UNIVERSITY OF KWAZULU-NATAL

Exploring personnel differentiation at KwaZulu-Natal Research Innovation and Sequencing Platform to create a competitive advantage

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DECLARATION

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ABSTRACT

KwaZulu-Natal Research Innovation and Sequencing platform (KRISP) is the health sciences Research Center of the University of Kwazulu-Natal (UKZN). The platform offers cutting-edge genomics services. It started operating in 2017 and since its inception, KRISP has focused on establishing a professional genomic services laboratory through acquiring state of-the-art equipment, and implementing industrial scale processes and systems. Managers at KRISP also place emphasis on recruiting highly-qualified personnel. At the time of this research, the selected market for KRISP encompassed users from public research organisations, industry R&D and other commercial users.

The need for cutting edge-genomics is fast-growing in South Africa and globally, given an impact of its application in many fields of science. Because of the expertise in health sciences research, KRISP is well positioned to offer genomics for infectious diseases' research and diagnostics. In the marketplace, KRISP faces a strong competition from large domestic and international genomic laboratories. To penetrate the market, KRISP adopted a cost leadership strategy. While the approach helped KRISP build customer base, it is not sustainable because established rival laboratories operate at scale and are able to offer much lower prices. Therefore, KRISP's survival and growth depend on devising a better suited approach to attain sustainable competitive advantage. The main aim of this study was to explore personnel differentiation as a strategy to create competitive advantage at KRISP. The focus was on understanding whether KRISP's personnel demonstrate unique qualities that enhance the value of the services the platform offers.

The research employed an exploratory case study strategy and qualitative research method underpinned by two qualitative research tools: an in-depth interview and document collection. The findings showed that the elements differentiating KRISP services were its high technical competence, knowledge, diverse skillset and the positive attitude of personnel. Service delivery outcomes resulting from these qualities included high-quality and comprehensive services offering, reliability and customisation. The KRISP environment and work practices were enabling for personnel learning and continuous capacity development. This was key to sustain personnel commitment and creativity.

Key words: competitive advantage, genomics services, personnel differentiation

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Chapter 1: Introduction to the Research Study

1.1 Introduction

This chapter outlines the focus of the research study and gives an overview of the research method. The study explored personnel differentiation to create a competitive advantage at KRISP, an emerging genomics centre of the UKZN participating in a highly technical and knowledge-intense industry. KRISP's management has significantly invested in strengthening capacity by setting-up cutting-edge scientific infrastructure and acquiring exceptional skills to grow the platform as a professional service provider for genomics. The purpose of this study is firstly to understand the strengths and qualities KRISP's personnel demonstrate. Secondly, it is to determine whether those strengths and qualities give KRISP a competitive advantage.

1.2 Background to the study

1.2.1 Overview on genomics and global growth trends

There is a growing need for cutting edge genomics in South Africa, especially to address public health issues caused by the burden of diseases the country faces. The past two decades have witnessed significant changes in disease management processes due to simultaneous advancements in genomics and personalised medicine. In addition to its applications to health and medical care, genomics is an enabling technology for the broader bio economy, as envisioned in the Bioeconomy Strategy (SA DSI, 2013); South African Department of Science and Innovation (DSI) White paper on Science, Technology and Innovation, (SA DSI, 2019).

Genomics is the field of molecular biology that focuses on analysing all or part of the genetic sequence of an organism to understand its structure, function and evolution (Hasin, Seldin and Lusis, 2017). It is a highly specialized field with many applications that cut across healthcare, industrial processes, biodiversity and conservation. In health sciences, genomics helps in understanding the molecular mechanisms of diseases and their response to medical treatment.

This study focused on the application of genomics in the health sector, which is on the rapid rise globally, making genomics one of the most actively growing niche markets. The convergence of scientific advancements as well as the need for better tools to diagnose, treat and prevent diseases drives this growth (Phillips et al., 2018). This growth is opening up new opportunities for scientific laboratories participating in the market. New service lines and products are continuously being introduced to the market. The most recent demonstration of the power of genomics in addressing societal health problems was during the COVID-19 global pandemic. The role played by genomic technologies in resolving outbreaks and guiding

preventative measures was immeasurable and escalated the demand to levels never previously anticipated. According to a report published by the Global Clinical Laboratory Services Market (2022), the estimated growth of US$222.7 billion from the analysis done in the year 2020 is projected to reach a revised size of US$303.1 billion by 2026, growing at a compound annual growth rate (CAGR) of 5.1%. This evidence shows that the market size for genomics is expected to increase substantially in the coming years. Many service providers are positioning their companies to seize opportunities presented by the market growth. Investments are flowing into the sector, particularly in advanced economies; in turn, the proliferation of businesses and the budding of start-ups is currently a common occurrence (Gajdzik, Wyciślik, and Gajdzik, 2020; Global Clinical Laboratory Services Market Report, 2022).

1.2.2 Organisation and functioning of genomics laboratories

Genomic laboratories as entities take different forms; for example, there are independent commercial laboratories, public (government) laboratories and others attached to academic institutions. The operation of laboratories is safeguarded by a general framework of regulations, quality standards, practices and ethical requirements. These vary from international to country-specific legislation and ethics codes. The scope of services each laboratory provides and the end-users it serves are based on certifications for all requirements pertaining to the particular service offering.

1.2.3 The South African market and competition outlook

Like other developing countries, the market is at its infancy in South Africa. Laboratories providing genomics testing in the country serve researchers, R&D industry customers and clinical diagnostics market. Genomic services are offered by the government facilities, the National Health laboratory Services (NHLS) for the public health, National Institute of Communicable Diseases (NICD) and South African Medical Research Council (SAMRC) for research. The major players include private domestic and international laboratories who offer services also to researchers, private health facilities and other commercial clients. Academically attached laboratories have capacity and in some instances, to exceptional levels. However, the commercialisation of genomic technologies from academia is not established yet (Brant and Sibanda, 2018; Stofberg, 2019). That is more common in developed regions where high-level genomics capacity from universities translates into commercial products and services through start-up businesses (Rasmussen and Wright, 2015; Audretsch and Caiazza, 2016; Mercelis, Galvez-Behar, and Guanyin, 2017). There are three interrelated factors which are seemingly the cause of minimal participation of academic

laboratories in commercializing genomics services; 1) high turnaround times, 2) lack of quality accreditation, and 3) low dependability. Such perception discourages potential customers and creates an entry barrier for academic-linked laboratories.

With low participation by academic laboratories, the competition in the local market is primarily driven by domestic and international commercial laboratories. The major international rivals that compete for genomics services in South Africa and in Africa are laboratories based in China, South Korea, the United Kingdom (U.K.) and The United States of America (U.S A.). (Leheny and Roberts, 2015). Their biggest advantages are that they operate at very high-throughput and, as a result, provide highly affordable services. It is a challenge to compete with these laboratories on cost basis, particularly for services that produce very large data (such as the sequencing of human, plant and animal whole genomes). The opportunity for emerging local genomics laboratories is on the sequencing of small genomes (such as viruses and bacteria, which KRISP specializes in) and in diagnostics that need a fast turnaround time.

1.2.4. KRISP contribution in the local genomics market

KRISP is one of best equipped academic laboratories, which, unlike others, is actively increasing its participation in commercial service. The state-of the art infrastructure at KRISP currently contributes to human health and well-being through provision of diagnostics and genomic data for infectious diseases (Technology Innovation Agency, 2022). In this regard, the KRISP group delivers high-level genomics to researchers and industry R&D customers. In the past five years, KRISP has focused on establishing itself as a strong genomic services laboratory by implementing industrial-scale processes and enhancing operations to become more efficient and competitive in the market. One of its goals was to attain international quality standard through South African National Accreditation System (SANAS) accreditation for medical laboratories, ISO 15189, and this was acquired in February 2022 (KRISP, 2022). The requirement for such accreditation is because the industry is highly regulated nationally and internationally, and it is desirable for organisations providing services to meet specified quality standards, ethical regulations and other operational requirements (Khadambi-Morokane, Bhowan and Ayuk, 2021). The fulfilment of quality standards has opened up an opportunity for KRISP to enter the clinical diagnostics market.

In addition to improving operational systems, strategies including incorporating sample collection services and customer support, were implemented to enhance service delivery. The platform strives to consistently deliver high-quality services at the shortest possible turnaround time in a manner comparable to other major competitors in the market (KRISP, 2022).

Operating at that level is essential in positioning KRISP to participate in the country's genomics market.

1.2.5. Motivation for the study

Following the work that has been done to acquire advanced equipment, setting-up operational systems and other resources to establish KRISP as a competent genomics services provider, the management and the platform team are focussing on growing the platform services business. The growth objectives are firstly, to increase sales by attracting more research and industry customers beyond the KwaZulu Natal province, secondly, to expand the customer base by entering the clinical diagnostics market and thirdly, to further diversify services offered. The group plans to intensify marketing of services. This involve deploying platform strengths that differentiate KRISP services and make them appeal to target customers with the ultimate purpose of securing a sustainable competitive position in the market. Competitiveness in genomics like other knowledge-based industries is largely driven by Intellectual Capital (IC) (Bobadilla and Gilbert, 2015). Beyond genomics the positive impact of the IC in attaining a sustainable competitive advantage is widely reported (Xu and Wang, 2018; Nadeem, Gan and Nguyen 2018; Khan, Yang and Waheed, 2019; Tonial et al., 2019; Khalique et al., 2020). IC is an enabler for laboratories to effectively and rapidly implement latest technologies or testing methodologies, and continually innovate to improve service offering (Singh-Moodley et al., 2020). As new and advanced tools and systems are frequently introduced in the market the competitive advantage lies in the laboratory's capability to creatively utilise that cutting-edge infrastructure in a manner that achieves higher efficiency or create higher-value for customers. It is employees who synergize other resources, internal skills and knowledge to enhance innovativeness and achieve superior performance (Lu et al., 2021). Personnel therefore are a strategic tool for establishing competitive advantage (Oosthuizen and Kara, 2008). From the groundwork KRISP has done to be a professional and competent genomic services provider, their consistent focus on developing exceptional workforce talent pose personnel as a strategic resource upon which efforts to differentiate the platform services can be based.

1.3 The problem statement

The currently heightened focus of KRISP management and their team to expand customer base require an effective approach to make their services stand out and appeal to potential customers. In the target market KRISP competes with large international laboratories that attract customers on the basis of low-cost, data quality, and speed (Abayomi et al., 2013; Glanzmann et al., 2021). Attempts to attract customers on the basis of offering services at

lower prices has proved to be unsustainable for KRISP due to scale operations limitations. KRISP can however establish its competitiveness in delivering on quality, speed and other value-adding features. Skills, knowledge and attributes of employees are key in delivering higher-value services. Driven by appreciation of the value of IC in the scientific services business (Bobadilla and Gilbert, 2015), KRISP managers consistently invest in personnel. This offer grounds for exploring personnel differentiation as an approach to establish a competitive advantage at KRISP.

1.4 Overall aim

The study explores how differentiation through personnel can be employed by KRISP as a strategy to gain and sustain a competitive advantage in the South African genomics services market.

1.5 Research questions

- What competitive strengths and qualities are demonstrated by KRISP's personnel?
- What competencies and capabilities does KRISP realise from personnel strengths and qualities?
- What factors are contributing to increase KRISP's personnel motivation and commitment?

1.6 Research objectives

- To determine the competitive strengths and qualities that KRISP's personnel possess.
- To determine competencies and capabilities at KRISP.
- To understand whether there are factors sustaining KRISP's personnel engagement.

1.7 Significance of the study

The study will contribute towards understanding whether personnel at KRISP demonstrate valuable and unique qualities that potentially enhance the value of services offered. This forms the basis upon which services can be differentiated and subsequently the outlining of KRISP's value proposition. Beyond KRISP, the results will contribute knowledge towards understanding personnel differentiation variables for similar highly-specialised service organisations.

1.8 Limitations of the study

The limitation of the study is that the input information on the value which customers ascribe to genomic service delivery was not available for targeted customer groups, particularly from

clinical diagnostics. It is acknowledged that these customers may present slightly different requirements. The baseline knowledge relied upon in this aspect was survey data from existing research customers. The knowledge of what value customers require is foundational to successful differentiation. The second limitation was the scant literature on personnel differentiation in laboratory testing services. To address this problem, the researcher reviewed literature in other services sectors, such as education and finance.

1.9 Outline of the dissertation

This dissertation is composed of five chapters and the organization is outlined below:

Chapter 1: Introduction to the Research Study – provides the background to the study and a brief review of the genomics market globally and in South Africa. It also briefly describes KRISP, the study site of this research, how the platform has been established to provide genomics services and the factors that motivated the study undertaken here. It also highlights the research problem, aims and objectives.

Chapter 2 Part I: Literature Review – covers relevant theories and findings from previous research. This section culminates in applying personnel differentiation in the context of scientific services laboratories.

Chapter 2 Part II: **A case of KRISP** - provides an overview of KRISP's genomics services laboratory, organization and functions. It also provides an insight into the competition KRISP faces in the selected market.

Chapter 3: **Research Methodology** – discusses the methods used and their suitability in addressing the objectives of the research study.

Chapter 4: Presentation of Results – outlines the results attained from the research data analysis.

Chapter 5: **Study Findings and Interpretations** - concludes the report by summarising the findings and giving recommendations for KRISP on deploying available strengths towards attaining the competitive edge.

1.10 Conclusion

In the past few years, significant groundwork has been done to establish KRISP as a provider of cutting-edge genomics services to research groups and industrial customers. Building on this capacity, the current growth plans for KRISP involve expanding the customer base. The challenge KRISP faces is to establish its position in customers' minds and become the preferred service provider. Understanding the edge KRISP has over its rivals forms the basis upon which it can distinguish its service offering and position itself in the market. This investigation explores personnel differentiation as an approach for KRISP to create the

competitive edge and set itself apart from competitors. The following chapter, Chapter 2, presents a literature review on creating competitive advantage, and on differentiation and provides background information on KRISP.

Chapter 2 – Part I: Literature Review

2.1 Introduction

This chapter entails two parts. Part 1 covers theoretical concepts and highlights scholarly work on creating a competitive advantage through personnel differentiation. It begins by discussing the fundamentals of competitive advantage, the dynamism of the concept and an analysis of Porter's generic strategies. This is followed by a review of findings from previous studies on the implementation of generic strategies across different industries. The middle part of the chapter focuses on personnel differentiation as a tool for creating competitive advantage, illustrating current knowledge on the topic. The current structure and organisation of the local genomics market are highlighted to give perspective on the opportunities for personnel differentiation in this particular market. Part II provides background on KRISP, focusing on the resources KRISP has, and how it currently competes.

2.2 Creating a competitive advantage

Attaining competitive advantage remains a goal of many company leaders as it is vital to ensure market leadership. The concept has a long history but it was Porter (1985) who first introduced it to the business strategy. To date, competitive advantage has been studied at length, resulting in numerous definitions. Drawing from submissions by various scholars, competitive advantage can be understood as a three-dimensional concept;

i) Customer value, company's ability to create and capture higher value for customers (Sigalas et al., 2013; Tanwar, 2013; O'Cass and Sok, 2015; Kaleka and Morgan, 2017).

ii) Access to exceptional resources, encapsulated in Resource-Based View (RBV) theory (Varadarajan, 2015; Hunt, 2015; Popli and Rizvi, 2017).

iii) Positioning of an organisation in a selected market including its dynamics and competitors (Porter, 1985). Porter posits that the competitive advantage stems from the company's capability to exploit market opportunities and neutralize competitive threats in the selected market.

The three dimensions are interdependent. Creating a competitive advantage requires an organisation to firstly have access to advantage-producing resources, and secondly an ability to effectively utilise those resources to produce services or products of higher value to customers, relative to those of a competitor (Johnson et al., 2020; Abubakar et al., 2022). In a similar context, an ability to deploy exceptional resources to exploit market opportunities better than rivals gives an organization an edge (Varadarajan, 2015).

The constantly changing external factors across different industries continuously introduce new complexities to the competition. The uncertain market environment nowadays compels managers to apply creative ideas to build competitive advantage for businesses to adapt and survive. Changes in external factors manifest through shifts in sources of competitive advantage and often such shifts erode the underpinnings of advantage-causing factors (Mukonza and Swarts, 2019; Elizabeth and Marie, 2021). Artificial intelligence, new technologies, access to information, globalisation as well growing customers concerns about environmental issues (regarding the pollution, waste, climate change and global warming) demonstrate that companies these days are faced with new threats and that the foundations of competitive advantage are changing (Kao and Du, 2020; Iansiti and Lakhani, 2020: Elizabeth and Marie, 2021). This highlights the dynamism of competitive advantage.

2.2.1 Competitive advantage and strategic management

Depending on the nature of the business, the model and available strengths, efforts to develop competitive strategies have focused either on the organisation's external environment (the market) or its internal environment (RBV), two of the three dimensions of competitive advantage discussed above. The competitive strategy denotes a combination of actions, systems and approaches implemented by a particular organisation to survive competition pressures and increase market share. In the external market-oriented approach, referred to as Market-Base View (MBV) (Porter, 1985), a competitive strategy is viewed in the context of the industry as a whole and the position of an organisation in the market in relation to rivals. Theorists advocating for MBV believe that understanding the strength of the competition the firm faces in a particular industry is foundational for decisions on strategies to pursue. Porter (1985, pp. 4) postulates that "competitive strategy must grow out of a sophisticated understanding of the rules of the competition that determine an industry's attractiveness". A tool used to attain this understanding is the 5-forces framework for analysing industry structures (Porter, 1985). According to this framework, determinants of competitiveness in a given industry are:

i) Internal rivalry
ii) Threat of new entrants
iii) Strength of consumers
iv) Strength of suppliers
v) Threat of substitute products

By determining the strength of each of these competitive forces, organisations can identify profitability opportunities that match their strategic capabilities as well as threats they need to address in a particular market. The limitation of this approach is that it assumes that

organisations operate within a static market structure, which is hardly the case nowadays. Furthermore, Porter's framework cannot adequately address industries characterised by complex multiple inter-relationships (Wang, 2014).

Focusing competitive strategies on RBV is guided by differences on heterogeneity and immobility of resources owned or accessible to each company. Resources encompass tangible and intangible entities available to the firm that enable it to effectively deliver higher customer-value services (Hunt, 2015; Johnson et al., 2020). Broadly speaking, resources could be finance, physical infrastructure, legal environment, personnel, organisational condition, information, and relationships. RBV theory posits that achieving competitive positional advantage in the market is the direct consequence of the firm's effective leveraging of resource advantages (Varadarajan, 2015).

Important considerations when establishing sustainable competitive advantage are that the sources upon which it is derived must be unique, not easy to duplicate, must set the organisation apart from its competitors and yield economic benefits (Abubakar et al., 2022). Intangible elements, such as intellectual property in people, organisational culture and practices, present as good sources of competitive advantage as these are not easily identifiable.

2.3 Porter's generic strategies for creating competitive advantage

Porter (1985) suggested three independent bases upon which managers can create competitive advantage; lower-cost or cost leadership, differentiation and focus strategy. The three bases are referred to as 'generic strategies' as they are applicable widely across different industry scopes and scales. Based on such generality, feasibility and well-defined structure, Porter's generic strategies are highly popular amongst business strategists. To date, the strategies are central to management theories concerning the behaviour of organisations in response to competition (Islami, Mustafa and Topuzovska Latkovikj, 2020). However, the emergence of new and reconfiguration business models in response to evolving customer needs and changing external factors create gaps in the available knowledge on applicability and usability of the framework to some modern businesses, such as e-business environment (Firoz Suleman et al., 2019) and highly innovative technology businesses (Leão and da Silva, 2021).

2.3.1 Cost leadership strategy

Organisations that subscribe to a cost leadership strategy focus on creating a competitive advantage by being the lowest-cost producer of goods or services (Hales and Mclarney, 2017) Lower production costs enable firms to offer products and services at lower prices while remaining profitable. The strategy rests on the organisation's capability to identify and exploit all cost advantage sources (Tanwar, 2013). Cost leaders can implement various ways to reduce their costs, including tightly controlling production and overhead costs, minimising distribution costs and setting up efficient scale facilities (Liu et al., 2018). The workforce mindset needs to be oriented towards operational efficiencies and a willingness to discontinue activities where the organisation does not have a cost advantage.

Mass production, economies of scale and control over the source of input materials (value chain control) are proven practical approaches that organisations adopt to lower their production costs (Islami Mustafa and Topuzovska Latkovikj, 2020). Nowadays, advancing technologies offer remarkable capabilities for mass production, resulting in increased efficiencies in organisations that are taking advantage of new and improved production systems (Liu et al., 2018). However, the cost-leadership strategy is effective for large organisations with substantial buying power but is not beneficial for small organisations (Wang, Lin and Chu, 2011).

While cost leadership can benefit an organisation in its initial growth, particularly when penetrating a new market, it has several downsides. One of the shortcomings of the strategy is the difficulty in sustaining the advantage; as soon as rivals discover cost-reduction methods, they are likely to replicate them. Another issue is that maintaining the perception of quality can be challenging (Tanwar, 2013). Furthermore, because they are operating with a thin profit margin, cost leaders have the challenge of maintaining high sales volumes for the strategy to be successful (Linton and Kask, 2017).

2.3.2 Differentiation

Differentiation is an act of making a company's products or services unique or distinct from others of a similar nature offered by competitors (Tanwar, 2013; Sharma et al., 2018). Varadarajan (2015) posits that differentiation is a tool to leverage a firm's unique resources to deliver better value products or services to customers. The strategy enables marketing managers to highlight special features of a product, service or seller's establishment that sets their offering apart; for example, their innovative processes, reputation for fair dealing and efficiency. For differentiation to be effective and worth the resources, the distinctiveness of

products or services must be based on essential attributes that relate to customer benefit (Varadarajan, 2015). This denotes that an organisation's offering must be distinct to enhance customer value. Understanding what customers value is then a vital input into the process. Another important consideration for marketing managers is the sustainability of the differentiation factors. Such sustainability helps create a lasting competitive edge and, in turn, maintains customer loyalty (Woo et al., 2014).

2.3.3 Focus strategy

The focus strategy is when an organisation selects a segment within the market to tailor its strategy to deliver to the needs of that particular group of customers (Tanwar, 2013). The strategy demands the focusing of organisational resources on certain value chain activities, for example, product design, distribution or market development (Odwaro, Abongo and Mise, 2022). Alternatively, the focus strategy can be in terms of scope or an area. The organisation can choose to concentrate on a select product range, a segment of a market and geographical areas (Firoz Suleman et al., 2019). For the focus strategy to be worthwhile for an organisation with reference to profitability and future growth, a target market segment must have good growth potential but be small enough to be insignificant to other larger competing organisations (Hales and Mclarney, 2017).

2.3.4 Application of Porter's generic strategies

Many aspects of generic strategies have been studied since the initial report by Porter (1980) (Tanwar 2013; Firoz Suleman, Rashidirad and Firoz Suleman, 2019; Lee, Hoehn-Weiss and Karim, 2021; Odwaro, Abongo and Mise, 2022). Depending on a given market segment, an organisation may select a suitable strategy from the three or a combination of either cost-leadership plus focus or focus plus differentiation. For some time, there were contrasting views regarding the simultaneous application of low-cost and differentiation strategies. Some scholars were of the view that combining these two strategies is difficult and unlikely to achieve success (Back and Boggs, 2008; Tanwar, 2013; Adner, Ruiz-Aliseda and Zemsky, 2016). Porter's conclusion from comparing the two strategies was that the two strategies are mutually exclusive (Porter, 1980). The more recent research has demonstrated that some organisations successfully apply hybrid low-cost strategy and differentiation strategy and in so doing create synergies that neutralise trade-offs associated with the combination (Salavou, 2015). Among others an example of a currently successful organisation implementing both cost-leadership strategy and differentiation strategy is Uber (Hales and Mclarney, 2017; Lee, Hoehn-Weiss and Karim, 2021).

Some of the research conducted in the past decade gives an insight into the performance of cost-leadership versus differentiation strategies in different organisational settings. Comparative analysis from investigations by Ali and Anwar (2021) in the banking sector in Iraq showed that the cost-leadership strategy had solid predictive value for competitive advantage. A comparative analysis conducted by Brett (2018) on ecotourism in South Africa demonstrated that a cost-leadership strategy improves business performance instead of differentiation. In contrast, findings by Islami, Mustafa and Topuzovska Latkovikj (2020), when examining the relationship between Porter's generic strategies and the organisation's performance in a highly competitive environment, highlighted that the differentiation strategy results in higher business performance than the low-cost strategy. This outcome is because the differentiation strategy gives a sustainable advantage over cost leadership (Islami, Mustafa and Topuzovska Latkovikj, 2020). These findings confirm that the effectiveness of specific strategy is dependent on whether conditions are favourable for that particular strategy in a selected market.

The work done by Chen et al. (2014) links customer loyalty to the satisfaction derived from the consumption of differentiated services or products. The customer loyalty resulted in increasing positive word of mouth recommendations, sales volumes and in turn financial performance of the organisation. This supports the fact that successfully implemented differentiation influences consumer behaviour concerning their purchasing decisions. Better financial performance when using differentiation is also demonstrated by Tanwar (2013). The author also compares differentiation to cost leadership strategy and concludes that while a low-cost approach is likely to increase market share, organisations are highly likely to achieve higher profits through differentiation because the latter sets a better market entry share (Tanwar, 2013). It is clear, therefore, that differentiation benefits the organisation because it enables competing without lowering prices.

2.4 Using differentiation as a strategic action to create a competitive advantage

Factors under which differentiation strategy can be especially effective are when; "there are many ways to differentiate the product or service, and many buyers perceive these differences as having value; when the buyer needs and uses are diverse; when few rival firms are following a similar differentiation approach; when technological change is fast-paced, and competition revolves around rapidly evolving product features**"** (Islami, Mustafa and Topuzovska Latkovikj 2020: 7). It has also been highlighted by Leão and da Silva (2021) that technological advances and how they transform industrial operations, service delivery and marketing, broaden the latitude for differentiation. For example, in addition to traditional ways of differentiation, such

as quality, features and design, more recent trends include brand image, customisation, distribution channels as post-sale support, and the list is growing. Accordingly, organisations adopting differentiation require strong research and development, creativity, marketing, and efficient collaboration with distribution channels and resources to create high-quality products or services (Brenes et al., 2014; Putra, Abdillah and Putri, 2021). The economic factor should also be considered; Trinh and Begun (2019) postulate that differentiation will work particularly well in markets where customers are not price-sensitive.

2.4.1 Challenges in implementing differentiation

The cost – Differentiation is often associated with increased costs and significant time demands. Introducing unique goods or services with increased benefit to the market follows significant investments by an organisation into research and development, innovation and creativity as well as into marketing and sales (Abdillah and Putri, 2021).

Limiting growth – The inherent risk in differentiation is the degree to which it is applied. The more specialised the offering, the more suited it is to meet the needs of the selected customer group. On the other hand, the more highly specialised the product or service, the narrower the market segment is for the company to realise growth in financial performance (Salavou, 2015). The accepted position is that differentiation cannot be moderate because it will fail to impress a solid core of enthusiastic customers (Kaleka and Morgan, 2017).

Changing customer perception – Another drawback of differentiated products and services is that customers may not comprehend the added benefit or unique features and may compare the product or service to a similar, cheaper offering from competitors (Lee, Hoehn-Weiss and Karim, 2021). As a result, marketing communication must be undertaken to create awareness and appreciation of particular benefits by target customers.

Inconsistency – Given dynamism and innovation in the process, highly differentiated offerings may associate with inconsistent marketing messages. To address this, marketing practitioners should develop umbrella communication capturing a broad range of elements or features characterising product design or process, such as *'*cutting-edge technology and innovative leadership' in the case of Apple Inc.*,* (Yayla, Kutlubay and Yeniyurt, 2020). This communication remains effective even as it deals with different segments and niches.

2.4.2 Approaches for differentiation

Regarding conditions surrounding the product or service, marketing managers can achieve differentiation by emphasising the condition of the organisation's physical establishment, business conduct, and efficiency and by linking customers to personnel (Kusumah, 2020). All of this can serve first to attract and then attach the customer to the organisation. Table 1-2 below lists different approaches organisations use to differentiate their offering.

Table 1-2 - Different dimensions for differentiation

Differentiation approach	Description
Product differentiation	This concerns improvements that are made to physical products, such as durability, quality, packaging and added features.
Services differentiation	This relates to services that accompany product delivery. It entails improvements or innovations regarding product ordering, logistics, speed of delivery, incorporation of technology, and consulting service, amongst others.
Personnel differentiation	The organisation's ability to deliver its offering to customers is based on the quality of personnel.
Channel differentiation	This concerns the coordination amongst distribution chain partners, their optimal configuration about coverage, expertise, and performance.
Image differentiation	Differentiation based on the organisational image is achieved through business practices, organisational culture, customer experience, and corporate social responsibility, amongst other factors.

Adapted from Kotler, 2002 p. 288

2.5 Personnel differentiation

The focus on personnel as an essential resource for organisations to develop a sustainable competitive advantage over rivals has grown significantly in recent decades. The reason is that the distinctive capabilities that personnel can bring into an organisation's operations are not easy to replicate as the causative factors are often not apparent or the competitor business environment is not enabling (Bokhari and Chowdhury, 2014; Ghahroudi and Sagheb, 2018). Oosthuizen and Kara (2008) contend that leaders in organisations now fully acknowledge that the strength of their businesses lies in the intellect they possess through their employees, a

position widely accepted by scholars and practitioners nowadays (Micu and Necula, 2020; Ilić, Šević and Ristić, 2020; Chiguvi et al., 2020; Jankelova, Joniaková and Procházková, 2022). By definition, personnel differentiation is the ability of organisations to respond in time and in a superior manner to the needs of their customers through the skills and knowledge of their employees (Mbugua and Kinyua, 2019). The literature demonstrates six significant elements from which the personnel differentiation effect radiates. These are presented in Figure 1-2 below.

Figure 1-2 - **Personnel differentiation variables**

Source: Adapted from Bokhari and Chowdhury, 2014 pp.23.

The skills, experience, and knowledge of personnel are a precursor to technical innovation, creativity and operational efficiency, all of which give the organisation the edge in production (Pradana, Pérez-Luño and Fuentes-Blasco, 2020). The power of these competency factors is even more significant in knowledge-intense industries (Bobadilla and Gilbert, 2015). The rise of knowledge-based economies is paralleled by increasing organisations' dependence on innovation and the creative abilities of their employees (Bobadilla and Gilbert, 2015; Ferreira and Coelho, 2019). Some of the highly competitive organisations whose success is based on their differentiated products include **Apple,** through its innovative product design and unique operating system (Tian, Wang and Wang, 2022) and **Lush,** which is uniquely placed in a saturated cosmetics market because of its handmade quality and ethical production (Spry et al., 2021).

Success, competitiveness and high performance are achieved when a good blend of competency and customer service elements are at play. The quality of interactions with

customers strengthens support service accompanying the delivery of the company's offering and can be a vital source of competitive edge. In the services sector, the effect of such personal attributes is even weightier as employees often deal directly with customers (Kotler and Armstrong. 2010). **Emirates airline** is the current example of a popular differentiated service organization; it has made itself stand out in the industry by building its brand on exceptional customer service and access to the latest in-flight technology (Cui and Li, 2022).

2.5.1 Personnel differentiation and organisational performance

Empirical evidence from work undertaken by various scholars demonstrates the effect personnel attributes on performance, customer satisfaction and loyalty. The work done in Kenyan micro-finance institutions demonstrated a robust positive relationship between personnel differentiation and organisational performance (Mbugua and Kinyua, 2019). Chiguvi et al. (2020) studied how to employ personnel differentiation to achieve a competitive advantage in a private tertiary education institution in Botswana. Their investigation identified hiring quality personnel, training and retention as vital for an organisation to achieve a competitive advantage (Chiguvi et al., 2020). The research that was done by Chiguvi et al. (2020) built upon the factor analysis research conducted by Bokhari and Chowdhury (2014), where they identified six elements essential for effective personnel differentiation; visually appealing personality and tangibility; assurance; credibility and accessibility; responsiveness; empathy and reliability. Some of these are align with elements reported by Kotler and Armstrong (2010).

2.6 Factors for building competitive advantage in scientific services laboratories

At the foundational level, laboratories need high quality, cutting-edge infrastructure and equipment, and optimal coordination with other value chain partners. Needless to say, well-qualified personnel are central to put these factors to use in a manner that gives the laboratory the edge over rivals. Hence building personnel competences is crucial. Table 2-2 below summarizes these factors and their effect on building competitive advantage.

Table 2-2 – Factors for competitive advantage and the effect on genomics laboratory operations

Competitive advantage factor	Resulting effect and advantage producing activities
Quality standards	Reliable and accurate performance of tests and credibility of test results (Gajdzik, Wyciślik and Gajdzik, 2020).
Technical competence of personnel	Appropriate education, skills and knowledge for staff who perform work (Bobadilla and Gilbert, 2015).
Cutting-edge infrastructure and innovative technologies	Implementation of advanced equipment and methodologies give an advantage over speed, quality, cost, and more in-depth analysis (Gajdzik, Wyciślik and Gajdzik, 2020).
Diverse service offering (breadth of services)	Offering as broad a range of services as possible within the limits of the field the laboratory is equipped to serve. This spreads the cost and risk of R&D and results in a more comprehensive fulfilment of customer needs (Trinh and Begun, 2019).
Image of the laboratory	A reputation built upon consistency in providing high-quality services. Reliability and appropriately addressing the needs or expectations of customers (Porter, 2010).
Cooperation and network formations amongst laboratories	Enables more efficient use of resources and enhances the delivery of services to customers. This creates a competitive edge for the network, and, in turn, increases the income for each member laboratory (Ghafari Someh et al., 2020).

Source: Adapted from Bobadilla and Gilbert, 2015 pp.223-224; Trinh and Begun, 2019 pp.2; Ghafari Someh et al., 2020 pp.1500; Gajdzik, Wyciślik and Gajdzik, 2020 pp.178-179.

2.7 Theoretical underpinning of the study

The Resource-advantage theory, commonly referred to as 'RA' theory, helps explain observed differences in innovativeness, quality of offering and productivity across organisations. The concept was originally introduced into the marketing literature by Hunt and Morgan in the 1990s (Hunt and Morgan 1996). RA theory bases these differences on heterogeneity and immobility of resources owned or accessible to each firm. Resources encompass tangible and intangible entities available to the firm that enable it to effectively deliver higher customer-value (Hunt, 2015). In broad classification, resources could be finance, physical infrastructure, legal environment, personnel, organisational condition, information and relationships. RA theory posits that achieving a competitive positional advantage in the market is the direct

consequence of the firm's effective leveraging of resource advantages (Varadarajan, 2015). On the premises of this position, differentiation should result from gaps in resources and capabilities between the firm and its competitors.

RA further assumes innovation and organisational learning are endogenous and that organisations and consumers have imperfect information (Hodgson, 1992; Hunt and Arnett, 2003). Due to such heterogeneity and immobility of resources, organisations with advantage-producing resources will have a competitive advantage. Foundational propositions of RA theory relevant to this study are listed in Table 3 below. These foundational elements informed the development of research questions.

Table 3-2 - Some of the foundational premises of RA theory

Foundational facet	**Descriptive features and actions**
The organisational resources	financial, physical, legal, ***human***, organisational, informational and relational
Resource characteristics	heterogeneous and imperfectly mobile
The role of management	to recognise, understand, create, select, implement and modify strategies

Source: Extracted from Hunt and Arnett, 2003

2.8 Conclusion

This literature study offered an insight into strategies designed to create a competitive advantage. It demonstrates that the concept is dynamic, as industries adopt new business models in response to the constantly changing competition: generic strategies are evolving. The focus on intellectual property and personnel qualities as vital intangible resources upon which strategists build competitive advantage nowadays has become widely adopted. Service organisations are oriented for such personnel-based competitiveness due to direct involvement of personnel in delivering services. In knowledge intense services like genomics, the knowledge and exceptional competences of personnel has higher significance.

Building on some of the highlighted research findings, the study undertaken here focused on creating a sustainable competitive advantage for the business operating in a highly competitive genomics market by studying variables for personnel differentiation and its effect on the value of services offered. The following section gives an insight into KRISP, the case of this investigation.

Chapter 2 – Part II: A case of KRISP

2.9 Background on KRISP

KRISP is the genomics and bioinformatics Research Center of the UKZN, located at the Nelson R Mandela School of Medicine in Durban, KwaZulu-Natal. Since it started operating in 2017, KRISP has been making cutting-edge genomics services accessible to academics, industrial groups and other commercial users. As shown in Figure 2-2 below, up until 2019, 79% of the customers have been academic researchers concentrated in South Africa and the KwaZulu-Natal province. In the same year, KRISP intensified marketing efforts to expand the customer base both geographically and by the scope of services. In 2020, prior to the spread of the COVID-19 pandemic to South Africa, the results of enhanced marketing efforts had started to show and the number of customers from industry R&D customers began to increase.

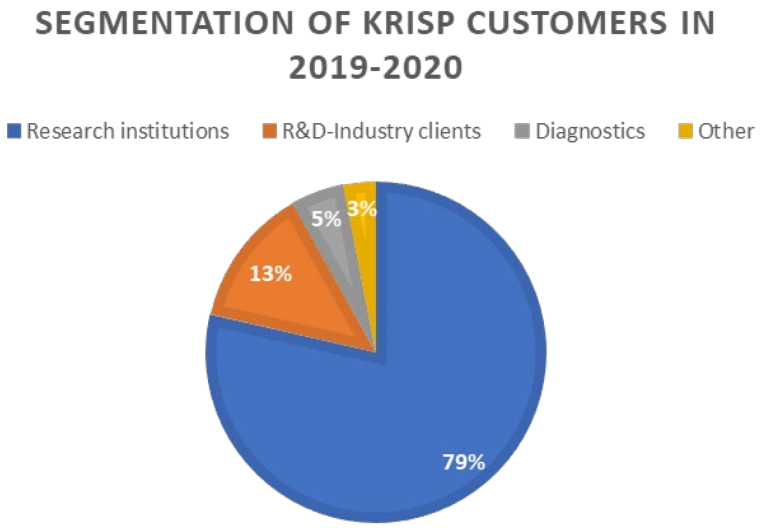

Figure 2-2. KRISP's customer segmentation according to the service scope.
Source: Courtesy of KRISP Business Development Unit

2.9.1 KRISP resources, facilities and personnel structure

KRISP's genomics laboratory has a range of industry-leading equipment that supports automated processing. The platform has a multi-disciplinary team consisting of scientists, technicians bioinformaticians and clinicians. KRISP has a well-established Bioinformatics unit that offers much-needed genomic data analysis to platform customers. Bioinformatics is a scarce skill that is not commonly available as part of services offered by most genomic service organisations. The team responsible for implementing genomic technologies are individuals qualified at the PhD level and Technologists. The team of scientists are mainly involved in research and development, while lower-level personnel will take responsibility for routine

processes (Figure 3-2). The technical team is supported by the second arm, which entails personnel responsible for support functions such as administration, finances and overall management, as presented in Figure 3-2 below.

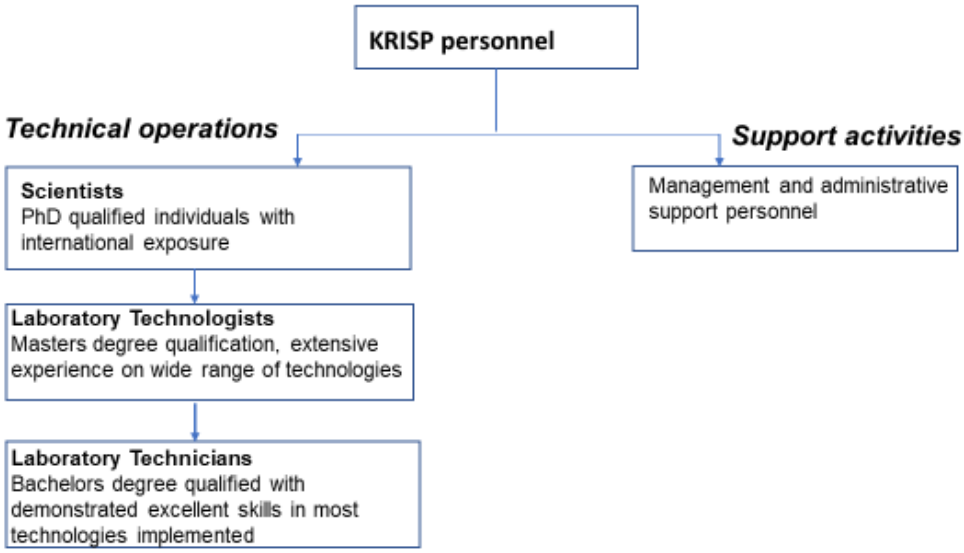

Figure 3-2 – The division of KRISP's personnel according to function, qualification range and positions for the technical operations team.
Source: Courtesy of KRISP laboratory operations

2.9.2 Marketing approach

The factors that form the marketing strategy of KRISP currently entail:

Reputation - The position that KRISP currently occupies in the market has been driven by the significant health and wellness impact it has made. The scientific data which KRISP provided informed the South African government's response to the COVID-19 pandemic. Prior to the COVID-19 pandemic, scientific evidence from KRISP was used to influence the design and implementation of measures to control other infectious diseases including HIV/AIDS and TB. These outputs had a notable impact on the health sector and it put KRISP on the map.

Packaging of services offering - KRISP enhances customer value by offering complementary services, including consultation and bioinformatics. Customers always have the option to add-on data analysis when procuring genomic services.

Quality – Genomic services at KRISP incorporate internal quality control (IQC) and external quality assurance (EQA), and all procedures are validated and performed by HPCSA-accredited scientists. In February 2022, the laboratory attained 1SO 15189 SANAS Accreditation.

Infrastructure – A range of highly-advanced equipment is housed at KRISP and the latest technologies are implemented. Some of marketing activities undertaken to promote the KRISP include showcasing cutting-edge equipment and technologies to customers, potential customers and other interested individuals or organisations. This is done through visiting KRISP facilities and through marketing videos which are distributed online and through social media platforms.

Extensive research collaborations and industry partnerships – These present KRISP with opportunities for product development and innovation to develop new technologies.

Training and Capacity development -Through leveraging available infrastructure, collaborations, and partnerships, KRISP offers a range of training courses in various genomic technologies to scientists, technicians and postgraduate students from various public and private institutions. This creates awareness of the genomic services accessible through KRISP.

2.10 Competition outlook

Clinical diagnostics customers - Private laboratories form most of the accredited laboratories and are the major participants in this market. These service providers have implemented comprehensive quality management systems and have business management strength. Public laboratories, however, have lengthy multi-step processes and requirements to satisfy before applying for accreditation. Because of the cumbersome processes involved, not many public laboratories attain accreditation. Most accredited laboratories are in the private sector (Khadambi-Morokane, Bhowan and Ayuk, 2021). Academic laboratories do not often serve this market segment as they lack SANAS accreditation. SANAS is the only internationally recognised accreditation body in South Africa that confirms a laboratory's competence to offer pathology services (Khadambi-Morokane, Bhowan and Ayuk, 2021).

Research and R&D customers - The academic laboratories in South Africa are commonly out-competed by independent commercial laboratories for three main reasons: i) high turnaround time, ii) lack of quality accreditation and iii) low dependability.

Table 4-2 – KRISP's competitors, their strengths and weaknesses

Competitors:		Strengths	Weaknesses
1	**Inqaba Biotec**	Infrastructure, expertise and large-scale operation	Limited R&D and innovation strength
2	**Molecular Diagnostic Services**	SANAS accreditation	Lack of high throughput machinery
3	**The Centre for Proteomics and Genomics Research (CPGR)**	SANAS accreditation	Limited diagnostics offering or service gaps
4	**Other academic laboratories**	Research collaborations and networks	Lack of high throughput machinery and implementation of quality standards
5	**International laboratories**	Infrastructure, expertise, large-scale operation	Difficulty in exporting samples due to increasing ethics control.

Source: Courtesy of KRISP's Business Development Unit

KRISP has state-of-the-art infrastructure, a world-class laboratory environment and systems in place to process samples and isolates from most biological sources and deliver high-quality genomics services. The platform has the potential to create a highly profitable genomics laboratory. Furthermore, the impact KRISP's services and scientific outputs have had on health and wellness in South Africa place KRISP in a favorable position to significantly contribute to the advancement of the national bio-economy. An optimal use of these strengths will help the platform create higher value for customers. Personnel can be an integral catalyst towards delivering better value from available resources and systems. The next chapter focuses on procedures and tools employed to investigate personnel differentiation at KRISP.

Chapter 3: Research Methodology

3.1 Introduction

This chapter outlines the methodology used in this study. Research methodology refers to a systematic approach applied to answer the research questions (Rajasekar, Philominathan, and Chinnathambi, 2013). The elements of the methodology range from broad constructions of research through to focused steps of data collection and analysis. The selection of a suitable methodology is determined by the nature of research problem, philosophical positioning of the researcher and the participants of the study (Creswell and Creswell, 2018). The researcher in this study was interested in understanding the key strengths of KRISP's personnel and whether these strengths translate to exceptional competences that give KRISP the edge in the selected market. In that context, the researcher interviewed KRISP's personnel to clarify their perspective and experiences delivering genomics services at KRISP.

3.2 Research strategy

The study undertaken here employed a case study design. Case study research can be described as an intensive systematic investigation in a defined singular entity or unit (Heale and Twycross, 2018). It enables researchers to answer explanatory questions in context. This research study was an exploratory undertaking to understand factors of personnel differentiation, relationships and impact in the context of the genomic testing laboratory at KRISP. Research to understand the competitive advantage arising from human resources has not been undertaken within KRISP or the laboratory service market in South Africa before. Case research is best suited for such an investigation as it focuses on a defined unit and will enable the researcher to understand a phenomenon in depth and comprehensively in multiple dimensions. This is possible because the methodology for case research permits data collection from multiple sources and, as a result, enables the development of a holistic description (Ylikoski and Zahle, 2019). The researcher will collect and analyse data through interviews and KRISP's business documents in this investigation.

3.3 Research method

Creswell and Creswell (2018) describe the research approach as plans and procedures for research enquiry spanning broad assumptions to more refined step-by-step data collection and analysis processes. There are three distinct approaches to research: (1) quantitative research, an analytical approach designed to produce quantifiable values (Asenahabi, 2019), (2) qualitative research, which is a systematic approach to explore and understand a social or human problem through descriptive data attained from those who are involved (Teherani et al., 2015) and (3) mixed methods research, which lies in the middle of quantitative and

qualitative approaches (Creswell and Creswell 2018). Selecting an appropriate research approach is informed by the nature of the research problem to be addressed as well as the philosophical assumptions the researcher brings to the investigation (Asenahabi, 2019).

A qualitative research approach was used in the study. The qualitative research approach is a systematic inquiry involving collating rich textual data in the participants' natural settings to explore and understand the meaning that the target population ascribes to a phenomenon (Teherani et al., 2015; Creswell and Creswell, 2018). Data analysis yields a holistic description through an iterative research process whereby the researcher gradually makes sense of the situation by comparing, contrasting, replicating, cataloguing and classifying data (Cunningham, Menter and Young, 2016; Creswell and Creswell, 2018). Such rigorous descriptive interpretations of data produce rich and detailed explanations enabling researchers to attain a deeper understanding of the phenomenon under study. The qualitative method was used in this study because the researcher sought comprehensive descriptive data based on of participants' experiences of participants in order to answer research questions. This type of research also allows collection of data from multiple sources and enables the researcher to understand the phenomenon from multiple perspectives.

Some of the essential characteristics of the qualitative research approach (Creswell and Creswell, 2018) that justified its use in the study are that;

- Data is collected in a natural setting where participants are experiencing the phenomenon under study.
- The researcher is the key data collection instrument through the review of documents, interviewing participants and observation.
- The research process is emergent. This means that the original research plan, for example, the research questions, participants, study site and data collection forms may be modified or adjusted as the researcher delves deeper into the topic.
- A holistic account involves reporting multiple perspectives and identifying many factors in the phenomenon under study.

The researcher adopted the phenomenology strategy of enquiry. An epistemological position regarding this study was that as the data was contained within perspectives of KRISP's personnel, the phenomenology strategy was considered appropriate. The approach was initially developed by Husserl, and it enables an understanding of a phenomenon based on lived experiences of the people involved (Dowling and Cooney, 2012).

3.4 Researcher's role and reflexivity

In qualitative research, the researcher is part of the world s/he is studying; for example, a researcher is an integral data collection tool and a knowledge producer. Accordingly, it is essential for the researcher to reflect on personal background, values and perspectives and how these can potentially influence the construction of meaning during interpretation. Reflexivity is the process of introspection to pinpoint the researcher's contribution to the construction of meanings (Palaganas et al., 2017). It is an ongoing process of examining, recognizing and understanding the effect of personal assumptions during the research process.

On the other hand, the value that the researcher's background brings to an investigation cannot be overlooked (Creswell and Creswell, 2018). Understanding the context, knowledge and experiences the researcher has about the phenomenon being investigated enriches conceptualisation of the study, framing of research questions and data interpretation. Furthermore, the good relationship that exists between the researcher and participants is beneficial to the investigation. It is the foundation of trust the researcher had from participants, making them openly share their honest views.

The research undertaken here is what authors refer to as '*backyard research*' (Glesne and Peshkin, 1992 cited in Creswell and Creswell, 2018 p.184). The researcher in this study is close to the phenomenon under study. She is an employee within the study site and is involved in the development and implementation of the marketing plan. During her experience in the marketing role, she identified the need for this research study. A good working relationship exists between the researcher and all the study participants. The researcher has a background as a scientist and served as laboratory personnel a decade ago prior to the business management role she currently holds. The researcher is, therefore, prone to a degree of subjectivity.

Measures taken to address these biases and enhance the study's rigour include, firstly, making explicit the personal assumptions and biases at the onset of the study to ensure the openness and transparency of the research. During data collection, the researcher adopted the practice of recording notes on reactive emotions and thoughts triggered by memos. This would assist her to self-examine and understand her position about the information presented and avoid bringing her meaning to the research at the time of analysing and interpreting data. She also employed multiple strategies for validation, including triangulation and member checking (Creswell and Creswell, 2018) to ensure the accuracy of the information. Lastly,

ethical requirements regarding accessing the study site, consent of individuals to participate in the study and confidentiality of participants as detailed under 'ethical consideration' later in this chapter were adequately addressed.

3.5 Study site, target population and sampling

Study site - the study was conducted at KRISP located at the Nelson R Mandela Medical School campus of UKZN. The campus is located at Glenwood in Durban, the largest city in the province of KwaZulu Natal in South Africa. This is the physical space where KRISP's laboratory, business and administration operations take place; hence this was the site where data was collected.

The target population - is the total number of persons possessing characteristics of interest to the researcher (Martínez-Mesa, 2016). The target population in this study were employees of KRISP.

Sampling - is the process of selecting a defined number of individuals (from the target population) to include in research (Martínez-Mesa et al., 2016) and it concerns representativity as well as the richness of information (Guetterman, 2015). Sampling is necessary because it is not always practically possible to study the entire population due to limited research resources and non-specificity. Various strategies are used for different research approaches, and they can broadly classify into probabilistic and non-probabilistic sampling types (Martínez-Mesa, 2016). This study adopted purposive sampling. Purposive sampling is when the researcher selects individuals with specific characteristics the researcher is interested in and who are in the position to provide the most credible and relevant information to the study (Malterud, Siersma and Guassora, 2016). It is one of the non-probabilistic types, and it is appropriate to use when views of knowledgeable (about the phenomenon under study) individuals are required. Other non-probabilistic sampling strategies include convenience, quota and snowballing (Creswell and Creswell, 2018).

Sample size - determination of the sample size in qualitative research depends on various factors, such as the research approach employed, homogeneity of participants' background, accessibility of participants, availability of time and resources, attainment of saturation as well as the adequacy of potential data to address the questions (Malterud, Siersma and Guassora, 2016). The adequacy of potential data refers to the specificity of experiences, knowledge or properties amongst participants about the phenomenon under study. Characteristics needed for study participants were firstly, an experience of two years or more working in the laboratory at KRISP. Secondly, individuals in positions of laboratory or medical scientists, laboratory

manager and senior technologists. These positions have responsibilities to perform laboratory tests, troubleshoot, plan and input to KRISP service delivery strategy. Informed by that criteria, six members of KRISP's personnel were selected and enrolled into the study. This sample is the total coverage of senior technical personnel at KRISP.

3.6 Data collection

Qualitative research data can be in diverse forms: interviews, documents, photographs, audio-visuals, images, videos and observations. Two types of data collected to address the objectives of this study were interviews and documents.

Qualitative documents - this involves the gathering of documents that contain information on the phenomenon under study (Creswell and Creswell, 2018). These can either be publicly available or private documents. The researcher collected a business plan, annual performance reports of KRISP and publicly available news articles about outputs from KRISP. Written permission from the Director of KRISP was attained prior to collecting documents which were not publicly available.

Participants' permission - prior to conducting an interview, informed consent was obtained from each participant. Introductory information shared with participants entailed an explanation of the purpose of the interview, the duration and why the participant was selected. Once participants' consent was obtained, in-depth interviews were conducted with each participant.

In-depth Interviews - the researcher conducted semi-structured interviews guided by open-ended questions and further probing to attain more detailed responses. Because COVID-19 restrictions were enforced during this study to avoid close contact, interviews were conducted online. The researcher took notes and made an audio recording of the discussion according to the participants' consent. She also made a verbatim transcription for each of the interview audio recordings.

An interview guide was developed to understand the critical personnel strengths and competences at KRISP, based on the technical teams' descriptions of their experience (Appendix A). The guide is essential to ensure research questions are thoroughly explored within the time scheduled, to prevent over-discussion of some themes over others and to maintain the consistency of the interview. The protocol entailed a few open-ended questions to allow lengthy discussion of themes and the researcher could probe when it was necessary to stimulate the participants to explain their thoughts further. In constructing the interview questions, the researcher started with broader and more abstract areas of the investigation and gradually refined each area into narrower and more focused questions. To ensure the

effectiveness of the guide, it was refined using *a* four-step refinement approach (Yeong et al., 2018). This entailed aligning the interview guide to research questions, constructing an inquiry-based conversation (converting questions from academic language into a daily conversation discourse), attaining feedback from experienced qualitative researchers on the structure of the guide and pilot testing the guide. Once feedback from pilot study had been received, some of the questions were rephrased to improve clarity and to ensure the guide functioned as intended.

3.7 Data analysis

Data analysis in qualitative research involves reduction, presentation and drawing, and verification of conclusions to make sense of the text or image data (Guest, MacQueen and Namey, 2012; Schutt, 2012). Data is reduced by assigning words, phrases, passages or sentences to represent meaningful information from participants' data. The process begins by actively and critically reading all the information captured to get a sense of the data in its entirety and summarising it. Once the researcher had prepared and analysed the data, she used NVivo computer software to organise and code the data. Thematic analysis was then conducted. Data collected from documents was analysed using content analysis. Content analysis involves coding and classifying data to make sense of the information and highlight significant findings.

3.8 Validity and Reliability

Validity involves checking the accuracy of the findings (Creswell and Creswell, 2018). The researcher triangulated data from different sources, including KRISP's operations documents and performance reports to validate the themes derived. Secondly, the researcher used peer debriefing, which involved identifying a person who critically reviewed and asked questions about the study. This ensured that the study interpretations expanded beyond the researcher and resonated with others (Creswell and Creswell, 2018). Lastly, the member checking, where data and interpretations were fed back to individuals from whom they were collected, was used to validate data. Reliability refers to the consistency, stability and dependability of the tools for data analysis and interpretation and the results attained (Leung, 2015). In this study, the researcher conducted constant data comparison. Constant comparison involves continuously checking accuracy of the results to original data sources in relation to context and form (Leung, 2015).

3.9 Ethical considerations

Ethics is an integral part of the research and the primary goal is to minimise risk to participants. To this end, the researcher must identify potential risk areas or ethical issues and articulate plans to address these before conducting research. Prior to the commencement of this study, the proposal was submitted to the ethics committee, and the investigation commenced following issuing of an approval. The information shared with identified potential research participants was clearly described in writing for easy understanding. Written consent was obtained from individuals who accepted an invitation to participate in the study. Those who agreed to participate were informed that they could withdraw at any stage, should they want to. The confidentiality of participants was ensured by excluding any identification details, including names, occupational roles or any demographic information, in all research reporting. Participants were assigned numbers for the purpose of data analysis. With the use of online meeting tools, the security of online meetings was heightened with an application of security features available, including password protection access. Data collected was kept confidential in password-protected electronic storage contained in the researcher's devices.

3.10 Conclusion

This chapter outlined the research methods selected for the study, including a discussion on how the researcher applied techniques and procedures to address the research objectives. It also addressed the role of the researcher, her connection to the study site, measures undertaken to minimise potential bias and techniques employed to confirm the accuracy of the results. The following chapter presents the data analysis, interpretation and an in-depth discussion of the results obtained.

Chapter 4: Presentation of Results

4.1 Introduction

This chapter presents the results from thematic analysis of the interview data. It also outlines the results from the content analysis conducted for data triangulation. The analysis led to identification of four key themes; i) technical and non-technical qualities of personnel, ii) personnel interactions with customers, iii) demonstrated competences and iv) determinant factors for personnel commitment and motivation. Technical and non-technical qualities of personnel capture distinct characteristics of KRISP's personnel. Demonstrated competences and capabilities refers to proficiency of personnel in delivering genomic services. The two themes and the one on customer interactions addresses key strengths of KRISP's personnel. Subthemes identified under each theme are also discussed. The main themes and related subthemes developed are discussed with reference to the research objectives.

4.2 Technical and non-technical qualities

To holistically understand the strengths of the personnel at KRISP, data collection was focused on technical and non-technical characteristics. Results indicated that personnel had broad skillset for genomics, high level knowledge and sound experience in pathogen genomics Figure 1-4. Based on these qualities, the team had the expertise to perform different genomic technologies with precision. Lack of expertise to conduct advanced molecular biology testing such as genomics is amongst the limitations South Africa and other African countries face in setting up laboratories and expand access to these services (Singh-Moodley et al., 2020). For a laboratory to have skillset to deliver a diverse range of tests is by itself a competitive strength (Trinh and Begun, 2019). It had been earlier pointed out by Porter (1990), that the capacity of an organisation to deliver comprehensively customers' needs gives the particular organisation the edge over rivals. Study participants attribute the employees' depth of experience and knowledge to high educational qualification levels and having worked in various top international laboratories. The majority of employees who are involved in technical operations hold qualifications at Masters to Doctoral degree levels.

Figure 1-4. Key technical and non-technical qualities that characterise KRISP's personnel

Source: Researcher

The findings also showed that personnel are trained on all methodologies implemented in the laboratory and can therefore easily replace each other if necessary. In this regard, *Participant 1 asserted*;

> "*All employees are trained on all workflows, with that, there is no dependency on a particular person to perform specific tasks*".

Further value is added to KRISP's personnel by quality management skillsets and a team of highly skilled bioinformaticians, who take laboratory results forward into analysis and interpretation. It is rare to find this combination of skills at a genomic laboratory in South Africa as bioinformatics currently remains a scare skill (Mulder et al., 2018). The value added by the integration of data analysis skills in genomics laboratories is stressed by Ko et al, (2020). Their analysis unpacks the fundamental elements of processing large genomic data sets namely; high-performance computing, creating complex computational pipelines and maintaining software packages which commonly overwhelm bench scientists and hinder them from analysing their data (Ko et al., 2020). Laboratories where informatics or programming expertise to perform complex analysis parallel genomic data generation are ahead of the competition (Ko et al., 2020) as they offer a comprehensive service to customers.

Regarding non-technical characteristics of personnel, a positive attitude was a prominent feature highlighted. Participant 6 stated;

> "*Being empathetic, making customers comfortable, and just being kind are essential strengths that KRISP has within the staff that interacts with customers. Polite etiquette and positiveness in our correspondence to customers, the words excited the words help are the words that stand out in our communication to a client. That*

make them know that we are taking what they want to accomplish seriously. Moreover, they also know that we have not just the skills but the character to fit into what they want to achieve, and we have the same level of dedication".

Participants highlighted that the staff's positive attitude was evident in how they applied themselves to their responsibilities, in the enthusiasm and dedication they showed when given tasks to perform, their respect for each other and their willingness to assist or support fellow team members. According to Tasgit et al., (2017), such internal reactions and behaviour should be a primary goal that organisational leaders strive to achieve with their workplace culture in order for personnel to be accustomed for similar response and cooperation in their external interactions.

4.3 Interactions with customers

In order to better understand non-technical qualities that the personnel demonstrate, data was collected on how team members interact with customers during service delivery. Overall, participants described the interaction of KRISP team members with customers as professional, friendly, understanding and empathetic. The skills and abilities below outline these interactions.

Relationship-building – Results showed that KRISP's personnel interact with customers in a manner that builds relationships. One participant explained that their approach was influenced by the understanding that clients procuring services could purchase other complimentary services, such as bioinformatics, and that they could also become long-term research collaborators. This is possible because the breadth of skills and expertise available at KRISP enabled the platform to offer a wide range of services and high-level research.

Good Communication – Most participants advised that they had learnt to keep open and constant communication with customers while providing services. That means communication throughout the process starting with giving clear and timely responses to customers' enquiries, to giving updates on the status of processing their samples and providing final results' reports. Participants commonly maintained that good ongoing communication built trust and ensured KRISP's commitment and accountability to its customers. Participants highlighted that it certainly helped, especially when a problem which was bound to cause delays and increase turnaround times arose. Examples would be equipment breakdowns or when emergencies like the COVID-19 pandemic arose, or problems with sample materials the customer submitted for processing. Participant 1 explained;

"*I have noticed that the best thing is to be upfront with the client. The moment you see that something is broken down, let them know there is going to be a delay, we*

have this issue. Let them know and keep them informed. They actually prefer, even if it is bad news, they prefer to hear it than being silent."

Participant 3 expressed a similar viewpoint;

"*It is always explaining the reality of what we are finding out in the lab to the customer. To say: Here is what I am finding. I am not sure whether I am doing something wrong or is there something you have done with the samples*."

Responsiveness – Keeping to turnaround times is vital to KRISP's fulfilment of the promise to customers as well as to its financial performance. It is, therefore, upheld by personnel. In most cases personnel were successful in ensuring that customer enquiries were addressed within 8 to 24 hours, giving clear answers with relevant technical details.

These findings align with elements underscored by Kotler and Armstrong (2010) as well as Bokhari and Chowdhury, (2014), as essential for effective personnel differentiation. Kotler and Armstrong (2010) further stressed the importance of these attributes in services businesses, as personnel often deal directly with customers. The nature of KRISP service delivery is in that exact manner where consultation and ongoing communication with the customer is vital in order to accurately deliver to specifications needed.

Customer interaction flaws

The study revealed certain shortfalls in customer interactions at KRISP. One drawback was the limited capacity. There was only one person to whom all service enquiries were directed. This was the case with customers approaching KRISP for the first time. If the only receiver of enquiries is not immediately available to respond to their enquiry, this causes delays, lack of feedback and these potential customers are likely to lose interest. Another drawback was that, in the case of repeat customers who have established access to different team members, there is no control over whom customers liaise with. This creates situations where customers sometimes contact different people when they have an enquiry. The challenge is that the language and tone used in responding to clients are not controlled. Some personnel are incredibly good at keeping irate customers calm and responding in a very professional diplomatic manner while others are not.

4.4 Demonstrated competences and capabilities

These results addressed the research question on what competences and capabilities stem from defined qualities of KRISP's personnel. The key aspects participants described as exceptional in relation to how services are delivered at KRISP were efficiency, adaptability

and innovation (Figure 2-4). While other competences and capabilities were demonstrated by the personnel, these three were the most prominent.

Figure 2-4. Competences identified among personnel at KRISP
Source: Researcher

Efficiency – in performing genomic testing entails optimal use of the equipment and other input materials to generate higher output which meets quality standards and set turnaround times. Results showed that efficiency is also enhanced by the complementing strength of the bioinformatics group. A great level of understanding and close collaboration between the bioinformatics and laboratory groups exist, a practice lacking in most other service providers. The advantage for KRISP out of this close collaboration is the rapid convergence of knowledge and proficiency in computer science and genomics. That cross-disciplinary strength enhances the accuracy and enriches data analysis (Altman, 2000). Furthermore, KRISP has another layer of internal quality control through the support of bioinformaticians. The results from laboratory are immediately analysed by bioinformaticians and if something is wrong with the data, this is addressed before the final results are released to the customer. This assures the accuracy of the results. Improving efficiencies is commonly the quest for organisations across industry sectors as this leads to higher performance. The factors driving efficiency are vastly covered in strategic management literature, including access to certain key resources, the arrangement and the manner in which organisations deploy those resources, practices and culture amongst others (Varadarajan, 2015; Islami, Mustafa and Topuzovska Latkovikj, 2020). While achieving efficiency plays a vital role in increasing an organisation's performance, the key to create competitive advantage is the strategy and the uniqueness of resources with which that particular efficiency is attained (Ali and Anwar, 2020; Abubakar et al., 2022). In this regard, a combination of bioinformatics expertise and work practices across bioinformatics and genomics disciplines puts KRISP in a strategic position and secures competitive advantage.

The adaptability - of KRISP's personnel was predominantly demonstrated during the emergence of the COVID-19 pandemic, the health challenge that overwhelmed pathology laboratories and the health sector as a whole. The platform team were able to set up a diagnostic test for COVID infection as well as sequencing technology to undertake genomic surveillance. Alongside setting up and implementing these new laboratory procedures, the team effectively arranged the logistics of moving samples to the laboratory, including handling shipments from other countries. All these processes were developed and put in place two weeks after KRISP was approached to support the South African government efforts to control the pandemic. Participants attributed their ability to quickly adapt new testing methods and implement new operational systems to the skillset, knowledge and experience collectively owned at KRISP.

> *Participant 6 highlighted,* "*With that very composition of a qualification, experience and skillset; our team members can look at a new technique, put together resources and plan to implement it in our lab to respond to new market needs*".

Participant 3 also linked KRISP's personnel's ability to adapt to technological changes to the fact that the team has a diversity of skills.

> "*Because of different skills available, we can easily adapt to different organisms and methodologies. As a result, we are not so channelled to a limited offering*".

> Participant 2 also remarked; "*KRISP team can be flexible and run with multiple projects at once. As circumstances changed in the market, we could adapt and redirect very quickly. I do not think that many people have that strength. The people I was able to work with showed outstanding flexibility and ability to adapt on short notice*."

Owing to the current dynamism of the competition fuelled by new technologies, globalisation, and complex multi-stakeholder systems, adaptability has become an important organisational capability making a business more competitive (Reeves and Deimler, 2012). The ability of KRISP team to cope with drastic shifts and changes, reconfigure the systems and resources and thriving during crisis demonstrate the resilience the platform has. When describing organisational resilience, Scalera et al. (2014) highlight cognitive and behavioural attributes as properties that enhance organisation's ability to withstand and overcome unexpected changes.

Participants highlighted **innovativeness** as one of the vital strengths of the personnel. The team constantly explored methods to make workflows more cost-effective, faster or less reliant on one supplier. Again, the COVID-19 pandemic offers a classic example of innovativeness

at KRISP. The biggest challenge for many laboratories when the pandemic first peaked was acquiring reagents, since supply chains were disrupted. Participants explained that they would try different test kits and materials available at the laboratory at the time until they found a combination that worked and allowed them to continue with the testing and generation of sequence data. Even after reagents became available, the prohibitive cost motivated personnel to explore miniaturizing, by reducing volumes of reagents used. Participants reported that when processing COVID samples, reagents were used at ¼ or 1/10 for the two types of technologies applied at KRISP. That meant producing 4X and 10X more output from input material, and it substantially reduced operational costs. Such an ability of employees to apply knowledge, skills and experiment to resolve operational challenges and continuously improve services characterises innovative organisations (Wang, Lin and Chu 2011). Research over the past two decades has showed that innovation is strongly linked to the organisation's competitiveness (Petrakis, Kostis, and Valsamis 2015; Pradana, Pérez-Luño and Fuentes-Blasco, 2020). Given that knowledge, skills and abilities of employees are antecedent of innovation (Pradana, Pérez-Luño and Fuentes-Blasco, 2020), such intellectual capital is a strategic resource which organisations rely on to compete in the scientific services (Bobadilla and Gilbert, 2015).

Innovativeness was not only driven by the COVID pandemic. Customers often approach with unique and new test requests that require the implementation of new methodology or adjustments to processes in use at that time. In this regard participant 5 explained;

> *"Because our clients were mostly researchers, it is like no two projects were really the same. For every project handled, there is a part or some aspect of innovation that, you know, the team needed to do. So, I think, as a whole, the team is quite innovative."*

4.5 Determinant factors for personnel commitment and dedication

The third objective of this study was to determine whether there were factors that motivated personnel dedication and commitment to remaining in their employment. This would help ascertain sustainability of KRISP's human capital advantage, as literature points to the fact that immobility of advantage-producing resources gives sustainable competitive advantage to an organization (Hunt, 2015). The results indicated three key factors in the environment at KRISP that impacted personnel commitment. These are discussed under the subthemes below.

4.5.1 Continuous growth and development

Most participants cited the fact that they were trained and had an opportunity to work on different workflows as one of the main sources of excitement in their job. The variety was stimulating and renewed their focus. Delivery of services which address different complex health or scientific problems was also found to trigger creative thinking and was mentally stimulating. While such learning occurs during regular work engagement, structured capacity development activities were constantly organised for personnel.

Constant upgrade of scientific equipment to ensure the laboratory house the latest and cutting-edge machinery also inspired personnel. Acquiring state of-the-art equipment created opportunities for personnel to implement new genomic technologies and this added to their development. Being part of an academic institution, UKZN, and being associated with other national scientific institutions augmented personnel learning and provided valuable exposure to more R&D in similar and related fields. Participant 1 summed it up by saying;

> "*I like that it is a very dynamic team, a very dynamic environment that's always trying to be at the forefront, and that encourages me to improve on myself and to continuously read and educate myself that I can also be mentally at the forefront as well."*

The idea that a company's innovation and performance will improve if its employees share knowledge, effective practices, experiences, and learning (Roper, Love, and Bonner 2017: Ali and Anwar, 2021) points to the importance of organisational ability to manage human capital. An optimal interplay of organisational culture, practices and environment on acquisition, assimilation and exploitation of knowledge is considered as a strategic instrument for the sustainability of intellectual capital-based advantage (Bobadilla and Gilbert, 2015; Petrakis, Kostis, and Valsamis, 2015).

4.5.2 Alignment of responsibilities with individual's passions

Participants explained that KRISP's leadership made an effort to understand each person's strengths and assigned responsibilities accordingly, and this fostered personnel commitment. They also conveyed that they felt excited when deliberating and thinking creatively to develop processes for scientific activities they were passionate about.

4.5.3 Contribution towards the improvement of healthcare

Delivering service with high health impact to societal well-being was another factor that some participants attributed to their dedication. *Participant 3* described how their understanding of

the impact of their services kept them focused and committed even at the most challenging time when the COVID-19 pandemic hit;

> *"Personally, I love being in the lab; I like doing what I do in the lab. Importantly working to assist, for example, during COVID, we were here very few of us; most people were at home, working remotely, and we were scared. Working with a new virus for which little was known about at the time, we were as scared and nervous, but we knew that society, the government, researchers and all other health stakeholders needed us! They needed those results. As the pandemic continued, new variants emerged; for us, it was like we need to get these results out now; this data is needed. You will go there each day knowing the purpose and being convinced that I have to do this; I have to deliver these results. You have to have that commitment and passion every day, knowing I need to get this and this done. It is really important how you see your job and what is your perception of things*."

4.6 Analysis of KRISP documents

Secondary data was analysed to develop a comprehensive understanding of KRISP's personnel strengths and enabling factors. The content analysis incorporated a business plan for the five years between 2018 – 2022, quarterly and annual reports for 2018 – 2021 and KRISP newsletters published bimonthly covering 2019 – 2021.

Delivery of services

Speed of sequence data generation - analysing quarterly and annual reports with reference to targets set in the business plan indicates that the most common generation of genomic data at KRISP exceeds target numbers. The state-of-the-art, high throughput equipment and personnel capacity to optimally utilise them enable KRISP to achieve data generation speeds comparable to established international laboratories. As a result, turnaround times promised to customers are achieved in most cases.

Quality of data –when biological samples provided for testing are suitable, results produced by KRISP's laboratory almost always meet customers' quality requirements and the quality standards under which particular tests are performed. Routinely, KRISP's laboratory testing is assessed via external quality assurance (EQA) as well as auditing of procedures. KRISP's laboratory consistently achieved total scores from assessments in the past two years. These results, together with the attainment of SANAS accreditation in February 2022, gives assurance of quality standards upheld at KRISP.

Innovation

The scientific capabilities which KRISP has demonstrated have attracted some large international biotechnology organisations, including Thermofisher Scientific, Abbot laboratories and Immunity Bio, to collaborate with the platform in R & D. The benefits for KRISP out of these collaborations and partnerships were exchange of latest genomic technologies, through which platform personnel advance their skills. This significantly adds value to the laboratory operations. Furthermore, the results showed that operational costs for the most requested services had reduced over the years of KRISP operation. The innovation capabilities including increasing automation and cost-saving in the use of reagents, are causes for operational costs reduction.

Technical expertise

The high-level skills, knowledge and experience of KRISP's personnel are foundational to the competences and capabilities listed above. A further demonstration of the team's expertise is the success of their capacity development efforts, where they provided training and support to their counterparts from other laboratories within and outside the country on cutting-edge technologies implemented at KRISP. Nearly a dozen courses and training workshops are annually delivered by KRISP's personnel. The success of these efforts is confirmed by the effective implementation of particular technologies in the laboratories affiliated with trainees. In line with the technical expertise and competences notable at KRISP, the platform was recognised as a cutting-edge genomic facility and invited by the World Health Organization to support other African countries in 2021.

Capacity strengthening plans and practices

Efforts to keep personnel abreast with new technologies in the market are evident in the training schedules followed at KRISP. Results from document analysis indicated that more than three training workshops on new technologies are organised for personnel in any given year. Equipment-specific courses are also conducted following acquisition of new machinery. There is also enrichment through events such as seminars and thought leadership sessions, which are conducted on a monthly basis. The academic environment within which KRISP operates is enabling for such activities. Through the association of KRISP with other national and international genomics institutes, personnel also have opportunities for training visits to other laboratories. This substantiates the continuous growth and development cited by some participants as a source of their motivation and commitment.

4.7 Conclusion

The results showed that personnel at KRISP were highly skilled in different genomic technologies and that placed the platform in a position to offer many different laboratory tests. An added value in KRISP offering was the depth of knowledge of operators which made them effective in addressing unique customer needs. Technical abilities existing at KRISP also ensured the high quality of their offering. Results showed exceptional competences and capabilities for operational efficiencies, innovation and adaptability at KRISP stemming from the technical qualities and personal characteristics identified.

Chapter 5: Study Findings and Interpretations

5.1 Introduction

From the time KRISP started to deliver services, the platform managers esteem the role personnel play in achieving business growth. This is evident in the past and present efforts and investment made to recruit and maintain a highly-skilled and quality workforce. The focus on personnel as a source of intellectual capital is a common approach nowadays, mainly by organisations participating in a knowledge-based economy (Bobadilla and Gilbert, 2015; Yaseen, Dajani and Hasan, 2016). This chapter summarizes the findings and gives conclusions on key strengths and competences KRISP has through its personnel. These strengths and competences are the personnel differentiation variables upon which KRISP can create competitive advantage, the main focus of this research.

5.2 Conclusions of findings

The findings showed that in-depth knowledge, diverse skills and solid experience in pathogen genomics and bioinformatics are key strengths of the personnel at KRISP. With these strengths, the personnel are able to implement different genomics technologies addressing many infectious diseases problems. This allows KRISP to diversify the genomic testing it offers as the health sector's needs change. An ability to deliver a wide range of tests constitutes an advantage for laboratories (Gajdzik, Wyciślik, and Gajdzik, 2020). Genomic data analysis is another of KRISP's strengths. As a result of having well-qualified bioinformaticians, KRISP's customers are able to procure data analysis service should they need to, to maximise genomic data produced. Bioinformatics is a scarce skill in South Africa and it is not common for genomics laboratories to incorporate expert data analysis support with their testing services. Offering integrated service packages in this manner also gives KRISP an edge. Porter (2010) postulates that offering complementary services makes the company gain a better position than its competitors because it offers more comprehensive fulfilment of customer needs.

This study further showed that KRISP's personnel were highly adaptable and innovative. Personnel innovativeness stands out as a differentiating competency for KRISP in the selected market, the academic and industry research customers because the needs of these customers are unique and often require tailored solutions for different complex scientific problems. In this regard, KRISP's personnel offer consultancy and are able to set up new methods or advance the existing processes for development of new scientific knowledge that may be desired. Furthermore because of their innovative strength, KRISP's personnel were able to minimize the impact of reagents supply chain disruption to an extent. Adaptability proved to be a remarkable strength at KRISP. The speed and efficiency with which personnel were able to

modify existing technologies, adjust and introduce new operating systems when COVID pandemic hit, made KRISP stand out. These demonstrated competences and capabilities assure customers and potentials that KRISP can be relied on to deliver undisrupted services that are addressing their needs.

The practices implemented at KRISP of ensuring that all personnel are trained and competent in all technologies used in the laboratory also gives them the advantage of consistency and uninterrupted service delivery. KRISP's personnel also demonstrated the ability to consistently deliver high quality and accurate testing, as evidenced by the outcomes of different audit bodies and SANAS accreditation. Quality and accurate testing is a vital competency in the industry (Khadambi-Morokane, Bhowan and Ayuk, 2021).

The findings of this study concerning the qualifications of KRISP's personnel and their abilities concur with the literature that better-trained personnel are equipped to provide excellent customer service (Kohler, 2010; Bokhari and Chowdhury 2014; Chiguvi et al., 2020). From six characteristics displayed by well-trained employees, as reported by Kohler (2010), [competence, courtesy, reliability, credibility, responsiveness and communication] competence, reliability and communication predominate amongst KRISP's personnel. Notably, other personnel's other qualities included dedication, willingness to solve problems, a friendly and positive attitude, cooperation and keeping turnaround times promised to customers. These qualities resulted in customers developing trust in the personnel. As stated by Bokhari and Chowdhury (2014) and Chiguvi et al. (2020), in service organisations, the attitude of personnel is just as important as their knowledge and skills; it also constitutes the strongest competitive advantage, as customers are in close contact with the provider.

Three prominent factors specific to the KRISP environment were identified as playing a role in the sustainability of human capital at the platform. They were ongoing growth and development, alignment of responsibilities with individual's passion and delivering services that positively impact societal health needs. The culture of learning and exposure to science, technology and innovation, which are enabled by the affiliation of KRISP to UKZN, contribute to professional development and this is one of the motivating factors for personnel. The learning environment and ongoing skills development constituting the KRISP ecosystem are vital factors that produce high technical abilities of personnel. The platform clearly has intellectually driven and learning-oriented personnel who are keen to make an impact in the space they occupy.

5.3 Recommendations

It is recommended that marketing efforts focus on personnel high technical competence, innovativeness, adaptability, in-depth knowledge and diverse skill to differentiate KRISP services. Service delivery outcomes which derive from these strengths include high-quality, comprehensive offering, in-depth exploration and customized solutions. These outcomes assure the customer that in most cases, relevant and accurate service will be delivered. A more comprehensive service offering with the incorporation of bioinformatics provided an added value to customers as it is not easy to match. The positive attitude demonstrated through commitment and willingness to give customers the best possible service was another personnel feature giving KRISP an edge.

Most KRISP's personnel are lacking in the know-how of interacting with customers. Although communication and responsiveness were effectively managed, one person was the primary contact, and the competency available in this aspect was limited to this individual. The strategic efforts towards equipping personnel with business management and customer relations should be developed and implemented for KRISP to have adequate skill and provide similarly high-level service to customers in this aspect. Identifying more team members to serve as contact points for customers and training on engaging with customers or managing customer relations can help address this shortcoming. This is particularly important for academically inclined personnel to whom business management is unfamiliar, as is the case for KRISP.

Importantly, KRISP ought to coordinate a plan and resources to effectively communicate the enhanced value of their services to the target market. Among the key internal strengths that make the implementation of differentiation strategy successful is a strong sales team with the ability to successfully communicate the perceived distinct value of services (Wang, Lin and Chu, 2011).

5.4 Conclusion

The study addressed the overall aim by identifying distinctive personnel qualities and competences that differentiated KRISP's services. KRISP's workforce was highly competent, knowledgeable, innovative and adaptable, had a diverse skillset and positive attitude. These elements offered KRISP a remarkable advantage in delivering enhanced value for customers. The innovative strength of personnel, in reference to providing appropriate tailor-made solutions to various complex needs of customers, sets the platform apart from its competitors in research customers market segment. The management should address limitations relating

to customer interactions. Maintaining the learning and development environment that exist at KRISP is vital to realize long-term commitment and in turn sustain the competences and capabilities owned through personnel. Knowledge-intense organisations can draw from these findings concerning personnel features upon which competitive advantage can be created as well as organisational factors conducive to sustaining human capital.

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Appendices

Appendix A – Ethics approval

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

15 June 2022

Gugulethu Cynthia Mkhize (982207221)
Grad School of Bus & Leadership
Westville Campus

Dear GC Mkhize,

Protocol reference number: HSSREC/00004204/2022
Project title: Exploring personnel differentiation at KwaZulu-Natal Research Innovation and Sequencing Platform to create a competitive advantage
Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 20 May 2022 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 15 June 2023.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

All research conducted during the COVID-19 period must adhere to the national and UKZN guidelines.

HSSREC is registered with the South African National Research Ethics Council (REC-040414-040).

Yours sincerely,

[redacted]

Professor Dipane Hlalele (Chair)

/dd

Appendix B: Interview guide

Exploring personnel differentiation at KwaZulu-Natal Research Innovation and Sequencing Platform to create a competitive advantage

Designation of the person interviewed	
Duration with the Organisation	
Date of the interview	
Time allocation	

The researcher will thank the participant for her/his time, explain the purpose of the interview, address the terms of confidentiality, explain the format of the interview and how long it will take and lastly ask if the participant has any question before commencing an interview. Request the permission of the participant to record the interview.

A. Learning variables for personnel differentiation

The goal is to understand key strengths of KRISP's personnel, the resulting competences and to identify what sustains these personnel strengths. So, I would like to firstly get your view on qualifications of KRISP team members. By qualifications I am referring to skills, experiences, talents and personal attributes.

Question 1: What skills and qualities do you consider as strengths of KRISP team members?
Probe: *Can you elaborate on soft skills aspects such as attitudes, respect and other personal attributes*.

Question 2: How do KRISP team members interact with customers, for example, regarding responsiveness, clarity of communication and trustworthiness?
Probe: *How respectful and considerate are team members to customers?*

B. Capabilities, competences and innovativeness at KRISP

Question 3: What aspects of service delivery would you say are consistently performed well (starting from service request, giving a quote, conducting test and providing results)
Probe: *Can you explain further?*

Question 4: What is your view regarding innovativeness of KRISP team (innovativeness refers to the skills and ability to improve tests on offer and to advance operational processes)?
Probe: *What benefit is this to the customer?*

C. Sustainability of KRISP competences

Question 5: What motivates you to remain a member of the KRISP team?

Probe: *Can you elaborate on that?*

Concluding

Question 6: - In your opinion what additional valuable skills and attributes personnel should ideally have for KRISP to stand out (deliver exceptional service)?

Thank you for your input

Appendix C: Information sheet and consent to participate

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

Information Sheet and Consent to Participate in Research

Date:_____

Greeting: Good day,

My name is Gugulethu Mkhize, a Master's (MBA) Degree Student from the Graduate School of Business and Leadership at UKZN. My contact details are; MkhizeG5@ukzn.ac.za , 031 260 4198 or 072 880 7674

You are being invited to consider participating in a study that involves research on exploring personnel differentiation at KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP) to create a competitive advantage. The aim and purpose of this research is to explore how personnel can be utilized in distinguishing KRISP service from that of competitors. The study is expected to enroll 6 members of KRISP personnel. It will involve the following procedures; data collection through semi-structured interviews, and data analysis will be done through thematic analysis. The duration of your participation if you choose to enroll and remain in the study is expected to be one hour for the interview session. The study is funded by Technology Innovation Agency (TIA).

The study may involve the following risks and/or discomforts; an opportunity cost and minimally the misrepresentation of your views. To minimize risk of misrepresentation the researcher will identify and be explicit about own possible biasness in data interpretation. Secondly the research is supervised by an expert researcher. Furthermore, your identity will be protected in all the reporting that will be done in this research. To minimize opportunity cost the interview will be schedule for a time most convenient to the interviewee and the researcher.

The study will provide no direct benefits to participants. We hope that the study will contribute towards understanding personnel features that give KRISP an advantage and resulting competencies. This forms the basis upon which KRISP marketing team can outline how the platform delivers the best customer value on the basis of personnel strength.

The interview discussion with selected participants is the only method by which the researcher will be able to gather the required research data as the knowledge of how team members engage their skills and expertise in delivering service at KRISP is embeded in themselves.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number_**HSSREC/00004204/2022**__).

In the event of any problems or concerns/questions you may contact the researcher at MkhizeG5@ukzn.ac.za , **031 260 4198 and 072 880 7674** or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557- Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Participation in this research is voluntary, participants may withdraw participation at any point and that in the event of refusal/withdrawal of participation the participants will not incur penalty or loss of treatment or other benefit to which they are normally entitled. Should you wish to withdraw, you are requested to complete a short study withdrawal notification provided in Appendix A (attached to this consent form) and send this to Gugulethu Mkhize, the principal investigator MkhizeG5@ukzn.ac.za for orderly withdrawal. The researcher may terminate the participant from the study to maintain the integrity of the data when a participant is not following the interview process guideline or may be deliberately providing misinformation.

Participant will not incur any cost for participating in the study and there will be no reimbursements for participation.

The protection of participants will be ensured by excluding any identification details, including names, occupational roles, or any demographic information. The coding of participants will be utilized. With the use of online meeting tools, the security of online meetings will be heightened with an application of security features available, including password protection access. Data collected will be kept confidential as directed by ethical regulations.

CONSENT

I_____ have been informed about the study entitled: **Exploring personnel differentiation at KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP) to create a competitive advantage** by **Gugulethu Mkhize**.

I understand the purpose and procedures of the study is **to explore how personnel can be utilized in distinguishing KRISP service from that of competitors**.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at (provide details).

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

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Tel: 27 31 2604557 - Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Additional consent, where applicable

I hereby provide consent to:

Audio-record my interview YES / NO

_____ _____

Signature of Participant **Date**