



Cape Peninsula  
University of Technology

**ANALYSING THE IMPACT OF REMOTE WORK ON PERFORMANCE  
OUTCOMES IN SOUTH AFRICA'S ENGINEERING INDUSTRY**

by

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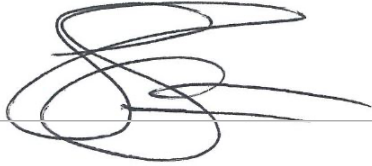
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## **ABSTRACT**

Design engineers are a scarce resource in South Africa, and losing top engineering talent can not only be a costly setback for an organisation, but they also lose that critical talent to competing organisations, impacting their ability to stay relevant in the market. With higher mobility options within South Africa and abroad, talent retention is of great concern to engineering managers. This research study will investigate critical factors impacting engineers' performance in a work from home (WFH) setting and develop a framework for effectively managing the performance of these engineers.

The challenge faced by many engineering organisations may have started with the sudden emergence of remote work because of COVID-19. This pandemic reshaped the way of working to the point where WFH was being referred to as "the new normal". In other cases, organisations attempted a WFH model but failed to implement it successfully. Many organisations have abandoned their WFH policy, summoning employees back to the office, with performance being one of the reasons given for doing so. The engineering sector is not unscathed, and results from LinkedIn show that an overwhelming number of engineers are required to be in the office full time. The challenge with not having a flexible working model for top, scarce talent is that it may push those engineers to other organisations which offer a WFH option that can contribute to engineers' satisfaction and work-life balance.

The research starts with a definition of what a design engineer does, and which of these tasks can be performed in a WFH environment. It is then followed by a review of well-known performance management models to identify key factors that need to be further researched in the literature review. The models identified communication, employee satisfaction, skills, training and development, organisational culture and others that were thoroughly researched in the literature review.

A qualitative approach was employed seeking to gain insights through semi-structured interviews with five engineering managers with extensive experience in the engineering industry, including managing remotely working engineers in South Africa. The respondents provided information on what tasks design engineers perform daily, and agreed that most of those tasks can be done remotely. The key factors from the literature review were discussed and insights were given by the respondents. There was strong correlation in the responses identifying the factors that have the greatest effect on design engineer's performance in a WFH setting. Those were communication, employee satisfaction, organisational culture, and skills, training and development.

Other insights included the fact that engineering managers do not believe that there need to be different performance management metrics and key performance indicators (KPIs) for remote or office working engineers. They did however identify that the KPIs and performance management methods need to be improved. Additionally, training, skills and development were strongly linked to junior engineers and their ability to WFH. The respondents all stated that junior engineers need more in-person oversight, and need to be in the office to be exposed to senior engineers to promote knowledge transfer.

Drawing upon the findings, a practical framework was developed to address the identified gaps and optimise performance management strategies for remote working engineers in South Africa. This included a strong focus on cultivating the desired organisational culture, an employee satisfaction and talent-retention strategy. Those strategies need to be implemented via three actions: firstly, offering training to both engineers and managers to improve communication and use available tools and software platforms effectively. Secondly, developing a deeper hierarchical structure that promotes clear training and development goals for engineers to be promoted to the next level, and supports the rotation of senior engineers to provide more exposure for junior engineers, thus accelerating knowledge transfer. Lastly, an adequate and flexible performance management system with relevant KPIs needs to be developed that aligns with the project's goals at that phase. The outcomes of those strategies can be measured, and using a communication feedback mechanism, the strategies can be re-evaluated and amended if need be.

The proposed research does not only contribute to theoretical literature but also provides practical guidance for managers and organisations seeking to navigate the complexities of remote work in the engineering sector and to remain competitive in the industry, if not to become employers of choice. All ethical clearances were obtained, and the research was conducted in an ethical manner, keeping all respondents in the interviews anonymous.

Keywords: performance management, remote work, engineering, work from home

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## DEDICATION

This dissertation is dedicated to my son, **Arthur Lincon Bower**.

You are not even four years old, so would not understand the words on these pages, but you have been my greatest source of inspiration and joy throughout this journey. Your laughter, curiosity, love and random hugs have reminded me of what truly matters, even during the most challenging moments.

One day, I hope this work will show you the value of perseverance, learning, and believing in yourself. Everything I do, I do with love for you.

# TABLE OF CONTENTS

DECLARATION .....	ii
ABSTRACT .....	iii
ACKNOWLEDGEMENTS .....	v
DEDICATION.....	vi
TABLE OF CONTENTS.....	vii
LIST OF FIGURES.....	xi
LIST OF TABLES.....	xi
GLOSSARY.....	xii
1. ORIENTATION OF THE STUDY .....	1
1.1 Chapter introduction.....	1
1.2 Study orientation .....	1
1.3 Background to the study.....	4
1.3.1. Challenges in managing remote employees .....	4
1.3.2. Organisations ending remote work.....	6
1.3.3. The critical shortage of engineers in South Africa .....	8
1.3.4. Performance management framework .....	8
1.4 Problem statement .....	9
1.5 Research questions .....	9
1.5.1 Primary question .....	9
1.5.2 Investigative questions.....	9
1.6 Aim and objectives of the study .....	9
1.7 The engineering disciplines this study will investigate .....	10
1.8 The conceptual framework.....	10
1.9 The research process.....	11
1.10 Research approach and design.....	11
1.10.1 Data collection .....	12
1.10.2 Data analysis .....	12
1.11 Ethics.....	13
1.12 Chapter outline.....	14
1.13 Chapter summary.....	14
2. LITERATURE REVIEW – WHAT DESIGN ENGINEERS DO AND THE IMPACT OF ENDING REMOTE WORK .....	15
2.1 Chapter introduction.....	15
2.2 The responsibilities of design engineers .....	15
2.3 Possible effects of ending remote work for engineers on the organisation.....	15
2.4 Chapter conclusion .....	19

3.	LITERATURE REVIEW: EVALUATING PERFORMANCE MANAGEMENT MODELS..	20
3.1	Chapter introduction.....	20
3.2	The performance management models.....	20
3.2.1	The Triple-P model .....	20
3.2.2	The Bath people and performance model.....	21
3.2.3	The service profit chain model .....	22
3.2.4	The cause-and-effect chain .....	23
3.2.5	Porter and Lawler’s expectancy theory model .....	24
3.2.6	Performance management as an integrating force.....	25
3.2.7	DeNisi and Pritchard’s model for individual performance improvement.....	26
3.2.8	Inputs from the models and other inputs to consider .....	28
3.3	Employee satisfaction.....	30
3.4	Skills, training and development.....	32
3.5	Performance evaluations / appraisals .....	33
3.6	Organisational culture .....	37
3.7	Trusting remote employees .....	39
3.8	Change management .....	40
3.9	Communication.....	42
3.10	Performance management of engineers .....	43
3.11	Chapter summary .....	44
4.	RESEARCH METHODOLOGY.....	46
4.1	Chapter introduction.....	46
4.2	Research orientation.....	46
4.3	Demarcation of study .....	47
4.4	Delimitation of study .....	48
4.5	Population.....	48
4.6	Sampling of organisations .....	48
4.7	Sample method.....	49
4.8	Sample size .....	49
4.9	Validity .....	50
4.9.1	Credibility.....	50
4.9.2	Dependability .....	50
4.9.3	Confirmability.....	51
4.9.4	Transferability.....	51
4.9.5	Reliability .....	51
4.10	Ethical Considerations.....	51
4.11	Chapter summary .....	52

5.	RESEARCH RESULTS .....	53
5.1	Chapter introduction.....	53
5.2	Pilot interview .....	53
5.3	Profile of the respondents .....	53
5.4	Responsibilities of design engineers .....	53
5.5	Design engineers' ability to WFH.....	54
5.6	The shortage of design engineers, their mobility options and trust.....	55
5.6.1	Shortage of design engineers.....	55
5.6.2	Design engineers and mobility .....	55
5.6.3	Talent retention strategies.....	56
5.6.4	WFH and trust .....	57
5.7	Engineer's key performance indicators (KPIs).....	59
5.8	Key factors that impact employee performance .....	60
5.8.1	Communication.....	60
5.8.1.1	Communication tools and platforms.....	61
5.8.1.2	Training and its impact on communication .....	62
5.8.1.3	Challenges and broader context .....	63
5.8.2	Employee satisfaction.....	63
5.8.3	Organisational culture .....	64
5.8.4	Skills, training and development .....	65
5.9	Team size and structure .....	67
5.10	Chapter summary .....	67
6.	GENERAL DISCUSSION AND CONCLUSIONS .....	69
6.1	Chapter introduction.....	69
6.2	Discussion .....	69
6.3	The factors impacting performance: the integrated retention strategy .....	69
6.4	A better understanding of remote performance management of engineers .....	70
6.5	Guidelines and recommendations for a remote performance management framework 73	
6.6	Theoretical and practical knowledge contributions of the study .....	75
6.6.1	Theoretical contributions .....	75
6.6.2	Contributions to the research in terms of performance and WFH .....	76
6.6.3	Adding a much-needed South African perspective.....	77
6.6.4	Practical benefits to organisations: human resources and managers managing performance .....	77
6.6.5	Benefits to employees.....	78
6.6.6	Benefits to society at large .....	78
6.7	Research constraints, limitations, and future research .....	79

6.8	Conclusion.....	80
	REFERENCES.....	82
	APPENDIX A: Ethics Approval.....	96
	APPENDIX B: Interview Guide.....	97

## LIST OF FIGURES

Figure 1.1: Factors impacting employee and organisational performance .....	6
Figure 1.2: Performance management framework for this research study.....	8
Figure 1.3: This research study's conceptual framework .....	11
Figure 3.1: Triple-P Model .....	21
Figure 3.2: The Bath people and performance model .....	22
Figure 3.3: Service profit chain model .....	23
Figure 3.4: Porter and Lawler's expectancy theory model .....	24
Figure 3.5: Performance management as an integrating force .....	26
Figure 3.6: DeNisi and Pritchard's Model for individual performance improvement.....	28
Figure 3.7: The decreased performance cycle / spiral .....	37
Figure 3.8: Change management elements .....	40
Figure 3.9: Factors considered in the literature review with some interlinkages shown.....	45
Figure 6.1: Deeper hierarchy of engineers promoting effective knowledge transfer. ....	72
Figure 6.2: Design engineer's performance management framework.....	75

## LIST OF TABLES

Table 2-1: Summary of findings from employee surveys .....	16
Table 2-2: Number of jobs advertised on LinkedIn with certain keywords for engineering positions .....	18
Table 3-1: Themes identified from the different models investigated. ....	29
Table 3-2: Organisations' reasons for brining staff back into the office .....	30
Table 5-1: Factors impacting performance and their ratings .....	60

## GLOSSARY

Definition	Explanation
CEO	Chief Executive Officer
COVID-19	The coronavirus disease, caused by the novel coronavirus SARS-CoV-2, which emerged in late 2019 and led to a global pandemic characterised by widespread illness, disruptions to daily life, and significant impacts on public health, economies, and social systems worldwide.
ECSA	Engineering Council of South Africa
HR	Human Resources
Hybrid working model	A flexible work arrangement that combines remote work with in-person work at the office or other designated locations, allowing employees to alternate between working remotely and working on-site.
IT	Information Technology
SAICE	South African Institution of Civil Engineering
SMART KPI	Key performance indicators (KPIs) that are Specific, Measurable, Achievable, Relevant, and Time-bound
Work from office (WFO)	A work arrangement where employees perform their job duties at their employer's office
Work from home (WFH)	A work arrangement where employees perform their job duties remotely, typically from their residence or another location outside of the traditional workplace.

# 1. ORIENTATION OF THE STUDY

## 1.1 Chapter introduction

This introductory chapter briefly reviews the performance management challenges faced by managers of design engineers. It provides a background to the study, study orientation, problem statement and research aim. It discusses the research questions, and concludes with an overview of the study design, ethics and the chapter outline.

## 1.2 Study orientation

Design engineers are individuals who require years of gruelling studies, further multiple years of on-the-job training and mentorship before they are eligible to register as professional engineers in accordance with the Engineering Council of South Africa (ECSA). These engineers deliver designs to build products, processes and systems from inputs from clients and industry while adhering to strict standards and regulations. Without design engineers nothing of great technological importance can ever be built. They guide the manufacturing, production, installation, testing and commissioning process that other engineers and installers need to follow.

These critically skilled engineers are in high demand with organisations competing to obtain the best talent. Design engineers also choose to work in organisations that provide flexible working conditions such as work from home (WFH) options. The challenge for organisations is that they need to find ways to performance manage these remote working engineers. What if an organisation cannot find the best remote performance management model? The loss of these design engineers can be devastating to those organisations, especially if those engineers end up joining the competition. The negative impacts from employee churn include loss of valuable skills, knowledge, and communications between disciplines and departments, quality, production, costs, design documentation, and even safety (Abdolmaleki, Naismith, Ghodrati, Poshdar, & Babaeian Jelodar, 2024).

This study focuses on the performance management of design engineers working from home (WFH) versus working in an office environment. It examines the various existing performance management models and determines to what extent they can be applied to design engineers in a remote work setting. The engineers examined are those who can perform their duties remotely without having to be on site or in the office permanently. Typical responsibilities of design engineers include applying creative methods and techniques, project management, obtaining and converting external information, creativity, problem solving, reflection, and creating acceptance of designs, methods and proposed solutions to engineering problems (Örnekoğlu-Selçuk, Brosens, Parmentier, Hasırcı, & Emmanouil, 2023). Translated to key outputs, these duties include working and completing engineering designs, computer aided

drawings, production of 3D drawings of factories and plants, creating manufacturing quality control plans and installation methods, all while trying to ensure that the designs deliver a financially viable product and within accepted time constraints.

Design engineers in various engineering disciplines, including amongst others electrical, mechanical, civil, industrial and electronic, are engineers who can work remotely and are the target population of this study. This will include other engineers with design responsibilities although their job description might not be limited to design only. These duties differ from those of implementation or site engineers which cannot be performed remotely. Those engineers also fall within the electrical, mechanical, civil and other disciplines mentioned above, but they are required on site to inspect the quality of the work, implement and guide the building work and manufacturing processes, commission new systems and approve the final products. Therefore, site engineers typically cannot work from home.

Now that design engineers have been defined and the critical importance of their work has been outlined, we need to look at performance management models that can be implemented to the benefit of organisations and design engineers working remotely. However, there is a dearth of research and studies focusing on performance management for remote working engineers. The study will therefore rely on the large body of knowledge that exists for performance management of employees in general and look to ascertain which of those will be applicable to the study at hand.

Looking at employees in general beyond the engineering profession, several researchers (Zumrah & Mokhtar, 2022; Krajčik, Schmidt, & Baráth, 2023; Prayudi & Komariyah, 2023) advance that employers across the globe make every effort to be known as a top employer and an employer of choice to ensure they can attract and retain top talent. The researchers claim that there are many factors that impact employee job satisfaction and specifically highlight that job satisfaction impacts on employee turnover intention. The factors include, but are not limited to training, co-worker support, perceived organisational support, work stress, participative leadership style, career development and flexible working conditions that include work from home.

In response to employees' demand for a more flexible working environment, some major organisations such as Yahoo! and IBM experimented with a WFH policy (Swisher, 2013; Simons, 2017). Other organisations were forced to employ a WFH strategy as a result of lockdowns imposed on them by governments because of COVID-19. Many organisations persisted after the pandemic and attempted to keep a WFH or hybrid model alive. However, recently it has become apparent that many of these policies failed as organisations are ending remote work and opting for the tried and trusted face-to-face approach.

Despite organisations ending remote work, a survey from Harvard Business School showed that 81% of employees wanted a more flexible working environment which included WFH or a hybrid model, and employees even developed healthy habits while working remotely (Reynolds, 2021). Despite this trend of wanting a more flexible working environment, organisations are pulling employees back to the office, citing communication, culture and performance as some of the main reason (Swisher, 2013; Kelly, 2021, Simons, 2017; Milmo & Hern, 2022; Isidore, 2022; Anand & Nguyen, 2023; Colvin, 2023).

This study has a focus on design engineers in South Africa; therefore, it needs to reflect on the South African context of employees and their desire to keep the flexible working conditions they enjoyed during COVID-19. The question is this: can the same demand for a flexible work environment be made by South African employees as in other developed countries? In many sectors in a country like South Africa where the unemployment rate has been the highest in the world (Naidoo, 2021), and as high as 33% in 2024 (Statistics South Africa, 2024), there are limited counterarguments against an employer's request to work from the office. Employees may fear that they will lose their job if they do not return to the office full time and with such a high unemployment rate, it will be difficult to find another job. However, this is not the case for engineers. Studies like those done by Swart (2009), Wang and Cuervo-Cazurra (2017), BusinessTech (2022), and Sayed (2023) show that there is a critical shortage of engineers in South Africa. A 2007 study showed that at that time, ECSA reported a shortage of between 4 000 and 5 000 engineers in South Africa, and the shortage could increase to a potential of 10 000 by 2010. Additionally, an estimated 300 engineers left South Africa each year contributing to the shortage (Swart, 2009). The exact current number of engineers required to meet the needs of South Africa's engineering concerns is not known but there is consensus that there is a critical shortage of engineers. There are too many jobs available for the number of engineers who are qualified, and the issues created for non-engineering workers through the high unemployment rate does not exist in engineering. For engineers, the opportunity exists to move, and if they are not happy, they will move.

The effect that this shortage of skilled labour has on an industry sector is that it increases employee mobility, either between organisations in that sector or even to organisations in a different country. A study by Worku (2014) on the labour market in South Africa found that workers with higher levels of education, typically engineers, tend to have shorter tenure, meaning they move between organisations more regularly compared to workers with low levels of education, who show longer tenure and thus lower mobility. This is because there are more opportunities, with more competition between organisations for talent, so engineers can move to other organisations more freely that offer career advancement, higher pay, better learning opportunities and a flexible working environment including working from home (Johansson & Andersson, 2007; Toofan, 2021). Additionally, a study of factors affecting engineers' mobility

by Johansson and Andersson (2007) also specifically mentions that performance management and appraisals have an impact on their mobility and need to be managed through human resource management processes.

Organisations facing shortages in availability of skilled employees typically make use of intermediaries such as head-hunters or recruiters to source and attract top talent. This strategy allows them to effectively poach employees from competitors, especially when suitable candidates do not emerge through standard application processes. Such practices support the rejuvenation of expertise and knowledge within an organisation and transfer of specific skills and working practices from other entities (Sandoz, 2015). One notable example underscoring this tactic was shared by a CEO of an engineering organisation via social media when he remarked, 'Every time a competitor mentions return to the office our recruiters reach out to their people'. He further disclosed that his organisation has poached more than 15 engineers from a competitor in the last two months (Lee, n.d.).

Therefore, this study sets out to understand the performance management requirements of engineering managers, specifically in the engineering design space, and to propose a practical solution to driving performance while not forfeiting employee satisfaction, with a focus on work from home, hybrid arrangements, or working from the office. This study will focus on the impact of flexible work arrangements, or the lack thereof, on elements including employee satisfaction, and employee performance, hence looking at the impact of working from home, hybrid working or working fully from the office.

## **1.3 Background to the study**

### **1.3.1. Challenges in managing remote employees**

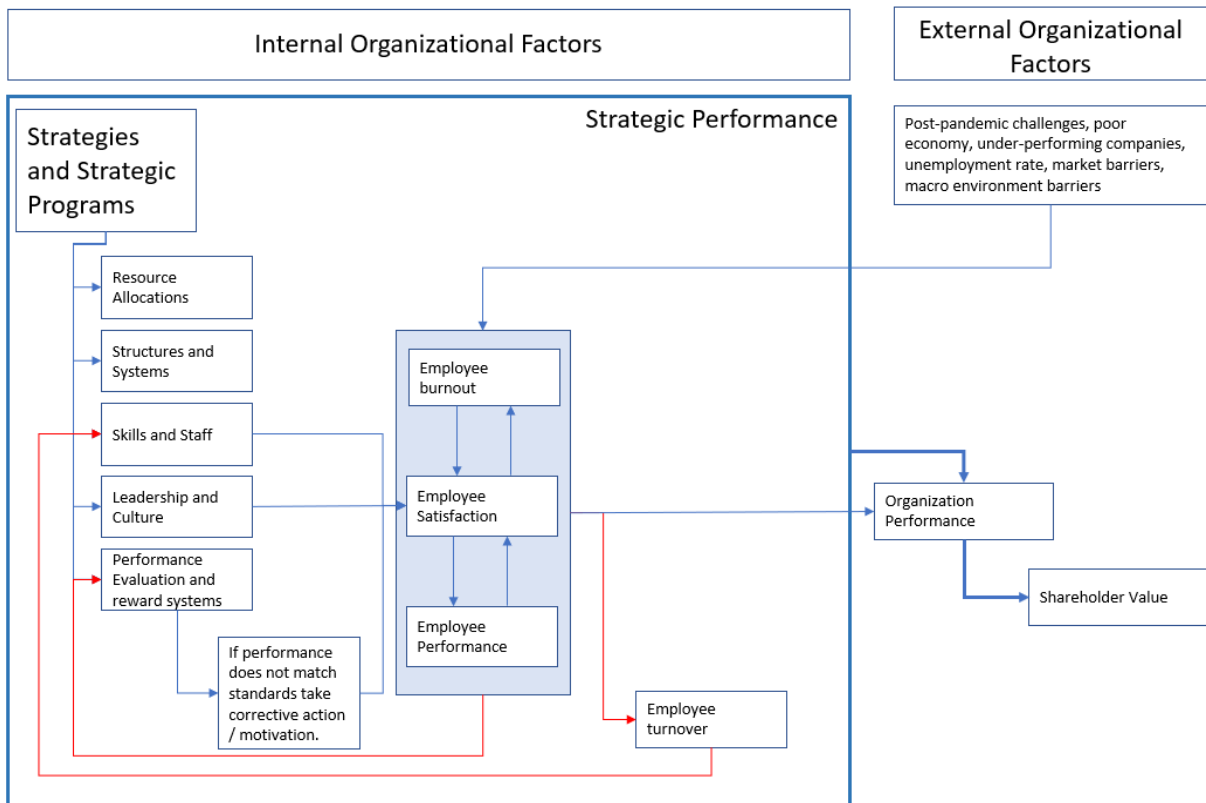
COVID-19 drastically changed the world, as the advent of the pandemic accelerated digital transformation in many organisations at a much higher rate than before, in some instances in a matter of days (Priyono, Moin & Putri, 2020). Changes in organisations were implemented in a very short period with only as much planning as that window allowed between the announcement of a pending lockdown and all employees being forced to work from home. Since many organisations adapted quickly to WFH, it is unclear whether these organisations adopted digital transformation effectively, employing best practices including WFH performance management principles. These organisations may have simply adopted tools that were available to them, such as teleconferencing platforms like Zoom or Microsoft Teams, which do not inherently promote or support performance management alone without a performance management strategy tailored to remote working (Ghar, 2024). The challenge that organisations now faced was that they did not have time to plan the transition and any amendments to policy or processes were implemented after employees were already working

from home. As a result, many of the policies implemented by organisations that were caught off guard had to be adapted on an ongoing basis (Smite, Moe, Hildrum, Gonzalez-Huerta & Mendez, 2022; Bilderback & Kilpatrick, 2024).

The lack of adequate performance management tools and strategy leads to problems managing remote employees effectively. A *Harvard Business Review* study found that managers tend to agree that working remotely has a negative impact on productivity (Bloom, Barrero, Davis, Meyer & Mihaylov, 2023). Multiple researchers including Ten Brummelhuis, Ter Hoeven, Bakker and Peper (2011), Aguinis and Burgi-Tian (2021), and Gabriel and Aguinis (2021) identified various factors that lead to lower performance, including work-related stress due to low job resources and high demands in the workplace, which can also lead to burnout. The decreased performance because of burnout may lead to a poor performance evaluation score and corrective measures must be put in place to improve the employee's performance. Furthermore, if performance does not improve, an employee may be placed on a performance improvement process, and if their performance still does not improve, their employment may be terminated. The performance management process itself, as well as correcting the employee's performance – or simply receiving this level of feedback – may increase pressure and anxiety, and in turn create more stress (Armstrong, 2008; Blackman, Buick, West, O'Donnel & O'Flynn, 2015). These elements all impact one another, and a cycle is created whereby stress levels are elevated, leading to burnout and reduced motivation which ultimately, without a performance improvement intervention, can lead to a downward spiral. Therefore, the performance management process needs to be implemented very carefully in order not to have a counterproductive effect on employees and reduce their performance.

To avoid creating an environment that leads to increased stress and reduced performance, the means of implementing the performance management process needs to be carefully considered. When looking at how organisations implement their strategy to achieve their goals, the first layer of implementing that strategy is heavily dependent on the organisation's human resources, and therefore the performance and performance management of those individuals. This is seen in the model in Figure 1.1 by Mokalane, Drotskie and Jasson (2016) that focuses on employee and organisational performance. The model shows a more granular focus on areas that affect employee satisfaction and how satisfaction will impact the first layer in return. These also are focus areas and guidelines to be expanded on in the literature review. What this model shows is that the correctly implemented inputs of organisational strategy will ultimately lead to a creation of shareholder value. Converting the strategy into shareholder value is dependent on certain resources. In this case skilled employees are the resources, and therefore the organisation's strategic performance is dependent on those employees' performance as well as how their performance is managed. This model further shows how employee turnover can negatively impact the retained skills and staff. If employees such as

engineers decide to exploit their higher mobility opportunities, there will be a higher turnover rate, and critical skills will be lost to competing organisations. From the above discussion regarding the research from Armstrong (2008), Ten Brummelhuis, Ter Hoeven, Bakker and Peper (2011), Blackman, Buick, West, O'Donnel & O'Flynn (2015), Aguinis and Burgi-Tian (2021), and Gabriel and Aguinis (2021), additional impacts are added to the below model showing (in red) possible linkages between employee turnover, skills and staff, and performance evaluation and reward systems. The multiple impact touchpoints as well as additional touchpoints lay the groundwork for further investigation in the literature review.



**Figure 1.1: Factors impacting employee and organisational performance (adapted from Mokalane et al., 2016:11)**

### 1.3.2. Organisations ending remote work

As mentioned above, the pandemic caused large scale changes to be implemented in a hurry that still have an impact on employees, through the ongoing changes that were required. Despite that, this study does not focus on the pandemic as a key WFH driver, although it had a large impact on the way employees work today. We need to consider WFH challenges even before the pandemic as the challenge of WFH goes further back. Many years before the pandemic, large multinational organisations with ample time to implement proper change management found that switching to a remote working model was not that simple. Some failed to implement a WFH strategy effectively and ultimately terminated their remote working policies. Some of the reasons cited include collaboration and communication between

employees, and this specifically included the informal discussions and meetings such as hallway and cafeteria discussions (Swisher, 2013; Simons, 2017).

Yahoo! ended its remote working experiments where employees throughout all divisions were working from home, including engineering, customer support and marketing (Avram, 2013). This was ended in 2012, long before COVID-19, due to the shortcomings. The main challenges cited were that quality and speed of workplace productivity and collaboration were negatively impacted. It is also mentioned that employees need to be in the office as that is how better decisions and insights are formulated (Swisher, 2013).

IBM followed a similar path when it discontinued its remote working policy after many years of its being in operation. IBM saw 20 consecutive quarters of revenue decline and concluded that WFH was negatively impacting the organisation's performance, so decided that they had no choice but to bring employees back to the office. This comes after IBM reported in 2009 that 40% of its employees were working remotely, which included digital marketing, software development, and design employees (Simons, 2017). The organisation did seize the opportunity to benefit by selling \$2 billion worth of its unused office buildings. It is important to note that the remote working policy was implemented many years prior to the revenue decline, with Simons stating the WFH policy was decades old, hence any negative financial impact of WFH was not immediately felt. In fact, IBM's first WFH policy dates to 1979, and by 1983 around 2000 employees were working from home (Useem, 2017). Furthermore, according to Peter Cappelli (2017), it cannot be concluded that WFH was the main driver of the revenue decline that IBM faced.

Organisations ending remote work did not just stop there. In more recent news, many organisations have announced a move back to the office to some degree, opting for a hybrid working model (O'Sullivan, 2024) while some organisations ended all remote work with employees expected to be in the office full time (Milmo & Hern, 2022). Tesla also emphasised that engineers needed to be at their factories to build products, while his recent announcements include ramping up their on-site presence (Khan, 2021; Carter, 2024; Jones, 2024; Patel, 2024; Arcoche, 2024). It is not clear from Tesla's statements what kinds of engineers needed to be on site and whether those included design engineers who could possibly perform their duties remotely. It appears from this that remote work as a policy affecting engineers at Tesla failed; and although no CEOs have blatantly said there were performance issues, one needs to wonder if the performance had been at the desired level, would they have cancelled remote work? One could argue that if effective performance management processes had been in place, there would have been fewer performance challenges, and remote work could have continued seamlessly.

### 1.3.3. The critical shortage of engineers in South Africa

The focus of this background study now turns to the engineering sector in South Africa and the critical staff shortages seen in this sector. According to the Engineering Council of South Africa (ECSA), at the end of 2023 there would be one engineer for every 3100 people in South Africa compared to one per every 200 in Germany (Neethling, 2023). This is at a time when there was a reported shortage of engineers in Germany (Kölling, 2022), which shows how big the problem is in South Africa. Eskom is the South African public electricity utility and has seen a net loss of 270 engineers in the last three financial years. A 2022 report published by the South African Institution of Civil Engineering (SAICE) highlighted that South Africa’s infrastructure problems can be attributed to the critical shortage of engineers (*BusinessTech*, 2022).

From the above it can be seen that organisations have problems managing their remotely working engineers, and that there is a critical shortage of engineers in South Africa. This research is vital to any organisation looking to retain their top talent while implementing better performance management practices.

### 1.3.4. Performance management framework

The focus of this study is on the performance management of design engineers working from home versus working from the office, with the aim of creating a practical framework that can be implemented by managers in organisations. To create the framework, it will need to include certain variables that need to be discovered in the literature review and corroborated by conducting the semi-structured interviews noted above. This will include an employee satisfaction viewpoint including elements such as work-life balance, culture and rewards. However, the focus will be on work from home vs hybrid and work from office (WFO) models. The steps that will be taken in this study to create this framework are shown in

Figure 1.2.

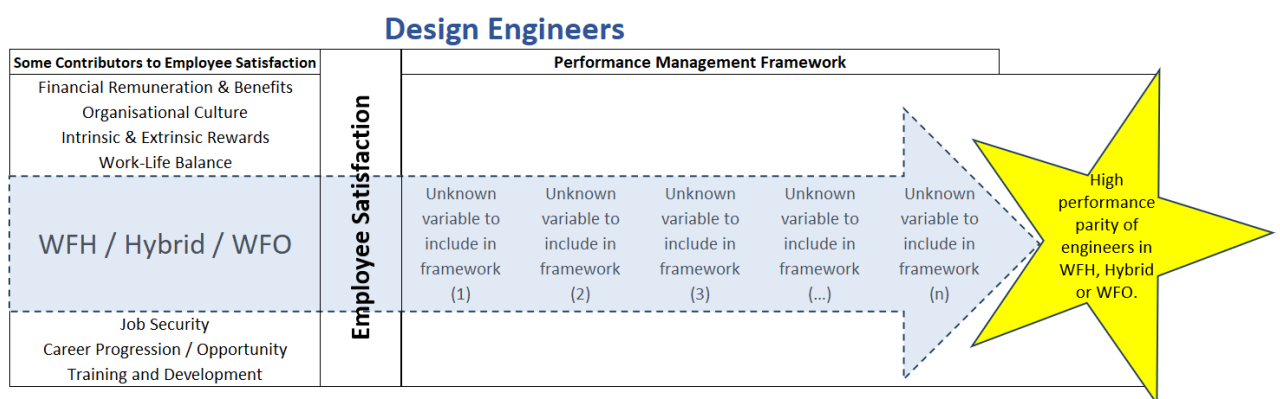


Figure 1.2: Performance management framework for this research study

## **1.4 Problem statement**

Remote working was almost instantaneously introduced to all organisations because of COVID-19. Many of those did not support WFH or have a hybrid working model before that. Despite many employees not only feeling that they were productively and successfully working from home, as also shown in studies (Murray, 2020; Stø & Vestre, 2020), organisations instructed employees to return to the office after the pandemic, either full time or in a hybrid model. Various employee surveys showed that employees would look to resign should they be forced back to the office; in one survey that percentage was as high as 66% (Microsoft, 2021; Kruger, 2022; Resume Builder, 2024). Therefore, some organisations were likely to lose key talent because of ending WFH.

Managers were not equipped to lead teams remotely, which could lead to a perceived reduction in performance (Höddinghaus, Nohe & Hertel, 2024). This study attempts to address the issue of how to manage engineers in a remote working environment, and aims to investigate the perceptions of South African remote technical workers in engineering and how they prefer to be performance managed.

## **1.5 Research questions**

### **1.5.1 Primary question**

How can design engineers be performance managed in a remote working environment to be fully productive to the satisfaction of the manager and organisation?

### **1.5.2 Investigative questions**

- I. What does a design engineer do? What are the main tasks when working on large complex projects?
- II. When comparing WFH and WFO in the context of a large project, what is the same and what is different? How does the difference affect the performance management approach?
- III. What performance management framework can be developed to aim to ensure employees are able to work remotely?

## **1.6 Aim and objectives of the study**

The aim of the research is to develop a performance management tool to support managers in South Africa's engineering industry. This will allow managers to support a flexible working environment to allow design engineers to work from home while having confidence that the quality and quantity of work performed by the engineers constitute a high level of performance.

The objectives are:

- I. To determine the roles and responsibilities of design engineers.
- II. To determine key performance indicators (KPIs) for design engineers.
- III. To determine the perceived differences between WFO and WFH in terms of performance management.
- IV. To understand what performance measurement and improvement techniques were used before and after WFH, if they differ, and how effective they were in creating a remote working performance management framework.
- V. To determine alternative performance management frameworks for design engineers.
- VI. To develop a performance management framework for design engineers for remote working.

## **1.7 The engineering disciplines this study will investigate**

This study aims to investigate performance management challenges with the goal of creating a framework to effectively manage remote working design engineers. The focus is on engineers who are not required on site permanently, and who typically spend most of their time in the office working on a computer. These typically include design and consulting engineers of various disciplines. This thesis will look to investigate any engineering discipline that is recognised by ECSA where an engineer can be registered as a professional engineer in South Africa (ECSA, n.d.). The engineering disciplines include:

- I. Electrical and electronic engineering, of which electronic engineers include control and instrumentation engineers,
- II. Mechanical and mechatronic engineering,
- III. Civil and structural engineering,
- IV. Construction management and quantity surveying,
- V. Industrial and systems engineering.
- VI. Other disciplines including aeronautical, chemical, metallurgical, and mining engineering.

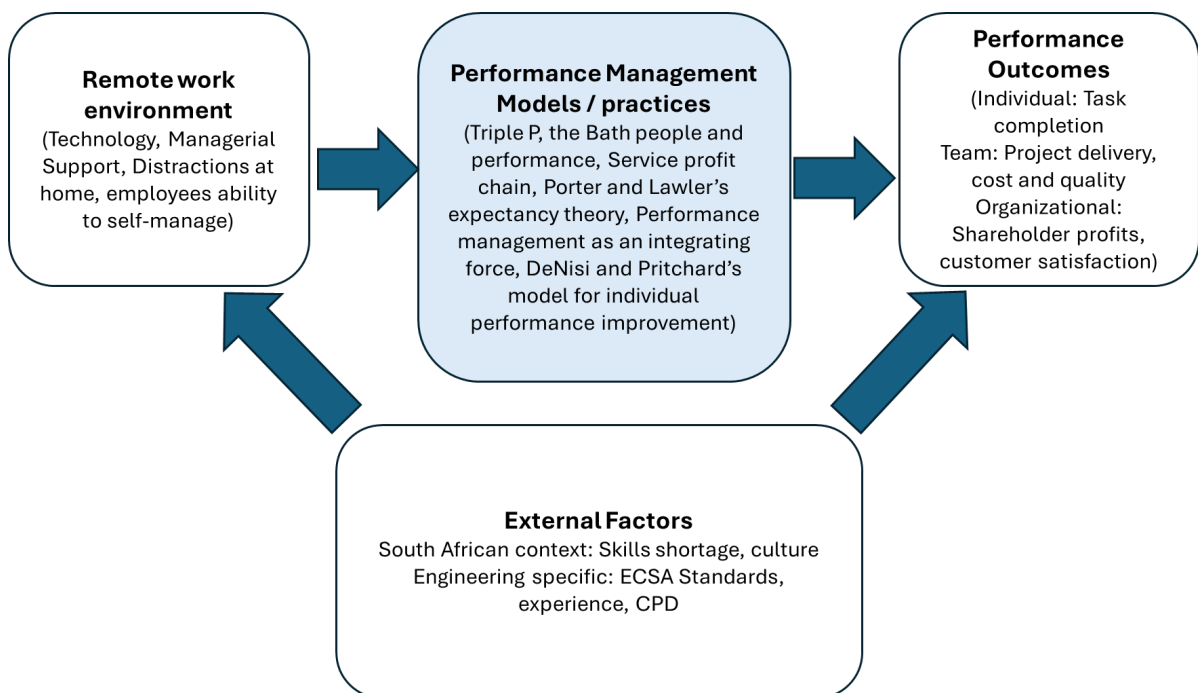
## **1.8 The conceptual framework**

To gain insights into performance management of remotely working design engineers while trying to navigate the paucity of literature available, the study starts by reviewing general employee literature and then looks to apply that to engineers. To that end this study analyses various performance management models including Mokalane, Drotskie and Jasson's (2016) model looking at factors impacting employee and organisational performance, the Triple P Model, the Bath people and performance model, the service profit chain, and Porter and

Lawler's expectancy theory model. Thereafter the extent to which these models can be applied to engineering are briefly explored and then used to guide the interview questions in the data collection process.

The conceptual framework in Figure 1.3 shows how the application of these models can convert the inputs from the remote work environment to the desired performance outcomes at an employee, team and organisational level while taking external factors into consideration.

This research looks to create a new framework to replace the multiple frameworks in the performance management models / practices block to simplify a remote performance management strategy for managers in the engineering industry.



**Figure 1.3: This research study's conceptual framework**

## 1.9 The research process

Saunders, Lewis and Thornhill state that research is a multi-stage process that usually include 'formulating and clarifying a topic, reviewing the literature, designing the research, collecting data, analysing data and writing up' (2009:10). These stages were followed and applied in this research study. This includes the identification of the research problem, establishing the merits for this study, and data collection following the ethical guidelines.

## 1.10 Research approach and design

This research study was done by evaluating performance management models to identify key themes that guided the literature review. The literature review expands on those themes

and contextualises it for the engineering industry so that it can be applied to design engineers.

### **1.10.1 Data collection**

The data collected in this study was interview data in the form of semi-structured interviews. This allows the understanding based on words and not just numbers to support the stakeholder perspective. This method allows for flexibility to adapt to the responses from candidates. The semi-structured interviews were conducted with employees who identify themselves as willing to be interviewed. Five interviews, including the pilot interview, were conducted as part of the data collection process.

### **1.10.2 Data analysis**

In preparation for the interviews, themes identified from the literature review were addressed in the questions. The list of questions was created as a guide, but no specific order was enforced, to allow for the flow of conversation and thought promotion from the respondents. Thematic analysis is useful when the research focuses on experiences, opinions, and views of individuals. The employee's views of WFH and performance was adequately investigated using this technique. This also rang true for the experiences that needed to be uncovered based on employees WFO and WFH comparisons.

The advantages of thematic analysis are that it is highly flexible, and different theories can be applied, which support a correct conclusion and an appropriate level of understanding. It does not require the researcher to understand the other research approaches and is suitable for less experienced researchers. It also allows for large amounts of text and data to be analysed while both personal experience and theoretical knowledge can be applied to the research at hand (Nowell, Norris, White & Moules, 2017).

A possible weakness in thematic analysis is that it does not specify how the themes need to be identified. If the correct themes are not identified or some themes missed, and other themes incorrectly identified it will have an impact on the conclusions drawn from the analysis (Stables, 2013). The work done in the literature review with those themes identified mitigated this challenge. The flexibility that thematic analysis provides may lead to a lack of coherence and consistency (Nowell et al., 2017).

Understanding the pros and cons of the data gathering methodology supported the researcher in making better decisions to conduct proper research and publish a credible paper.

Transferability is the test to gauge how the research can be extended or generalised to other contexts had there been other respondents. The researcher must be able to articulate the

research context so that when any other researcher transfers the research to another study, they need to take the context into account for the feasibility of that transfer (Saunders et al., 2009; Saunders et al., 2023; Trochim, no date).

To prove transferability, thick description is used to provide the correct context so that the findings become meaningful and useful to outsiders. To make this study applicable in other contexts the participants and research process were described in as much detail as possible. If the description is thick enough any other interested researchers will have the ability to gauge if this study will be relevant and add value to their research.

Finalising the analysis entailed conducting a final review of all themes and sub-themes to ensure it was complete. All relevant data needed to be captured, and all themes needed to be accurately shown in the interview content. Thereafter the findings were written up, and the themes were presented with supporting information using quotes from the transcripts where needed. The themes are explained in detail and their significance (or not) to the research question is demonstrated.

## **1.11 Ethics**

The researcher committed to ensure that he complied with the Cape Peninsula University of Technology's (CPUT) Faculty of Engineering and the Built Environment ethics guidelines. He submitted his ethical compliance for engineering students form to the Faculty Research Ethics Committee (FREC), which they approved. The ethics approval certificate can be seen in

## APPENDIX A: Ethics Approval.

The researcher is also a registered professional engineer with ECSA as well as a registered chartered management accountant with the Chartered Institute of Management Accountants (CIMA). Each of these establishments has strict ethical standards that the researcher must abide by as part of his membership.

### **1.12 Chapter outline**

The following shows a brief outline of the chapters of this master's research study.

- Chapter one provides the introduction, motivation for the research, including the importance of this study and impact of the problem on the engineering industry, the research questions, the aim and objectives of the study, the research approach and design, ethics and the chapter outline.
- Chapter two presents the literature review showing what engineers were the focus of this study, and defining what design engineers do. It also investigates if ending remote work for engineers can create a problem for organisations.
- In chapter three, a review of various performance management models is presented to identify key themes that are then expanded on including employee satisfaction, skills, ability and training and development, performance evaluations and appraisals, organisational culture and communication, amongst others.
- Chapter four focusses on the research methodology, including the focus area, data collection and semi-structured interview approach, the data analysis and the ethical considerations pertaining to this study.
- Chapter five contains analysis of the data collected in the semi-structured interviews.
- Chapter six presents the conclusions and recommendations for managers of design engineers.

### **1.13 Chapter summary**

This chapter provided the introduction and background to the study, including information to show why this is a significant study. The problem statement and research questions were included. This chapter also outlined the research design and methodology. Ethics was also discussed, and an outline of the thesis as a whole was presented.

## **2. LITERATURE REVIEW – WHAT DESIGN ENGINEERS DO AND THE IMPACT OF ENDING REMOTE WORK**

### **2.1 Chapter introduction**

This literature review chapter will cover two sections. It defines what design engineers do, and it looks at whether ending remote work for employees can lead to employee dissatisfaction and possible employee turnover. In the next chapter performance management models will be investigated to find common themes that will guide the interview questions.

### **2.2 The responsibilities of design engineers**

The typical responsibilities of design engineers include applying creative methods and techniques, project management, obtaining and converting external information, problem solving, reflection, and creating acceptance of designs, methods and proposed solutions to engineering problems (Örnekoğlu-Selçuk et al., 2023). Design engineers also are responsible for concept development, design and modelling, prototyping, and very importantly, for adhering to a host of compliance and standards which need to be defined as part of the basic and detailed design process. This also includes virtual engineering or computer aided engineering using computer aided design software packages and finite element models for mechanical and process analysis (Lemu, 2014). By the nature of using computer software and the use of laptops and home offices, engineers can perform these tasks remotely or in the office.

Depending on the organisation's internal procedures, other tasks that design engineers may need to perform could include being on site to evaluate the work being done, confirming that their designs are being implemented to the correct level of quality with strict adherence to the necessary safety standards and regulations. In some cases, the design engineer hands over their designs formally, and implementation engineers oversee the construction on site, freeing up the design engineer to focus on other designs. It is worth noting however, that while design engineers may be able to perform a large amount of their tasks remotely, some design engineers are required to be on site at certain times.

### **2.3 Possible effects of ending remote work for engineers on the organisation**

To adequately explore whether the termination of remote work for engineers might have a negative impact on organisations, it is important to understand to what extent employees would consider leaving for another company if remote work was no longer an option. Various studies and surveys have shown that employees will consider leaving their organisation for remote working opportunities. The Microsoft 2021 Work Trend Index showed that 46% of employees who are considering leaving their work are likely to move because they are looking for remote work, and employers need to be cognisant of how their remote working policy affects employee

retention (Microsoft, 2021). A survey of 6 500 employees done by Apollo Technical (2024) found that employees prefer working from home so much that 23% of those surveyed said that they would take a 10% reduction in pay to work from home permanently. Similarly, the FlexJobs' 2024 Work-From-Anywhere Survey found that 50% of respondents would take a pay cut and 20% would increase their work hours to keep remote working benefits (Howington, 2024). Kruger (2022) found that of those who preferred hybrid work, 69% would leave if that was no longer an option. A survey by EY Global done on employees in South Africa (Haupt, 2021) showed a similar trend with 35% of respondents indicating they would leave if they were forced back to the office. Pelta (2024) found in a survey that 81% of respondents stated that they would be more loyal to their employers if they had flexible working options, indicating they would remain with the organisation longer and increase their discretionary work. Table 2-1 suggests these and other findings from surveys showing employees are willing to find alternative employment if they are no longer able to work remotely, and they are willing to take a pay cut to keep working remotely. This information shows that organisations that do not offer or eliminate remote working opportunities may lose key talent to other organisations that do.

**Table 2-1: Summary of findings from employee surveys**

Survey	Key findings	Reference
Resume Builder 2023	Remote and hybrid workers reported being less likely to look for other work in the next year.	(Resume Builder, 2023)
	Workers fully in the office are three times more likely to be unhappy.	
	Remote workers are less likely to advance and receive promotions.	
Resume Builder 2024	8 in 10 organisations lost talent due to their return to office mandates.	(Resume Builder, 2024)
	14% of organisations say they lost a lot of talent, 36% say they lost some talent.	
FlexJobs' 2024 Work-From-Anywhere Survey	50% of employees would take a pay cut to work remotely.	(Howington, 2024)
	20% of employees would increase their working hours to work remotely.	
Productivity, work-life balance improves during pandemic	81% of respondents would be more loyal to their employers if they had flexible working options.	(Pelta, 2022)
OnePoll	69% of remote workers would resign if they had to work from the office.	(Kruger, 2022)
Microsoft 2021 Work Trend Index	46% of employees who are considering finding remote work	(Microsoft 2021 Work Trend Index, 2021)
PwC's Global Workforce Hopes and Fears Survey 2024 – African Perspectives	72% of respondents highlighted remote work is top priority for maintaining work-life balance and motivation.	(PwC, 2024)
	The return to the office poses a challenge for employers.	

Survey	Key findings	Reference
Owl Labs 2022 State of Remote Work Report	66% of workers reported that they would immediately start looking for another if their current job took away work from home.	(Owl Labs, 2022)
Apollo Technical - Statistics on remote workers that will surprise you (2024)	23% of those surveyed said that they would take a 10% pay cut to work from home permanently.	(Apollo Technical, 2024)
EY Global - Will South Africans workers simply quit if they are forced back into the office?	35% of respondents indicated they would leave if they were forced back to the office.	(Haupt, 2021)

In the introduction to this study, studies by researchers like Worku (2014) and Johansson and Andersson (2007) indicated that a shortage of skilled labour creates an increase in employee mobility. It is important to understand to what extent engineers are afforded more flexible working conditions. For that reason, it is essential to determine whether engineering organisations have discontinued their WFH or hybrid policies. Specifically, it needs to be determined if there is a trend for organisations to require engineers to work from the office, or if the WFH or a hybrid working model are still prevalent. However, the paucity of the literature on the South African engineering sector’s remote working policies, or a comparison between how many engineering organisations adopted a WFH versus WFO policy, makes this challenging. Other attempts to determine the percentage of WFO versus WFH engineers typically made use of surveys completed by both engineers and employers. In the absence of the relevant information, another method can be used as illustrated by Hansen, Lambert, Bloom, Davis, Sadum and Taska (2023). This method involved looking at job posting data to understand the trend of organisations working models. Using a simplified model of the work done by Hansen et al. (2023), a LinkedIn job search with different keywords was done to see how many job opportunities there were for different working models, which is an indication of the current working environment and sentiment of hiring managers and organisations.

For this study, following the data gathering principle applied by Hansen et al., the first search for ‘engineer’ in South Africa showed there were 3 379 jobs posted for that criterion. Of that, 66.6% were for on-site positions. However, there seems to be a misconception that engineers cannot work remotely. According to the American Society of Mechanical Engineers, a survey showed that 92 percent of design engineering managers reported that they were still working during COVID-19 lockdowns (Persun, 2020). For that reason, another search was done citing ‘design engineer’ as the job title in South Africa. This yielded 712 job postings, but the result remained similar with 70.6% of job postings being for on-site positions. The results are displayed in Table 2-2. This indicates that most engineering organisations have moved away from remote and hybrid working environments to WFO only.

**Table 2-2: Number of jobs advertised on LinkedIn with certain keywords for engineering positions**

Job description	Location	Working model	Results	Percentage of jobs
Engineer	South Africa	Remote	494	14.60%
		Hybrid	635	18.80%
		On-Site	2250	<b>66.60%</b>
Total			3379	
Design Engineer	South Africa	Remote	67	9.40%
		Hybrid	142	19.90%
		On-Site	503	<b>70.60%</b>
Total			712	

The lack of remote working options as shown above may lead to an increase in engineers' mobility. This increased mobility of scarce and specialised talent such as that of design engineers may have a negative financial impact on organisations not offering a flexible working environment. It may be more detrimental to those organisations than they are aware of. Murray (2020) found that in countries such as the United Kingdom, replacing an employee can cost as much as nine month's salary. A study by in 2002 stated that it costs approximately R250 000 to replace a skilled employee in South Africa (Rasool & Botha, 2011). Adjusting that amount for inflation to the present calculates the current estimated cost of losing a skilled employee to be approximately R780 000 (Crause, no date).

It is of vital importance for engineering organisations to retain their top talent to not lose the critical skills, tacit knowledge and expertise. Losing key talent hinders the organisation's ability to work effectively, hampering productivity and translating to erosion of shareholder value, as discussed and shown in Figure 1.1. Moreover, it also provides the opportunity for competing organisations to gain access to those skills, placing a greater risk on the organisation's ability to remain competitive and viable. To further emphasise the importance of being competitive, this study recognises how many organisations in South Africa have struggled to keep their doors open. Mohau Mphomela of the Master Builders Association said in 2023 that five of the association's long-standing members went bankrupt in the preceding year (Venter, 2023). Other major engineering and construction organisations that have had challenges, including bankruptcy include Group Five, Esor, Murray & Roberts, WBHO, Raubex, Basil Read and Aveng (Meintjies, 2019; Clark, 2023).

## **2.4 Chapter conclusion**

In this chapter, the responsibilities of design engineers were identified. Thereafter, the possible impact of ending remote work was investigated where the literature reviewed suggests that the higher mobility of design engineers may lead them to leave their organisations if remote work is ended. To show that there may be a challenge, data from the LinkedIn social networking platform for business professionals was reviewed that showed that approximately two thirds of job postings were WFO roles. The section ends by showing the possible cost of replacing a highly skilled employee and the opportunity it would create for the competition to gain those talents and skills.

The next chapter focuses on multiple performance management models to identify what themes may apply to design engineers, and lays the foundation for the semi-structured interview questions.

## **3. LITERATURE REVIEW: EVALUATING PERFORMANCE MANAGEMENT MODELS**

### **3.1 Chapter introduction**

The previous section started the literature review by identifying what design engineers do, followed by the possible negative impacts that a company can face by ending remote work. LinkedIn data was then used to show that the majority of organisations are posting WFO jobs which suggests that there is a move away from WFH.

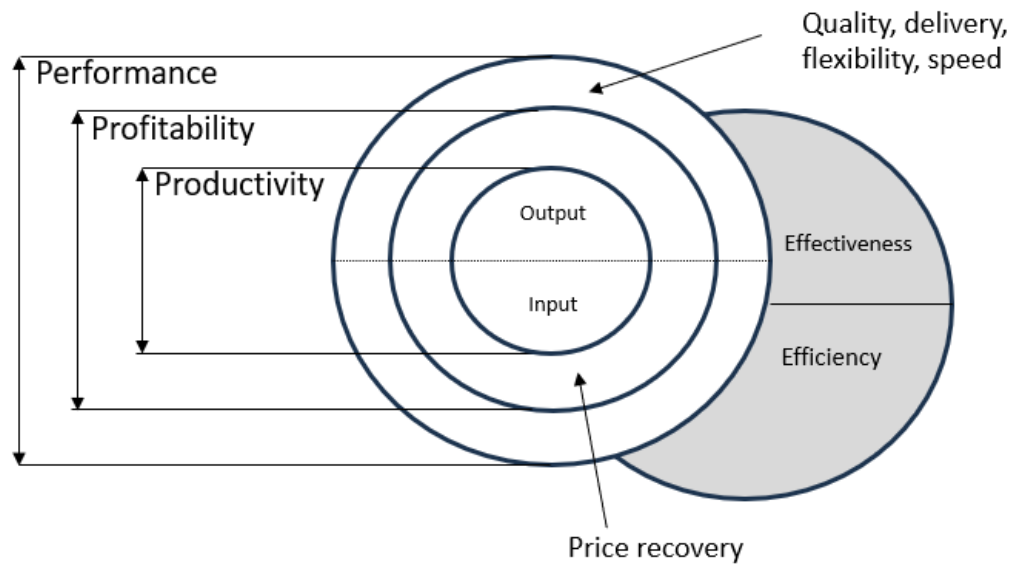
This chapter starts by exploring some existing performance management models that will lay the groundwork in developing a WFH performance management framework. Since there is a paucity of literature on performance management of engineers in a remote working environment, this abbreviated literature study in the section below analyses general employee performance management models, whereafter this study will attempt to develop linkages to the impact on design engineers, which will guide the research questions.

### **3.2 The performance management models**

Taking performance of remote working employees into account means that any elements that have an impact on performance needs to be investigated as part of the literature review. Much research has been done on the topic of performance and performance management. A study by Brown, O'Kane, Mazumdar and McCracken in 2019 alone reviewed 230 articles from 41 journals over 11 years. The literature also includes recent studies on remote workers; however, there is a paucity of research that focuses on performance of remote employees in engineering in South Africa which includes design engineers. This makes this an important field of research to add to the body of knowledge.

#### **3.2.1 The Triple-P model**

The first model reviewed is the Triple-P model that shows performance simply as a measure of inputs and outputs. Performance should not be confused with productivity as they are separate, specific concepts. The model shows how effectiveness, efficiency, productivity and profitability impact performance (Pekuri, Törmänen, Haapasalo & Herrala, 2011). This is a simple model that is relevant to design engineers as performance is a key factor of the outputs and inputs that affect organisational performance. This model however does not provide a performance management framework for remote working design engineers so the inputs from this model will be considered together with the other models.



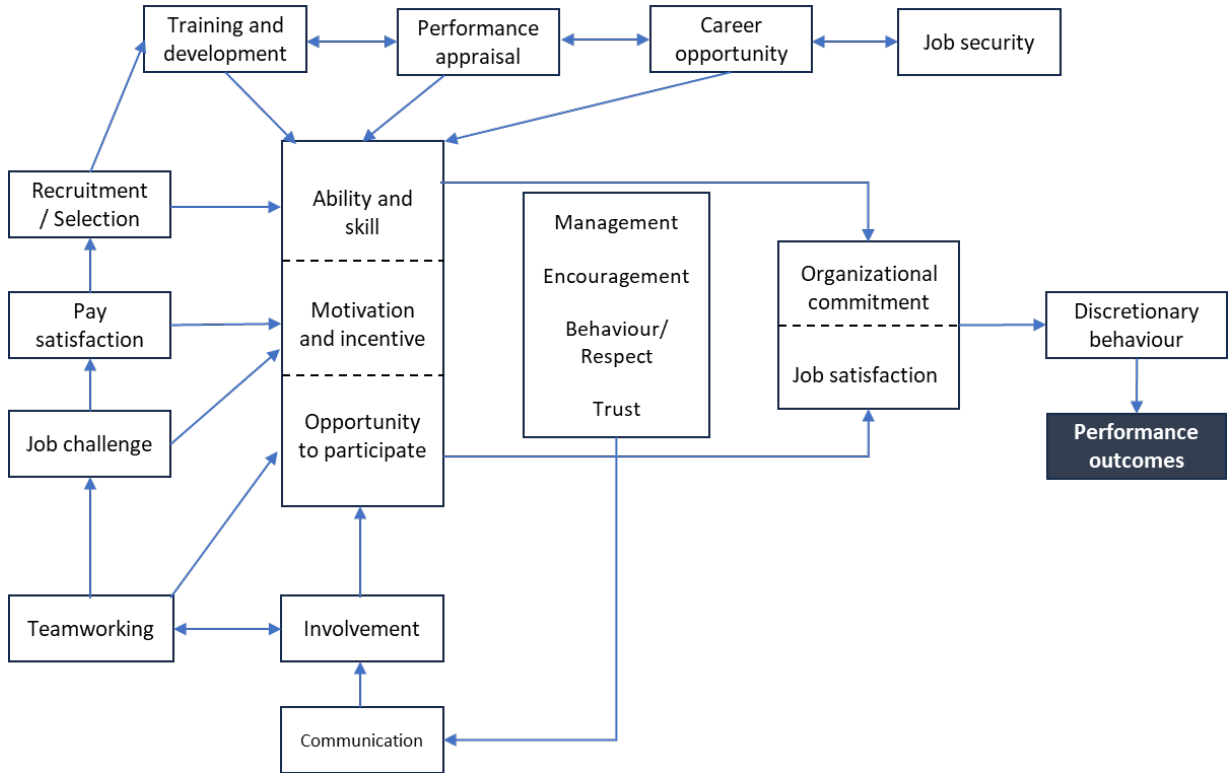
**Figure 3.1: Triple-P Model  
(Pekuri et al., 2011:4)**

### 3.2.2 The Bath people and performance model

The next performance management model is the Bath people and performance model as seen in Figure 3.2. Purcell, Kinnie and Hutchinson (2003) state that it should be common sense that good people management practices influence performance, but it is not clear as to how exactly it should be done. They call it the black-box problem, whereby people inputs enter the black box, and performance comes out the other side. This model is an attempt to demystify what is happening in the black box. Furthermore, the model asserts that ability, motivation and opportunity drive performance, while employee discretion impacts how well they will do a given job (Purcell et al., 2003). Hughes and Kelliher (2016) reiterate that point and state that employee discretionary effort explains the difference between achieving and exceeding organisation goals. El Sherbini (2017) point out that in this model, the building blocks for good performance can be created by human resources (HR) but a critical driver of individual performance is the activities and behaviours of managers. The Bath model shows motivation and job satisfaction as connected elements with organisational commitment. It is important to note that motivated employees are not necessarily satisfied or vice versa, but there is a relationship between the two and they can impact one another (Dartey-Baah & Harlley, 2010).

This model may be applied to design engineers as it touches on some aspects investigated in the previous chapter. A linkage can be made to employees leaving their jobs due to organisations ending remote work, as seen in a study by Saari and Judge (2004) on employee attitudes and job satisfaction. They found that job satisfaction can be linked to 'life satisfaction' and that dissatisfaction with company policies that affect them leads to reduced job satisfaction. In Figure 3.2, other important aspects can also be identified. Design engineers

have high career opportunities both internal and external to their organisations, and if the career opportunity meets their requirement for remote working, they will leave the current employer. Losing a design engineer has an impact on ability and skill, motivation and incentive, organisational commitment, discretionary behaviour and then finally, on performance outcomes.



**Figure 3.2: The Bath people and performance model (Purcell et al., 2003:7)**

### 3.2.3 The service profit chain model

Another model to review is the service profit chain model (Figure 3.3) that shows organisation revenue growth and profitability as the performance output. The link is made between shareholder value and employee productivity where organisation performance is heavily reliant on its employees (Rusu, Avasilcăi & Huțu, 2016). Employees in the engineering fields can be seen as service-delivering employees as they consult with clients, solve problems (Lapidus, Topchiy, Kuzmina & Shevchenko, 2023), and rely on other departments and disciplines to perform their duties. This model shows that employee satisfaction, capability, productivity and output quality are affected by an organisation’s operating strategy and service delivery system. The circle of interaction between these elements has an impact on organisation performance via the customer’s perceived service value received and satisfaction (Heskett, Jones, Loveman, Susser & Schlesinger, 1994; Pugh, Dietz, Wiley & Brooks, 2002; Kurdi, Alshurideh & Alnaser, 2020). Some of the value that the organisation enjoys in terms of revenue growth and profitability is transferred back to the employees in the form of raises and bonuses while

employees are expected to retain or increase productivity, hence a value exchange takes place (Swartz & Iacobucci, 2000; Wang, Chen, Hung, 2024).

In the context of this study, a WFH or hybrid working model can be seen as being part of an organisation’s operating strategy. Another study evaluated this model and found a positive correlation between employee and customer satisfaction although this effect is small compared to external service quality. The latter study also made a contradictory finding that employee satisfaction does not always promote customer loyalty, as it is dependent on whether employee satisfaction has a positive impact on employee productivity – not all employee satisfaction has a positive impact on employee productivity. There is however a positive impact of employee retention on revenue: managers should acknowledge the multiple effects that internal service quality may have on employee satisfaction (Hogreve, Iseke, Derfuss, & Eller, 2017).

This study however does not look at employees in the engineering and technical fields, but some correlation can be looked to be investigated during the analysis of the interview data. Design engineers’ productivity and output quality has a direct impact on the performance of and quality of their service delivery. In the case of this model, the service is a well-executed project without time and cost overruns to the clients’ expectations. This model shows how satisfaction and loyalty impact their productivity and output quality that through the model’s service concept and target market affect the outcomes in terms of company performance. Therefore, this model can be relevant to design engineers.

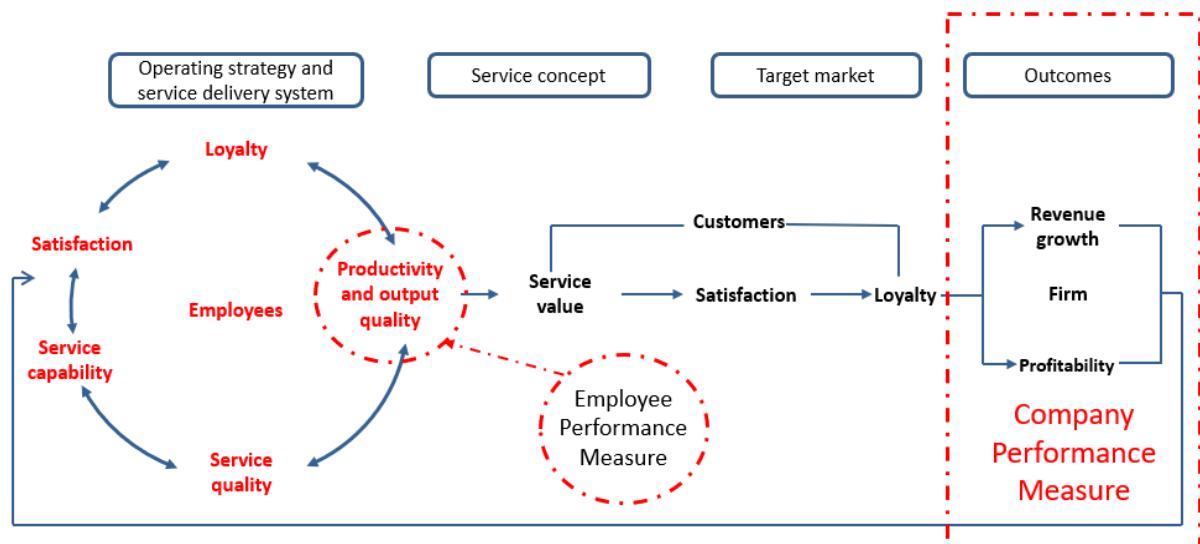


Figure 3.3: Service profit chain model (Pugh et al., 2002:75)

### 3.2.4 The cause-and-effect chain

Verweire and Van Den Berghe’s cause and effect chain (2004) shows a similar picture. While there are multiple inputs, employee satisfaction is regarded as one of the base inputs required

to drive shareholder value through expertise and experience (skills), service quality and customer satisfaction. Note that these models also specifically refer to employee satisfaction as an important input to shareholder value creation. Jack Welch, the former CEO of General Electric said that ‘the three most important things you need to measure in a business are customer satisfaction, employee satisfaction and cash flow’ (Armstrong, 2008: 127).

### 3.2.5 Porter and Lawler’s expectancy theory model

The topic of value exchange raised above can create an expectation between the employee and the organisation. Porter and Lawler’s expectancy theory model takes a different look at employee satisfaction with performance not being an outcome but an input to employee satisfaction due to intrinsic and extrinsic rewards (Mdhlalose, 2022). If employees perceive that their ability to have a flexible working model and to work from home, either permanently or in a hybrid model, is a form of benefit, then the removal of that benefit will be seen as a negative exchange of value. This will lead to a reduction in intrinsic rewards, reduction in satisfaction, perceived value of rewards, which will have a negative impact on the effort they exert. This issue can be of particular importance when the employee feels that they have worked hard and performed well, the organisation has reaped the benefits, and the reason for returning to the office has not been clearly communicated. Therefore, this model is applicable to design engineers in the context of this study.

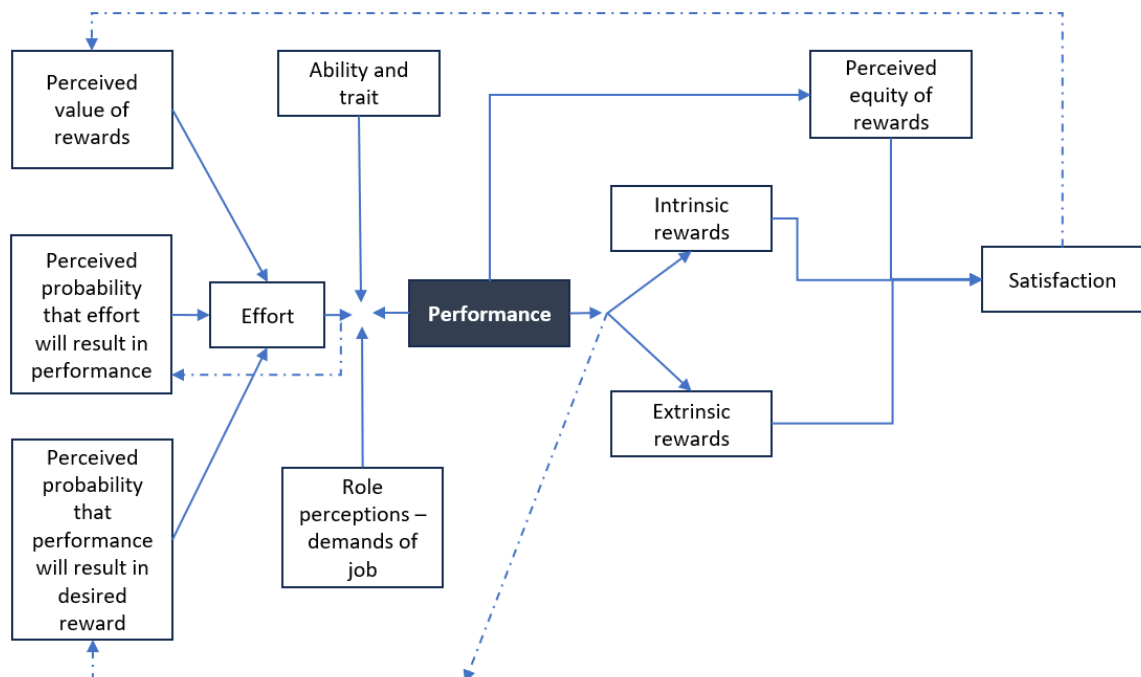
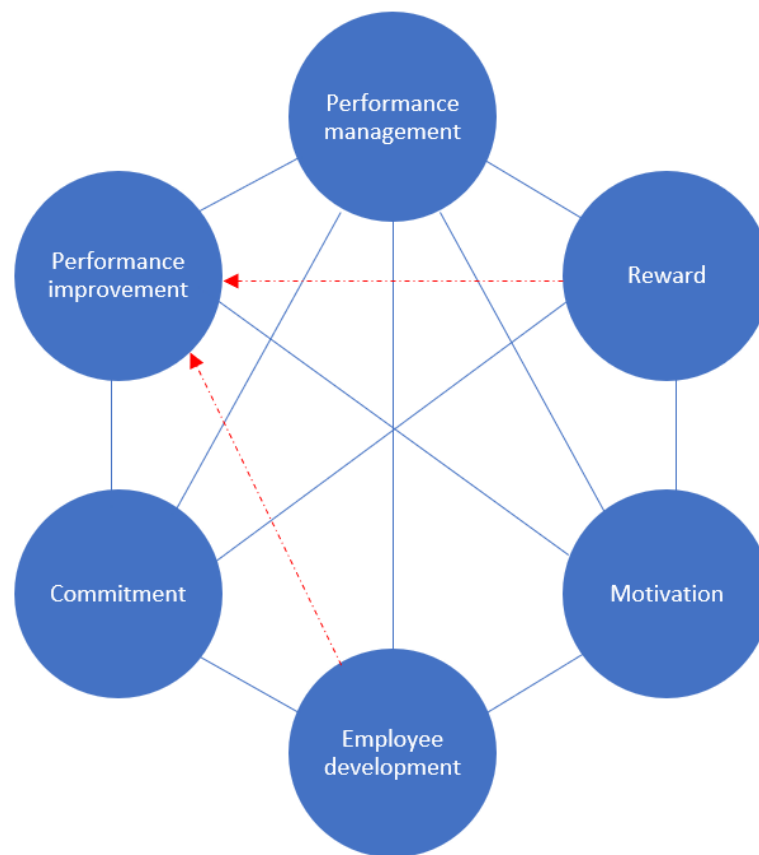


Figure 3.4: Porter and Lawler’s expectancy theory model (Mdhlalose, 2022:440)

### **3.2.6 Performance management as an integrating force**

As seen in the abovementioned models, performance management is a process whereby elements interlink and affect one another. Armstrong (2008) shows how performance management integrates with elements such as performance improvement, motivation, and reward. Figure 3.5 however does not link employee development or reward to performance improvement, which is believed to be an oversight in the publication (added here in red) and not a limitation placed on performance improvement in this model (Armstrong, 2008). Employee development or a rewards-based programme may drive performance improvement. Furthermore, rewards can be other than monetary. A mix of monetary- and non-monetary rewards may drive employee engagement and therefore performance improvement (Waqas & Saleem, 2014; Okpebholo & Sheikh, 2020). Despite this potential to improve performance, many organisations have not looked at rewards but have implemented performance management processes that have focused on performance improvement.

WFH may increase motivation and commitment that have an impact on the performance improvement of design engineers. If an organisation does not have WFO as a general policy, allowing design engineers to WFH, as long as their performance levels remain high, may be seen as a reward. However, this may be debateable, and some design engineers may argue that it is not a reward and should just be a normal working practice. Performance management however sits at the top of this model, linked to commitment, motivation and performance improvement, so this is relevant to the study at hand.



**Figure 3.5: Performance management as an integrating force (Armstrong, 2008:69)**

### 3.2.7 DeNisi and Pritchard’s model for individual performance improvement

Performance models in general do not specifically discuss performance improvement as a process element. It was shown only in one of the six previously presented models. Typically, the performance improvement process is embedded in the performance management process. One model that does discuss an option for individual performance improvement was created by DeNisi and Pritchards (Gupta,2010). It creates four linkages between five elements, namely between actions and results, results and evaluation, evaluation and outcomes, and outcomes and need satisfaction (green arrows in Figure 3.6). These four linkages in turn drive performance improvement and the stronger these four links are, the higher the performance of the employee. This framework also supports the identification of the weak linkage and where to focus efforts (Gupta, 2010; Pucikova, Woolliscroft & Cambal, 2013; Rusu, Avasilcăi & Huțu, 2016; Wang et al., 2021; Yang, Holtz, Jaffe, Suri, Sinha, Weston, Joyce, Shah, Sherman, Hecht & Teevan, 2022).

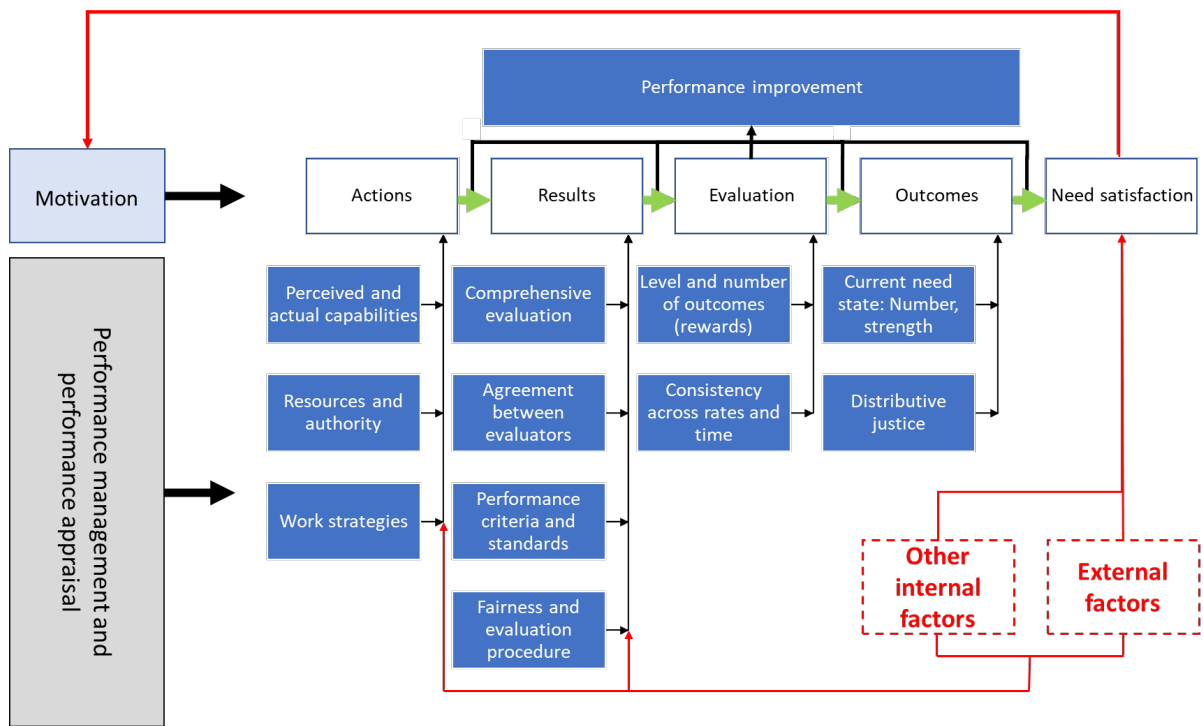
The model does not take into consideration positive impacts that WFH may have on performance or negative impacts of removing WFH. In an adapted model these issues may be considered when a manager looks at the perceived and actual capabilities, or in the resources

and authority component, although that was not its intent. These are external factors that need to be considered in a performance improvement process.

Need satisfaction is also shown to be a result of the performance improvement process but as shown in the review of the Bath people and performance model, employee satisfaction may impact motivation (Dartey-Baah & Harley, 2010). Additionally, if the employee does not agree with the fairness or subjectivity of the process it will impact on their motivation. As an example, if the fairness and evaluation procedure creates a weak linkage between results and evaluation, it may impact on satisfaction and hence motivation. Therefore, organisations that end remote work due to a lack of performance without showing how that was measured in the correct context may lead to a reduction in motivation. Other elements may also impact employee satisfaction outside of this process but still internal to the organisation, including policies which include WFH policies, management styles, and leadership behaviours (Dartey-Baah & Harley, 2010; Gupta, 2010; Dangol, 2021).

Lastly, this model was created in 2006 and does not consider other WFH implications more recently identified such as the impact of employee performance when their colleagues also work remotely, as identified by Lippe and Lippényi in 2019. The true impact of remote teams may become a measurement requirement in a process such as this under the actions and results linkage, resources and authority to strengthen that linkage.

An adapted DeNisi and Pritchard's model is shown in Figure 3.6 with a proposal of other elements that may need to be considered in a performance improvement process. These include other internal and external factors as well as the possible impact of satisfaction on the employee's motivation.



**Figure 3.6: DeNisi and Pritchard's Model for individual performance improvement (adapted from Gupta, 2010:38)**

### 3.2.8 Inputs from the models and other inputs to consider

A summary of themes from these models is shown below. As can be seen, some themes emerge such as employee satisfaction, rewards and incentives, skills development and training. Some themes also recur in multiple models and are therefore critical to the success of managing employee performance.

**Table 3-1: Themes identified from the different models investigated.**

	Figure 1.1	Figure 3.1	Figure 3.2	Figure 3.3	Figure 3.4	No Figure
Model	Mokalane et al. (2016)	Triple-P Model	The Bath people and performance model	Service profit chain model	Porter and Lawler's expectancy theory model	Cause and effect chain
Impact on performance grouped themes	Employee Satisfaction		Job Satisfaction	Satisfaction	Satisfaction	Employee Satisfaction
	Rewards		Incentive	Value exchange from profits back to employees as rewards	Perceived value of rewards	
	Skills		Training and Development	Service capability	Ability and trait	Expertise and Experience
	Performance evaluation system		Performance Appraisal			
			Discretionary behaviour		Effort	
	Burnout					
	Culture					
	Leadership					
			Motivation			
		Productivity				
		Effectiveness				
		Efficiency				

What these models are not considering is WFH and the possible failures to manage employees remotely. Many CEOs have cited reasons why they want employees back; some are not shown in these models. Some of the largest organisations to eliminate WFH totally or at least announce a great reduction in remote working are shown below with the reasons stated publicly. Strangely, the top reasons that CEOs give are related to soft, intangible or qualitative traits, meaning, they are traits that are very hard to measure, typically subjective, and do not fall within the SMART framework (specific, measurable, achievable, relevant and time-bound). Whereas performance, productivity, quality and speed are quantifiable, easier to measure and report on and are more objective (Shahin and Mahbod, 2007).

**Table 3-2: Organisations' reasons for brining staff back into the office**

(Swisher, 2013; Simons, 2017; Kelly, 2021; Hern, 2022; Isidore, 2022; Anand & Nguyen, 2023; Colvin, 2023)

Reason	Organisation							Rank in repetition
	Yahoo	IBM	Apple	JP Morgan Chase	Goldman Sachs	Morgan Stanley	Tesla / Twitter	
Collaboration		■	■	■	■	■	■	■
Culture		■	■		■	■		■
In-person interaction		■	■	■			■	■
Performance		■					■	■
Productivity							■	■
Strategy	■							■
Quality	■							■
Speed	■							■

The above models give reasons why organisations are ending remote work and WFH, identifying specific challenges that have provided the basis to expand the literature review on certain key topics that may be interlinked, namely: employee satisfaction, skills, ability, training, development, performance appraisals, culture, change management and communication.

### 3.3 Employee satisfaction

Employee satisfaction is a common theme throughout the models reviewed and a good starting point. Research shows that employee satisfaction has an impact on employee retention (Coetzee, & Stoltz, 2015; Upadhyay, Ansari, & Bijalwan, 2020). In the preceding sections it was shown that employees are advocating for more WFH, yet organisations are bringing employees back to the office. This adds commuting time to an employee’s day in contradiction of the principles of a healthy work-life balance and driving productivity and outputs (Okot, 2021; Bilderback & Kilpatrick, 2024). Not striking the balance between performance and employee satisfaction may lead to excessive employee turnover. In addition to the fact that involuntary staff turnover has taken place in large portions of organisations in South Africa that has led to the departure of unique skills, unsatisfied staff will also lead to significant skill shortages. A study has found that the optimal rate of voluntary employee turnover is between 14% and 19% (Rijamampianina, 2015). The true impact of involuntary staff turnover and the average normal voluntary turnover has not been examined and is beyond the scope of this study; however, an organisation that sees higher than the nominal 14% to 19% turnover may need to reconsider

their WFH policies. Additionally, research done by LinkedIn in 2023 showed that 93% of employers are concerned about employee turnover, showing that they acknowledge the importance of managing this issue (Ardi, Cahyadi, Meilani & Pramono, 2024).

A higher-than-normal employee turnover has negative impacts on an organisation and is often not considered. A 2019 PwC survey found that 41.9% of participants did not measure the human resource costs associated with the staff turnover, even though there were clear benefits in doing so (PwC, 2020:11). One study found that the loss in productivity was as high as 70% of the total turnover costs incurred (Rijamampianina, 2015:241). Organisations in South Africa that are under severe pressure simply cannot afford these further losses and need to retain their talent to survive.

There have been many articles and discussions about global resignation spikes but whether there has been an increase in voluntary resignations in South Africa is inconclusive. South Africa has one of the highest unemployment rates in the world (Rasool & Botha, 2011; Wisevoter.com, 2023) and as a result one could argue that there are fewer opportunities and employees find it difficult to find a new job. In South Africa, unhappy, less motivated, and hence less productive employees remain with organisations for longer. Rijamampianina (2015) states that an improved economy may create more external opportunities, thereby increasing voluntary resignations. The same economic environment may however create opportunities within an organisation that may reduce voluntary turnover, but Rijamampianina advised that these statements were unsupported by empirical evidence and remained an opportunity for further research. A recent study by Kali and Liu (2024) however shows a positive correlation between an increase in external opportunities and an increase in employee turnover, therefore a better economy with more higher employer concentration leads to higher employee mobility.

However, when considering engineering workers, the problem might be far worse for employers, and a poor economy may not hinder them in finding alternative employment. Certain less experienced engineers may struggle to find opportunities quickly, but others have ample opportunities due to their being a scarce resource. In preparation for the 2010 soccer world cup hosted in South Africa, it was producing too few engineers for its requirements and required 16 times more engineers (Rasool & Botha, 2011). In the mining industry, around one third of engineers were lost to organisations in other countries and that sector has a critical skills shortage of engineers and artisans (Thasi & van Der Walt, 2020). Engineers who are unsatisfied at work may have more opportunities to find work elsewhere and may seek to work at organisations that offer a more flexible environment. The negative economy may therefore not be a factor that limits design engineers' mobility and ability to move to other organisations.

The topics of employee retention, turnover and satisfaction are closely linked. Their satisfaction will impact performance, so it is possible that unsatisfied employees who remain with an organisation contribute to performance issues.

### **3.4 Skills, training and development**

The next common theme from the models is skills, ability or training and development which are arguably similar enough in nature to group together. When an organisation's top talent resigns, they leave with critically important institutional and tacit knowledge. Tacit knowledge is knowledge that cannot easily be codified, is typically gained through experience, 'usually shared through highly interactive conversation, storytelling, and shared experience' (Droege & Hoobler, 2003:52), and 'is profoundly attached to people' (Dinur, 2011:246).

The gradual process of dissemination of tacit knowledge is called diffusion (Liang, Guo & Shen, 2022; Xu & Xu, 2022). From this, many of the mechanisms that support tacit knowledge transfer are hampered in a remote working environment. Dinur (2011) investigated tacit knowledge transfer mechanisms, and it was found in some cases that teleconferencing was more problematic than face-to-face discussions, so much so that important meetings would only be held if all attendees could be in the same room. Many of the knowledge types were also investigated and suggestions made for the most efficient mechanism of transfer. Skill, cultural, cognitive unlearning, and human knowledge transfer require hands-on or long-term visits to be effective and may be one of the reasons why certain managers object to WFH (Dinur, 2011). Knowledge transfer and information exchange may be hampered because of WFH, as employees are isolated more than in the office. This may result in work intensification as there may be a reduction in support from colleagues. This may include issues where the reduction in contact results in employees not offering support on problems that team members may face, which could increase conflict, disrupting the team dynamic (Lippe & Lippényi, 2019).

To understand if the lack of in-person contact is a valid objection, the time of the research also needs to be considered. Dinur's work did not identify teleconferencing as an important knowledge transfer tool, but the research was published in 2011 and teleconferencing and supporting technology such as uncapped internet and faster fibre connections have improved dramatically since then. A more recent study found that the use of virtual reality tools could support competence transfer in a technical environment (Weigel, Baumgart, Zeuge, Sauter, Niehaves, Huchler, Heinlein, Wittal & Staiger, 2022). Dolo (2023) also found that certain strategic interventions and technology approaches can reduce tacit knowledge transfer challenges and help organisations remain competitive. Mtshikana (2023) suggested that tacit knowledge transfer in engineering organisations was important for an organisation's industrial competitiveness in the context of an engineering organisation in South Africa but did not include the impact of remote working engineers. Mtshikana does suggest ways in which tacit

knowledge can be transferred which include engineers showing their work to others, storytelling, tracking and lessons learnt, and guided experience by means of a mentoring approach. Mentorship is seen as such an important part of the tacit knowledge transfer and coaching process that it is included as a requirement as part of an engineer's ECSA registration. To remain a valid registered professional engineer certain activities are required for continuous professional development (CPD) (ECSA, 2021). The great importance of mentorship is so highly recognised that it is seen as a key strategic objective by ECSA (ECSA, 2023). The true impact on tacit knowledge transfer in remote teams is an area that requires more investigation. While there is research that suggests tacit knowledge transfer can be achieved by implementing certain processes, it is important to understand how managers of design engineers perceive this challenge.

Moving beyond just the skills that can be developed via tacit knowledge transfer, organisations also need to have training and development strategies in place. In addition to the ECSA mentorship CPD requirement, ECSA also has a requirement that engineers undergo continuous professional development and register their learning to ensure they keep their professional registrations (ECSA, 2021). CPD points can only be claimed if the course taken is offered by a registered and accredited CPD training provider. Xi, Shen and Chen (2022) recognised that universities cannot fully train and prepare graduate engineers for industry and that organisations must contribute to an engineer's learnings and development. Intervention to engineering training is needed at a university level to improve their practical skills before entering the workplace as well as once they have entered the workplace. Chadha and Heng (2024:16) conducted a review of professional skills development over 40 years and showed that 'specific performance courses', 'use of technology to support skills' and 'interactive learning strategies' were the most prominent skills development strategies between 2010 and 2020. Chadha and Heng do not however discuss what technology was suggested to be used and whether that can be linked directly to using technology in a WFH environment in the context of this study.

Despite the direct link to WFH implications in this section, the impact that tacit knowledge transfer and training has on skills, ability, training and development are important factors to consider in the discussion with the interviewees and will be explored.

### **3.5 Performance evaluations / appraisals**

Productivity is one of the key measures of performance (Misterek, Dooley & Anderson, 1992; Pekuri et al., 2011; Sauermann, 2016) and can be measured using various tools and means. Reports, timesheets, measured KPIs and other traditional productivity measuring tools can be augmented by new technologies now available. Microsoft Teams allows organisations to view employee activity through its user activity report (Pack, 2023). The difference between activity

and productivity will still rely on the supervisor's interpretation. Without supervisor oversight the activities performed by employees may be non-value creating or not even work-related. The number of emails sent, or phone calls made does not provide an accurate indication of productivity and performance. It is about 'doing the right things and doing things right' (Palvalin, 2024:333). It is the quality of the activity and not simply the volume of the activity.

While productivity can be measured quite accurately if done correctly using these and other tools mentioned above, they do not always measure and report on the softer issues like employee satisfaction or anxiety. A study done on the Australian Public Service showed that anxiety about the evaluation of performance affected both managers and employees and the way that it was implemented needed to be reviewed. Furthermore, employees who did not have role clarity might suffer from stress and anxiety (Blackman et al., 2015). Other studies reported similar findings that linked stress and performance reduction to the performance evaluation and appraisal process (Dwipayana, Supartha & Sintaasih, 2015; Bell, Goldman, Vogus, Zhang & Merritt, 2020; Bui, Zackula, Dugan & Ablah, 2021). The performance evaluation process is followed to retain or improve performance and may be unpleasant, leading to the opposite effect on motivation and discretionary behaviour if not implemented correctly. Employees might react negatively to feedback. Feedback provided in the incorrect manner, despite its validity, may demotivate employees, especially if there was any uncertainty about their role clarity or exact expectation of performance criteria relating to their duties. If there is role uncertainty by the employee or the manager there can be no agreement on the performance management framework, goals, or standards to achieve. Feedback should be evidence-based and be provided in a timely manner. It should be a mechanism to provide a clearer understanding to the employee how well they have been doing or what areas for improvement there may be (Armstrong, 2006). Positive and negative feedback is to be expected; however, negative feedback should be framed as being a learning and further development opportunity. Armstrong (2006) and Tsappi and Papageorgiou (2023) provide guidelines for providing feedback. The correct way to provide feedback includes providing feedback on actual events that have been substantiated, it should be done in a manner that describes the event and not in a judgemental manner, and positive feedback should be provided as well.

It is also important to note that the challenges linking stress to performance reviews do not start in the review process but may be due to other factors long before that. Moving from an office work model to WFH may include a change in employee roles that is not clearly communicated, or employees may anticipate a change in their roles where management has not envisaged any change. Whether the role or the employee's place of work changed, a change still took place that needed to be managed. This means that the impact on employee roles, responsibilities, and performance measures, or simply changing the performance

measures to align with the new WFH model might result in reduced employee satisfaction (Joubert, 2010; Gori & Topino, 2020). This reduced satisfaction might lead to underperformance that will warrant more strenuous performance management interventions. Since these aspects impact each other, it might lead to further performance measurement anxiety and if not correctly managed the situation for an employee might deteriorate drastically.

Another aspect that can add more negative implications over and above the stress and possible changes in roles and responsibilities is identified by Blackman et al. (2015). They state that the phrase 'performance management' is seen by employees as a pejorative term whereby employees see it as being done to them'. Where employees have been working remotely, an instruction to return to the office can be seen as a corrective action or even punishment, even if no performance management process has been initiated against them. Employees simply feel that they have not been communicated with clearly and management is unsatisfied with their performance. Where they do not feel punished, they might feel that a benefit has been removed with no fair exchange of benefit to them.

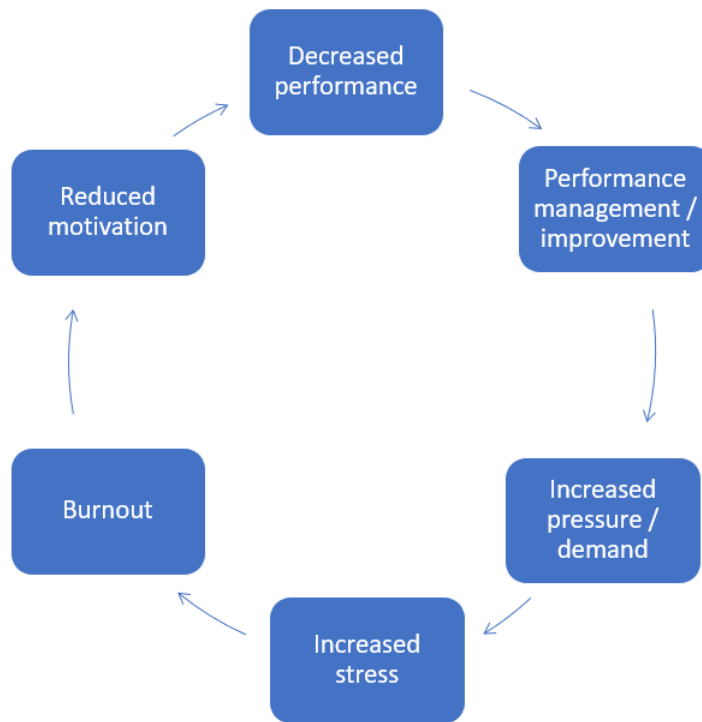
The decreased performance will lead to a poor performance evaluation, and corrective measures must be put in place. This might push management to implement performance improvement initiatives such as a high-performance work system. Armstrong (2008, 2020) defines a high-performance work system as one where people management basics are critical to its success. These include an inclusive, open and creative culture, driving employee learning and development, flexible working conditions, and benchmarked measurable performance targets. One can easily align the thinking of WFH with organisational flexibility as Armstrong (2008) discussed in his book. He defines strategic flexibility as 'the ability of the organisation to respond and adapt to changes in its competitive environment' (2008:38). Armstrong and Taylor state that 'flexible working is a pattern of working practice or working hours that deviates from the standard or normal arrangement' (2023:139) and include WFH in the list of inclusions but do not elaborate much on the benefits, challenges or impact of remote working as part of a flexible working environmental aspect. Armstrong and Taylor indirectly link an organisation's ability to compete with employee flexibility and WFH that agrees with previous suggested findings in this literature review. The implication is that WFH options for design engineers may impact company competitiveness and performance by either exploiting their higher mobility options and resigning, or dropping performance due to reduction of discretionary efforts as a result of employee dissatisfaction, because of a lack of intrinsic or extrinsic motivation and rewards (Lawler & Porter, 1967; Adamopoulos, 2022; Armstrong and Taylor, 2023; Jayaraman, George, Siluvaimuthu, & Parayitam, 2023).

The context of WFH in the literature thus far shows WFH as a possible tool to reduce stress and improve employee satisfaction. However, selective uses of WFH can also be

counterproductive and diminish employee performance. Organisations can see this as a form of flexibility and promote this amongst employees. The term presenteeism refers to employees being at work showing an unproductive presence when they should be at home (Bryan et al., 2022; Młokosiewicz, 2023). Organisations now use WFH to enable employees to work from home when they cannot come to work, including when they are ill and should be bedridden to recover. Where employees would have taken sick days to recover, they are now engaged in a new form of presenteeism which can also lead to stress and reduced performance. Working when ill can reduce performance of the employee as well as other employees and losses can be more severe than if the employee did not work (Ferreira, Mach, Martinez, Brewster, Daghererez-Nebra & Lisovskaya, 2017).

If performance review stress, the performance review process itself, possible changes in roles and responsibilities and presenteeism is not managed, it may lead to another problem that has received a lot of attention in the media, namely burnout (Heinemann & Heinemann, 2017). Management must endeavour to make every effort to gauge and understand each employee's level of satisfaction, workload, and whether they are suffering from burnout. Burnout may even lead to physical and mental illness. Work-related stress is the main reason for burnout but is not the direct primary cause of burnout. Reduced- or low job resources and high demands in the workplace create work-related stress (Ten Brummelhuis et al., 2011; Gabriel & Aguinis, 2021).

These elements all impact one another, and a decreased performance cycle or downward spiral is created as illustrated in Figure 3.7, which to a certain extent summarises the preceding sections graphically. A decrease in performance will result in a poor performance review and hence a performance management and improvement process will be implemented. If the employee fails to improve their performance, they may be demoted or face dismissal which places additional pressure on the employee. This leads to increased stress, and ultimately to burnout. The burnout leads to a reduction in motivation which has been shown to decrease performance and the cycle continues.



**Figure 3.7: The decreased performance cycle / spiral**

There are more variations of the decreased performance cycle, but looked at from the burnout point of view. One such example was developed by Herbert Freudenberger and Gail North (Ponocny-Seliger & Winker, 2014). They do not incorporate the pressures added by the performance management and improvement process but rather show that poor performance is a result of the phases in this process. Another study was conducted by Ten Brummelhuis et al. (2011) which stated that performance leads to a form of extrinsic motivation, showing that poor performance can lead to reduced motivation and in the greater scheme of the cycle in turn can reduce performance even further.

Employee burnout is not the topic of this thesis but as can be seen by the above, many factors impact each other and lead up to burnout which has an impact on performance. The above section seems to be applicable to design engineers so will be considered in the interviews and questions

### **3.6 Organisational culture**

'Culture eats strategy for breakfast' is one of Peter Drucker's often cited sayings, which highlights the importance of organisational culture (Tallman, Shenkar & Wu, 2021). Table 3-2 shows that organisational culture is often cited as being one of the main reasons why organisations want employees back in the office, which may also be because of the lack of a change management strategy. Change management will be discussed later in the chapter, but it can be said that the lack of change management planning and implementation may have

had a negative impact on organisational culture. One of the pitfalls that Kotter mentions is that organisations are 'not creating new social norms and shared values consistent with changes' (Kotter, 2007:1). Kotter makes the link between change and corporate culture in the fact that the changes need to be anchored into the culture for them to become permanent. We can further link change and culture, and Schein also highlights the importance of values and norms on corporate culture (Schein, 2004). This means that a change from WFO to WFH will need to follow a change management process to support culture retention or development.

There are still some organisations that have announced and maintained that employees will work from home indefinitely. If not the entire workforce, then at least the employees who are not needed to be in the office. In some cases, new employees only meet their colleagues face-to-face months after joining an organisation, if at all. An increasing number of organisations are sourcing the best international talent from outside their country's borders and around the globe (Ardi et al., 2024). If we look at Schein's (2004) three levels of culture, which are artefacts, espoused beliefs and values, and underlying assumptions, some challenges emerge. A simple example is that artefacts play less of a role in creating culture as some people will never experience the building, ornaments, and art that may be important to the organisation. New employees may not hear stories that relate to the organisation's history that makes an important impact on how the culture was created and maintained in the organisation. Furthermore, a study found that reduced levels of satisfaction, trust and performance was found in teams that had high levels of geographic and cultural differences (PwC, 2020:7). Therefore, leadership must play an integral role in promoting a positive remote working culture and need to implement changes in collaboration, communication patterns and employee engagement (Bilderback & Kilpatrick, 2024).

When looking at communication and collaboration, teleconferencing is a key focus point as one of the top communication and collaboration tools (Melati, 2025). Teleconferencing meetings however do not include as many opportunities for unintentional information exchanges (Morrison-Smith & Ruiz, 2020), social banter or watercooler talk that allows employees to bond and get to know each other that impact other elements of Schein's three levels of culture. Employees getting to know their colleagues also allow them to see if they have similar values and commitment. Some studies have found that there is a strong correlation between organisational culture and alignment with employee values and employee commitment and their intentions to seek alternative employment. One such study showed that one of the top three reasons why employees leave organisations are related to 'unhealthy or undesirable culture' (Branham, 2012:28) while others also advise on the impact of culture on employee turnover (Kwakye, 2018; Pathan, 2022).

Thus far, the focus has been on employees at an organisational level; however organisational culture is also impacted by employees on an individual level. The individuality of each employee includes personality traits and the impact on culture (Vanajas, 2023). When considering WFH, even performance management models overlook the impact of simple issues such as the working preferences of introverts compared to extroverts. Some introverts have been found to perform better when not subjected to overstimulation from increased social interactions (Looman., 2023; Murray, Caska & Keefe, 2020). Other research has shown that approximately 55% of engineers in those studies have been found to be introverts (Culp & Smith, 2009; Raza, UIMustafa & Capretz, 2011). These studies introduce the possibility of improving introverted employees' performance by means of WFH. It will however depend on the form of WFH interaction that is present in each organisation, and if it promotes performance improvement of introverted employees. Dennis, Barlow, and Dennis (2022) found that introverted employees in WFH environments using more text-based computer-mediated communication participated better and would likely perform better.

The impact of organisational culture seems to align with challenges that can impact design engineers and will be considered in the research.

### **3.7 Trusting remote employees**

Table 3-2 shows the reasons stated by CEOs for ending remote work in those organisations. Note that 'we do not trust our employees' is not listed. It will be a public relations nightmare for any CEO to make such a statement despite trust being a challenge in allowing employees to work from home (Murray, 2020). Even if they can trust most of their employees, the few employees who abuse the system ruin it for all. Some problematic employees may influence productive employees, which leads to managers viewing all employees indiscriminately as complicit, despite the actions of only a few (Dimmock & Gerken, 2018).

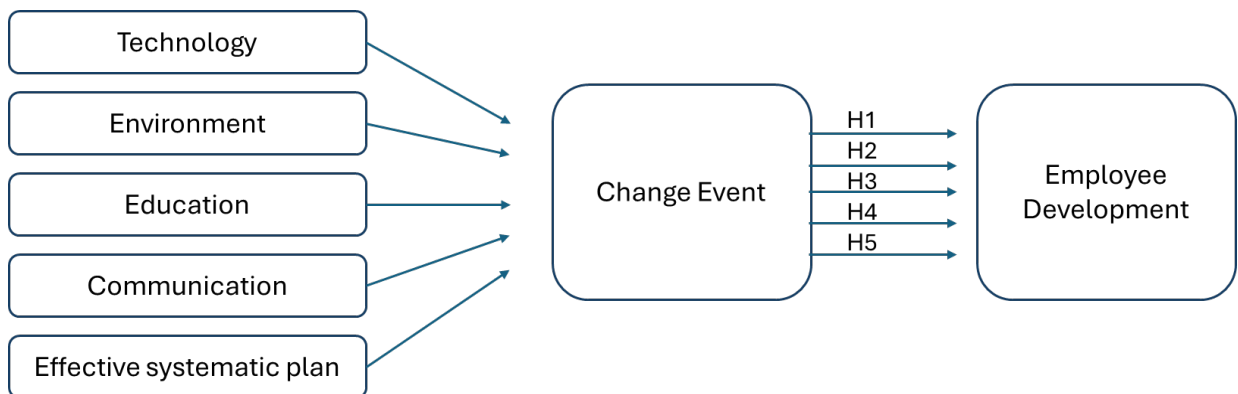
Beyond influencing other employees negatively, managers may struggle to trust that their employees are working as effectively as they would at the office, as there are more challenges in observing their employee's effort. Managers are concerned that if they are not watching their employees all the time they will not work and 'goof off and play' all day (Murray, 2020:18). It is also not uncommon for workers to lie about their working hours when working from home (Stø & Vestre, 2020).

Management's idea that 'if we can see what our employees are doing' leads to a surveillance type of management and micromanaging employees. This has been shown to reduce productivity and job satisfaction, having the opposite effect as desired. A balance needs to be found between active management and reporting, and autonomy for employees to manage their time and effort. The linkage between training and trust is made where proper training can

reduce concerns up to 15% compared to untrained managers (Murray, 2020; Zhuravel & Svenson, 2021).

### 3.8 Change management

An important aspect to consider, linked to and discussed somewhat in the preceding section on organisational culture, is change management. Change management is not mentioned in the models reviewed which is an odd exclusion since typically, when a person is underperforming, the corrective action is a form of change that needs to be managed, or the outcome will remain the same. Furthermore, a move from home to the office or vice versa entails not just a change in location but also a change in management style. Various studies have identified the link between change management and employee performance (Ali & Anwar, 2021; Purwanto, 2021; Ali & Hassan, 2022). Ali and Anwar (2021:363) posed the change elements that include technology, environment and communication, and that act as inputs to the change event that in turn impacts employee development (Figure 3.8). The linkage between employee development and performance has been discussed in previous chapters and shown in the models, therefore effective change management is an important element to consider.



**Figure 3.8: Change management elements**

**(Ali and Anwar, 2021:363)**

An organisation's strategic flexibility and ability to compete relies on how that organisation responds and adapts to change (Armstrong, 2008). In a rapidly changing economy, business strategies need to change, and with that the output required from the organisation's employees. Organisations simply must change to survive. These changes will include what the employees do on a day-to-day basis as well as the quality of how these tasks are performed. Change is an uncomfortable issue for many employees, and can lead to an increase in employee turnover (Appelbaum, Mitraud, Gailleux, Iacovella, Gerbasi & Ivanova, 2008; Ekhsan, Sudiro, Mugiono & Hussein, 2022). Significant organisational changes without proper management can also be seen by employees as a breach of the psychological contract, also leading to employee turnover (Marshall & Stephenson, 2020).

Some studies have focused on change management and the difficulties that organisations face when implementing changes that impact employees at a large scale. Kotter (2007) stated that change and transformation is a process and not an event, and since many managers do not follow the correct process the change event fails. Kotter also developed an eight-step change leadership model that needs to be managed correctly (Carreño, 2024). One could argue that a change as great as a move from working from the office to WFH requires a great deal of planning; a level of planning that had a low likelihood of being done and executed as effectively as managers and employees would have liked in a matter of days in the context of COVID-19. The move towards WFH or hybrid working can however be planned in a structured approach that includes elements such as planning the change, managing change and managing resistance to change (Arbter, 2023; Bagga, Gera & Haque, 2023).

One obstacle that Kotter focuses on is managing employee resistance to change that can lead to the change process to fail. During the COVID-19 pandemic, managers experienced a low level of resistance to the change due to employees and organisations not having a choice in the matter. Governments imposed lockdowns with heavy restrictions, so it was accepted by employees. Even if employees had a choice, it was not safe in the office and since very few people understood the Coronavirus and how deadly it was, they happily opted to WFH with very little resistance to this change event. Any subsequent changes to support the organisation, however, had to be made in a transparent manner with clear communication to reduce any resistance to change (Arbter, 2023). It must be done systematically based on a carefully considered plan, and each step needs to be evaluated (Mahpudin & Suseno, 2022). The effects of that immediate WFH implementation and lack of change management can now be seen whereby organisations are pulling employees back to the office. Had a change management process been followed, even after the COVID-related WFH move, the correct measures, procedures and manager training could have been put in place to ensure the WFH was successful and a viable option.

If change management was overlooked and could have eliminated many of the issues in the move to WFH, then it can be said to be equally important when moving employees back to the office. Employees have seen this as a significant change and have shown resistance to that change (Lathabhavan & Mehendale, 2025). There are many factors to consider, including soft issues like employee satisfaction, the fact that they need to start commuting again, and lose the flexibility to be with their family. Hard factors include the fact that many organisations downsized their office spaces and there simply might not be enough space for employees to sit or not have enough parking (McPhail, Chan, May & Wilkinson, 2024). The general change management process is of vital importance and may be missed by many employers.

### 3.9 Communication

Communication has been found to be critical for business success and growth and includes inter-departmental or cross-departmental communication (Verma, Ansari, Bagaria & Jain, 2022). A study showed that remote interpreters' performance declined more rapidly than that of on-site interpreters' performance. Some challenges raised are a 'faster onset of fatigue' and 'overlapping speech was often followed by omissions' (Braun, 2015:8). If remote interpreters suffer from a lower performance, who are arguably focusing on much closer detail than a remote employee, there could be a lot more lost in translation between employees and miscommunications will increase. Possibly more so in highly technical discussions that can be held between engineers, original equipment manufacturers (OEMs) and contractors.

One possible reason for the lack of concentration and poor communication during online meetings is that employees are not totally focused on the meeting and get distracted by other things, or multi-task. An article in the *Harvard Business Review* stated that employees are multitasking during conference calls with up to 65% of employees doing other work, 44% are texting and 47% are going to the restroom, amongst other things (Gavett, 2014). Lyons, Kim, and Nevo (2010) found that 73.7% of respondents admitted to multitasking often or always during teleconferencing but only 10.6% in face-to-face meetings, showing these distractions are almost eliminated in face-to-face meetings and thus communication is improved between employees and departments. A more recent study found that approximately 30% of employees were multitasking, usually email multitasking (Cao, Lee, Iqbal, Czerwinski, Wong, Rintel, Hecht, Teevan & Yang, 2021). That same study confirmed that a move to more remote meetings increased multitasking; however recurring meetings and other characteristics such as timing and meeting size influenced the amount of multitasking. Therefore, if meetings are managed correctly, they are kept relevant and have the correct stakeholders it will reduce multitasking and increase the quality of communication.

Meeting fatigue is another possible reason why employees multitask and may be another consideration for managers. Meeting fatigue is experienced by employees due to having multiple meetings in a day, often back-to-back since they do not need to drive between meetings, of which some might not be relevant to the employee, or they have other more critical tasks to complete. Their unimportant meetings have led to the recently popular saying, 'This meeting could have been an e-mail' (Lauer, 2020; Walz, 2023). Cao et al. (2021) suggest ways to reduce meeting fatigue and reduced communication from multitasking, namely reduce unnecessary periodic meetings, keep meetings brief, and scheduling more intense meetings for later in the day.

Moving beyond the structured meetings, a further element of communication between employees and departments are social interactions that take place in more casual settings at

the office such as in the common area or simply passing by other employees in the hallways. This is absent in a remote working environment and social isolation can have a negative impact on employee's wellbeing (McPhail et al., 2024). Naturally, managers want to try and improve employee relations by adding social interactions where possible to build morale and relationships and improve collaboration. What managers may not recognise is that too many social interactions may have the opposite effect than is desired and add more stress, which may result in burnout. The difference between social interaction and social support is noted, but without social interactions and events, organisations will struggle to boost morale and create a corporate culture. Managers can look to increase social support over social interactions to reduce stress (Gabriel and Aguinis, 2021). When looking to improve employee engagement it is still important to create social opportunities if done to the correct degree, so that it does not lead employees to feel like social interactions are additional job demands. A recent study found that an increase of 20% in performance was evident in employees who had 15 minutes social time compared to those who did not (PwC, 2020). Managers must take care to balance the level of social interactions which may become tricky, as it may vary from person to person. Van Zoonen and Sivunen (2022) found that an effective way to promote informal communication between colleagues is to leave some time at the start and end of an online meeting to do so. This can go a long way toward improving staff morale, increasing collaboration and engagement while not creating more meetings than necessary that may lead to meeting fatigue.

### **3.10 Performance management of engineers**

When searching literature on how to manage engineers, the information available is sparse at best. It may be that engineers have been put in the same category as other employees, but the main challenges are that:

- An engineer's work is highly specialised and not every manager will understand what they do. This is especially relevant to managers managing a team of multidisciplinary engineers such as mechanical, electrical, civil and others at the same time (Galaz-Delgado, Herrera, Atencio, Muñoz-La Rivera & Biotto, 2021; Nwulu, Elete, Erhueh, Akano & Omomo, 2022).
- They need to adhere to a plethora of standards (Franch, Glinz, Mendez & Seyff, 2021) which include International Electrotechnical Commissions (IEC), South African National Standards (SANS), Eskom and local municipality standards and other specific customer standards that may be out of date or in conflict with best practice.
- The quality of the work is subjective due to engineering problems not having a single solution (Glassman, 2013:1; Kilinc & Caicedo, 2019:1) and the engineering solutions typically integrate with other solutions to other problems.

- Registered engineers take accountability for designs if something goes wrong so the authorising engineer is also the guarantor of quality (ECSA, 2017).
- The performance of an engineer can be subject to other disciplines not delivering, in which case the engineer in question cannot progress in their work and becomes a victim to circumstances out of their control (Galaz-Delgado et al., 2021).
- The performance of the engineer can also be subject to client approval of designs (Netscher, 2016; Alenazi, Adamu & Al-Otaibi, 2022) and any delays may have a negative impact on the engineer's KPIs.

Furthermore, engineers often work on multiple projects in a matrix reporting structure (Elezaj, Morina, & Kuqi, 2020). This means that an engineer typically has a few stakeholders each vying for their projects to be prioritised. An engineer who is instructed to prioritise one project over another may seem to be a very productive resource to the project manager whose project is enjoying attention, but the other project managers may rate the engineer as a poor performer. This problem is exacerbated when there are too few resources and engineers are overloaded. Some of the main challenges found within matrix structure organisations are unclear roles and responsibilities, misaligned goals, the authority can be ambiguous, difficulty in balancing time, cost and performance, the engineer's priorities are constantly changing, and dual reporting creates multi-dimensional information- and workflows (Sy, Beach, & D'Annunzio, 2005; Kerzner, 2022).

### **3.11 Chapter summary**

This literature review has looked at performance management models and identified various elements that impact performance, and has also noted that elements are impacted by performance. The interlinkages between the major and minor contributors are shown in Figure 3.9 as they were discovered in the literature review, as well as the reasons organisations' CEOs have stated for returning to the office. Some of the elements identified from the models include skills, training and development, change management, communication and importantly, performance management of engineers. With engineers being such a scarce resource in South Africa, and with their having higher mobility opportunities between organisations, it may be of vital importance that managers provide flexible working options for engineers which may include a hybrid or WFH model, or they might lose their key talent with all the institutional and tacit knowledge they hold.

The following chapter will focus on the research methodology, including the research orientation, demarcation of the study, sampling, and critically, the ethical considerations.

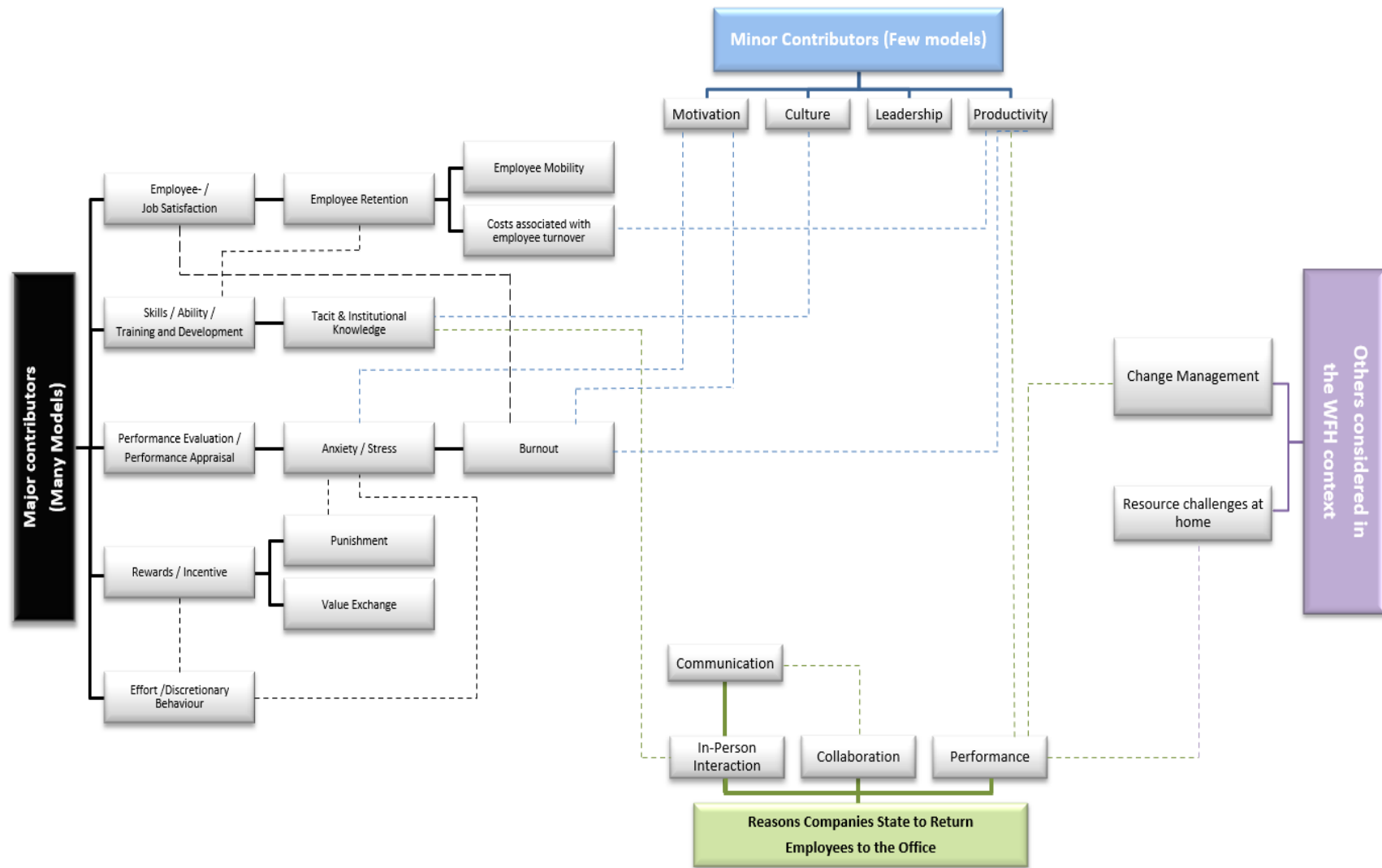


Figure 3.9: Factors considered in the literature review with some interlinkages shown

## **4. RESEARCH METHODOLOGY**

### **4.1 Chapter introduction**

In the previous two chapters, a literature review was completed that identified the key themes that guided the questions in the semi-structured interviews. This included in Chapter 2 the identification of design engineer's roles and responsibilities, and possible effects on organisations that have ended remote work for engineers. Chapter 3 reviewed general performance management models to identify key themes that were then investigated further with the aim of linking those themes to managing engineers.

This chapter discusses the research methodology that will be followed, including the data collection approach and motivation for selecting qualitative data collection by means of semi-structured interviews, sample size, population and other relevant research design information.

### **4.2 Research orientation**

There are various studies focusing on remote working and performance management which made use of quantitative, qualitative or a mixed qualitative-quantitative approach (O'Connor, 2011; Braun, 2015; Rusu, Avasilcăi & Huțu, 2016; Lippe & Lippényi, 2019; Nagel, 2020; Wang et al., 2021; Yang et al., 2022).

Focusing on virtual teams, O'Connor (2011) reviewed a few such research methods, and it was found that of the six that was reviewed, five used quantitative data as their original research instrument, and one used the qualitative approach. When researching business and management, quantitative research is often done making use of surveys. Case study and experimental research can also make use of surveys. Surveys in the form of questionnaires can be done online using various platforms such as SurveyMonkey, although telephone questionnaires and structured interviews can also be conducted. Questionnaires in this case are regarded as the same set of questions in a pre-selected order (Saunders, Lewis & Thornhill, 2009; Saunders, Lewis & Thornhill, 2023). Making use of surveys allows for a large amount of data to be obtained with reduced effort and cost so a larger sample can be used. On the other hand, a key challenge is that it is simple to carry out analysis that is incorrect or, using available analysis software, generate information that is presented well but inaccurate (Saunders et al., 2009; Bradley, Kuriwaki, Isakov, Sejdinovic, Meng & Flaxman, 2021; Saunders et al., 2021).

The qualitative approach was also used in other studies conducted, including a study by Matli (2020) that looked at remote workers and their circumstances in South Africa. To obtain

information for the qualitative approach, there are multiple interview approaches to be considered including structured, semi-structured, unstructured or in-depth interviews (Saunders et al., 2009; Mueller & Segal, 2015; Saunders et al., 2021). Other researchers have used a mixed quantitative-qualitative approach or referred to studies that have made use of both approaches for remote work research (Braun, 2015; Wang et al., 2021).

When considering the various research methods, the research topic at hand, the depth required to build a strong thesis, and the possible variation in responses, a lot of value can be derived from having detailed discussions with data subjects. A qualitative approach conducting semi-structured interviews will give richer and more detailed responses. Using a list of themes identified in the literature review, the interviewee will still be guided by the themes and thus enable different questions to be asked in the context of the research situation. Some questions may be omitted based on the organisational context and questions may be changed to accommodate the flow of the conversation (Saunders et al., 2009; Gani, Rathakrishnan & Krishnasamy, 2020; Saunders et al., 2021).

Each interview must be utilised to its full potential, therefore an interview pilot was first held before the official interviews took place. This helped the researcher become comfortable with the interview process and built confidence. It also helped test the interview guide, identify any potential issues (Gani et al., 2020), and assessed the participants' understanding, further improving the responses to obtain higher quality data. If a pilot interview is of sufficient quality, its findings can be included in the data analysis and results, as was the case in this study.

The research approach was in the form of the interpretivist philosophical paradigm (Saunders et al., 2009; Saunders et al., 2021) and took the generic approach (Kahlke, 2014). In this method the researcher rather understands than explains (Mack, 2010). In the context of this study, ironically in the context of a study of remote working engineers, typically this research method is most effective when conducting face-to-face interviews. The interviews were done using teleconferencing platforms such as Microsoft Teams which allowed transcribing during the interviews and reduced analysis preparation time.

All ethical considerations and approvals were obtained for the data collection process including ensuring that all participants completed a consent form. All records of interview recordings, transcripts and survey responses were saved and presented as part of this study.

### **4.3 Demarcation of study**

4.3.1 Geographical boundaries: this study focused on design engineers in South Africa.

4.3.2 Temporal limits: the study was conducted in 2024 and 2025 and focused on engineering performance after the COVID-19 pandemic.

- 4.3.3 Contextual limits: the study is limited to the engineering sector in South Africa, focusing on design engineers who do not require an on-site presence for the entire duration of a project.

## **4.4 Delimitation of study**

- 4.4.1 Population and sample: The study included only managers of design engineers who have worked or are working from home. The definition of manager includes engineers who led other engineers in a matrix or other organisational form. In layman's terms, it was not about who approved the engineer's leave, but who was accountable for their performance.
- 4.4.2 Variables: the research focused on variables such as employee performance and performance management, while excluding unrelated factors like technology barriers in remote working environments and economic changes not related to or impacting the engineering sector.
- 4.4.3 Methodological choices: data was collected through semi-structured interviews to obtain partial thematic saturation.

## **4.5 Population**

The population, unit of analysis and unit of observation to study were any employed or previously employed individuals who worked remotely in the engineering industry, and was a sample set of people who were in managerial positions at that time. The geographic area focused on was South Africa as a region, with a focus on the views and opinions of employees in South Africa whether they were South African citizens, naturalised or on foreign work permits. The context of work in South Africa and the views around local organisations and their performance improvement processes on motivation and satisfaction were of importance to the topic at hand. The nationality of the individual was not seen as a limiting factor.

This target population was both relevant academically and practically. In the literature review process the researcher could not find any relevant studies focusing on design engineers in the South African context. The practical value is derived in the fact that organisations within South Africa can benefit from this study if they incorporate changes in their remote working and performance improvement policies and procedures based on its outcomes.

## **4.6 Sampling of organisations**

Organisations were not sampled as part of the research conducted.

## 4.7 Sample method

The individuals sampled consisted of managers of design engineers. Any engineer who had worked in a WFH or hybrid model for more than six months was also considered for this study. Employees with a minimum of one year's experience were considered. Respondents must have worked in South Africa during this time.

The data collection method was done by means of individual level, semi-structured interviews. An adequate sample of employees needed to be selected. Using the sampling techniques tool's logic, the sample would be relevant but not necessarily representative, the purpose would not be explanatory, the individual cases would not be difficult to identify, the sample compared to the population would be very small, thus the purposive non-probability method would be used. Purposive sampling allowed for the use of judgement to select cases that would best answer the research question and would be particularly informative. This method meant that the total population was not statistically represented. It could also not be stated with certainty if extreme case, heterogeneous or critical case sampling could be used as these types of cases would need to be identified beforehand. For that reason, the typical case method was used that would aim to illustrate a representative case (Saunders et al., 2009; Saunders et al., 2023).

Sharma (2017) advises that some advantages of purposive sampling are that it allows for the use of small samples, the relative cost is low and the control over the sample contents are reasonable. This sample method also allows for generalisations to be made. Since there may also be multiple phases in sampling, purposive sampling also allows for the use of a wide range of sampling techniques. A disadvantage of this method is that it can be prone to researcher bias, and it can be difficult to defend the representativeness of the sample. The researcher made every best effort to not let bias affect the integrity of the study.

## 4.8 Sample size

Thematic saturation has 'become the gold standard by which diversity samples are determined' (Francis, Johnston, Robertson, Glidewell, Entwistle, Eccles & Grimshaw, 2010:3). In qualitative data collecting, depending on the type of study, some have found that thematic data saturation can be achieved with as few as twelve interviews. The same study states that fewer than 10% of studies pertaining to organisation and workplace provided a sample size justification (Vasileiou, Barnett, Thorpe & Young., 2018). It is also noted that qualitative research is not representative of the entire population, but it is relevant (Hair, Celsi, Money, Samouel & Page., 2011).

Partial thematic representation can be obtained with as few as four interviews (Young & Casey, 2018). This thesis is submitted as partial completion of a coursework master's degree

programme and does not require full thematic saturation nor is it part of an extensive research project, so five interviews were conducted.

## **4.9 Validity**

Validity refers to the extent to which the research can be trusted and whether it is evaluating what it is supposed to. Key aspects of validity include credibility, transferability, dependability and confirmability (Anney, 2014; Gani et al., 2020).

### **4.9.1 Credibility**

Credibility is the measure of how plausible the representation of information is that is drawn from the data and if it was interpreted correctly in terms of the participant's original views. The issue of credibility has multiple strategies that must be considered to prove compliance with the specific criterion. These are member check, triangulation, persistent observation prolonged engagement (Anney, 2014; Gani et al., 2020).

Persistent observation means that the researcher needs to identify the elements that will be focused on that are most relevant. To overcome this challenge the researcher, created a list of elements that needed to be focused on from the literature review and referred to that list frequently so as to not lose focus. The focus needed to be on the specific topic at hand and not to widen the scope due to not focusing on the correct elements.

Member check refers to the process of providing feedback to the participants such as interpretations and conclusions to obtain the respondents' perspectives and compare them with that of the researcher. Findings from the study were shared with several of the participants and feedback requested as a member check mechanism. Additionally, the pilot interview was done with an individual that has research experience that provided feedback as a test (Korstjens & Moser, 2017).

### **4.9.2 Dependability**

One measure of the dependability of a study is when the findings can be found to be stable over time. This study was not conducted over many years, so the dependability needs to be proven by other means. Another method is by means of peer examination (Anney, 2014) whereby the dependability is shown by the findings being discussed by neutral colleagues. In this case the researcher's supervisor supported the peer examination process.

Additionally, the research steps were reported in a transparent manner from start to finish to show consistency. An adequate tracking tool was used to make notes and track steps in as much detail as possible to record the progress.

### **4.9.3 Confirmability**

Confirmability refers to the extent that other researchers can confirm the findings of the study (Anney, 2014; Gani et al., 2020). This is to show that the researcher derived the findings from the data only.

The same reporting of steps can be used in the strategy for confirmability as for dependability but with the difference of it being concerned with the aspect of neutrality. The research was conducted in a manner that was neutral and grounded in the findings within the data only and was proven by supplying an audit trail.

### **4.9.4 Transferability**

Transferability is the test to gauge how the research can be extended or generalised to other contexts had there been other respondents. The researcher must be able to articulate the research context so that when any other researcher transfers the research to another study, they need to take account for the feasibility of that transfer (Trochim, 2021).

To prove transferability, thick description is used to provide the correct context so that the findings become meaningful and useful to outsiders. To make this study applicable in other contexts the participants and research process were described in as much detail as possible. If the description is thick enough any other interested researchers will have the ability to gauge if this study will be relevant and add value to their research.

### **4.9.5 Reliability**

The aim of reliability is to obtain the same results from a method of investigation when it is repeated on multiple occasions (Alf & Walle, 2015). Reliability in this study pertaining to semi-structured interviews was ensured by ensuring consistency and dependability in the research process and findings. Standardised procedures, detailed documentation, and peer reviews of the research enhanced the reliability of the thesis, ensuring that the findings are reliable.

## **4.10 Ethical Considerations**

Every attempt was made not to violate any ethical standards as set out in the Ethical Compliance for Engineering Students form issued by CPUT. The following was applied as well as any other factors mentioned in the FREC for this thesis.

- I. No data will be collected before ethics approval has been given.
- II. Voluntary and informed consent shall be obtained as to not violate the ethical principle of autonomy and infringe upon the rights of the participants.

- III. The research will not be conducted solely for personal gain and the participant and society shall be protected from harm.
- IV. Participant's confidentiality and identity shall be protected and measures put in place to do so including appropriate data storage security, and anonymising data collected by removing names and other personal information.
- V. The research shall be designed so that the study is done in a way that minimises the potential for harm to participants.
- VI. This research will not pose any harm to the environment.
- VII. All sources shall be referenced in the study and the work submitted to Turnitin to ensure there are no plagiarism issues.
- VIII. The researcher is subject to the ECSA and CIMA code of conduct as a registered professional engineer and a registered chartered global management accountant. This includes upholding the following sections in the ECSA code of conduct:
  - Section 3.2 – the researcher will conduct himself with integrity
  - Section 3.3 – the researcher will consider public interest, and
  - Section 3.5 – the researcher will uphold the dignity of the profession.

#### **4.11 Chapter summary**

In this chapter the research methodology was discussed with motivations for the data collection option being qualitative data collection by means of semi-structured interviews. The interviews were guided by the literature review findings with the goal of achieving partial thematic saturation while ensuring the study was credible, dependable and valid. The ethical considerations were also discussed as a critical element to keep in mind through the process. The next chapter will present the findings of the interviews and analyse the results, highlighting key themes and patterns that emerged.

## **5. RESEARCH RESULTS**

### **5.1 Chapter introduction**

In the previous chapter, the research mythology was discussed, including the sample size, validity, population, and ethical considerations. These aspects were discussed in terms of the data collection methodology which was done by means of semi-structured interviews. Five interviews have now been concluded and in this chapter the data is analysed and converted into information that will be used in the general discussion and recommendations.

### **5.2 Pilot interview**

A pilot interview was conducted to ensure that the questions were relevant, applicable, appropriate and if they were open ended to allow for further engagement from the interviewee. This allowed the researcher to become comfortable with the process and ensure the interviews were streamlined and not too long, as some respondents may have had limited time. This process included obtaining the signed consent form and starting the interview with an appropriate introduction confirming consent was provided, that the respondent had the right to withdraw at any time, and that their information would be kept confidential.

The interview concluded within 58 minutes without the need to rush through any questions. The respondent elaborated on many of the questions which led to additional questions and richer and more detailed responses. Some questions needed to be rephrased for clarity and were adjusted accordingly in the subsequent interviews. The pilot interview was a success, and the data was included in the analysis with the other four interviews.

### **5.3 Profile of the respondents**

Five engineering managers were interviewed who had related experience including design engineering, and had design engineers report to them directly or indirectly. The least amount of experience any of the respondents had was 18 years and all the respondents had a combined experience of approximately 126 years. All the respondents worked in engineering organisations in South Africa and had worked remotely in the past. Currently most respondents' organisations had a WFO-only policy with one having a hybrid model.

### **5.4 Responsibilities of design engineers**

There was a great overlap between the different answers provided regarding what design engineers do, showing a common theme. The primary premise is that they are there to solve complex problems. This is done by finding safe and environmentally friendly technical solutions to defined problems or project deliverables through the creation of technical documents. These documents and tasks are created by interfacing with other disciplines to obtain information.

The information leads to calculations that need to be performed that are included in the documentation, specifications, detailed drawings and manuals. Prior to producing the equipment, the designs need to follow a review process where another engineer checks the correctness of that design and then approves or rejects the design (Taylor, 1996; Kuusto, 2024).

The approval is followed by equipment selection and procurement. Design engineers are also involved with equipment selection, so they do not simply provide inputs, and it is handed over to the procurement department. Beyond procurement, these engineers are also involved in overseeing construction and execution, and are needed on site for certain activities. Respondent 2 stated that a design engineer is involved in the project 'from cradle to grave', meaning they are involved from the very start to the completion of the project.

## **5.5 Design engineers' ability to WFH**

With the responsibilities of design engineers identified, the next set of questions focused on whether design engineers can perform those tasks in a remote location while working from home.

All respondents agreed that a large amount of the work performed can be done from home. Responses ranged from 50% to 70% of the tasks can be done from home and the remainder of the work that typically could not be done remotely are those where the design engineer needs to be on site.

The time that an engineer can work from home was however subject to change depending on where in the lifecycle the project was. Respondent 1 specifically mentioned that in the early stages of the project it is better to sit in the same room while brainstorming. This helps to identify different engineers' battery limits of the project (where their responsibility starts and ends) and the team can work through sketches and drawings together. In contradiction to this, Respondent 2 responded that in the initial phases of a project, there is a lot of groundwork that needs to be done that requires time alone to focus. WFH supports this especially in cases where other engineers on the project are in other offices or distant locations. From this it is important to note that organisations have different models, and where they have more than one office, WFH may be more beneficial in the initial stages compared to a situation where engineers are in the same office.

Following the confirmation that design engineers can perform a lot of their tasks from home, the respondents were asked what their preference was, WFH, WFO or hybrid. All of them responded that their preference was a hybrid option. The reason for this choice was also very similar across the board: this was a good combination of time alone to perform the tasks needed, as well as enough time for face-to-face collaboration and contact time. Other reasons

provided included it's being a good flexible option and that not all engineering can be completed in office hours and needed to be done from home after hours. All respondents also agreed that a full WFH model is probably not a good idea for all engineers and employees.

## **5.6 The shortage of design engineers, their mobility options and trust**

The literature review indicated that design engineers are in short supply, are a valuable organisational resource, may have higher mobility allowing them to find work elsewhere quite easily, and talent retention is an important element to consider for these organisations. These questions were discussed in the interviews.

### **5.6.1 Shortage of design engineers**

When discussing the possible shortage of design engineers and their concerns around talent retention, all respondents agreed that design engineers are in short supply. Respondent 2 said, 'There's a dire shortage of qualified design engineers and we've seen that in my previous position where we try to find qualified engineers with years of experience...'. Respondent 3 said, 'Yes, very concerned, very concerned, especially experienced engineers'. Thirdly, Respondent 5 also stated that South African engineers are well known and work all over the world due to it's being a global market. So those engineers are exposed to global opportunities that make retention a bigger concern than just local market competition.

These responses aligned with the literature review in agreement with Writer (2022) and Sayed (2023), highlighting that there is a critical shortage of design engineers in South Africa. This shortage can increase their ability to move to other organisations or even other countries. Other organisations looking to fill positions urgently can engage with talent recruitment specialists to poach engineers from organisations, exacerbating the problem even further.

### **5.6.2 Design engineers and mobility**

Following the confirmation of a concern for engineering resources, the discussion moved to engineers' mobility and the options of leaving for other organisations, which brought about various responses. Most of the respondents felt that design engineers have a reasonably high mobility, so much so that Respondent 2 stated that they had found another job within an hour of putting their resumé on the market. Despite this, respondents did mention that engineers' mobility is impacted by various factors, including years of experience, salary, and field of expertise. Respondent 3 also stipulated that a specific focus of engineering, being a utility engineer, may drop mobility and make it more difficult to find other opportunities as there are not a lot of utilities available. Focusing on transmission and distribution compared to motors

and other design reduces mobility, according to that respondent. On the other hand, consulting engineers have higher mobility.

The respondents therefore had mixed reactions, in that even though design engineers have relatively high mobility, it needs to be viewed on a case-by-case basis, and would differ from person to person. This agrees with the literature review, but it is noted that it is more complicated than simply stating that design engineers have high mobility with many opportunities to move to other companies.

### **5.6.3 Talent retention strategies**

To start the talent retention strategies and implications, the discussion turned to the respondent's own organisations' WFH policies. Despite all respondents preferring a hybrid model, only Respondent 3 had a hybrid working option. Except for being allowed to WFH for emergencies like a child being sick, all the others were in the office full time. This aligns with the information provided in Table 2-2 showing that approximately 70% of roles are WFO only. Two respondents did however state that on rare occasions, certain design engineers had an agreement to WFH but that was very limited and not a standard practice.

The reason for a WFO environment was also questioned. The respondents stated that despite their personal preference for a hybrid working environment, the decision was made at executive level, possibly with HR input, and it was not within their power to control. Respondent 1 specifically mentioned that HR was a 'stumbling block' for remote work and did not understand engineering work. This might also come down to being a trust problem. All the respondents stated that they preferred a hybrid model and responded that they had a high level of trust their in teams to work from home. However, two aspects followed the questions around trust, namely was there an equal level of trust in junior and senior engineers while they WFH, and did the executive leadership team trust employees and WFH as they were not the direct line managers? The discussion around trust will be elaborated on in section 5.6.4.

The questioning moved onto whether their organisations had a talent retention strategy. Despite the shortage of skilled engineers and the respondents' clear expression that it was a reason for concern, most of the respondents stated that their current or previous employers did not have a talent retention strategy in place. Respondent 4 said there might be a retention policy in place, but they were not aware of it. Of the group of respondents, only Respondent 2 stated that their organisation had recently implemented a lucrative retention policy for senior managers and senior engineers.

The link between mobility and retention strategy was then made, and while most of the respondents believed that WFH was a perk and possible retention tool, this was not considered due to the lack of a retention strategy in these organisations. While the respondents said that

they and their teams preferred a hybrid model, they did not indicate that a lack of WFH was a standout factor that increased employee turnover. Respondent 1 mentioned that they knew of people who had resigned from their jobs because of WFH being terminated, and that they themselves might also look to resign in the next six months as a result thereof. Respondent 2 said that it may have been a contributing factor to certain resignations, while the others said that they were not aware of anyone resigning for that reason; but they were also not always fully aware of the reasons for resignations so it might be a reason. In addition to retention, Respondent 2 advised that their organisation not only had challenges with retention but also with finding top talent. Respondents agreed that including WFH as a talent retention tool might reduce employee turnover, with one respondent also advising that it may make working at that organisation more appealing, thus attracting more talent.

#### **5.6.4 WFH and trust**

The line of questioning to the respondents did include if they trusted their teams to work from home, and whether the executive leadership trusted WFH. There exists a trust disparity between junior and senior engineers for various reasons.

##### **5.6.4.1 Executive leadership and trusting WFH**

When respondents were asked whether the executive leadership of the organisation trusted employees to WFH, Respondent 2 openly said that in their previous organisation they felt the executive leadership did not trust engineers working from home, so much so that they wanted to implement keystroke loggers and tracking tools to monitor if engineers were working as they said they were. Respondent 5 also said that they didn't believe that their executives trusted WFH and that was one of the reasons WFH was not allowed in the organisation. The other respondents did not seem to think a lack of trust was an issue.

The interviews were done with engineering managers who had a team that reported to them and who they typically had more direct contact with. This is not the same as the contact their teams would have with the executive leadership of the organisation as there is a vertical separation in the hierarchy between each other. A study by Härenstam, Björk and Corin (2024) discussed this phenomenon where they separate personal trust from system trust. They state that trust is 'a psychological state of individuals that results from the quality of trust in mainly vertical relationships' (Härenstam, et al., 2024:923). The trust that employees have in their direct line managers is because of daily personal contact with them and is called supervisory trust. On the other hand, managers at higher levels with little to no direct daily contact rely on communication via abstract systems of rules, structures and policies. Top management therefore have what is called system trust or organisational trust, which is a form of impersonal

trust. This can explain why the executive leadership of organisations impose policies like WFO despite the engineering managers and their team's preference for hybrid or WFH.

#### **5.6.4.2 Age and experience and the impact on trust, and ability to WFH**

A clear theme that was identified in the interviews was that there might be a level of distrust in junior engineers. It was clear however that the trust was related to their abilities or lack thereof, as they did not have the same level of experience as senior engineers and needed more supervisory oversight. All the respondents stated that, while senior engineers needed to work alone to perform their tasks in isolation, junior engineers needed to be in the office more often, or even full time. This was because junior engineers needed more contact time with experienced engineers to learn and be exposed to solutions that only experienced engineers were able to devise. Therefore, senior engineers should have more freedom to WFH, and juniors have less to WFH, but it should increase as they gained experience.

Some of the specific reasons provided included that junior engineers often had smaller tasks that were completed sooner, there was a need for more interfacing and coordination with other disciplines, and more discussions were required with the rest of the team. They also needed to get used to doing basic tasks which were affected by how the organisation's systems worked, which a senior engineer already understood, about which they often needed to speak to human resources or IT to support them on.

An interesting challenge was identified in the fact that junior engineers needed to be in the office more often to gain experience from senior engineers, but those senior engineers would not be in the office if they WFH. The respondents did note that this might seem counter-intuitive but was something that could be developed into a WFH framework whereby senior engineers would work from home more often while junior engineers were in the office more often.

The respondents all stated in a similar way that there still was tremendous value and knowledge to be gained by juniors working together on complex projects without the presence of a senior engineer, although it was more beneficial to have senior engineers with them. Interfacing with other disciplines would support their learning journey as those senior engineers would also be in the office on the days that their direct manager might not be there. The main solution offered was that having the junior engineers in the office more often would not mean their specific line manager needed to be in the office, but at least one of the discipline-specific senior engineers who could answer their questions. This solution might increase information diffusion amongst the junior engineers as they would all be in the office at the same time, and all be exposed to the same knowledge. Additionally, in this manner they would also be exposed to different senior engineers and not just their own, therefore being

exposed to more engineering wisdom and insights, gaining experience more quickly, especially in an open office. Bjerrum and Bødker (2003), and Salvadori, Hindmarsh and Heath (2023) agree that this form of working supports knowledge transfer, but there are also drawbacks such as distractions in the office, the very reason why senior engineers often opt for WFH. This means that the seniority of an engineer and their ability to work alone impacts their WFH options and the more senior an engineer becomes, the more they can be out of the office.

## **5.7 Engineer's key performance indicators (KPIs)**

In Section 5.4 the responsibilities of design engineers were identified as described by the respondents. How they perform those tasks and how the quality of the tasks is evaluated is done by allocating KPIs to them. Ideally those KPIs will follow the SMART framework as described in Section 3.2.8, but some of the respondents stated their KPIs were very subjective and not SMART. Some of the respondents also said that while they had KPIs, and they were well intentioned, the KPIs were just a paper exercise and did not achieve what senior leadership thought it did. This raises some concerns around the performance management of design engineers, whether WFH or WFO.

KPIs discussed varied between the respondents. The list of KPIs is shown below.

- KPIs focusing on design output within the time specified by the client,
- Accuracy,
- Quality,
- Profitability of the engineer,
- Managing costs,
- Low work returns (corrections after review),
- Complaints from the client issues on site post design,
- Business acceptance and publication of specifications within correct timeframe, and
- Project success.

While it was evident that the KPIs and performance management process needed improvement, all the respondents stated that the KPIs for an engineer in a WFH and WFO environment would not be different. So, they would have the same KPIs as their output was not tied to their location but rather to the quality of their designs, work and tasks described in section 5.4. All respondents also advised that their organisations did not have a specific remote performance management framework or guideline, and how employees were performance managed remained the same despite their working location.

## 5.8 Key factors that impact employee performance

For the next set of questions, the respondents were shown a list of options to select from and asked to rank them in order of importance in how they impacted a design engineer's performance. These are the factors that were investigated in the literature review under sections 3.3 to 3.9. For brevity and considering time constraints during the interviews, the respondents were not asked to add a weight of importance or net promoter score to these options. An inverse score was allocated to the ranking where one has a score of six, two scores five and so on until a ranking of six gives a score of one. The subsequent ranking can be seen in Table 5-1 with scores allocated.

Communication was clearly seen as the most important factor that affects performance, so much so that Respondent 5 ranked communication number one and said the rest were all equal after communication. That respondent stated, 'For me the most important thing is always communication, because all of these other things are related to that'. Thereafter employee satisfaction, organisational culture and skills, training and development scored high with little difference between them. The performance evaluation and appraisals process seemed to have a lower impact on the performance outcomes of the design engineers, according to the respondents. This may also be because of the responses reviewed in the preceding section where the respondents felt some of the KPIs were subjective and the process was just an administrative exercise. Change management consistently ranked very low and did not seem to be a major contributing factor that impacted design engineers' performance. In subsequent discussions, the respondents also advised that their organisations either did not have a change management policy, or at least they were not aware of one.

**Table 5-1: Factors impacting performance and their ratings**

Element impacting performance	Rating
Communication	30
Employee satisfaction	26
Organisational culture	24
Skills, training and development	23
Performance evaluations / appraisals	16
Change management	12

### 5.8.1 Communication

Communication was ranked as the most important factor that contributes to an engineer's performance and was a common theme in the interviews. Communication was also raised by all respondents, often unprompted, with one stating that, 'I believe communication sets the

foundation for everything'. This aligns with the research done by Verma et al. (2022) as discussed in the literature review.

All respondents discussed communication and its impact on design engineer's performance especially in remote working environments. There were some differing views that showed that not all organisations work in the same way. One example thereof is that Respondent 1 felt that in the initial stages of a project the brainstorming and scope clarification, face-to-face collaboration was preferred, yet Respondent 2 stated that the early stage of a project was best supported by WFH.

The discussion around communication ranged across multiple contexts including the need for tools and platforms, and training to support communication.

### **5.8.1.1 Communication tools and platforms**

Respondents frequently mentioned tools to promote communication which included Microsoft Teams, WhatsApp, Autodesk, Revit and other 3D modelling tools. They further mentioned use of engineering platforms, often cloud-based, where progress can be tracked and that enabled live collaboration. This includes setting key milestones and deliverables that are linked to specific dates. Note that allocating a milestone with a date in such a collaboration tool supports the alignment with KPIs to a SMART KPI framework.

Other tools such as project management software including Primavera and Microsoft Projects were mentioned that can support driving schedules. These schedules are linked to other disciplines, and the progress can be displayed visually for all to see. The project manager then can also accurately track progress and if an engineer or team falls behind, the project manager can interface with the correct stakeholders driving communication.

When asked about the inclusion of specific performance management tools, none were mentioned. The respondents stated that improved communication supports performance and that can be achieved by implementing and tracking activity via these tools. The main takeaway is that performance tracking via these tools must be implemented as part of the performance management strategy and not be overlooked.

Research by Weigel et al. (2022) and Dolo (2023) suggests that the correct use of certain remote working tools can drive competence and knowledge transfer in a remote working environment which includes tacit knowledge. Strategically these tools are not being used to their full potential as per these respondents. Using these tools more effectively can assist in reducing trust issues, enable junior engineers more, and enable better KPI management.

### 5.8.1.2 Training and its impact on communication

Training in the context of this study was raised to understand whether respondents received training to manage remotely working engineers. None of the respondents had received training yet all of them stated that it would have been beneficial for them and their teams to receive training. When asked what specific training they would have liked to receive, the vast majority immediately stated that focused training on improving communication would have been beneficial.

Adapting communication methods to hybrid working models would also support managers and employees to identify and distinguish between micromanagement and necessary check-ins as well as to have more effective and productive virtual meetings. In section 3.9 in the literature review, poor communication was attributed to a lack of concentration. The study done by Lyons, Kim, and Nevo (2010) showed that a large proportion of participants were found to be multitasking and not focusing on the meeting when compared to in-person meetings. Cao et al. (2021) found that recurring meetings, timing of meetings and meeting size impacted the amount of multitasking or lack of meeting focus that eroded communication. Furthermore, too many meetings and back-to-back meetings also lead to meeting fatigue (Lauer, 2020; Walz, 2023). These are all aspects that can be improved or eliminated by providing effective training to managers and engineers on when, how, and how frequently to have meetings and to ensure the correct number of relevant participants are included in the meeting.

In addition to having more focused and productive meetings, Respondent 1 stated that 'some training on not only the manager, but also the people to have everybody on the same page as what is going to happen or is expected to happen. I think that's important'. This shows that the training should focus on aligning expectations so that there are no miscommunications.

In terms of setting expectations, Respondent 1 also stated that the lack of training 'left the door open for, perhaps the less enthusiastic workers to abuse that hybrid', meaning they could shy away, or reduce their productive hours and not work as hard as they would in the office under constant supervision. Respondent 3 also noted that they believe training would be very beneficial for young engineers who are less experienced and might not have the discipline to work as effectively without oversight. Murray (2020) found that managers may struggle to trust employees working remotely and would prefer to manage those employees in person to be sure they are working and not *slacking off* as Respondent 2 stated. Whether employees are slacking off or that is just a manager's fear or perception, it is difficult to prove and can lead to micromanagement that leads to employee dissatisfaction. Improved communication by means of training may improve this issue (Murray, 2020; Zhuravel & Svenson, 2021).

Demerouti's (2023) research suggests that there are effective strategies for WFH that can be implemented and driven through certain training interventions. This research identifies one of the main changes of WFO to WFH is how WFH provides more opportunities for self-management and autonomy. In the case of junior engineers this may not be something that will be inherently positive unless they receive adequate training. This has to do with their self-regulating behaviour and how they manage any increase in workload and relevant resources. They need to adjust to varying workloads in a process called job crafting and includes the process of asking for help when they need it at the appropriate times.

Demerouti's also suggests certain training assignments that include self-recognition, job crafting, recovery (the process of relaxation and psychological detachment), and work-family management (Demerouti, 2023). This framework is a possible guide to include as a training framework to support WFH and promote healthy, constructive communication between other team members and management. In the same fashion, managers should receive training that aligns with this framework but tailored specifically to their roles.

### **5.8.1.3 Challenges and broader context**

Generally, communication was framed positively and critical to project success. However, respondents stated that there are certain issues that needed to be avoided such as 'over-collaboration' which means that too many meetings are arranged, or too much time spent interfacing with other disciplines and not enough alone, uninterrupted time to work independently. Some respondents stated that in a WFO environment someone would walk into their office and have a quick chat for a few minutes, but when they worked remotely it became a 30-minute call.

Contrary to the above, while WFH can promote over-collaboration, increase the number of and length of meetings, respondents felt that they had more time to work independently without interruption while working from home. Urrila, Siiriäinen, Mäkelä and Kangas (2025) point out that working from home has introduced this balancing act between being isolated as an employee and working alongside others and needing to be managed. Improving the individual's remote working skills and virtual communication practices can support finding that balance between over- and under-collaboration and getting it just right.

## **5.8.2 Employee satisfaction**

Employee satisfaction was also ranked highly by the respondents, having a score just below communication, meaning that it was a large contributing factor that can affect an engineer's performance. While not all the respondents were aware of a design engineer resigning because they did not have a remote working option, they agreed that WFH promotes employee satisfaction.

When asked if engineers working remotely experience higher job satisfaction, Respondent 1 said that while it does create job satisfaction, those engineers do not see their designs or products being built, which also provides job satisfaction to engineers. So, while the flexibility of remote work may increase employee satisfaction, they should also get to site and see their designs being constructed to further increase their satisfaction.

Other respondents stated that the flexibility WFH provided more free time in terms of reduced commuting time, which had a big impact on satisfaction, while another stated that 'employee satisfaction drives company culture'. They stated that if the culture is forced onto employees and employees are unsatisfied, the culture 'becomes sour'. Respondent 4 went as far as to say that WFH can be seen as a perk that will increase employee satisfaction. Respondent 2 also stated that in their previous organisation remote work was taken away and it created '...a lot of unhappiness within the group and that may have contributed to people looking elsewhere [other organisations]'. They did however state that it might not be the case for all engineers, and some may have preferred to work from the office.

The flexibility enjoyed by engineers working from home also had its pitfalls, according to Respondent 3. The same flexibility that is seen as a perk can also lead to engineer's overwork and burnout as 'if you're flexible, people tend to put more in'. Respondent 3 stated that the workload and timelines need to be managed in a remote working environment as people may simply be given more work without capacity and it needs to be ensured the work completion is achievable. Respondent 3 advised that burnout will lead to poorer performance, and it is the responsibility of the manager to identify burnout. Burnout identification should also form part of the training managers get. This aligns with the literature review and research done in terms of burnout by Brummelhuis et al. (2011), Heinemann and Heinemann (2017), and Gabriel and Aguinis (2021).

Even though the respondents agreed that WFH improves employee job satisfaction, when asked if it can be used as a retention tool, the response was that it might be a retention tool, but engineers might not resign because of WFH being removed. It would also not be considered in isolation but would be a contributing factor and other issues would be considered with WFH, including the general working environment.

### **5.8.3 Organisational culture**

Culture ranked third and highly by the respondents, who advised that culture was an important factor for the organisation. Respondent 1 mentioned that culture is something that can be developed that creates outputs in an 'online' environment, referring to WFH. That respondent added that remote engineers working on projects, possibly international projects, still contribute to the organisation's culture.

Respondent 3 stated that ‘we mustn’t underestimate the culture of a business’, highlighting its importance to engineers. When asked if a team’s size impacts their ability to WFH, that respondent added that it comes down to the culture of the organisation. If the culture is aligned with and set up to support remote work, there are few obstacles that can hinder performance in a remote work environment.

Respondent 2 stated that culture ‘... drives everything underneath it’ and that if the culture is poor, it has a negative impact on the rest of the organisation. This aligns with Peter Drucker’s statement that culture eats strategy for breakfast (Tallman, Shenkar & Wu, 2021). This also is indicated in Figure 1.1 where leadership and culture are shown to have an impact on employee satisfaction.

Respondent 2 however also stated that employee satisfaction drives company culture, showing how culture and satisfaction are interlinked. It was noted that while there is a drive from senior leadership to implement the positive culture they desire, it relies on the engineers to be successful. They continued that if a culture was forced onto engineers who they did not agree with it, it would also impact satisfaction negatively.

Another factor that affects organisational culture is change management (Schein, 2004) and communication patterns (Bilderback & Kilpatrick, 2024). As discussed, communication was ranked the most critical factor impacting employee performance and aligns with culture, also ranked quite high. However, in the context of this study, change management was ranked very low by respondents, indicating that these factors are not considered equally important.

#### **5.8.4 Skills, training and development**

Skills, training and development ranked quite high, but the lowest of the top choices, albeit narrowly. However, there was a powerful indirect link to performance and the ability to work from home, and this factor was discussed at length by most respondents. It was a recurring theme aligned to junior, less experienced design engineers versus senior, more experienced design engineers.

The leading question was regarding whether the respondents trusted their teams to work from home, to which they responded that they trusted most of their teams, but some would not perform well on their own working remotely. In all instances it did not take long for respondents to point out that junior engineers need more oversight, leadership, and opportunities to be exposed to senior engineers. Junior engineers may not only lack the discipline to keep working without constant supervision, but *they do not know what they do not know* and would not know what questions to ask. This response from respondents is supported by the findings of Chadha and Heng (2024) that showed a tremendous increase in interactive learning strategies in the 2010 to 2020 period for skills development amongst engineers compared to previous periods.

Overwhelmingly the responses pointed out that junior engineers need to either work fully from the office or have a very limited remote working option that may only be for certain tasks and with direct managerial approval. They need to be exposed not only to engineers in their own disciplines, but to various levels of seniority from all disciplines to gain insights from all project aspects and learn to interface with those engineers. Knowledge transfer via diffusion (Liang, Guo & Shen, 2022; Xu & Xu, 2022) was ranked critical to the training and development of junior engineers. Some respondents also pointed out that those engineers needed support from other departments like HR or IT because they didn't yet understand all the processes of the organisation. This idea is supported by Gibbs, Mengel and Siemroth (2023) who found that employee tenure within an organisation impacts their output, with employees with longer tenure within the organisation having performed better. This means that not only is the support from a direct line manager or senior engineer needed, but also from other departments within the organisation.

On the other hand, it was pointed out that senior engineers need more uninterrupted time alone, and that the tasks that senior engineers need to perform include detailed work and calculations that are hampered by distractions. Respondent 2 stated that a day working remotely without interruptions by people going into their office allowed them not to be distracted, focus on what needed to be done including designs, and to catch up on emails and other tasks that they have fallen behind on.

The view that junior engineers need to be in the office in close contact with senior engineers, while those senior engineers need to be allowed more free time to work from home, was admitted to being self-contradictor by respondents. Respondent 4 said, '...there's no point in having people [junior engineers] here in the office if there's nobody to help and guide them or nobody to talk to and they have to phone everyone elsewhere'.

When asked if there was a way around that problem and if a system could be implemented to support junior engineers to WFO and seniors to WFH, some respondents made various suggestions. One such suggestion was that the more junior an engineer, the more they are at work, but as they gain experience they too will be afforded more opportunities to WFH. This will allow some senior engineers to WFH while others are in the office supporting junior engineers. Another suggestion was that not all the senior engineers need to be in the office at the same time, as long as there is someone with relevant experience that can guide the junior engineers. Some form of rotational or *shift* method of working was alluded to that could allow some senior engineers to WFH while others WFO, so not all of them need to be in the office at the same time. This would also allow for a greater exposure to more experience and different ways of working that will help develop junior engineers further.

It was mentioned that some of these challenges can also be overcome by ensuring that the senior engineer has the correct level of experience to manage juniors, and to have an intuition for when they will get stuck in certain situations. If a senior engineer is engaged enough, they will be able to pick up on issues and respond before the junior gets too lost. This will however differ from senior engineer to senior engineer and needs to be evaluated to see if it is practical and beneficial. This notion that knowledge can be effectively transferred while working remotely using strategic tools was supported by Dolo (2023). Another initiative explored by Mtshikana (2023) was for engineers to show their work to others, doing storytelling, lessons learnt sessions and other opportunities that can also be scheduled to be done via conference call. Respondent 5 specifically mentioned that in certain cases it is easier to have a conference call despite everyone being in the office as they can simply show the drawing (single line diagram in their example) and everyone can collaborate and even edit the drawing. They mentioned that in those cases it is more effective than having everyone in a boardroom.

Skills, training and development and the impact on junior engineers' performance in a WFH context was seen as a critical discussion point amongst all respondents and is a matter to consider when developing a remote working performance management strategy.

## **5.9 Team size and structure**

Some of the questions asked received similar responses and highlighted the importance of certain factors. Communication and junior engineers' office presence are two examples of factors that are considered critical to the success of WFH performance metrics. On the other hand, team size or reporting structure made little difference to their preference for WFH or WFO. In the context of team size, the conversation on whether team members could work remotely was again dominated by junior versus senior engineers and the number of team members made little difference. Similarly, reporting structures such as working on one project or working on multiple via a matrix structure (Elezaj, Morina, & Kuqi, 2020) also had little impact on engineering manager's preference for their teams. Team size and structure is therefore seen as having little impact to driving performance in the context of this study.

## **5.10 Chapter summary**

In this chapter the interviews, including the pilot interview, were discussed and the results from those interviews presented. The questions identified in prior chapters were answered, including what design engineers do, whether they can WFH, the difference between WFH and WFO in terms of large projects and performance management approaches, and whether a performance management framework can be created from the results.

The respondents provided information confirming that there is a shortage of design engineers in South Africa, design engineers may have higher mobility depending on certain

circumstances, and they ranked communication as the top factor affecting performance. Other factors also ranked high included training and development, especially for junior engineers, employee satisfaction, and organisational culture. One critical factor was the difference between WFH opportunities for junior and senior engineers, with junior engineers needing more contact time for knowledge transfer. Team structure and size had little impact on performance and WFH options.

The following chapter will include the discussion, contributions of the research, limitations of the study and conclusion.

## **6. GENERAL DISCUSSION AND CONCLUSIONS**

### **6.1 Chapter introduction**

In the previous chapter, the data from the semi-structured interviews with five respondents with approximately 120 year's combined experience was analysed. Design engineers' tasks, shortage of engineers in South Africa, mobility, trust, and retention policies were investigated. In this chapter the discussion, contributions to the research, limitations and conclusion will be presented.

### **6.2 Discussion**

The aim of this study was to answer three main questions, namely (1) what does a design engineer do; (2) how WFO and WFH differ in terms of working on large projects and their impact on the performance management approach; and (3) whether a performance management framework can be developed to support WFH.

The research results from the five interviews answered the first two questions and showed that there was strong correlation on themes including what design engineers do. Those tasks can be performed from home, but despite engineering managers preferring hybrid work, it is not always allowed by the executive leadership and HR of the organisation. Respondents also agreed that junior engineers should be in the office while senior engineers could be allowed to work remotely. The respondents advised that the work done in WFH versus WFO does not change, and that design engineers can be managed with the same KPIs regardless of the working policy.

Additionally, agreement was found in the fact that there is a dire shortage of design engineers, they have reasonably high mobility, and that WFH can be used as a retention tool, although it is not being used as such presently.

Despite the above, none of the respondents were able to advise on a specific performance management framework that could be developed to support WFH. The combined set of responses did however provide insight into the challenges faced and specific focus areas that impact performance management that will be elaborated in this chapter.

### **6.3 The factors impacting performance: the integrated retention strategy**

The various factors that were discussed and showed to be recurring themes with a high level of agreement from the respondents were employee satisfaction, talent retention, culture, skills, training and communication. Skills, training and communication will be discussed in the next

section as the interlinkages between these factors and an engineer's experience were specifically drawn by all respondents.

In terms of employee satisfaction, talent retention and culture, some links were made between these factors. Respondent 2 stated that culture drives everything but also said that employee satisfaction drives culture, showing how closely these factors can impact one another. WFH was also identified as a possible talent retention tool that improves employee satisfaction. The challenge identified from the interviews is that their organisations did not have a talent retention, culture building or employee satisfaction strategy. These three factors may need to be considered together to create those strategies.

The famous Benjamin Franklin quote, 'If you fail to plan, you are planning to fail' (Guest, 2023) seems to be relevant to the results of the interviews. The impact is that the lack of strategy leads to no plan being communicated to the engineers. This is evidenced by one respondent saying that if these strategies existed in the organisation, they were not aware of them.

Momeni and Nazemi's (2022) research into talent management in engineering specifically mentions that organisations can be seen to be more attractive by highlighting opportunities for career growth. A suggestion to make growth opportunities more visible is to show a deeper hierarchy with clear experience requirements needed to be promoted to the next level of seniority. This is supported by Bonet (2014) and Deligiannis (2019) who found that the structure of the hierarchy impacts promotion opportunities, with a deeper hierarchy leading to more opportunities and therefore possibly clearer growth opportunities within the organisation. Bonet also stated that training has a direct link to promotion supporting this notion of a deeper hierarchy. Additionally, Hurst, Lee and Frake (2024) found that a flatter hierarchy gives employees the perception that there are limited career opportunities, therefore it is important to not only have a deeper structure but also communicate how that structure supports career growth.

In addition to training, Momeni and Nazemi (2022) discuss how culture and values are important factors to make the organisation more attractive as well as the importance of a retention strategy that not only focuses on career development but also job satisfaction. This retention strategy needs to be driven by HR and needs to be aligned with the organisation's needs. From the above, there is a critical need to create an integrated talent retention strategy that focuses on all these elements.

#### **6.4 A better understanding of remote performance management of engineers**

The responses from the semi-structured interviews allowed for a better understanding of the challenges and strategies associated with managing engineers' performance remotely. Quite

simply, the respondents did not feel that there was a specific or adequate performance management strategy in place for their teams, let alone for remote work. KPIs were either not aligned with what was needed, were not SMART, or were too rigid by being set at the beginning of the year and did not change as the project's priorities changed. Respondents advised that there was no need for a separate set of KPIs for remote engineers as the outcomes would be the same, as long as there was a well-constructed set of SMART KPIs that supported the performance management strategy.

There seems to be much room for improvement and the opportunity to develop a strong performance management framework that includes a remote working environment. It needs to be more flexible in terms of setting KPIs to align with the immediate or short-term needs of a project which may be periodic or more ad hoc. Multi-directional communication, between the design engineer and the manager will be needed to identify when the project requirements have changed and the KPIs need to be aligned.

Communication was raised as a critical factor in managing remote engineers and ranked number one of all the factors. Training was identified as vital to improving communication for both managers and design engineers. That training should include utilising the available tools to their full potential, including cloud-based software platforms that can track progress and performance, set deadlines, and improve collaboration and learning.

In addition to communication and training, how those factors impact engineers with different levels of experience was raised as one of the most important factors in considering whether an engineer can work remotely. Unanimously, all respondents said that junior engineers need to be in the office and have as much contact with senior engineers as possible. The challenge was identified that junior engineers need to be exposed to seniors as much as possible, while senior engineers need opportunities not to be distracted to perform their tasks, often in a remote setting to allow them to focus on complicated calculations and designs.

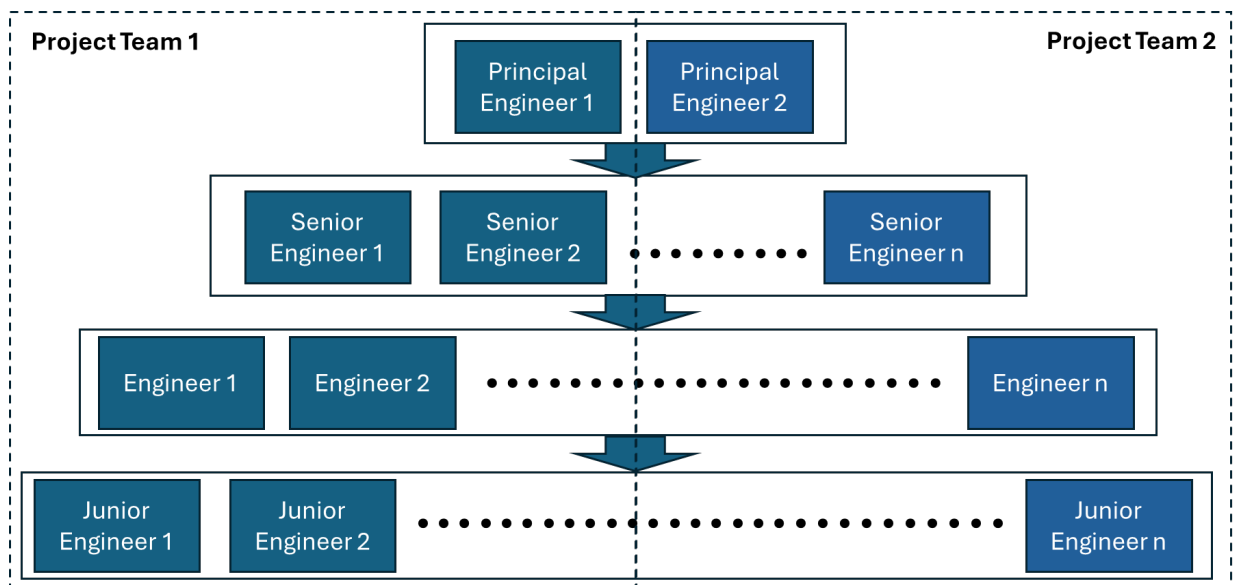
It was however mentioned that a framework can be developed where senior engineers and managers can split the responsibility of being available to junior engineers. Junior engineers need as much exposure as possible which can be optimised by rotating senior engineers. Therefore, the senior engineers will be in the office to support the junior engineers on a rotational basis, allowing the knowledge transfer burden to be shared as a workload.

Additionally, work done by Garicano (2000) and later Lombardi (2019) shows that there may be benefits in creating a deeper hierarchy to promote the correct level of knowledge transfer. This deeper hierarchy was discussed in the previous section and strengthens this suggestion to organisations. In the context of this study, pairing a graduate engineer with a senior engineer with more than 20 years of experience may be counterproductive as the junior

engineer has no exposure and may not understand the basic principles, let alone complex principles that a senior engineer will discuss. It will be far more beneficial to create a deeper hierarchy where engineers are trained by engineers one level their superior. In this context, junior engineers will work closely with an engineer (where the term engineer here is used as a level of promotion), a group of engineers will work closely with a senior engineer, and senior engineers will work with principal engineers. The deeper level of hierarchy is shown in

Figure 6.1 where it can be seen that a number of principal engineers will collectively be available to senior engineers in a structured manner, senior engineers be available to engineers, etc. This is despite the principal and senior engineers working on separate projects. This method of planned knowledge transfer not only promotes the rotation of more senior engineers, allowing them to focus on their own work in a remote working environment, but promotes the correct complexity of knowledge transfer that is appropriate for the receiving engineers.

The hierarchy created in this model also allows for the number of remote days each level of engineer is allowed to be set as a standard or organisational policy. For example, junior engineers may have zero remote days per week, engineers one day, senior engineers two days, ending with principal engineers being allowed three remote days each. This policy will however be subject to various considerations including the number of senior engineers available for rotation, or the flexibility of changing the number of remote working days allowed based on the stage of the project (beginning or end).



**Figure 6.1: Deeper hierarchy of engineers promoting effective knowledge transfer.**

## **6.5 Guidelines and recommendations for a remote performance management framework**

Based on the literature review and subsequent findings from the interviews, a framework can be developed to better manage remote engineers' performance, while allowing enough face-to-face interaction to junior engineers who promote knowledge transfer. This framework must also incorporate the other factors discussed including employee retention, employee satisfaction, culture, employee training and development, and critically, communication, as they all have an impact on design engineers' performance. This framework may not replace any of the existing performance management frameworks, but based on each organisation's needs, this can be used in conjunction with those frameworks to tailor a performance management strategy that supports the organisation.

Some of the models reviewed in the literature review are important to consider, including the Bath people and performance model (Purcell et al., 2003:7) that includes many of the factors discussed (including communication, albeit one-way communication from management to employees, job satisfaction, training and development and ability and skills), but excludes organisational culture, employee retention and specific details around team structures.

Mokalane's (2016:11) factors impacting employee and organisational performance also include many of the factors discussed, but just as the Bath people and performance model, also excludes culture and retention and team structures.

DeNisi and Pritchard's model of individual performance improvement (Gupta, 2010:38) can also be a useful tool when performance management is taken to the individual level, but is confined to the performance evaluation process that needs more inputs from what was uncovered in this study.

The framework below in Figure 6.2 shows the suggested key strategies, actions to implement as well as strategic outcomes from the initiatives, as developed from this study. The key strategies include a culture, employee satisfaction and talent retention strategy. These are in the same block to show that they are to be considered together and not in isolation.

From the key strategies the actions to implement are to offer training to engineers and managers, implement a deeper hierarchy, and an applicable and correct performance and evaluation process.

### **6.5.1 Training for engineers and managers**

The training will help engineers to host better and more productive meetings that do not waste time and resources. The training must also focus on the tools and software that

the organisation uses and to allow engineers and managers to better use those tools for collaboration, communication and evaluation. The training must have a clear focus on improving communication in the organisation on an ongoing basis and ultimately improve interorganisational trust, including trust between managers and engineers, with the aim of improving trust between executive leaders and engineers.

### **6.5.2 Deeper hierarchy structure**

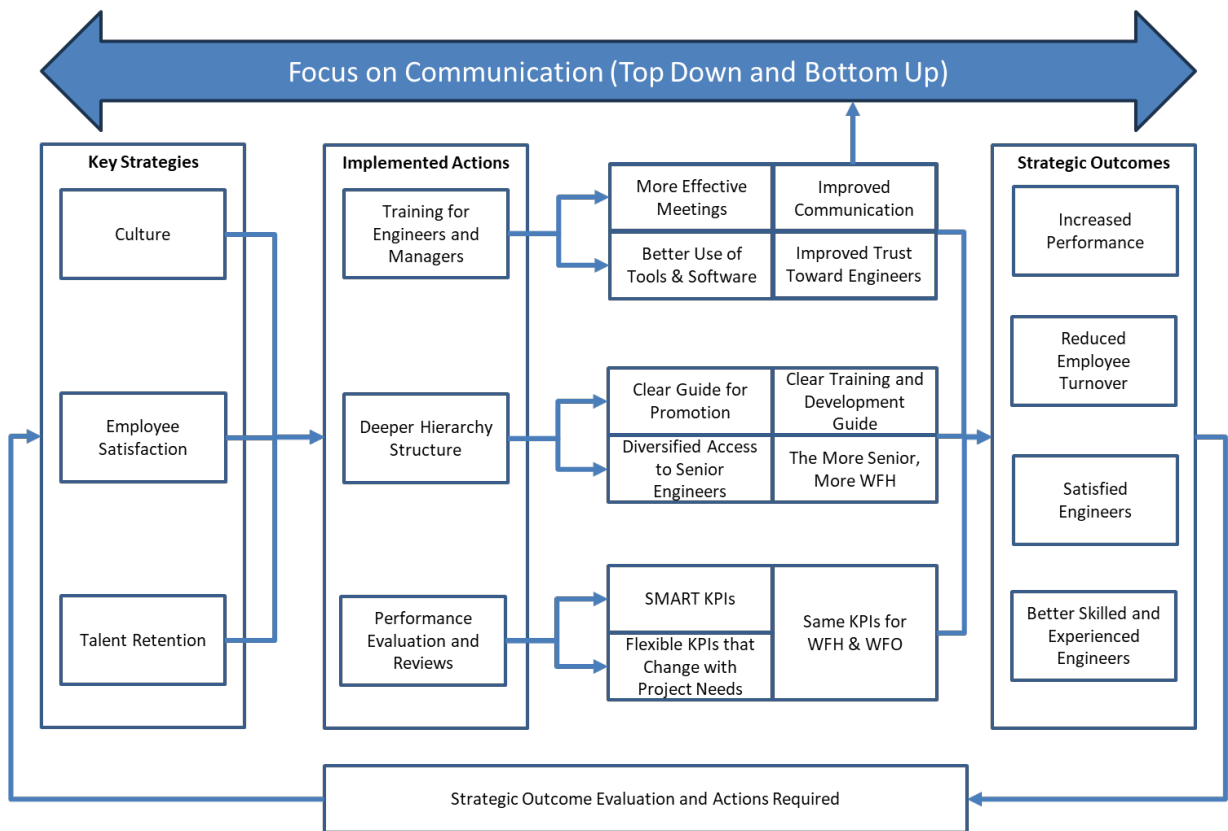
The deeper hierarchy structure creates a clear guide for engineers to which positions they can be promoted, as well as the training and experience requirements needed for those promotions. The deeper structure also provides access to a diverse range of senior engineers, including those from other disciplines, and provides a motivation for allowing certain levels of engineers to WFH with more junior engineers needing more time in a WFO environment.

### **6.5.3 Performance evaluation and reviews**

The performance evaluation and reviews will rely on SMART KPIs that change as the project scope or requirements change. This is to ensure that engineer's tasks are not misaligned with what is best for the project and the organisation. As recommended by the respondents, if the KPIs are implemented correctly they will be the same for WFH and WFO engineers.

The summation of the preceding key strategies with the implemented actions will lead to strategic outcomes. These outcomes are increased performance, reduced employee turnover, a higher employee satisfaction, and better skilled and experienced engineers. As can be seen in the strategic outcome evaluation and actions required block, the process does not simply end at the strategic outcomes. They need to be measured, and if not adequate, need to be addressed again in the key strategies. It might involve changing the key strategies over time to ensure the outcomes align with senior leadership and shareholder expectations. A method of measuring performance and employee turnover may be simpler than measuring employee satisfaction and skills and experience improvement, so those measurement techniques need to be defined in the strategy definition process.

During the entirety of the process, a key focus should be communication both from the top down and the bottom up. Training to communicate also falls within the framework, which will improve the communication even further. As the communication is top down and bottom up, training may need to be provided to the entire organisation including engineers, managers as well as executive leadership.



**Figure 6.2: Design engineer's performance management framework**

## 6.6 Theoretical and practical knowledge contributions of the study

In the literature review, the dearth of specific research pertaining performance management of remote working design engineers in South Africa was discussed. The research and findings in this study have brought some insights into what is needed to better manage remotely working engineers. The research aimed to contribute not only theoretically, but also practically by filling a gap in understanding remote performance management in engineering disciplines.

### 6.6.1 Theoretical contributions

The theoretical contributions that this study aimed to provide were to create a better understanding of performance managing engineers who were working remotely. In simple terms, if an engineer is building an oil, gas, solar plant, or working on any other large project, can they work remotely to a certain extent, and can they be managed to ensure that their performance matches what it would be if they were in the office? Performance management is a widely researched topic; however, studies focusing specifically on the performance management process of design engineers in the South African context was sparse at best.

Some recent studies have investigated how employee performance is impacted by organisation contextual factors and made recommendations to expand the research to include a wider set of factors that influence the performance appraisal process (Rusu, Avasilcăi and Huțu, 2016). Other studies have been done on non-focused populations and made recommendations to focus further studies on relevant organisations. These options were considered, but the generality that this study looked to provide in this context, with these challenges engineering managers have, makes this an attractive study. In doing this new research it has proven to be more useful rather than to expand on the previous work done by researchers like Gupta (2010).

Matli (2020) investigated the change in work landscape because of COVID-19 in the South African context, which provided some insights. However, the research was performed focusing on employees who were new to WFH and did not consider a longer term WFH situation whereby lower performance could lead to a return to the office. This also did not have an engineering focus. Understanding what managers' perceptions and expectations are now, years after COVID-19, is also an important contribution to this field of study.

The literature review touched on several factors that impact one another. The impact on employee satisfaction, culture, burnout, skills and training, trust, and talent retention were some of the factors identified and discussed in the interviews. Understanding how performance was measured, or in this case that it was not accurately being measured, and if that changed in a WFH policy, added tremendous insights. More so was the fact that there is a concerted view that junior engineers need to be in the office more than senior engineers. This is not an insight that was found in the literature review process. Therefore, this study contributed new insights into this important, but under-researched field.

### **6.6.2 Contributions to the research in terms of performance and WFH**

Performance management in general has enjoyed a lot of attention (Schleicher, Baumann, Sullivan, Levy, Hargrove & Barros-Rivera, 2018; Brown, et al., 2019; Maley, Dabić, Neher, Wuersch, Martin & Kiessling, 2024) and recently there has been a greater focus including a WFH model. However, the performance management models in the literature review such as the Bath people and performance model, and the service profit chain model were not created with a WFH or hybrid policy in mind. While they might be relevant, it has been a worthwhile exercise to consider this new dimension in modern working arrangements. As pointed out in reviewing DeNisi and Pritchard's model, other internal and external factors not considered will impact employee performance which include WFH, the competition for talent and engineers' mobility. The framework created in this study has added a much-needed WFH perspective for the engineering industry.

### **6.6.3 Adding a much-needed South African perspective**

While a lot of research has been done on the themes identified in the literature review, very few consider the unique challenges that are seen in South Africa. This study did not focus on socio-economic issues that are often unique to South Africans such as high unemployment rates, infrastructure deficits and deterioration, crime, corruption or racial segregation, but did present findings within the engineering sector in South Africa that are invaluable. This research opens the door for future research to include the unique issues that are faced in this country. Some insights provided by Matli (2020) may support this research, but that study focused on the impact of COVID-19 on the workplace, and although COVID-19 resulted in WFH policies in organisations that extended their WFH policies beyond the lockdowns, this research considers WFH in the post-COVID era.

### **6.6.4 Practical benefits to organisations: human resources and managers managing performance**

This study can benefit organisations in South Africa by allowing managers and HR to better understand the needs of their engineering talent and how to better manage their performance. This should be something that all employers strive for, as their alignment with what drives employee satisfaction, retention, culture and individual performance will have an impact on organisational performance and the ability to create shareholder value.

The combination of factors identified in the literature review, and later tested in the interviews, are key drivers of organisational success in increasingly competitive times. Many studies have been done and books written about these topics, but managers have been following principles and guidelines created by their human resources (HR) departments pre-COVID-19, with those policies not being adapted to suit the new era of WFH, according to the respondents. The identification of a need for critical strategies including fostering the right culture, driving employee satisfaction, and talent retention are important insights that HR departments and managers need to consider. HR practitioners may never fully understand the engineering process and how projects progress, but they can work hand in hand with engineering managers to create a working environment that fosters high performance.

HR needs to be the link between the executive leadership team and engineering managers, ensuring a total alignment in the organisation with top-down strategy being developed with bottom-up feedback considered. This will build a better trust relationship that can typically suffer because of hierarchical distance between leadership and lower-level engineers. HR also needs to drive communication practises in the organisation and find ways to identify when communication quality has reduced to the point that it negatively impacts projects and employee performance. This can be done by working closely with engineering managers,

using key metrics and KPIs reported on by the software and tools, ensuring training is ongoing and not a once-off exercise.

### **6.6.5 Benefits to employees**

While this study focused on the performance management of employees who will ultimately benefit the organisation and shareholders, it also underpinned the importance of employee satisfaction, development and growth opportunities and an organisational culture that supports employee retention. These are no longer just in favour of the organisation, but become mutually beneficial to the betterment of the organisation and engineers. The information from this study can inform organisations and empower them to make better decisions and create policies that align with employee wants and needs.

Through the various initiatives supporting engineers, including training that is more in tune with their needs, a better informed and flexible performance evaluation process tied to flexible, current and relevant KPIs, and a clear path and guideline to promotions, employees will feel more confident and comfortable in their roles. The enhanced communication will also help employees feel engaged and eliminate misinterpretations causing challenges and possibly reflecting negatively on their performance. Engineers will have the ability to better communicate about their workloads via the different online tools, and alert managers when they are unable to meet deadlines, thus reducing burnout. Additionally, a deeper hierarchy which allows more access to different senior engineers will upskill junior engineers more quickly, giving them even more confidence and job satisfaction.

### **6.6.6 Benefits to society at large**

The South African economy needs all the support that it can get, with a growth in gross domestic product under two percent in recent years, according to the World Bank (2025). Job creation can only be achieved by improving performance across all sectors, which means a performance improvement in as many organisations, and thus as many employees, as possible. The higher the employment rate, the more taxation revenues are contributed. Engineering organisations not only contribute tax revenue but also drive building and maintaining critical infrastructure that drives revenue.

Losses in revenue to organisations due to increased employee turnover is not in the interest of the South African economy, especially if top talent is lost to organisations abroad. Additionally, the findings from this study may open some organisations up to the possibilities of employing their own international talent free of WFO restrictions. Attracting international talent to South Africa will be of tremendous benefit to this country.

## 6.7 Research constraints, limitations, and future research

Research constraints included the limited time available to conduct the research as part of a coursework-based master's degree. The time available created some challenges which needed to be managed carefully to produce a quality study. Another challenge with a study within such a short time frame is that it has the potential to miss long-term trends and changes in the industry. This was noted in the discussion around the percentage of remote jobs compared to on-site jobs available in the LinkedIn search and that a change in the trend could not be observed. However, this study was not financially taxing, nor did it suffer from geographical constraints, due to the availability of teleconferencing technology.

One of the limitations of the research is the small sample, however, it did allow for partial thematic saturation to be obtained from the interviews. The scope of the study also focused on design engineers and not engineers in general, so a portion of the population of engineers is not considered in this study. The study focused on engineering in South Africa but did not include other socio-economic factors, different engineering organisations or differing specialisations such as consulting engineering, manufacturing, pharmaceutical, etc.

Recommendations for future research are to include the above-mentioned factors such as other engineers, other types of engineering organisations, consideration of socio-economic factors, as well as age and gender. The Human Sciences Research Council (Hannan, Parker, Roberts, Dunn & Gordon, 2025) stated that there has been a drive to promote women's participation in science, technology, engineering and mathematics (STEM) in South Africa. Future studies can support organisations to attract women in engineering by investigating women's needs in terms of WFH, the flexibility needed to support a family, and how that aligns with organisational expectations around performance.

One of the strongest suggestions was to allow for a deeper hierarchy to support knowledge transfer and career development. However, Mnyani (2016:4) found that large construction organisations have moved to a flatter hierarchy to reduce 'the number of "wasteful" layers'. Special care needs to be taken to not simply drive a deeper hierarchy that may complicate decision making and reduce autonomy and flexibility in decision making. Future studies should find the correct depth of hierarchy that supports a flexible working environment that allows organisations to compete while supporting career opportunities and knowledge transfer to junior engineers.

Additionally, this study provided insights into the fact that while engineering managers support WFH and hybrid models, the executive leadership and HR may not. The inclusion of interviews with executive leadership and HR will provide other insights that may support performance improvement of remote working engineers.

## 6.8 Conclusion

This study focused on performance management of remote working design engineers in South Africa. Ethical clearance was obtained and every best effort made to ensure all the work in this study was done in an ethical manner.

The literature review systematically looked at some of the better-known performance management models to identify key factors including employee satisfaction, talent retention, culture, skills, training and development, amongst others. Those factors were investigated further in the literature review to allow for guidance during the semi-structured interviews.

Interviews were held with five engineering managers with a combined experience of 126 years. They all defined the tasks design engineers perform daily and confirmed that many of those tasks can be completed in a remote working environment. The themes from the literature reviews were discussed and partial thematic saturation was obtained with a great overlap in responses to those factors. Critical factors that impact performance identified were firstly communication, followed by employee satisfaction, organisational culture and skills, training and development. The engineering managers stated that there should be no difference between how a WFH and WFO engineer is managed, but specifically pointed out that experience has a great impact on the ability of an engineer to WFH. Training and better and more flexible KPIs were also common themes.

A framework was created that allows HR and engineering managers to create strategies focusing on culture, employee satisfaction and talent retention. Those strategies can be actioned by tailored training for engineers and managers that support improved communication and use of tools and software. A deeper hierarchy was suggested that would allow for the creation of a clear promotional guide for engineers, further outlining their training and experience requirements to be promoted. This structure also supports knowledge transfer by promoting diversified access to senior engineers on a rotational basis. Lastly, performance evaluations need to be done off the back of SMART KPIs that are flexible and relevant to the phase the project is in. The combination of effective management of these factors supports the strategic outcomes of an organisation by increasing individual and organisational performance, reducing employee turnover, increasing employee satisfaction, and having a highly skilled workforce due to better training and knowledge transfer. Communication play a pivotal role in this framework and is an ongoing task that includes a feedback mechanism to gauge if the performance outcomes have been sufficient, or if the key strategies need to be realigned.

The theoretical and practical contributions of the research, limitations of the research and recommendations for future research were discussed in this chapter. The researcher is hopeful

that the findings of this research will not only support engineering managers, their employees and organisations, but also the South African economy at large.

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## APPENDIX A: Ethics Approval



### FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

On 17 September 2024, the Faculty of Engineering and the Built Environment Ethics Committee of the Cape Peninsula University of Technology granted ethics approval to **Mr Shaune Deon Boucher** student number 241411351 for research activities related to his research proposal at the Cape Peninsula University of Technology.

<b>Title of proposal</b>	Remote work and performance in the engineering industry in South Africa
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**Comments:**

Data collection permission is not required.

	8 October 2024
<b>Prof Veruscha Fester</b> Assistant Dean: Research, Technology, Innovation & Partnerships (RTIP) Faculty of Engineering and the Built Environment	<b>Date</b>

## APPENDIX B: Interview Guide

The first section of the interview guide is the scripted introduction for the respondents. Thereafter all questions in white cells are the questions included in the original guide, and all questions in grey cells are questions that were added to the guide as the interviews progressed based on the nature of a semi-structured interview approach.

<b>Questions:</b>
<b>Thank you for your time today. My Name is Shaune Bouwer with student number 241411351</b>
<b>This is an interview to obtain information for a master's research thesis for the Cape Peninsula University of Technology, titled</b>
<b>ANALYZING THE IMPACT OF REMOTE WORK ON PERFORMANCE OUTCOMES IN SOUTH AFRICA'S ENGINEERING INDUSTRY.</b>
<b>You consent to this interview, understand that ethical clearance was obtained for this research and all information will also be managed with the highest levels of ethical standards. You are aware that you can withdraw consent at any time?</b>
What type of company do you currently work for?
Do you now have engineers reporting to you?
How old are you?
How long have you worked in engineering?
How many years have you directly or indirectly led other engineers?
In this context, a design engineer may not necessarily have the word 'Design' in their title but perform some design work, review work or other design related.
What does a design engineer do? What are the main tasks when working on large complex projects?
Can those tasks theoretically be performed from home?
What is your preference for your engineers to work, WFH, WFO or hybrid and why?
So does that mean that more experienced engineers can work from home more.
What specific tools?
And in terms of direct performance management?
Does this get integrated into a companywide performance management model?
Does your company have a remote work option?
Exceptions, on certain permission
Will the organisation employ a fully remote worker only.
Some have an agreement to work remotely, but the majority may not.
Has there been times that remote work was allowed outside of COVID 19?
Who made that decision, EM, leadership, Exco?
Why was remote work ended? Did they give a good reason?
What was the reasoning for the remote work to be ended?
Was there a change management process?
Is there a lack of satisfaction as a result of this removal of remote work?
Did they have a hybrid after covid?

what were the reasons for stopping it?
Was performance mentioned in this change process?
Has performance management metrics changed?
Employee mobility is defined as the ability to easier move to other companies. So higher mobility means they can move easier than other types of employees.
Do you think design engineers have a high or low mobility compared to other employees?
Do you think that WFH will reduce engineer's mobility, intention to find another job with remote options, or that you have or may lose talent because of WFH policies?
Retention policy?
Is WFH a retention tool?
Are you aware of a design engineer that stated they want to resign or have resigned and stated that remote work options was a reason for the resignation?
Are you concerned about the shortage of engineers in SA and your employee turnover?
What steps are in place to retain talent?
Then looking at quality talent, what steps are there to keep them in the organisation?
Would you employ a quality engineer that states they will only work remotely?
If you have one and they want to start working remotely, will you also allow them?
Is HR a block on remote work?
Does the engineering manager have a say? How much of a say does the EM have?
Do you trust your engineers when they work from home?
All of them, some of them etc? Juniors vs seniors?
If the juniors are in the office, can the EM be at home?
Is that something that a framework can be developed to encourage leadership to allow more WFH?
Does the executive leadership of the organisation trust WFH?
What KPIs are specified for engineers?
Are the KPIs SMART? SMART criteria: Specific, Measurable, Achievable, Relevant, and Time-bound
Is that a focus area that need to be improved to allow WFH and prove performance to the organisation?
Subjective KPIs? How must an organisation support an EM's KPI feedback on subjective, not measurable KPIs?
Can you please rank the following?
Can you please elaborate on the below in the context of how it affects an engineer's performance or ability to perform well?
Employee Satisfaction
Skills, Ability, Training and Development
Performance Evaluations / Appraisals
Organisation Culture
Change Management
Communication
When comparing WFH and WFO in the context of a large project, what is the same and what is different?
When performance managing these engineers in WFH or WFO, what performance management differences are there for these similarities and differences?

Should there be a difference?
What performance management framework can be developed to aim to ensure employees are able to work remotely?
Is the difference in performance measured between remote and office-based engineers? If so, how accurately is that measurement?
Does a remote management framework exist for your organization and teams?
Does the organization have a change management process that was utilised when employees had to WFH?
Have you as a manager received training pertaining managing remote employees?
Do you believe you or others can benefit from training?
What type of training do you think is needed if any?
Do you believe that engineers working remotely experience higher job satisfaction?
Will WFH employees negatively impact WFO employee's performance?
If so, would they encourage and support better performance management and measurement tools to allow them to keep that option of flexible working.
Does the given option to work remotely change based on:
Team size
Organizational structure especially matrix with one engineer reporting to more than one manager on multiple projects?
Can there be a case of 'over-collaboration' for complex projects with multiple teams and disciplines?
Will WFH support that over collaboration?
What must be included in a performance management framework that will help companies allow remote working for engineers?
In broad terms, what can be done to improve performance of remote working engineers so that more companies will allow them to work from home?
Any last remark on anything that I may have overlooked?