategy map.

The benefits of the strategy map and balanced scorecard details to stakeholders are as follows:

Clarity: The strategy map and balanced scorecard provide an agreed upon set of priorities, strategies, and outcomes for the institution

Alignment: The agreed-upon strategy map and balanced scorecard provide for alignment of purpose and effort in this instance, to institutionalise the innovation priorities for example: Everyone knows where the organisation is going, how employees are going to get there, and how progress will be assessed.

Transparency: This gives more line-of-sight transparency on progress than having other annual measures.

Accountability: Each measure has a designated owner (in this instance a designated innovation employee who is specifically tasked) to measure innovation strategic activities with clear threshold targets. This provides a clear pathway on accountability.

2.2.5.1 Strategy map

To indicate whether an organisation vision and strategy will be successful a strategy map or a road map needs to be developed in the context of innovation. Strategy maps are used to draw a map of the organisations strategy and show where different strategic objectives fit into the organisation. Strategic pillars need to be further broken down into strategic objectives to describe the specific things that must be performed well.

2

Figure 2-6: (An Exegesis Study of Strategy Map, 2021)

The strategy map provides a portion of a one-page visual map that includes the components that are aligned to form a cohesive, vertical strategy.

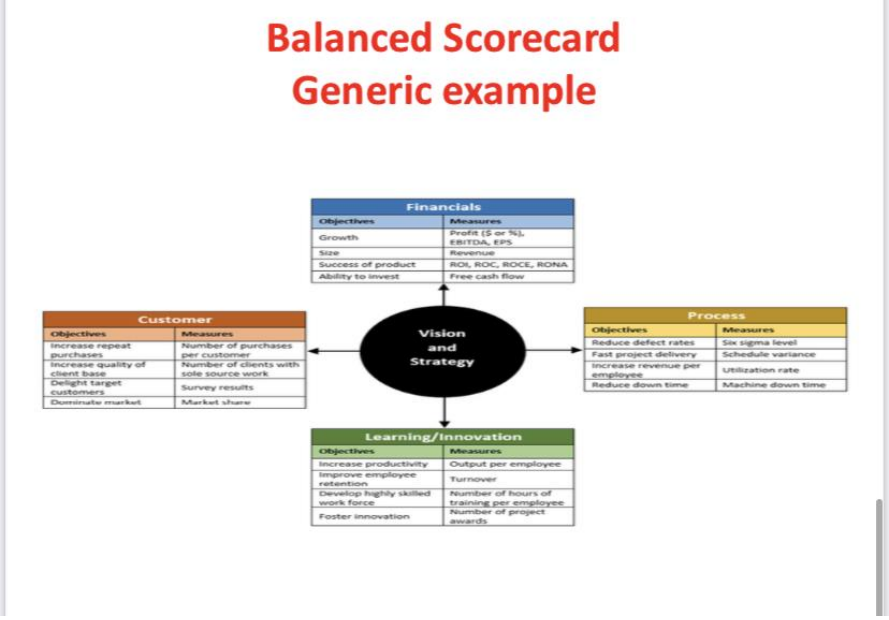
The strategy for each theme begins at the bottom at Organizational Capacity and links up to the top-level strategic result.

The four classical perspectives of the balanced scorecard provide balance while progressing up through the strategy.

The three lower objectives are the strategic ingredients or drivers used to accomplish the top-level strategic result, which then leads to seeing the theme and ultimate mission realized. Once this visual strategy map is formed, companies can move to the details of the balanced scorecard.

The strategy for each perspective will be assessed at J.C Van Der Linde and Venter Projects as the balance scorecard is used as a measuring tool.

2.2.5.2 Balanced scorecard (BSC)



3

Figure 2-7 Balanced scorecard(Mann,2013)

The balanced scorecard consists of four perspectives that includes:

Financial perspective -if we succeed how well we look to our stakeholders.

Customer perspective-to achieve our vision, how should our customers perceive us.

Internal perspective- to satisfy our customers what management processes must we excel at

People/Innovation perspective- To achieve our vision what culture and people will we need.

Mann (2013) state all mentioned perspectives are relevant for business to survive and remain in business in a fast-paced world economy. (financial is not the only perspective to focus on).

BSC develops objectives and Measures.

Each of the four perspectives of the Balanced Scorecard is looked at using the following components:

Objectives translate the goals into specific units of effort and are more specific. They should be SMART.

Measures: Are performance measures that can be used to track the progress made with regards to identified objectives. For each strategic directional objective there are accompanying meaningful measures with the owner, update cycle (annual, semester, monthly) and targets.

Targets: Targets specify each performance level that the organisation expects in terms of each strategic objective

Initiatives: Initiatives describe how objectives (desired end states will be achieved. Refers to programmes, activities or projection or actions on innovation an organisation will embark on to achieve its objectives.

2.6 BENEFITS OF INNOVATION

Fernando et al. (2019) state innovation in construction projects enables decreased cost, higher quality, health and safety improvements, minimized waste, reduced carbon emissions, additional cost savings in future projects due to gained experience, future collaboration along the supply chain, knowledge transfer to inform future projects, client and end user satisfaction, improved quality of life for local people, increased productivity, competitive advantage, organizational effectiveness, increased organizational commitment, higher organizational motivation, and enhanced corporate image and recognition.

Furthermore, benefits of innovation in the construction industry with regards to build projects are as follows:

1. A reduction in capital construction costs.
2. A reduction in the time available from client approval to practical construction

3. An increased number of projects completed on time and within budget.
4. A reduction of the number of defects on hand-over by contractor to the client
5. A reduction in the number of accidents
6. Increased productivity at all levels increased turnover and profitability for construction firms (Fernando 2019)

2.7 BARRIERS TO ADOPTING AND IMPLEMENTING INNOVATION IN THE CONSTRUCTION INDUSTRY

Blocked projects, delayed progress and extortions in the construction industry has caused a R68 billion economic loss for the economy (Matoma,2023). Disruptive elements, such as the construction mafia who monopolises the industry, poses a grave threat to the economic growth of South Africa

Fossum (2018) argues that the industry must keep its core business healthy and need to learn how to do proper innovation management as companies find it difficult and hard to innovate when profit margins are low.

2.8 LEGISLATION GOVERNING THE CONSTRUCTION INDUSTRY

The construction industry is regulated by an Act of Parliament, Act 38 of 2000. This act constituted a Construction Industry Development Board (CIDB) which promotes a regulatory and developmental framework which promotes growth within the construction industry delivery capacity in South Africa. A recent CIDB (2022) report found that there is only a slight increase in the construction sector due to the COVID pandemic and other economic conditions such as rising interest rates. This means this sector needs to innovate as it is growth trend shows the industry's performance is under par as it only is expected to have an average growth of 1% between 2021 to 2024.

2.9 CHAPTER SUMMARY

In conclusion, the literature review will review strategic innovation frameworks for the construction industry. Failure to regulate and grow this industry poses a serious risk

to the infrastructure of South Africa and it is important for companies to stay in business and not abandon building projects.

Numerous studies on construction innovation are found, but limited research is available into understanding on how innovation is perceived, assess, and conceptualise in the day-to-day operations of the construction industry. With the construction industry in severe crisis as studies have shown it is important that the industry look at a holistic integrated innovation framework to stimulate the economy and create value to customers. This chapter attempted to look at innovation frameworks to assess the level of innovation with regards to the construction industry.

As the construction industry is slow to adapt to changes the industry needs to examine incremental innovation as a point of departure which focuses on gradual changes and targets the internal arrangements of a company to create value for the market, but also identify more innovative strategies simultaneously to stimulate growth in the industry. Starting with the Porters value chain companies can determine activities in their internal arrangements to determine what activities are value added or non-value added to stay in business. Secondly, the customer matrix model must also be employed to determine customer preferences and needs to create new value in the market for its customers. Construction companies must make sure that the organisation have the necessary capabilities and collaborate with business partners to refine its products and services to stay competitive. Innovation must be part of a strategy map and measured by means of a balanced scored because only by measuring its processes a company can stay in business and improve its value proposition to its customers. The next chapter will focus on the research design and methodology employed in the study.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

West (2023) state South African contractors abandon projects and infrastructure is lagging with 10 years posing a serious threat to the growth and development of the country If companies want to be successful it is recommended that innovation frameworks (internal controls and external influences) be developed. This will enable individuals and companies to succeed now and, in the future (West,2023). Sustainable competitiveness is the ability of companies, sectors, individuals, and countries to create frameworks (policies, regulations, management tools, visions) that can generate income. Sustainability and competitiveness are the key to successful strategic positioning, as (Hough 2011) explains: “Strategy is about creating unique and valuable positions that encompass different sets of activities.”

Innovation must be a strategic priority and resources must be made available for innovation to be effective. Buy-in must be obtained from management as the environment must support change. Hence, organisations should develop a framework to innovate and develop a business as new ideas are not sufficient to create value for the market {Du Preez & Louw,2008}. Davis et al. (2018) argues that numerous studies on construction innovation is found, but limited research is available into understanding on how innovation frameworks is perceived, assess, and conceptualise in the day-to-day operations of the construction industry.

This chapter discusses the research design and methodology to be used to gather the data from participants.

3.2 RESEARCH DESIGN

3.2.1 Research philosophy

A research philosophy is a set of views and beliefs a regarding the development of knowledge in a particular field (Saunders, 2016:125). The research philosophy used for this research was the **positivist philosophy** which adopts the objective approach of a natural scientist. According to Garg (2016:66) a positivist philosophy is research undertaken in a value-free way and the researcher is independent of the data and

maintains objectivity. This method is based on observable and measurable facts and is usually based on quantitative data (Saunders, 2016:136).

3.2.2 Research strategy

The research strategy used in the study was surveys. The study was descriptive, as the researcher was exploring to what extent innovation practices were adopted and challenges experienced within the construction industry. The researcher found a descriptive approach most suitable for the study. The study was inductive in nature, with the collected data used to develop the theory.

3.2.3 Descriptive and explanatory research

Descriptive research aims to produce an accurate representation of real persons, events, or situations (Saunders, 2016:715). Descriptive statistics include measures of central tendency –average, median and mode – and measures of variability about the average (range and standard deviation.

The nature of the research was explanatory, and a quantitative research approach was followed. Explanatory research aims to examine a problem to explain the relationship between two variables. There are two forms of descriptive research design, namely the longitudinal and the cross-sectional design (Garg, 2016:65). A cross-sectional survey design is a survey strategy used to collect data at a particular period while a longitudinal survey design aims to collect data over a longer duration of time. Fr this study a cross-sectional design was considered most appropriate as the researcher was interested in a snap-shot view of current use of e-policing technologies at a specific point in time.

3.2.4 Target population and sample size

Population refers to a complete group of members being studied (Garg, 2016:84). The target population for the study was approximately 236 employees and a random sample of 100 employees were selected to fill in the questionnaires; 80 questionnaires were received back, but 5 of them were rejected due to incomplete information. Due to time and cost constraints a sample was selected from the construction company,

J.C Van Der Linde and Venter Projects. A sample is a smaller and more accessible subset of the population that is representative of that overall group (Garg,2016:84). Sampling enables the researcher to give an accurate picture (within acceptable limits) of the population, in relation to aspects of the research study (Saunders, 2016:17).

3.2.5 Probability sampling

Probability sampling was used to identify the approximately 75 employees from the construction company, J.C Van Der Linde and Venter Projects in Tshwane Central to whom questionnaires were issued. Probability sampling is a sampling technique in which the chance, or probability, of each case from selected from the population is known and is not zero (Saunders, 2016:724). The researcher used this method as the exact number of the target group was determined with the human resource office of the company. A response rate of between 40 and 50 per cent was expected (between 10 and 12,5 per cent of the target population). According to Garg (2016:84) a rule of thumb of 10 per cent of a population is regarded as adequate. Of 236 questionnaires distributed to the project sites, only 80 respondents filled it in and 5 of the questionnaires were rejected due to incomplete information. This represented a response rate of 31,7 % of the target population of which is adequate for research (Garg 2016:85).

3.2.6 Primary Data

Primary data are data which are collected for the first time, while secondary data are data that have been previous collected Garg (2016:69). The researcher opted for a survey-based research strategy, where a questionnaire was formulated based on previous research. Questionnaires are most suitable for descriptive and explanatory research (Garg,2016:74). The questionnaire consisted of open-ended questions and a Likert scale. Quantitative research that is absolute such as numerical data were gathered and examined in an unbiased manner.as it was measured with numbers and analysed using statistical techniques.

3.2.7 Secondary Data

Secondary data were collected to complement primary data that were received from the questionnaires. Secondary data related to current national and international innovative approaches and strategies were gathered by analysing documented sources such as recent newspaper articles, journals, books, government websites, J C Van der Linde and Venter annual reports received from the company, relevant legislation, policies, regulations, journal, magazine, and newspaper articles.

3.2.8 Pilot Study (Pretesting of questionnaire)

The survey-based questionnaire was designed carefully and tested with a few employees of the target population for improvements. Five questionnaires were reviewed at project site with three employees. Data collected using these questionnaires were not included in the final counting but were used only to establish the relevancy of questions, the comprehension of the questionnaire and to ensure the data collected would be valid and accurate.

3.2.9 Instrumentation (Questionnaire design)

To enable easier presentation and interpretation of data, a questionnaire with multiple selection, rating scale and open-ended questions was used to gather primary data from employees (Annexure C). Closed-ended questions were used to monitor current extent of adopting innovation practices in J C van der Linde and Venter Projects. Questionnaires were chosen in this study because respondents of the study would then be able to answer questions comprehensively. The researcher could then also assure the respondents about the confidentiality of their responses. The researcher personally administered the questionnaire with assistance from site managers at the project sites. According to Garg (2016:74), questionnaires are an appropriate method of collecting primary data to measure attitudes, opinions, behaviour, and preferences.

The first objective was to determine the extent to which constraints regards to innovation approaches were experienced in project sites. This objective was operationalised by using the following relevant dimensions and innovation approaches. The literature suggests that the construction industry is slow to adopt innovation strategies (Gupta, 2020). The success of innovation depends on key assessments. This includes determining the extent of employees' understanding of

innovation, their capabilities in innovation, and the extent to which innovation are stimulated in the companies. Companies must create a climate conducive for innovation. Consequently, it was necessary to measure certain innovation theories and approaches. Table 3-1 expands on the dimensions and indicators employed about the first research objective.

Table 3-1: Current Innovation processes and strategies adopted in J.C van der Linde and Venter Projects.

Dimension	Item	Indicator
Competencies to deliver the business strategy	1	Speed to deliver results
	2	Lack of skills to implement innovation
	3	Generating new ideas with impact
	4	Do you innovate in product, strategy, service and administration?
	5	Do you reduce costs by closely managing costs, people and processes?
	6	Other (Please specify
Workplace culture	1	Customer centric
	2	Innovation centered
	3	Results driven
Customer Service	1	Understanding customer needs
	2	Following up on positive/negative feedback
	3	Monitor social media platforms for positive and negative comments
	4	Monthly meetings to meet or manage customer needs

The second objective was to determine the extent of current adoption and likelihood of future adoption of innovation approaches in building projects at J C van der Linde and Venter Projects. Table 3-2 expands on the operationalisation of the second research objective.

Table 3-2: The reasons for developing and implementing innovation processes within J.C Van Der Linde and Venter Projects.

Dimension	Item	Indicator
Reasons for refining and reviewing innovative. processes	1	Reduce costs by refining or reviewing processes.
	2	Do we increase productivity of project teams
	3	Compliance safety requirements
	4	Learning and development of workers to add value
	5	Is there competitive differentiation and sustainability in the market
	6	Is there increased value proposition to the customer

The third objective was to determine the extent to which innovation strategies have been adopted and measured by the company in support of decision-making processes Table 3-3 expands on the dimension and indicators employed regarding the first research objective.

Table 3-3: Innovation needs and challenges in J.C Van Der Linde and Venter Projects.

Dimension	Item	Indicator
Innovation Strategies	1	Disruptive innovation (reinventing the industry by coming up with new technology improvements)

	2	Incremental innovation (Refining existing products and services. Streamlining execution of your existing processes)
	3	Other (Please specify)
Constraints	1	Lack/ Poor operations
	2	Lack of skilled labour
	3	Lack of technology
	4	Inadequate training or courses relevant to construction.
	5	Outdated building technology
	6	Project delays
	7	Other (Please specify)

Table 3-4 Proposed solutions and recommendations of innovation in J.C Van Der Linde and Venter Projects.

Dimension	Item	Indicator
Solutions and recommendations	1	Technology used in projects.
	2	Leadership brand that directs managers on which results to deliver and how to deliver them.
	3	Training and development to empower employees to deliver on key projects and processes.
	4	High performing teams with the competencies to achieve key objectives
	5	Timely project delivery.
	6	Customer centric culture.
	7	Implementation of updated building technology (e.g. apps, 3d technology, drones)

	8	Does the company provide incentives for new innovative ideas or processes
	9	Incremental innovation (refining new ideas and service)
	10	Streamlining execution of administrative processes to add value to the company
	11	Does the company incorporate good external business practices that align with organizational goals
	12	Does the company form strategic alliances/partnerships with subcontractors to deliver projects on time

3.2.10 Data analysis

3.2.10.1 Descriptive analysis

Descriptive analysis was used to summarise the set of data collected, including measures of central tendency (mean, median and mode) and measures of frequency. The collected data were analysed using quantitative approaches. Descriptive analysis of primary data was done using Excel®; Frequency tables and graphs were used to present the data for easy interpretation. Descriptive data collected were coded according to emerging themes and included in the quantitative data.

3.2.10.2 Document analysis

Secondary data on current national and international innovation framework approaches were studied using document analysis. Annual reports from company website, books, articles, and journals were analysed to gain an insight of the topic.

The following section describes the activities the researcher undertook to establish reliability and validity of the instrument.

3.3 VALIDITY AND RELIABILITY

According to Saunders (2016:202) the concepts of validity and reliability are important considerations in the method and construction of measurement instruments. Reliability is the degree to which a measurement presents highly similar and uniform results each time when measures are taken in the same situation. Cronbach's alpha coefficient, which is a widely accepted measurement for reliability testing, was used to establish the reliability of instruments used in this study. The research instrument, a survey, consist mainly of objective items and open-ended questions of a factual nature. Such items are unlikely to threaten the reliability of the instrument or introduce the risk of bias when analysing and interpreting the results of the study.

Validity is the strength of our conclusions, inferences, or propositions (Saunders, 2016:202). Content validity is a measure of the extent to which information gathered utilising a specific instrument relates to a specific domain or content of a particular concept. It refers to how adequately the questionnaire covers the research questions. To ensure content validity of the research instrument the researcher requested guidance from the supervisor to ensure that the questionnaire measured the intended objectives of the study and that data collected would be valid and accurate.

3.4 ETHICAL CONSIDERATIONS

All respondents were dealt with in a dignified, respectful manner and ethical considerations related to informed consent and identity protection were applied (Annexure B). Confidentiality was, has been and will be maintained throughout the study and beyond. Ethical clearance for the project was sought and obtained from the Research Ethics committee of the University of South Africa and the approved research protocol was followed to ensure that no harm came to research participants. The researcher obtained an introductory letter authorising participation in the study from J.C van der Linde and Venter Projects: This process was also thoroughly communicated to all the project managers at the project sites. Participants were informed of the nature and purpose of the research, and their participation was voluntary. Participants were allowed to provide information without any inconvenience and interference in their daily tasks. Any sign of discomfort from participants was dealt with promptly and sensitively. Respondents were allowed a reasonable time to fill in

questionnaires, which were then collected in person by the researcher and participation were completely voluntarily and anonymously to protect the participants.

3.5 CHAPTER SUMMARY

This chapter described the research design used in this study. The research population and sample, data collection strategies, data analysis, validity and reliability, and ethical considerations were discussed. Due to time and budgetary constraints the research participants were limited to the construction company JC van der Linde and projects. The method of data collection, as well as the instrumentation of the study were described. The research instrument—a survey—sought specific information required to support recommendations to the directors on how they can review an innovation framework to add value to gain competitive advantage and stay in business.

In Chapter four the focus will be on presenting the results of the data collection, as well as on the analysis and interpretation of these results. The data analysis aims to examine whether innovation initiatives are present in JC van der Linde and Projects and to provide possible recommendations to the company in this regard thereby adding value to sustainability and competitiveness of the company.

CHAPTER 4: DATA COLLECTION AND DATA ANALYSIS

4.1 INTRODUCTION

This chapter shows the findings of the study. The data are presented in tables and graphs and the researchers" results are presented and interpreted. The study reports response rate and demographic information of respondents, measures innovation strategies used in construction projects such as competencies to deliver the business strategy, workplace culture customer service, reasons for developing innovation frameworks, innovation needs and constraints. The study also explores solutions and recommendations of innovation frameworks in J.C Van Der Linde and Venter Projects, using Cronbach alpha, descriptive statistics, and correlation analysis. The chapter concludes by summarizing the results of the study.

4.2 DATA COLLECTION

The Likert scale was used for the survey through a survey questionnaire that was distributed to the project sites and head office of the targeted respondents, The respondents were given two weeks to respond whereafter the completed questionnaires were collected logged and analyzed. The sample size comprises all departments in JC van Der Linde and Venter Projects, a construction company in the Tshwane region. The researcher collected 80 questionnaires from a population size of 236 employees. 5 Questionnaires were rejected due to incomplete information. This represented a response rate of 31,7 % of the target population of which is adequate for research (Garg 2016:85).

4.3 DATA ANALYSIS

4.3.1 Demographics

Descriptive analysis was performed to obtain frequency distribution of demographic variables such as gender, length of service with the company and different departments Table 4-1 illustrates frequency distribution of demographic variables.

Table 4-1 Demographic characteristics

Demographics		Count	Percentage
A1 What is your gender?	Male	43	57,3%
	Female	32	42,7%
	Total	75	100,0%
A2 What is your highest level of education?	Postgraduate	37	49,3%
	Undergraduate	23	30,7%
	Secondary	10	13,3%
	Primary	0	0,0%
	Other	5	6,7%
	Total	75	100,0%
A3 How long have you worked in J.C Van Der Linde and Venter Projects?	Less than 5years	51	68,0%
	6 to 10 years	13	17,3%
	11 to 15 years	10	13,3%
	16 to 20 years	0	0,0%
	Above 20 years	1	1,3%
	Total	75	100,0%
A4 Which department are you involved in at J.C Van Der Linde and Venter Projects?	Site personnel	41	54,7%
	HR and Payroll	11	14,7%
	Procurement	6	8,0%
	Finance	17	22,7%
	Total	75	100,0%

4.3.2 Gender distribution

Sang and Powell (2013) argue the construction industry is male dominated and lack equality and diversity. The current study supports the argument as 57,3 percent males participated in the study compared to the 42,7 percent females..Morrison(2021) argue inclusion and gender equality is critcal for the industry as diverse construction teams is 132 times more productive and innovative.. The researcher observed the high level of women who participated in this study are more used in office position than on job sites and this stereotyping that physical work is more suited for men, points to a gender gap on project sites which need more inclusion of women.

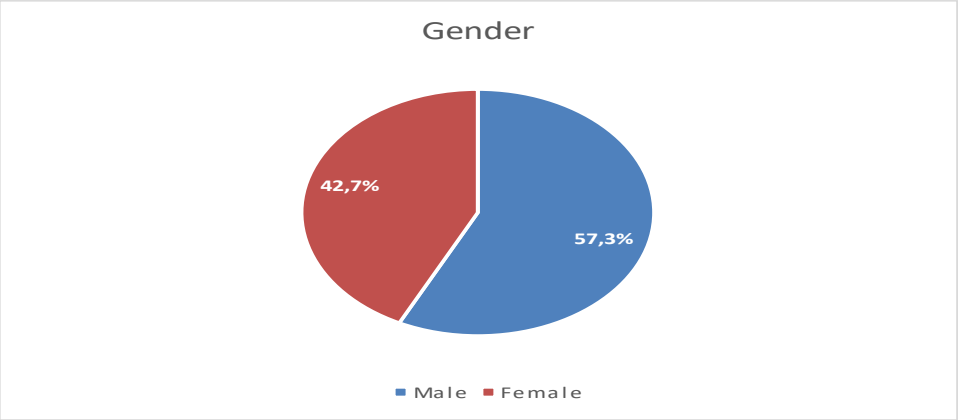


Figure 4-1 Gender Distribution

Morrison ((2021) argue it is important stimulate innovation and rebuild the construction industry through diversity and inclusion.

4.3.3 Education distribution of respondents

JC van der Linde and Venter hires a high level of undergraduates (30,7 percent) and postgraduates (49,3 percent) as Figure 4-2 shown. This shows the company is willing to attract new talent and gain more business as it's skills development plan for job creation of unemployed young university entrants and graduates. According to the company website, its BEEE status is a level 2 as it hires minority groups with limited experience (32 percent of its personnel are black youth). This initiative increases the company's reputation and shows it is diverse and innovative as millennials are growing up in a world with electronics.

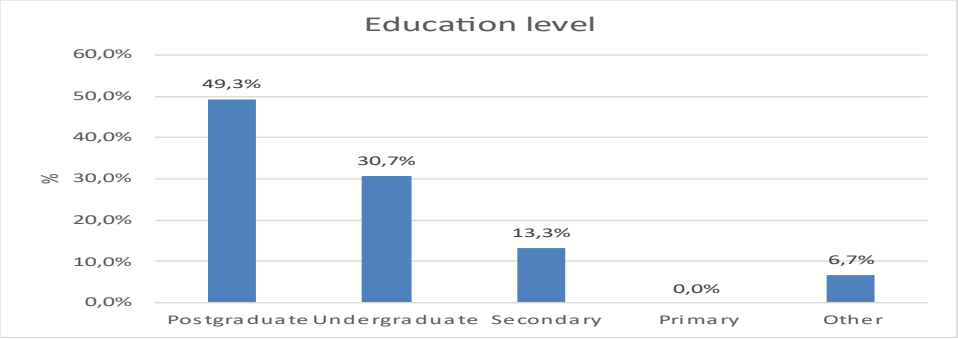


Figure 4-2 Education level

4.3.4 Experience in construction of site and administrative personnel

Figure 4.3 illustrates that 68 percent of the respondents who participated in the study are less than 5 years at the company., but 17,3 percent respondents are in the 6 to 10 years bracket. This shows a gap as the company develops graduates, but they leave after 5 years for better opportunities and benefits.

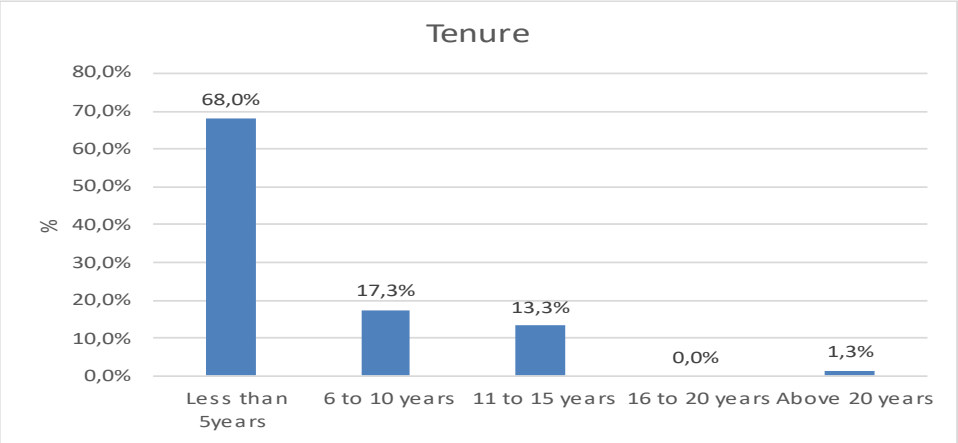


Figure 4-3 Years of experience

4.3.5 Department distribution

Figure 4-4 shows that 54,7 percent of the respondents are site personnel, while the rest of the personnel are office personnel. Mostly women in construction work as office personnel and not on project sites. All departments (inbound and outbound operations) forms part of the value chain and is equally important to create effectiveness; Ferera and Gunatlaka (2018) argue construction companies must review and manage their value chain frequently to improve value and eliminate waste, such as reduction of cost and project delays. to maximize profit share.

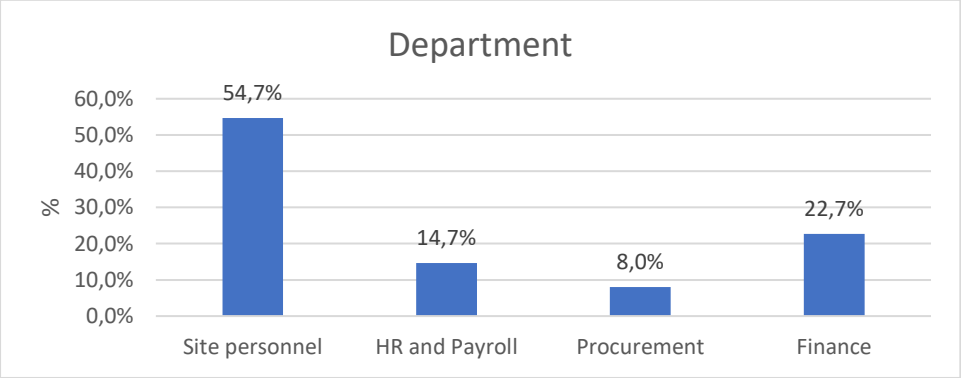


Figure 4-4 Department

4.4 RELIABILITY

Cronbach's alpha was used to test the extent to which a set of items can be used to measure a single latent variable- known as the reliability of the questionnaire. The closer the Alpha value is to one, the higher the internal consistency or reliability. An Alpha value of 0.7 or higher is deemed acceptable. The consistently high Alpha values for the dimensions of the questionnaire mean that the items measure the same underlying construct and therefore have a high reliability.

Table 4-2: Cronbach's Alpha

Item	Cronbach's Alpha	Number of Items
Competencies to deliver the business strategy	0,957	5
Workplace culture	0,899	3
Customer Service	0,951	4
Reasons for refining and reviewing innovative processes	0,975	6
Innovative Strategies	0,905	2
Constraints	0,984	6
Proposed solutions and recommendations of innovation	0,982	12
Overall Cronbach 's Alpha	0,994	38

4.5 DESCRIPTIVE ANALYSIS

This section will quantitatively describe the main elements of data collection aimed at summarizing samples and measures drawn from the data set. In conjunction with tables and graphs these form the basis of the quantitative data analysis. Quantitative data are objective and consequently the research results are reliable.

4.5.1 Opinions of the respondents regarding current innovation processes and strategies adopted in J. C van der Linde and Venter Projects

Table 4.3 illustrates the opinions from respondents regarding current innovation processes and strategies adopted in the construction industry. A five-point rating scale

questionnaire was used to calculate scores from the 75 respondents represented by (5) very great extent, (4) great extent, (3) moderate extent, (2) little extent and (1) not at all.

Quantitative analysis of data points obtained from a rating scale can't be done with the same precision as when data points are purely numeric, as the intervals between different points on the scale aren't fixed, for example: the difference between two consecutive integers is 1, however the difference between "" very great extent "" and "" great extent"" can't be determined. However, data retrieved from a rating scale does give some indication of the concentration and dispersion of data points, as well as of the strength and direction of any measured variables.

Three core objectives were identified and analyzed under current innovation processes and strategies; competencies to deliver the business strategy, workplace culture and customer service.

Table 4-3: Opinions of the respondents regarding current innovation processes and strategies adopted in J.C van der Linde and Venter Projects

Objective B1: Competencies to deliver the business strategy: Indicate to which extent innovative strategies are used in building projects?				
Item	**Indicator**	**Mean**	**Standard Deviation**	**Description**
B1_1	Speed to deliver results	4,20	,753	Great extent
B1_2	Lack of skilled labour	2,99	1,133	Moderate extent
B1_3	Generating new ideas with impact	4,04	,687	Great extent
B1_4	Do you innovate in product, strategy, service and administration	4,05	,804	Great extent
B1_5	Do you reduce costs by closely managing costs, people and processes?	4,43	,701	Great extent

Note: Speed (4,20) and cost reduction (4,43) scored the highest under this objective as it is a project environment. About 55 percent of respondents indicated that costs in all operations are closely managed; 44 percent of respondents indicated innovation are practiced in JC van der Linde and Venter Projects. Respondents indicated there is only to a moderate extent a lack of skilled labor in the company. This link to the demographic characteristics where it can be seen in the study that the company recruit under graduates and postgraduates to a large extent.

Objective B2 Workplace culture: Indicate to which extent a workplace culture is practised at J.C Van Der Linde and Venter Projects?

Item	Indicator	Mean	Standard Deviation	Description
B2_3	Customer centric	4,47	,664	Great extent
B2_1	Results driven	4,41	,639	Great extent
B2_2	Innovation centered	4,08	,673	Great extent

Note: About 54,7 percent of respondents rated a customer-centric workplace culture to a great extent (4,47). Innovation centered(4,08) scored lowest.

Objective B3 Customer service: Determine the extent to which you value customers at J.C van der Linde and Venter Projects?

Item	Indicator	Mean	Standard Deviation	Description
B3_1	Understanding customer needs	4,41	,639	Great extent
B3_2	Following up on positive/negative feedback	4,32	,756	Great extent
B3_4	Monthly meetings to meet or manage customer needs.	4,09	,918	Great extent
B3_3	Monitor social media platforms for positive and negative comments	3,85	1,009	Great extent

Note: About 50 percent respondents indicated understanding customer needs are valued to a “great extent’’: 48 percent respondents follow up on positive/negative feedback. Research indicates that 73 percent of customers leave due to bad

customer service (Powell,2017). The study shows respondents concurs with understanding customer needs to add value to innovate and sustain the business. However, respondents' rates monitoring social medial platforms for positive and negative feedback in the construction industry to a lesser degree. Social media platforms are used globally to reach customers more effectively and this needs to be explored by construction companies.

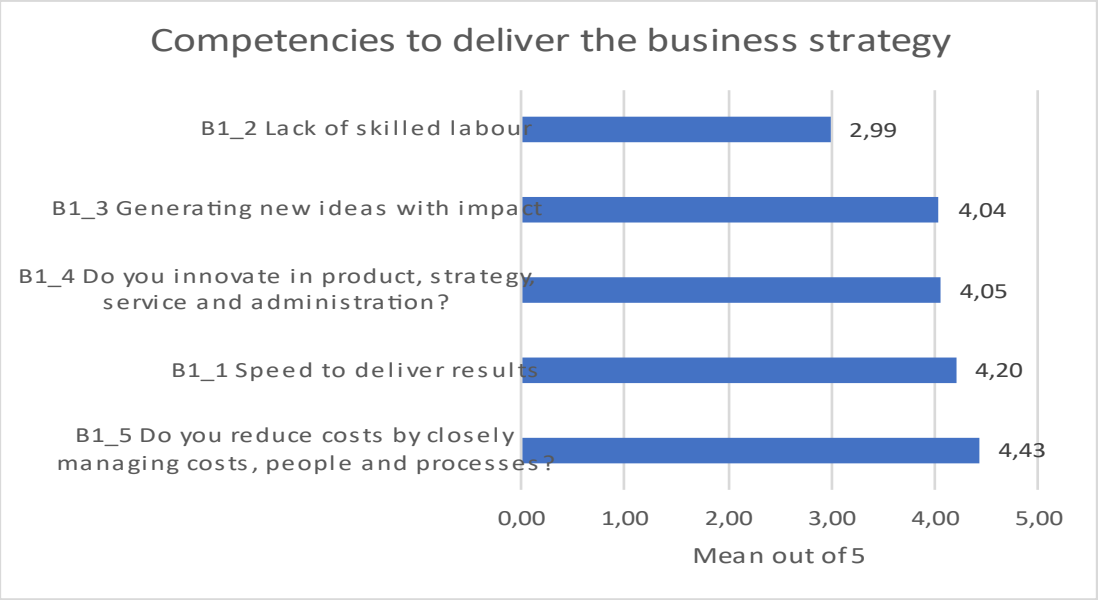


Figure 4-5 Deliver a business strategy.

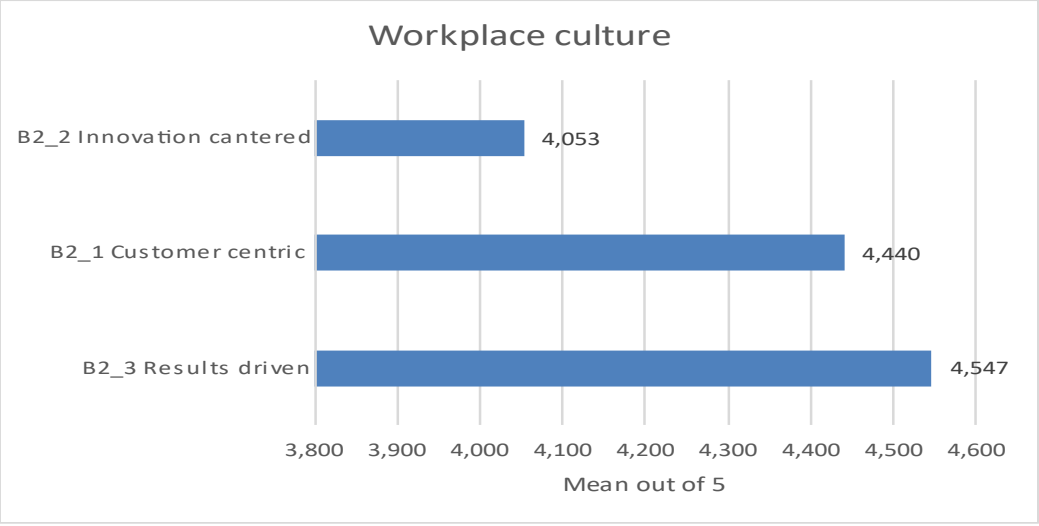


Figure 4-6 Workplace Culture

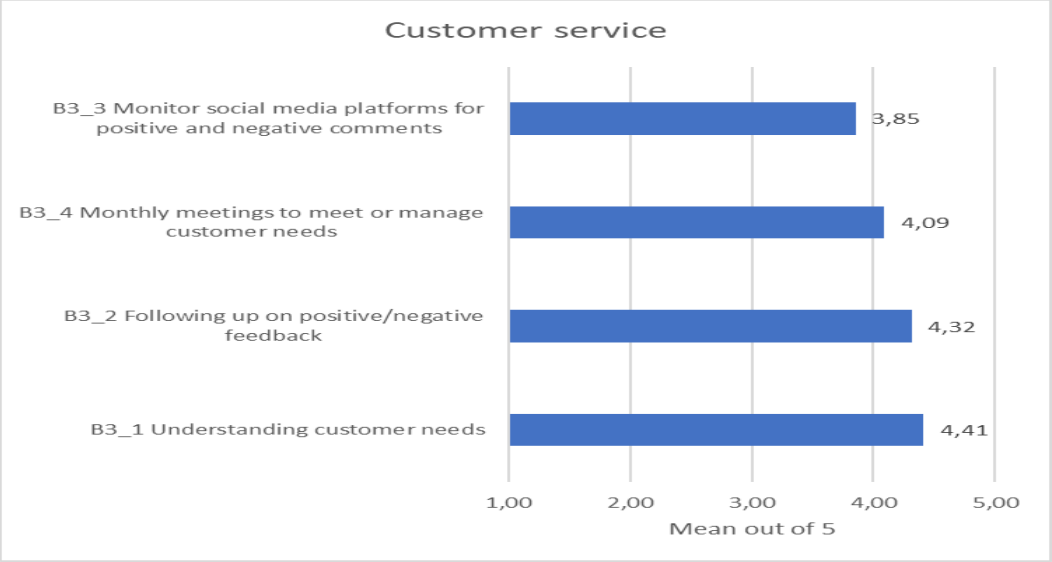


Figure 4-7 Customer Service

4.5.2 Opinions of the respondents regarding reasons for refining and reviewing innovation processes within J.C van der Linde and Venter Projects

In the next objective it was analyzed to which extent respondents refined and reviewed innovation processes within the company.

Table 4-4: Opinions of the respondents regarding reasons for refining and reviewing innovation processes within J.C van der Linde and Venter Projects

Objective C1 Refining and reviewing innovation processes: Indicate the extent to which JC van der Linde and Venter Projects employees refine and review innovative processes?				
Item	**Indicator**	**Mean**	**Standard Deviation**	**Description**
C1_2	Do we increase productivity of project teams	4,35	,797	Great extent
C1_5	Is there competitive differentiation and sustainability in the market	4,33	,777	Great extent
C1_4	Learning and development of workers to add value	4,31	,735	Great extent

C1_3	Compliance safety requirements	4,29	,912	Great extent
C1_1	Reduce costs by refining or reviewing processes	4,17	,665	Great extent
C1_6	Is there increased value proposition to the customer	4,03	,735	Great extent
Note: It is observed that all scores are very close in table 4-4 (all above a 4 rating). About 53,3 percent respondents view 'productivity of project teams' as the highest score (4,35), to a 'great extent'.; 54,7 percent respondents indicate sustainability and competitive differentiation to a 'great extent' (4,33) in the market which largely indicates respondents see the importance of 'refining and reviewing innovative processes.				

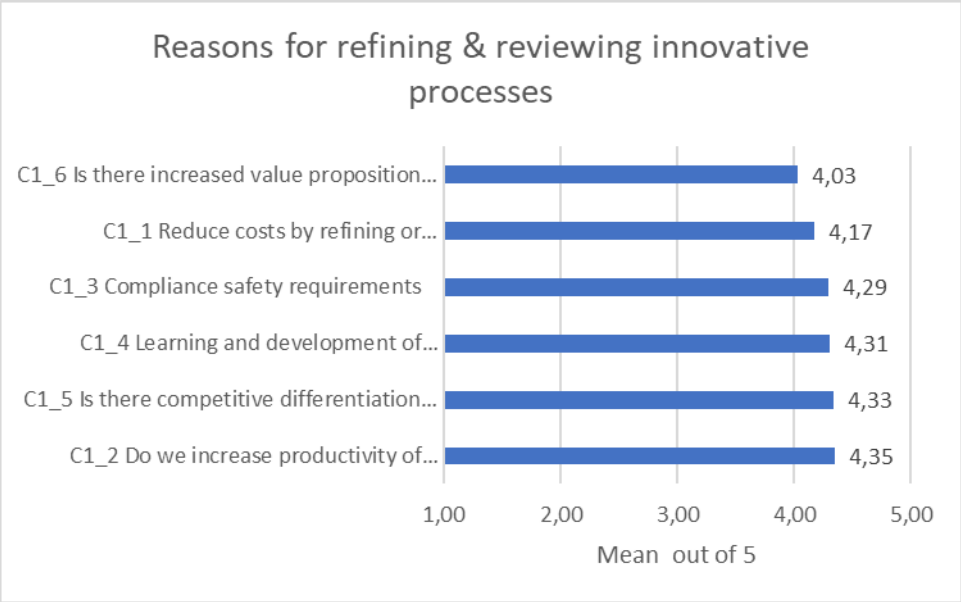


Figure 4-8 Innovative Processes

4.5.3 Opinions of respondents regarding innovation needs and challenges in J.C van der Linde and Venter Projects

In this category respondents were asked to analyse to which extent innovation strategies and constraints are used in the company to determine what is currently relevant in the construction industry. Only two main types of innovation strategies were

identified and included for this objective. The study also went further to explore respondents' views regards to challenges experienced in relation to their daily activities.

Table 4-5: Opinions of respondents regarding information needs and challenges in J.C van der Linde and Venter Projects

Objective D1 Innovation strategies: Indicate the extent to which and or /type of innovation strategies used in JC van der Linde and Venter Projects?				
Item	**Indicator**	**Mean**	**Standard Deviation**	**Description**
D1_2	Incremental innovation (Refining existing products and services. Streamlining execution of your existing processes)	4,00	,994	Great extent
D1_1	Disruptive innovation (reinventing the industry by coming up with new technology improvements)	3,72	,788	Great extent
Note: About 53,3 percent respondents primarily indicate that the company is more incremental (4,00) than disruptive (3,72).				
Objective D2 Constraints: To Indicate the extent to which innovation constraints/challenges are faced in employees' daily activities.				
Item	**Indicator**	**Mean**	**Standard Deviation**	**Description**
D2_2	Lack of skilled labor	3,05	1,126	Moderate extent
D2_6	Project delays	2,93	1,150	Moderate extent
D2_1	Lack/ poor operations	2,91	1,903	Moderate extent
D2_4	Inadequate training or courses relevant to construction.	2,44	1,017	Little extent

D2_5	Outdated building technology	2,43	,989	Little extent
D2_3	Lack of technology	2,36	,925	Little extent
Note: Respondents rated skilled labor (3,05) and project delays (2,93) less of a challenge than lack of technology (2,36) and outdated building technology (2,43) as can be seen in Figure 4-9. This could point to technology not being primarily used on construction sites and needs some further research as research pointed out that this industry is lagging to adapt to new technology. Use of new technology points to disruptive innovation and respondents views incremental (small improvements) are more applied in daily activities.				

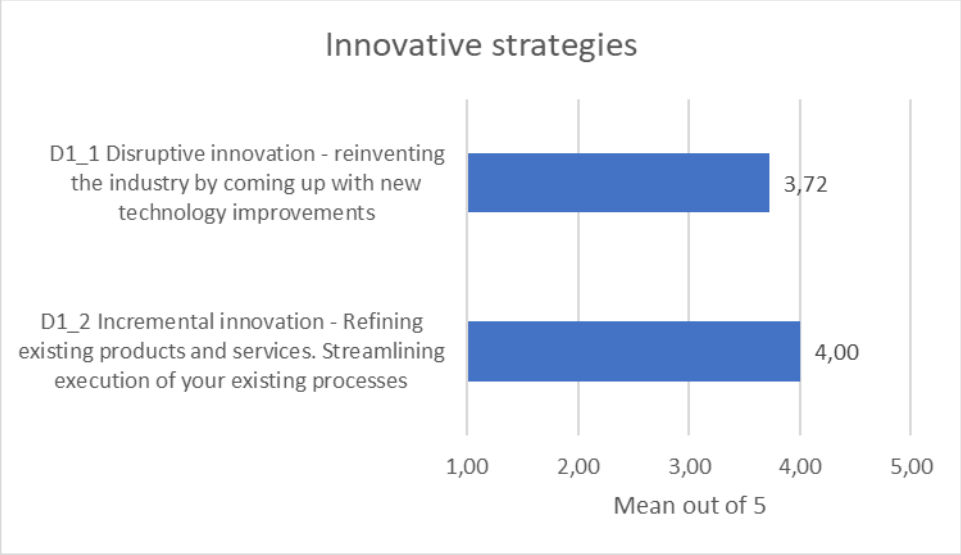


Figure 4-9 Innovative strategies

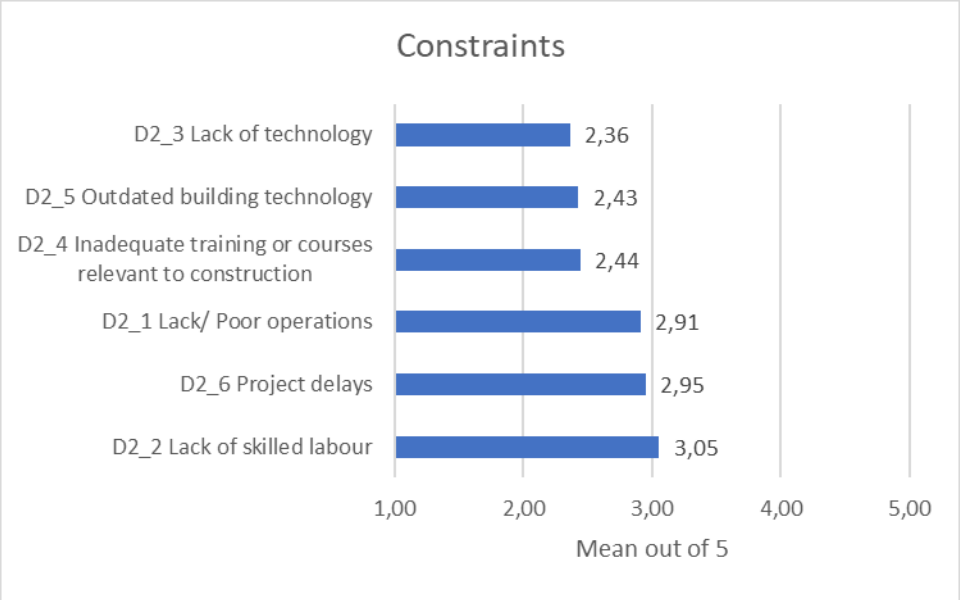


Figure 4-10 Constraints

4.5.4 Opinions of respondents regards to proposed solutions and recommendations of innovation strategies in JC van der Linde and Venter Projects

For this objective twelve indicators were identified for the purpose of this study and the opinions of respondents regarding the extent to which proposed solutions and or recommendations were analyzed.

Table 4-6: Opinions of respondents regards to proposed solutions and recommendations of innovation strategies in J.C van der Linde and Venter Projects

Objective E1 Solutions and recommendations: Indicate the extent to which extent you recommend the following strategies be implemented in the J.C Van Der Linde and Venter Projects?				
Item	**Indicator**	**Mean**	**Standard Deviation**	**Description**
E1_5	Timely project delivery	4,48	,828	Great extent
E1_1	Technology used in projects.	4,27	,723	Great extent

E1_4	High performing teams with the relevant competencies to achieve key objectives	4,23	,746	Great extent
E1_2	Leadership brand that directs managers on which results to deliver and how to deliver them.	4,20	,854	Great extent
E1_12	Does the company form strategic alliances/partnerships with subcontractors to deliver projects on time	4,28	,669	Great extent
E1_3	Training and development to empower employees to deliver on key projects and processes	4,21	,890	Great extent
E1_11	Does the company incorporate good external business practices that align with organizational goals	4,19	,711	Great extent
E1_6	Customer-centric culture	4,16	,806	Great extent
E1_10	Streamlining execution of administrative processes to add value to the company	4,12	,788	Great extent
E1_7	Implementation of updated building technology (e.g. apps, 3d technology, drones)	4,05	,837	Great extent
E1_8	Incremental innovation (refining new ideas and service)	3,92	1,148	Great extent

E1_9	Does the company provide incentives for new innovative ideas or processes	3,36	1,311	Little extent
Note: In this table 4-6 it is observed that all the average scores are above four except for company incremental innovation and incentives, which shows that respondents highly recommend all these recommendations. Timely project delivery and high performing teams in projects scored higher than innovation and incentives. The low score indicates on innovation and incentives, that there is not a formal innovation plan in place as new ideas are not rewarded, hence, not seen as a priority by respondents.				

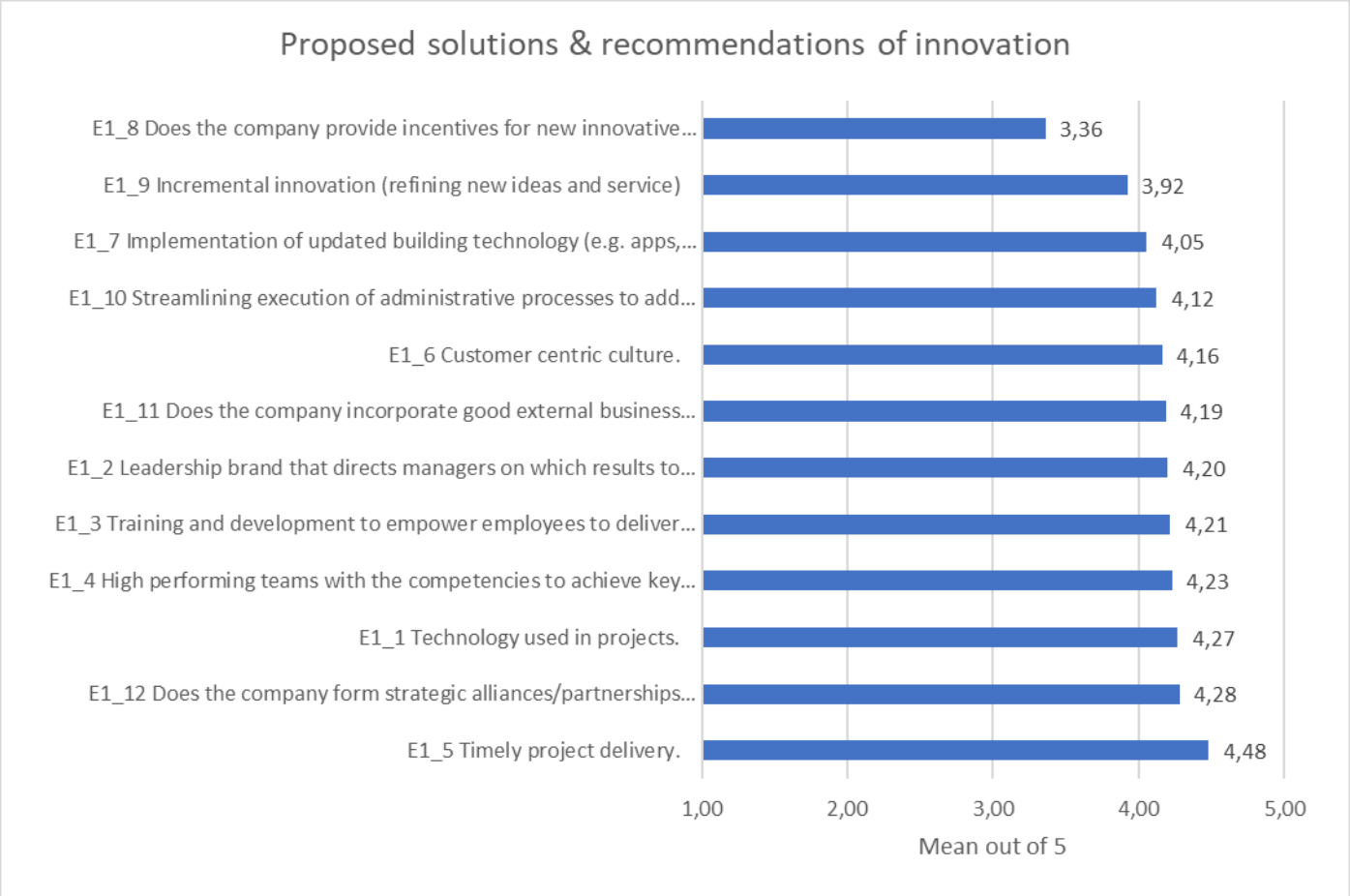


Figure 11 Solutions and Recommendations

4.5.5 Summary of descriptive values

In this paragraph the average mean and standard deviation regards to all the objectives are discussed.

Table 4-7 Summary of descriptive values of respondents regarding current innovation processes and strategies adopted in J.C van der Linde and Venter Projects

Item no	Objectives	Average (mean)	Standard Deviation	Count	Rating
B1	Competencies to deliver the business strategy	3,93	,763	75	Great extent
B2	Workplace culture	4,35	,571	75	Great extent
B3	Customer Service	4,24	,700	75	Great extent
C1	Reasons for refining and reviewing innovative processes.	4,26	,703	75	Great extent
D1	Innovative Strategies	3,80	,788	75	Great extent
D2	Constraints	2,89	1,018	75	Moderate extent
E1	Proposed solutions and recommendations of innovation	4,07	,784	75	Great extent

These results indicate that customer service (4,24) and reasons for refining and reviewing processes (4,26) were rated the highest by respondents.

Proposed solutions and recommendation of innovation (4,07) were also rated to a ‘great extent’, meaning that respondents see the importance of innovation as important to create value for the market.

Respondents acknowledge the value of innovation strategies from a ‘moderate’ to a ‘great extent’. However, the research shows that there is still not a clear-cut innovation plan in place in the organization to guide employees as to how innovation must be implemented. This concurs with the findings of a recent study that indicates 97 percent

of executives worldwide view innovation as a top priority, but 50 percent don't have an innovation plan and 55 percent don't believe their organizations' change fast enough, whilst 56 percent believe their companies don't have the time to turn new ideas into reality (Gutshe,2020).

4.6 CORRELATION ANALYSIS

Garg (2016:96) stated that correlation analysis is used to measure the strength of relationships between two or more variables, however it does not indicate cause and effect, Pearson's coefficient is the most statistical method to measure the relationship between two or more variables. The Pearson (r -value) indicates strength and direction, either negative or positive of the correlation, while the p- value indicates that a certain given r- value occurred by chance. A perfect positive correlation will be (r = +1), while (r = -1) means a perfect negative relationship. Correlation analysis was performed to test the relationship between the dimensions "competencies to deliver the business strategy", "workplace culture", "customer service", "reasons to refining and reviewing innovation processes", "innovative strategies "constraints" and "proposed solutions and recommendations of innovation" on the one hand and "extent of level of innovation" in building projects in JC van der Linde and Venter Projects.in Tshwane on the other.

Correlations

		Competencies to deliver the business strategy	Workplace culture	Customer Service	Reasons for refining and reviewing innovative processes	Innovative Strategies	Constraints	Proposed solutions and recommendations of innovation
Competencies to deliver the business strategy	Pearson Correlation	1	.356**	.378**	,205	.249*	.233*	,167
	Sig. (2-tailed)		,002	,001	,078	,031	,045	,153
	N	75	75	75	75	75	75	75
Workplace culture	Pearson Correlation	.356**	1	.357**	,154	,201	-,129	.278*
	Sig. (2-tailed)	,002		,002	,189	,083	,269	,016
	N	75	75	75	75	75	75	75
Customer Service	Pearson Correlation	.378**	.357**	1	,057	.251*	-,093	.246*
	Sig. (2-tailed)	,001	,002		,629	,030	,425	,033
	N	75	75	75	75	75	75	75
Reasons for refining and reviewing innovative processes	Pearson Correlation	,205	,154	,057	1	.307**	-,066	.315**
	Sig. (2-tailed)	,078	,189	,629		,007	,574	,006
	N	75	75	75	75	75	75	75
Innovative Strategies	Pearson Correlation	.249*	,201	.251*	.307**	1	,085	.234*
	Sig. (2-tailed)	,031	,083	,030	,007		,468	,044
	N	75	75	75	75	75	75	75
Constraints	Pearson Correlation	.233*	-,129	-,093	-,066	,085	1	-.259*
	Sig. (2-tailed)	,045	,269	,425	,574	,468		,025
	N	75	75	75	75	75	75	75
Proposed solutions and recommendations of innovation	Pearson Correlation	,167	.278*	.246*	.315**	.234*	-.259*	1
	Sig. (2-tailed)	,153	,016	,033	,006	,044	,025	
	N	75	75	75	75	75	75	75

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4-8 Correlation analysis

The most used correlation is the Pearson coefficient which ranges from -1.0 to +1.0. The Pearson correlation coefficient is a measure that determines the degree to which the movement of two different variables is associated. Correlation refers to a statistical relationship, it does not indicate cause and effect, but only shows the strength of association between the two variables. Using Pearson's correlation coefficient, Table 4-8 shows the result of the correlation between each factor determining the extent of level of innovation strategies in construction projects.

For instance: a score of -.7 to -.1 is a very strong negative, -.5 to. -.7 points to strong negative, ,5 moderate negative -,3 weak negative, and 0 is a zero (no linear relationship).

0 to ,3 is a weak positive,.3 to .5 is a moderate positive, 5 to .7 strong positive and .7 to 1 very strong positive relationship (Bandari, 2023).

The results in Table 4-8 show the following correlation results:

4.6.1 Competencies to deliver the business strategy (objective B1)

There is moderate positive relationship between the two variables ‘’competencies to deliver the business strategy’’ and ‘’customer service’’ (r = .378; n = 75; p < 0.01).

4.6.2 Workplace culture (Objective B2)

There is a weak negative relationship between the dimensions ‘’workplace culture’’ and ‘’constraints’’ (r = .129, n=75. p = .42).

4.6.3 Customer Service (Objective B3)

There is a moderate positive relationship between ‘’customer service’’ and “reasons for refining and reviewing innovative processes’’ (r = .378; n = 75; p < 0.01).

4.6.4 Reasons for refining and reviewing innovative processes (Objective C1)

There is a moderate negative relationship between ‘’reasons for refining and reviewing innovative processes’’ and ‘’constraints’’ (r = .66, n=75, p = .57).

4.6.5 Innovative strategies (Objective D1)

There is a positive relationship (weak to moderate) between Innovative strategies and all the other dimensions. The relationship between ‘’reason refining and reviewing innovative strategies’’ and’’ innovative strategies’’ is moderate positive (r = .370, n=75, p< 0,01)

4.6.6 Constraints (Objective D2)

There is a weak negative relationship between ‘constraints’ and all the other dimensions except the items’’ competencies to deliver the business strategy’’, which is moderate positive (r=.233, n =75, p = ,045) and ‘’constraints’’ (r=0,85, n=75. p=;468), which is weak positive.

4.6.7 Proposed solutions and recommendations (Objective E1)

There is a weak to moderate positive relationship between ‘’proposed solutions and recommendations’ of innovation and all the other dimensions, except the item ‘constraints’, (r = - .259, n =75, p = ,025), which is a very weak negative relationship.

4.7 DISCUSSION

The intention of this study is to determine to what extent J.C van der Linde and Venter Projects have employed innovation by testing the opinions of respondents and to recommend a possible innovation framework to increase market sustainability in a competitive environment.

The mean values of competencies to deliver the business strategy, workplace culture, customer service, reasons for refining and reviewing innovative processes, innovative strategies, constraints and proposed solutions and recommendations of innovation were 3,93, 4,35,4,24,4,26,3,80,2,89 and 4,07 respectively. This gave an overall mean of ‘’great extent’’ and ‘’moderate extent’’ for all dimensions of level of innovation in J.C van der Linde and Venter Projects. The descriptive analysis indicates although the respondents’ views innovation to ‘’great extent’ there is no understanding as to how innovation fit into the organization. This concurs with the findings of a recent study that indicates 97 percent of executives worldwide view innovation as a top priority, but 50 percent don’t have an innovation plan and 55 percent don’t believe their organizations’ change fast enough, whilst 56 percent believe their companies don’t have the time to turn new ideas into reality (Gutshe,2020).

Table 4-8 highlights the correlation between each of the dimension measured These correlates are discussed in the paragraphs below.

4.7.1 Current innovation Processes and strategies adopted in the construction industry.

4.7.1.1 Competencies to deliver the business strategy (objective B1)

When capabilities/competencies are aligning with the capital base in the organisation it stimulates growth and innovation. The competencies, **speed** (4,20) and **cost reduction** (4,43) and **do you innovate in product, strategy, processes, and**

services (4,05) were rated the highest under this objective. Speed, reduction of cost and do you innovate in product, strategy, processes innovation is perceived to a ‘’great extent to influence capabilities to innovate in projects. Respondents’ views to a’’ great extent’’ innovative strategies as important to perform and innovate on the business strategy.

In terms of the correlates there is a moderate positive relationship between ‘’competencies to deliver the business strategy’’ and ‘’customer service’’ ($r = .378$; $n = 75$; $p < 0.01$

Ackintoye et al., (2012) argue innovation is sought as a strategy to procure competitiveness for the organisation, ‘value for money for customers and sustainability for the economy and the environment.

Tidd and Bessant (2013,27) argue resources and capabilities must be created before a company can embark on incremental innovation to sustain value or create new value for the market. Innovation never occurs in a single field of expertise, but in a synthesis of domains. Research points to the respondents understanding the importance of innovation but not understanding how innovation plans are interrelated as innovation is collective of expertise is needed as shown in figure 2-4.

4.7.1.2 Workplace culture (objective B2)

In this objective **customer-centric culture** score the highest (4,47) which shows the company value its customers**.** The company put customer satisfaction at the forefront of its operation, and it is a responsibility of everyone in the organisation.

Results-driven culture score the second highest (4,41) as most of the respondent were from project sites, project deadlines, this shows that that project deadlines are seen as important.

Innovation-centred culture scored the lowest in this objective (4,08) and is seen as the lowest value. The literature shows that the construction industry is slow to adapt to innovation as discussed earlier. All three scores are to a ‘’great extent’ ‘seen as important by respondents. According to Beswick al., caring for customers, performance which point to results and innovation are perceived as important behaviours that form the ‘culture’ of an organisation.

Beswick, et al., (2015) argue to attain sustainability the culture of the organisation must produce value in the environment it function, Businesses need to be socially responsible and implement adequate support between people from the local community, the research indicate that J.C van der Linde and Venter Projects supports local upliftment projects(it is 35% black women owned) and they also support graduates and under graduates from minority groups to make the workplace culture more inclusive and diverse.

There is a weak negative relationship between ‘’workplace culture’’ and ‘’constraints’’ (r = .129, n=75. p = .42). The respondents don’t see the relationship between ‘’workplace culture’’ and constraints although they understand to a ‘’great extent’’ the importance of workplace culture, the association between workplace culture and innovation is not strong.

It is observed that the company manage its reputation externally, however internally it needs to stimulate a culture of innovation that encourages employees to think creatively and incentivise them accordingly to retain employees as personnel leave after 5 years.

4.7.1.3 Customer service (objective B3)

About 50 percent respondents indicated understanding customer needs (4,41) are valued to a “great extent’’: 48 percent respondents follow up on positive/negative feedback. Research indicates that 73 percent of customers leave due to bad customer service (Powell,2017). The study shows respondents concurs with understanding customer needs to add value to innovate and sustain the business.

However, respondents’ rates monitoring social medial platforms (3,85) for positive and negative feedback in the construction industry to a lesser degree. Social media platforms are used globally to reach customers more effectively and this needs to be explored by construction companies. Customer communication is part of innovation as it allows companies to manage customer perception and increase the value proposition to the customer thereby increasing its value proposition to the market.

It is important that construction companies understand the value proposition to its customers to create growth and sustainability, Christansen (2018) argue understanding the customers jobs and providing choices to the organisation will grow the company and make it more sustainable. Although respondents understand to a ‘’great extent’’ the importance of customer service, there is a moderate positive relationship between ‘’customer service’’ and “reasons for refining and reviewing innovative processes’’ ($r = .378$; $n = 75$; $p < 0.01$). This points to respondents seeing the relationship only as moderate between ‘’customer service’’ and ‘’innovative processes.’’ Customer satisfaction is one key capabilities in innovation to grow a business and create value for the market.

4.7.2 The reasons for developing and implementing innovation processes within J.C Van Der Linde and Venter Projects

4.7.2.1 Reasons for refining and reviewing innovative processes (objective C1)

Reasons for refining and reviewing innovative processes (process improvement) are an important objective in companies to create value and gain competitiveness in the market (Akintoye,2012).

Within this objective the respondents’ dimensions for refining and reviewing innovative processes were rated as follows:

About 53,3 percent respondents rated **‘increase productivity of project teams’** as the highest score (4,35), to a ‘great extent’’ When productivity is increased of a team the company will reduce profit margins and increase speed’ thereby creating the necessary leverage to innovate.

54,7 percent respondents perceive ‘’competitive **sustainability and competitive differentiation** to a ‘great extent’ (4,33). J,C van der Linde differentiated itself by creating a unique value proposition to its clients as a reputable company who put its customers at the forefront of its business and this shows as it increase its profit from R1billion to R1,5 billion within a year.

learning and development of employees perceive (4,31) as the third highest under this objective to a ‘great extent J, C Van Der Linde and Venter value improving the

skills of its employees as it employs graduates and under graduates mostly, according to the study. This assists the company to make strides in terms of increasing its profitability.

It is observed the respondents see these dimensions as important for refining and reviewing innovative processes. The study shows respondents rated all scores very closely in table 4-4 (all above a 4 rating).

Akintoye (2012) argues both process improvement and process understanding form the lifeblood of total quality organisations. Springer (2019) argue team collaboration is rated as the leverage that give organisations competitive advantage. Respondents rated project teams the highest score and see the importance of ‘refining and reviewing processes.

However, there is a moderate negative relationship between innovative strategies and all the other dimensions; this shows respondents see the importance of incremental innovation (refining and reviewing processes), however don’t see the relationship between innovative processes and ‘’constraints’’.

4.7.3 Innovation needs and challenges in J.C Van Der Linder and Venter Projects

4.7.3.1 Innovative strategies (objective D1)

Two main types of innovation were identified, and respondents rated this objectiveas follows:

The respondents found 53,3 percent respondents primarily indicate that the company is more **incremental**, meaning refining and reviewing processes or products with gradual improvements (4,00) than **disruptive (**using technological innovations**)** (3,72). This concurs with the argument that improvement of internal operations (minimal changes) in construction occurs gradually and not at a rapid speed as technological advancements, which is disruptive requires funding (Schultz,2020).

Porumbula (2021) argue big companies, such as Google, use the 70/20/10 rule of innovation. Companies invest 70 percent of resources and capital in the core business (incremental), 20 percent in the new developments(breakthrough) and 10 percent on new ideas(disruptive).

There is a positive relationship (weak to moderate) between Innovative strategies and all the other dimensions; this shows respondents see innovative strategies as important, to a ‘’great extent’’, but don’t see the relationship between innovative processes and all the other dimensions. The relationship between ‘’reason refining and reviewing innovative strategies’’ and’’ innovative strategies’’ is moderate positive (r = .370, n=75, p< 0,01)

4.7.3.2 Constraints (objective D2)

It is important to understand constraints to improve on existing processes as it can hamper and pose a threat to innovation and increased growth of a company, keeping the margins low.

Below are the top areas where respondents rated innovation constraints ‘moderate ‘to little extent’ experienced in daily activities in the construction industry:

Respondents rated **‘skilled labour’** (3,05) to a ‘moderate extent’ Skilled Labor is important to deal with complexities on project sites such as soft ware tools and needs technical expertise to deliver projects on time. This will avoid project delays.

‘Project delays’ (2,93) to a ‘moderate extent’, Project delays is a big risk to the success of a project and can lead to contractors overspending on their budgets, which will hamper growth and productivity.

Outdated building technology’ (2,43) and **‘Lack of technology’** (2,36) to a ‘little extent’ (as can be seen in Figure 4-9). This could point to technology not being primarily used on construction sites and needs some further research as research pointed out that this industry is lagging to adapt new technology. Use of new technology points to disruptive innovation and respondents views incremental (small improvements) are more applied in daily activities.

There is a weak negative relationship between ‘’constraints’’ and all the other dimensions except the items ‘competencies to deliver the business strategy’, which is moderate positive (r-.233, n =75, p = ,045) and ‘’constraints’’ (r=0,85, n=75. p=;468), which is a weak positive coefficient.

4.7.4 Proposed solutions and recommendations of innovation in J.C van der Linde and Venter Projects (objective E1)

4.7.4.1 Proposed solutions and recommendations

Table 4-6 it is observed that all the average scores are above four except for company incremental innovation and incentives, which shows that respondents highly recommend all these recommendations, which was specially proposed for the project sites to suit their environment:

Respondents rated the top five dimensions as follows:

Timely project delivery' (4,47) to a 'great extent'. Project delivery is important as construction are complexed and need project management techniques and tools such as Building Information Modelling (Akintoye,2012)

Forming strategic alliances and or partnerships (4,28) to a 'great extent', Engineers, construction employees and architects work very closely to identify potential problems and streamline communication to deliver the results (Akintoye,2012)

Technology used in projects' (4,27) to a 'great extent', As construction projects are becoming increasingly complex software tools will help construction professionals to deal with all and manage aspects of a project: For example: scheduling and budgeting of a project to reduce cost and improve efficiency (Akintoye,2012).

High performing teams in projects' (4,25) to a 'great extent'> High performing teams are important to ensure that projects are completed on time, with high quality and within the specified budget (Akintoye (2012)

It is observed that incremental innovation' (3,96) and 'incentives' (3,32), was perceived 'moderately'. The low score indicates 'incremental innovation' and 'incentives', is not regarded as a top strategic priority by project sites employees.

There is a weak to moderate positive relationship between ''proposed solutions and recommendations' of innovation and all the other dimensions, except the item ''constraints'', (r = - .259, n =75, p = ,025), which is a very weak negative relationship, meaning the two variables are moving in an opposite direction.

This shows respondents see the importance of proposed solutions and recommendations to create leverage to innovate in companies, but the implementation of the innovative strategies is not regarded as urgent or not clearly understood to implement as a strategic framework.

The study confirms much of what is known from literature that the construction industry is slow to adapt to innovate and adapt new approaches globally (McKinsey report ,2015).

4.8 CHAPTER SUMMARY

This chapter shows that respondents see the importance of innovation strategies, however it is not clear as to how these objectives are interrelated. Hence, it can be concluded that a more strategic innovation plan is needed with a strategic perspective to look at the entire value chain and business processes to create value to the customer and procure a competitive advantage in a difficult economy. In the next chapter, conclusion will be drawn from the results of the study, and recommendations will be made for adopting innovative strategies by employees in the construction industry to procure a competitive advantage and increase business performance.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In the next chapter, conclusion will be drawn from the results of the study, and recommendations will be made for adopting innovative strategies by employees in J C van der Linde and Venter Projects

The analysis of this data showed that employees in J.C van der Linde and Venter see the importance of the level of innovation in building, however respondents' lacks understanding of how innovation is perceived, assess, and conceptualise in the day-to-day operations of the company. The main objective of the study was to assess the current extent of innovation strategies used in building projects, with reference to competencies/capabilities to deliver on the business strategy, workplace culture and customer service. The sub-objectives of the study were to determine the extent to which respondents see the need for developing and implementing innovative processes in JC van der Linde and Venter projects. Another sub-objective was to determine the need for innovation and the challenges experienced in daily activities that will pose a threat to innovation processes. The study also further looked at respondents' views on recommendations made in innovation strategies to see whether respondents regard it as important to stay in business. Next, the findings of this study are discussed with reference to the main objectives and sub- objectives.

5.2 CONCLUSIONS

It is evident that J.C van der Linde and Venter projects are a reputable company that work on being profitable in a difficult economic climate. Consequently, this study can be used by building companies as a holistic innovation framework as there is limited research. The following conclusion were made in terms of the objectives.

5.2.1 Current innovation Processes and strategies adopted in the construction industry.

5.2.1.1 Competencies to deliver the business strategy (objective B1)

The study concludes van der Linde and Venter projects do have the capabilities/competencies -to leverage, to innovate and deliver on their business strategy. The study found that the competencies, **speed** (4,20) and **cost reduction** (4,43) and **do you innovate in product, strategy, processes, and services** (4,05) were rated the highest under this objective and is very relevant to a construction environment.

Speed, reduction of cost and "**do you innovate in product, strategy, processes innovation"** is perceived to a ''great extent to influence capabilities to innovate in projects. Respondents' views to a'' great extent'' innovative strategies as important to perform and innovate on the business strategy.

Hence, it is **concluded**, respondents understood the importance of matching competencies to a skill base to stimulate innovation.

Furthermore, respondents, do not see a strong association between the variables 'competencies to deliver the business strategy' and 'innovation strategies' as there is currently not a formal innovation strategic framework in place.

5.2.1.2 Workplace Culture (objective B2)

It is concluded that J.C van der Linde has more of a **customer-centric culture** score the highest (4,47) which shows the company value its customers company value its customers and put customer satisfaction at the forefront of its operation, and it is a responsibility of everyone in the organisation.

Furthermore, it is concluded that the company has a strong **results-driven culture** as it scores the second highest (4,41) as most of the respondent were from project sites, project deadlines, this shows that that project deadlines are seen as important.

Innovation-centred culture scored the lowest in this objective (4,08) and is seen as the objective lowest value.

Therefore, the conclusion can be drawn that the construction industry is slow to adapt to innovation as discussed earlier. All three scores are to a ''great extent' 'seen as important by respondents. Companies that care for customers, perform better, which are perceived as important behaviours that form the 'culture' of an organisation.

Beswick, et al., (2015) argue to attain sustainability the culture of the organisation must produce value in the environment it function, It is concluded that J.C van der Linde is socially responsible within the local community, the research indicate that J.C van der Linde and Venter Projects supports local upliftment projects(it is 35% black women owned) and they also support graduates and under graduates from minority groups to make the workplace culture more inclusive and diverse.

The study concludes respondents see the importance of workplace culture, but don't see the strong association between workplace culture and innovation, pointing to the organization not having a strategic innovation plan in place to guide employees in relation to innovation that will stimulate innovation and increase economic growth.

5.2.1.3 Customer Service (objective B3)

The study found understanding customer needs is very highly communicated and entrenched in the organisation. About 50 percent respondents indicated understanding customer needs (4,41) are valued to a "great extent'': 48 percent respondents follow up on positive/negative feedback.

The study **concludes** respondents understood the value proposition to its customers to create growth and sustainability. Although respondents understand to a ''great extent'' the importance of customer service, there is a moderate positive relationship between ''customer service'' and ''innovative processes''. This shows that innovation is not formalized in the company's strategic plans.

5.2.2 The reasons for developing and implementing innovation processes within J.C Van Der Linde and Venter Projects

5.2.2.1 Reasons for refining and reviewing innovative processes (objective C1)

The study concluded 53,3 percent respondents rated **'increase productivity of project teams'** as the highest score (4,35), to a 'great extent'' The study found the company value productivity of its teams very high.

54,7 percent respondents perceive ''competitive **sustainability and competitive differentiation** to a 'great extent' (4,33). J,C van der Linde and Venter differentiated

itself by creating a unique value proposition to its clients as a reputable company who put its customers at the forefront of its business and this shows as it increase its profit from R1billion to R1,5 billion within a year.

Learning and development of employees perceive (4,31) as the third highest under this objective to a 'great extent.' The study concludes J, C Van Der Linde and Venter value improving the skills of its employees as it employs graduates and under graduates mostly, according to the study. This assists the company to make strides in terms of increasing its profitability.

The study **concludes** that respondents see the reasons importance of refining and reviewing innovative processes in this objective as all the scores are above a 4-rating. Respondents rated project teams the highest score and see the importance of 'refining and reviewing processes. Team collaboration is rated as the leverage that give organisations competitive advantage to innovate and stay sustainable.

The study concludes there is a moderate negative relationship between innovative strategies and all the other dimensions; this shows respondents see the importance of incremental innovation (refining and reviewing processes), however don't see a strong relationship between "refining and reviewing innovative processes and innovation".

5.2.3 Innovation needs and challenges in J.C Van Der Linder and Venter Projects

5.2.3.1 Innovative strategies (objective D1)

The study **concludes** that respondents view incremental innovation as more relevant than disruptive innovation. This concurs with research that the construction industry lacks proper innovation management skills.

There is a positive relationship (weak to moderate) between Innovative strategies and all the other dimensions; this shows respondents see innovative strategies as important, to a ''great extent'', but don't see the relationship between innovative processes and all the other objectives, for example: the relationship between ''reason refining and reviewing innovative strategies'' and'' innovative strategies'' is moderate positive ($r = .370$, $n=75$, $p< 0,01$).

5.2.3.2 Constraints (objective D2)

The study found **‘skilled labour’** (3,05) is only to a moderate extent.’ Skilled labor is important to deal with complexities on project sites such as software tools and needs technical expertise to deliver projects on time. This will avoid project delays.

‘Project delays’ (2,93) is also found to a ‘moderate extent’, Project delays is a big risk to the success of a project and can lead to contractors overspending on their budgets, which will hamper growth and productivity.

The study **concludes** technology not being primarily used on construction sites and this part needs some further investigation as research pointed out that the company is lagging to adapt new technology.

The study concludes there is a weak negative relationship between ‘’constraints’’ and all the other dimensions except the items ‘competencies to deliver the business strategy’, which is moderate positive (r-.233, n =75, p = ,045) and ‘’constraints’’ (r=0,85, n=75. p=;468), which is a weak positive coefficient

5.2.4 Proposed solutions and recommendations of innovation in JC van der Linde and Venter Projects

5.2.4.1 Proposed solutions and recommendations (objective E1)

The study concludes that timely project delivery’ (4,47), forming strategic alliances (4,28) and technology used in projects (4,27) is regarded as important as this is a project environment to increase productivity.

The study concludes the low score indicates in proposed solutions of ‘incremental innovation’ and rewarding ‘incentives’, is not regarded as a priority by management. The study concludes there is a weak to moderate positive relationship between ‘’proposed solutions and recommendations’ of innovation and all the other dimensions.

This study concludes respondents see the importance of proposed solutions and recommendations to create leverage to innovate in companies as most of the items were understood to a ‘great extent’.

To summarize, it can be concluded respondents acknowledge the value of innovation strategies to a great extent.

However, the research shows that there is still not a clear-cut plan as to how innovation must primarily be implemented as there is a weak to moderate positive relationship between the variables and in some instances a negative association.

5.3 RECOMMENDATIONS

The construction industry must collectively develop the relevant strategic capabilities/ competencies, customer service and workplace culture, creating a conducive environment to implement an innovative framework.

5.3.1 Competencies to deliver the business strategy.

The study shows that although the respondents’ views innovation important (to a ‘’great extent’) there is no understanding as to how innovation fits into the organization. When the organisation aligns competencies to its capital base it creates leverage to innovate. Respondents rated project teams and speed as the highest capabilities in building project, new ideas and innovation score lower, the relationship between capabilities and the other items shows a weak to moderate positive coefficient. This shows respondents focuses more on project delivery than on creating new ideas. The study indicates JC van der Linde employ mostly postgraduates and under graduates, therefore lack of skilled labour scored the lowest in this dimension. This shows the organisation created the capacity to innovate as it established a strong knowledge base. The study recommends that the company tap into its skill base to create the necessary capabilities required to create an innovation framework.

5.3.2 Workplace culture

The study shows J.C van der Linde and Venter views customer and project results more important than innovation. The study shows the workplace culture to be diverse

and inclusive as the research indicate that JC van der Linde and Venter Projects supports local upliftment projects (it is 35% black women owned) and they also support graduates and under graduates from minority groups to make the workplace culture more inclusive and diverse. Respondents understands the importance of workplace culture; however, they don't see the association between culture and innovation, which shows the organisation don't have an innovation strategy. The study recommends that the company reviews its internal workplace culture to create capacity for employees to create value and this be acknowledged by senior management.

5.3.3 Customer service

Understanding the customers jobs and providing choices to them will grow the company and make it more sustainable. The study shows that value proposition to the customer score the lowest and although respondent views this item important they don't understand the association between customer service and innovation. It is recommended that regular customer feedback surveys will allow the company to innovate and grow as well as improve on customer service and the company increase its presence on its social media platforms to innovate and grow its business.

5.3.4 Refining and reviewing of innovative processes.

Process improvement and process understanding form the DNA of total quality organisations. Team collaboration is rated as the leverage that give organisations competitive advantage to innovate. The research shows that the organisation views productivity of project teams as important, but don't see a strong association between the variable and innovation. Hence, it is recommended the innovation process to be formalised to guide employees as to how the innovation benefits the organisation.

5.3.5 Recommendations

The average scores are above four except for company incentives, which shows that respondents highly recommend all these recommendations. Timely project delivery and high performing teams in projects were rated higher than innovation and incentives as the lowest. The low score indicates shows that there is not a formal innovation plan and incentive plan in place as respondents rated this item the lowest

(2,36) to a ‘’little extent’’. It can be seen in Figure 4-2 that although there is a skills development programme for postgraduates and undergraduates in place the company don’t retain personnel. The study recommends that the company review its retention strategy (employees leaves after year five) as this may hamper innovation as it loses it skills base after year five.

Innovation do not occur in a vacuum it is not a single event, it never occurs in a single field of expertise, but in a synthesis of combinations across domains, hence, companies must address strategic elements such as workplace culture, time and cost management, customer service, corporate flexibility and responsibility, electronic data management and a firm’s capability etcetera to continuous change and improve. The research indicates respondents didn’t see a clear association between the different dimensions of innovation.

The research shows that innovation do not understand the different concepts of an innovation framework although they see the value thereof. Hence, it is recommended any innovation framework must be firm led by management and seen as a strategic priority and resources must be made available for innovation to be effective. Hence, before any innovation framework can work, buy-in must be obtained from top management as the internal environment must support change.

5.3.6 Proposed Strategic approach for companies to manage innovation strategically.

This outline provides a more structured approach of managing innovation instead of hoping for the best results.

Firstly, companies must analyse where they are in terms of innovation. Companies must scrutinise the internal environment by conducting a Porters value chain analysis to see where corrections. Companies must also review its organisational structure to make the workplace culture conducive for innovation.

Secondly, Companies must review their vision for the future. Look at short- and long-term objectives in terms of innovation and growth and include it in their strategic plan. When companies innovate, they must develop and implement strategic innovation

priorities for all departments, key result areas of innovation and designate accountability to a designated employee to oversee this responsibility.

Thirdly, assess the innovation plan by means of a balance score card and measurable key results of growth as shown in Figure 2- as companies can only improve what they measure in terms of a strategic innovation plan.

The study recommends the model used by Google,70/20/10 (70% incremental,20 % breakthrough and 10 % disruptive) of innovation. This must be incorporated into strategic plans to make innovation part of a formal process that can be measured in terms of Key Result Areas (KRAs).

5.4 LIMITATIONS OF THE STUDY

The study was limited by time and resource availability. It is evident that more research is needed as there is still a big gap in the implementation of innovation frameworks in the construction industry. The ethics approval was 28 November 2024. Different project site managers had to distribute a formal questionnaire to all employees (236 employees) and a week was given for respondents to fill in the questionnaires. Most employees worked on different construction sites and due to their lack of availability and strict deadlines as the holiday break for December were approaching ,80 respondents filled in the questionnaire and only 75 of these questionnaires meet the requirements. Due to these time constraints and limited time availability this study only examines level of innovation strategies in building projects within JC van Der Linde Projects.

5.5 FUTURE RESEARCH

The research shows the construction industry is very slow to innovate and adapt new innovative approaches globally. It is evident respondent understood the importance of an innovation framework, however more research is needed regarding the implementation of innovation frameworks in the construction sector, as research indicate a serious gap in this part of implementation of innovation. It is evident respondents lacked understanding of the different interrelationships of innovation strategies and formal training is needed in this regard. The study found the

organisation do not have a formal innovation framework linked to strategic priorities in place. This must be addressed at a strategic level as innovation have to be initiated from a managerial level with clear strategic innovation plans incorporated in the strategic plan of the company. Lack of investment in innovation creates lost opportunities and reduced growth for companies and this is a serious concern to the infrastructure of the country. In conclusion, innovation can only work if it is measured.

REFERENCES

Akintola Akintoye, J. S. (2012). *Construction Innovation and Process Improvement .* Lancashire : John Wiley & Sons LTD Publications .

Clayton M. Christensen, T. H. (2016). *Competing Against Luck: The Story of Innovation and Customer Choice.* New York: Harper Collins Business.

Cris Beswick, D. B. (2015). *Building a Culture Of Innovation .* New Guinea : Kogan Page.

Fossum, O. (2018, 11 27). 11 Barriers and Drivers of Innovation In Construction. p. 12. Retrieved from Civil Engineers at Ramboll.

Gutsche, J. (2020). *Create the Future Tactics for Disruptive Thinking .* New York: Fast Press Company .

West,E.(2023) Construction Industry Recovery Plan accepted in government IOLhttps://www.iol.co.za/business report

Davis P, Gajendran T, Vaughan J and Toinpre O, September 2016 Assessing construction: Theoretical and practical perspectives: Journal of Construction, Economics and Building Volume 16(3) 2204-9029

Schultz B 2020 How incremental innovation can benefit your construction business. https://www.foeconstructionpros.com/c...

Smallman and Urlrich 2004 Capatalising on capabilities https://hbr.org/2004/06/capatilizing-on-capabilities

Louw, L., Schutte.C.S.L., Seidel. C and Imser, C., Towards a flexible process model assuring quality and customer needs S.Afr.J. Ind.Eng(online) 2018 vol29, n,1, pp 155-168. ISSN 2224-7898. http:// dx doi.org/10.7166/29-1-11911

Du Preez N, and Louw L., 2008 A framework for managing the innovation process DOI:10.1108/PICMET.2008. htpps//ieeexplore.ieee.org

Liang Qi., Peter S. P. Wong & Sarah Holdsworth Towards understanding impact of the perceptions about construction innovation on advanced technology adoption 31 March 2023 https://doi.org/10.1080/15623599.2023.2220519

Perera S and Gunathilake, S. 2018 July A conceptual model for Value Chain Management in Construction Contractor Organisations https://www.researchgate.net/publications

Karna S, Junnonen J and Sorvala M., May 2009 Modelling structure of customer satisfaction with construction, Journal of Facilities Management 7(2)111-127

Matoma M. 2023 South Africa unites to tackle disruptions threatening jobs and the economy. https://rateweb.co.za>news

Bowman, C & Schoenberg R. 2008. Ch. 2 From customer understanding to strategy innovation: practical tools to establish competitive positioning, in strategy, innovation, and change: challenges for management, edited by R Galavan. Oxford:OUP.

Cambridge Technology Partners. 2000. Creating value through innovation. Available from http://www.kirkklasson.me/wp-content/uploads/2010/07/Innovation-white-paper.pdf [accessed 25.11.2015]

Hamel, G. 1998. Strategy innovation and the quest for value. Sloan Management Review 39(2):8.

Michaelides, D. 2012. The art of innovation: Dimis Michaelides at TEDxGramercy. Available from https://www.youtube.com/watch?v=uqGUkJzrolg [accessed 26.02.2018]

Treacy, M & Wiersema, F. 1995. The discipline of market leaders: choose your customers, narrow your focus, dominate your market. New York: Basic Books

Mann, R. (2013). Thriving Scorecard: Developing Your Strategy Map: Basic Concepts, Credo Consulting

Perry, G. S. (2000). Strategic Themes–How Are They Used and WHY? Balanced Scorecard Institute

Gutsche, J. (2020). Create the Future Tactics for Disruptive Thinking. New York: Fast Press Company.

Porumboiu, D. (2017). What is the 70-20-10 Rule of Innovation and How to use it. Vuma by Hype, 10.

McKinsey Global Institute .2017. *Reinventing Construction: A route to higher productivity* [Online] Available from: https://www.mckinsey.com [Accessed:20 October 2023].

International council for Research and Innovation in Building and Construction.2022. *Organisation 4.0 Organisational Level Challenges and Solutions* [Online]. Available from: https://www.cibworld.org [Accessed 15 October 2023]

Achim, M., & Bala, H. 2008.*Business performance between profitability return and growth* [Online]. Available from: https://www.researchgate.net [Accessed 1 December 2023]

Neethling, B. 2023. Don't be fooled by South Africa's GDP growth. *Daily Investor* [Online]. Available from: https://www.dailyinvestor.com [Accessed 2 October 2023]
.
Rao, S.2021.The Benefits of Artificial Intelligence in construction. *Trimble Construction*. [Online]. Available from: https://www.construction.trimble.com [Accessed 1 December 2023}.

Smyth, H., Razmdoost, K. & Kasuma, I. 2016. Innovation and the co-creation of value in construction [Online]. Available from https://www.ucl.ac.uk [Accessed 1 December 2023].

Hough, J. & Gamble, J. 2011 Crafting and executing strategy. Mc Graw-Hill Higher

Ellis, G. 2022 The rise of artificial intelligence in construction. www.constructionblog.autodesk.com [Accessed 5 May 2023]

Rojas B & liu li. 2015 Value creation in construction projects. Available from https://www.researchgate.net [Accessed 15 July 2023]

Saul Ngarava, A. M. (2022). Impact of the COVID-19 pandemic on the South African tobacco and alcohol industries: Experiences from British American Tobacco and Distell Group Limited. Pubmed Central, 1-20.

Gourinchas, P.-O. (2023). The outlook is uncertain again amid financial sector turmoil, high inflation, ongoing effects of Russia's invasion of Ukraine, and three years of COVID. World Economic Outlook, 1-207.

Dewald Kristen, C. T. (2023). Economic Forescast Summary. South Africa: OECD Economic Surveys.

Wood, L. (2023, 06 11). South African Construction Industry, 2015-2019 & 2020-2024 - Growth Prospects by Market, Project Type and Construction Activity. Retrieved from Research and Markets: https://www.globenewswire.com

ZinFFwegoni, T. 2020. Deconstructing south Africa's construction industry performance. www.mg.co.za [Accessed 15 July 2023]

Gupta, N. J. (2020). Sustainability and Competitive Advantage: An Empirical Study of Value Creation. United Kingdom: Competition Forum Vol 9

Dale, J 2007. Innovation in construction: Ideas are the currency of the future. www.dokumen.tips

Garg, A.K 2016 A functional approach to research proposal writing for MBA or Doctoral students. *India*: ASTER

Saunders, M. LEWIS, P & THORNHILL, A. 2016. *Research methods for business students*. England: Pearson

Hamal, G. 1998. Strategy innovation and the quest for value. Sloan management review 39(2):8.

Tidd, J. 2013. Managing Innovation www.researchgate.net.

Sacks, R, Girolami, M, Brilakis, I. Building information modelling, Artificial Intelligence and construction tech. www.sciencedirect.com

Fernando, F. 2019. The benefits of taking a slower approach to innovation https://fernandofischmann.com

Annexure A (Questionnaire)

GRADUATE SCHOOL OF BUSINESS LEADERSHIP (SBL)

Ethical clearance #: 2248

Research permission #: 01

COVER LETTER TO AN ONLINE ANONOMOUS WEB-BASED SURVEY

Dear Prospective participant,

You are invited to participate in a survey conducted by Marjorie Niemand under the supervision of Dr. Gladys Nyamagere a lecturer in the Department of School of Business Leadership towards a Master of Business Administration at the University of South Africa.

The survey you have received has been designed to study the level of innovation in building projects to ensure market sustainability and competitiveness in a recession. You were selected to participate in this survey because you work within projects environment. You will not be eligible to complete the survey if you are younger than 18 years or older than 65 or you don't work within project environment. By completing this survey, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings.

It is anticipated that the information we gain from this survey will help us compile an innovation framework on how to add value and have market sustainability and competitiveness in a difficult economic climate. You are, however, under no obligation to complete the survey and you can withdraw from the study prior to submitting the survey. The survey is developed to be anonymous, meaning that we will have no way of connecting the information that you provide to you personally. Consequently, you will not be able to withdraw from the study once you have clicked the send button based on the anonymous nature of the survey. If you choose to participate in this survey it will take up no more than 10 minutes of your time. You will not benefit from your participation as an individual, however, it is envisioned that the findings of this study will add value to the construction industry. We do not foresee that you will experience any negative consequences by completing the survey. The researcher(s) undertake to keep any information provided herein confidential, not to let it out of our possession and to report on the findings from the perspective of the participating group and not from the perspective of an individual.

GRADUATE SCHOOL OF BUSINESS LEADERSHIP (SBL)

The records will be kept for a minimum period of five years for audit purposes where after itwill be permanently destroyed electronic versions will be permanently deleted from the harddrive of the computer. You will not be reimbursed or receive any incentives for your participation in the survey.

The research was reviewed and approved by the Graduate School of Business Leadership_RERC. The primary researcher, Marjorie Niemand can be contacted during office hours at 14060663@mylife.unisa.ac.za, (+27 72 588 8289). The study leader, Dr. Gladys Nyamagere, can be contacted during office hours at nyamagere@yahoo.com Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the Graduate School of Business Leadership_RERC at wiltonb@unisa.ac.za Alternatively,you can report any serious unethical behaviour at the University's Toll Free Hotline 0800 8696 93.

APPENDIX: QUESTIONAIRE FOR J.C VAN DER LINDE AND VENTER PROJECTS EMPLOYEES

I am Marjorie Iris Niemand, a postgraduate student at the University of South Africa. I am undertaking a study titled:

ASSESSING THE LEVEL OF INNOVATION IN BUILT PROJECTS TO CREATE VALUE FOR THE MARKET AND ENSURE SUSTAINABILITY AND RECOVERY OF THE CONSTRUCTION INDUSTRY WITHIN A RECESSION, THE CASE OF J. C VAN DER LINDE & VENTER PROJECTS IN THE TSHWANE REGION.

The study is meant for academic purposes. The information provided will remain strictly confidential and anonymous. The information will be used for assistance to meet the requirements of a degree in Masters of Business Administration. Please read the answers carefully and provide a mark in the appropriate box.

Part A: General Information

A1. What is your gender?

[ ] Male

[ ] Female

A2. What is your highest level of education?

[ ] Postgraduate

[ ] Undergraduate

[ ] Secondary

[ ] Primary

[ ] Others

A3. How long have you worked in J.C Van Der Linde and Venter Projects?[

] Less than 5 years

[ ] 6-10 years

[ ] 11-15 years

[ ] 16-20 years

[ ] Above 21years

A4. Which department are you involved in at J.C Van Der Linde and Venter Projects?[

] Site Personnel

[ ] HR & Payroll Department

[ ] Procurement Department

[ ] Finance Department

Part B: Current Innovation processes and strategies adopted in construction industries.

B1. Are you using innovation strategies in your projects? Please rate on a scale of 1-5 where5 = Very great extent,4 = Great extent,3 =Moderate extent, 2= little extent 1= Not at all

Competencies to deliver the business stratergy	**5**	**4**	**3**	**2**	**1**
Speed to deliver results					
Lack of skilled labour					
Generating new ideas with impact					
Do you innovate in product, strategy, service and administration?					
Do you reduce costs by closely managing costs, people and processes?					
Other(Please specify					

B2. What is the workplace culture practised? at J.C Van Der Linde and Venter Projects Please rate on a scale of 1-5 where5 = Very great extent,4 = Great extent,3 =Moderate extent, 2= little extent 1= Not at all

Workplace culture	**5**	**4**	**3**	**2**	**1**
Customer centric					
Innovation cantered					
Results driven					
Other(Please specify)					

B3. How well do you service your customers? Please rate on a scale of 1-5 where5 = Very great extent,4 = Great extent,3 =Moderate extent, 2= little extent 1= Not at all

Customer Service	**5**	**4**	**3**	**2**	**1**
Understanding customer needs					
Following up on positive/negative feedback					
Monitor social media platforms for positive and negative comments					
Monthly meetings to meet or manage customer needs					

Part C: The reasons for developing and implementing innovation processes within J.C Van Der Linde and Venter Projects.

C1. Do we reduce costs by refining and reviewing innovative processes? Please rate on a scale of 1-5 where5 = Very great extent,4 = Great extent,3 =Moderate extent, 2= little extent 1= Not at all

Reasons for refining and reviewing innovative processes	**5**	**4**	**3**	**2**	**1**
Reduce costs by refining or reviewing processes					
Do we increase productivity of project teams					

Compliance safety requirements					
Learning and development of workers to add value					
Is there competitive differentiation and sustainability in the market					
Is there increased value proposition to the customer					

Part D: Innovation needs and challenges in J.C Van Der Linde and Venter Projects.

D1. What type of innovation strategies are used? Please rate on a scale of 1-5 where5 = Very great extent,4 = Great extent,3 =Moderate extent, 2= little extent 1= Not at all

Innovation Strategies	**5**	**4**	**3**	**2**	**1**
Disruptive innovation (reinventing the industry by coming up with new technology improvements)					
Incremental innovation (Refining existing products and services. Streamlining execution of your existing processes)					
Other(Please specify)					

D2. What are the innovation constraints/challenges faced in your daily activities? Please rate on a scale of 1-5 where5 = Very great extent,4 = Great extent,3 =Moderate extent, 2= little extent 1= Not at all

Constraints	**5**	**4**	**3**	**2**	**1**
Lack/ Poor operations					
Lack of skilled labour					
Lack of technology					
Inadequate training or courses relevant to construction.					
Outdated building technology					
Project delays					
Other(Please specify					

Part E: Proposed solutions and recommendations of innovation in J.C Van Der Linde and Venter Projects.

E1. How likely would the following strategies be implemented in the J.C Van Der Linde and Venter Projects? Please rateon a scale of 1-5 where5 = Very great extent,4 = Great extent,3 =Moderate extent, 2= little extent 1= Not at all

	5	**4**	**3**	**2**	**1**
Technology used in projects.					
Leadership brand that directs managers on which results to deliver and how to deliver them.					
Training and development to empower employees to deliver on key projects and processes.					
High performing teams with the competencies to achieve key objectives.					

Timely project delivery.					
Customer centric culture.					
Implementation of updated building technology (e.g. apps, 3dtechnology, drones)					
Does the company provide incentives for new innovative ideas orprocesses					
Incremental innovation (refining new ideas and service)					
Streamlining execution of administrative processes to add value to the company					
Does the company incorporate good external business practicesthat align with organizational goals					
Does the company form strategic alliances/partnerships with sub-contractors to deliver projects on time					

Annexure B (Ethical Clearance)

UNISA university of south africa

Graduate School of Business Leadership_RERC

NHREC Registration # : (if applicable)
Ref #: 2248
Name: Ms Marjorie Niemand
Student #: 14060663
Staff #:

Date: 28/11/2023

Dear: Ms Marjorie Niemand

Decision: Ethics Approval from 28/11/2023 to 27/11/2025

Researcher: Ms Marjorie Niemand

13 Ghaap Street, N4 Gateway, Willow Park Manor

Pretoria

14060663@mylife.unisa.ac.za 0725888289

Supervisor: Dr Nyamagere Gladys Sospeter

Email address: nyamagere@yahoo.com

Assessing What Level of Innovation Is Required in Building Projects to Ensure Market Sustainability and Competitiveness in A Recession; The Case of J. C Van Der Linde & Venter Projects in The Tshwane

Qualification: MASTERS IN BUSINESS ADMINISTRATION

Thank you for the application for research ethics clearance by the Graduate School of Business Leadership_RERC for the above mentioned research study Ethics approval is granted for two years.

The **low risk application** was **reviewed** by Graduate School of Business Leadership_RERC on 28/11/2023in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the Graduate School of Business Leadership_RERC .
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.

6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.

7. No field work activities may continue after the expiry date (27/11/2025). Submission of a completed research ethics progress report will constitute an application for renewal, for Ethics Research Committee approval.

Additional Conditions

1. Disclosure of data to third parties is prohibited without explicit consent from Unisa.
2. De-identified data must be safely stored on password protected PCs.
3. Care should be taken by the researcher when publishing the results to protect the confidentiality and privacy of the university.
4. Adherence to the National Statement on Ethical Research and Publication practices, principle 7 referring to Social awareness, must be ensured: "Researchers and institutions must be sensitive to the potential impact of their research on society, marginal groups or individuals, and must consider these when weighing the benefits of the research against any harmful effects, with a view to minimising or avoiding the latter where possible." Unisa will not be liable for any failure to comply with this principle.

Note

The reference number 2248 should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,

NBWMlitwa

Prof N Mlitwa
Chair of Graduate School of Business Leadership_RERC
E-mail: wiltonb@unisa.ac.za

Executive Dean / By delegation from the Executive Dean of Graduate School of Business Leadership_RERC
E-mail: mswelp@unisa.ac.za, mosalgk@unisa.ac.za

Annexure C (Supervisor Consent Form)

CONSENT TO SUBMIT RESEARCH REPORT FOR EXAMINATION 2023

MBLREP / MBL5913 / MBA5929

Consent is hereby given to:

Student name: Marjorie Iris Niemand

Student number: 14060663 to submit her research report in its final form.

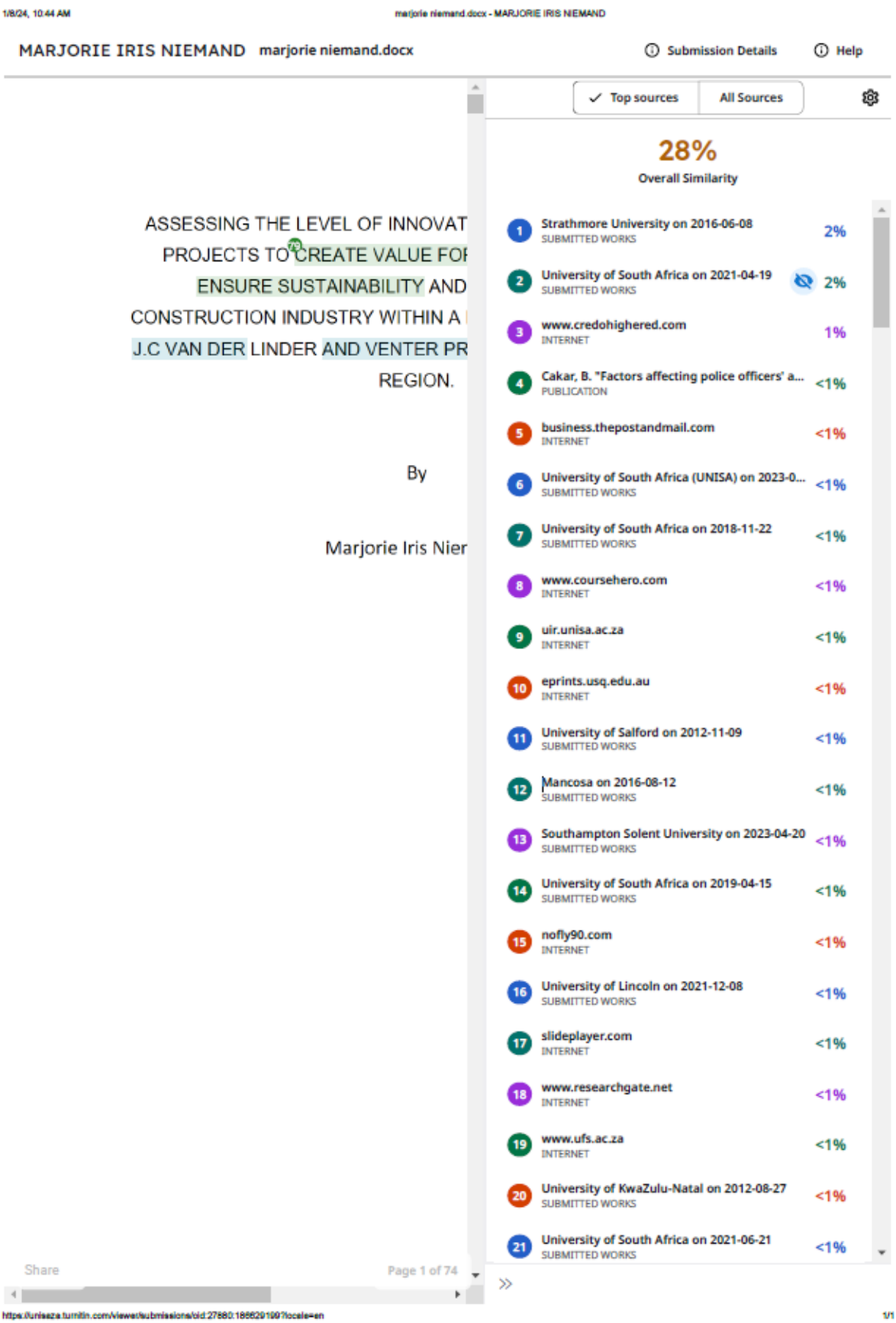
Supervisor Signature: ..... Date: 7th January 2024

Supervisor Name: Dr. Nyamagere Gladys Sajeter

The student acknowledges that sufficient feedback was provided by the supervisor and that s/he took the responsibility to attend to the feedback in a way that satisfies the requirements for a research dissertation on the MBA and MBL level.

Student signature..... Date: 08/01/23

Annexure D (Turnitin Report) – Submission from the 24/12/23



1/8/24, 10:44 AM marjorie niemand.docx - MARJORIE IRIS NIEMAND

MARJORIE IRIS NIEMAND marjorie niemand.docx

Submission Details Help

ASSESSING THE LEVEL OF INNOVAT
PROJECTS TO CREATE VALUE FOR
ENSURE SUSTAINABILITY AND
CONSTRUCTION INDUSTRY WITHIN A
J.C VAN DER LINDER AND VENTER PR
REGION.

By

Marjorie Iris Nier

Share

Page 1 of 74

Top sources | All Sources

28%
Overall Similarity

1	Strathmore University on 2016-06-08 SUBMITTED WORKS	2%
2	University of South Africa on 2021-04-19 SUBMITTED WORKS	2%
3	www.credohighered.com INTERNET	1%
4	Cakar, B. "Factors affecting police officers' a... PUBLICATION	<1%
5	business.thepostandmail.com INTERNET	<1%
6	University of South Africa (UNISA) on 2023-0... SUBMITTED WORKS	<1%
7	University of South Africa on 2018-11-22 SUBMITTED WORKS	<1%
8	www.coursehero.com INTERNET	<1%
9	uir.unisa.ac.za INTERNET	<1%
10	eprints.usq.edu.au INTERNET	<1%
11	University of Salford on 2012-11-09 SUBMITTED WORKS	<1%
12	Mancosa on 2016-08-12 SUBMITTED WORKS	<1%
13	Southampton Solent University on 2023-04-20 SUBMITTED WORKS	<1%
14	University of South Africa on 2019-04-15 SUBMITTED WORKS	<1%
15	nofly90.com INTERNET	<1%
16	University of Lincoln on 2021-12-08 SUBMITTED WORKS	<1%
17	slideplayer.com INTERNET	<1%
18	www.researchgate.net INTERNET	<1%
19	www.ufs.ac.za INTERNET	<1%
20	University of KwaZulu-Natal on 2012-08-27 SUBMITTED WORKS	<1%
21	University of South Africa on 2021-06-21 SUBMITTED WORKS	<1%

https://unisaza.turnitin.com/viewer/submissions/oid:27880:186629199?locale=en 1/1