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# The impact of remote working post COVID-19 in the construction industry of South Africa

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# The impact of remote working post COVID-19 in the construction industry of South Africa

## Applied Research Project Proposal

## Submitted by


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**An applied research project submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration**

**Johannesburg, [2023]**


**Protocol number: WBS/BA418496/328**

# DECLARATION

I, __**Ramano Victor Singo**_____, declare that this applied research project is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.



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Signed at …Midlands Estate……

On the …28th day of ……July… 2023

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# SUPPLEMENTARY INFORMATION

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# 1. INTRODUCTION

## 1.1. Context

This study investigates the impact of COVID-19 on the South African construction industry, focusing on remote working. It was identified that the COVID-19 pandemic crisis was an ideal case study for this study since it has wide-ranging impacts and implications for the construction industry of South Africa. This thesis examines the impact of remote working on the construction industry. Construction differs greatly from other industries in that most project participants must be on site. In light of this unforeseen situation, understanding how the construction industry handles it is crucial (Gamil, 2020).

Coronavirus Disease, COVID-19 had a catastrophic and long lasting economic impact on many industries in South Africa and the world at large (Ogunnusi et al., 2020). A global calamity, COVID-19, left all economic sectors paralysed, including construction. COVID-19, declared a pandemic in March 2020, has devastated world economies. The prevalence of the disease has grown exponentially since the first case was reported in January 2020. The first death occurred on 29th February 2020, leading to dramatic actions on the part of individuals and governments (Angelucci et al.,2020). During this time, stores and restaurants were closed, as were schools and non-essential businesses. The pandemic brought the world to a complete halt, with impacts extending to sectors such as construction (Alsharef et al., 2021).

One of South Africa's most crucial industries for economic development is construction. Although this sector is mostly unorganized and human-driven, many people work here. In 2017, Statistics South Africa reported that the construction industry contributed about 4% to the country's Gross Domestic Product (GDP) and provided more than 1.4 million jobs (Statistics South Africa, 2017). The construction industry faced multiple challenges due to the COVID-19 pandemic. During the COVID-19 pandemic, most construction sites were closed due to Coronavirus infection. (Dlamini,2012) points out that the construction industry contributes to economic growth in direct and indirect ways. Every country benefits from the construction sector's power to empower its economy and development.

## 1.2. Problem statement

In the context of COVID-19, Biswas et al, (2021) suggest that remote working may have been a viable option for the reopening some industries; however, it presents significant challenges in the construction sector. A significant impact has been experienced by the construction industry as a result of the COVID-19 outbreak. The pandemic could adversely affect both workers and employers in the construction industry. (Nnaji et al., 2022). In many industries that do not require manual labour (white collar) or physical presence to complete the task, remote working is quite common and easy to implement. Remote working is not easy to implement in the construction industry due to its dependency on physical presence to execute tasks.

The second issue is the adaptation of the construction industry (non-remote working) post COVID-19 to other supporting sectors (remote working). The construction sector heavily relies on many other sectors and functions, such as human resources, procurement, purchasing, communication, administration, contracting, legal, financing, and many others. The notable observation during the COVID-19 outbreak was that most of these supporting sectors could resume their operations using remote working platforms with ease. However, this was not the case in the construction sector.

The third and last issue is that the available literature on remote working post-COVID-19 tends to focus mainly on the future of remote working in white-collar (non-manual labour) sectors such as Banking, Information and Communication Technology (ICT), Finance, Education, and other sectors that aren't dependent on manual labour or physical presence for the successful completion of work. The literature suggests that remote working is quite popular and easier to implement in white collar industries than blue collar industries.

Only a few studies have examined fieldworkers' perceptions of safety and health practices and strategies in response to a pandemic in the construction industry (Alsharef et al., 2021). To mitigate COVID-19 risk effectively, there is a need to bridge this gap in knowledge, since employees’ perceptions of an organization's practices, rather than the actual effects of an organization's planned practices, directly influence their behaviour and performance (Jiang et al., 2017; Liao et al., 2009).

As most construction activities must be performed on site, the construction industry is vulnerable to COVID-19 (del Rio-Chanona et al., 2020). For the construction industry to meet these challenges, effective strategies must be developed and implemented. In the construction industry, research suggests that worker safety, health, and wellbeing should be prioritized during these challenging times (Ogunnusi et al., 2020; Alsharef et al., 2021; Assaad and El-Adaway, 2021).

Overall, COVID-19 has a significant impact on the construction industry in terms of (1) labour shortages, preventive quarantines, layoffs as a result of delayed or cancelled projects; (2) implementing new policies and practices in the workplace and on the project; (3) procurement and supply chain implications, such as restrictions and closures of international exchange markets; and (4) issues related to the application of force majeure clauses (Assaad and El-adaway, 2021).

## 1.3. Research Objectives

The objectives of this research are:

1. To compare remote working in the construction industry of South Africa post-COVID-19 with non-remote working prior to COVID-19.
2. To describe the factors emerging from the COVID-19 pandemic that have an impact on staff morale.
3. To assess the risks and chances of remote working in the construction industry.

## 1.4. Research Questions

This study will attempt to answer the following questions:

1. How has remote working impacted staff morale since COVID-19?
2. How has the working culture and organizational effectiveness been impacted by remote working?
3. What are the emerging advantages and disadvantages of remote working to the construction industry?

## 1.5. Significance of the study

In fact, construction plays a very important role in generating economic development and creating jobs both on a local and national scale (Igbal et al, 2021). The construction industry is estimated to employ 1.4 million people and contribute 3.9% to the South African economy, according to Statistics South Africa (2017). It is one of the few sectors that can provide employment in both the formal and informal sectors, it can assist the country in lowering its high unemployment rate (Dlamini, 2012). It is therefore one of the many sectors that South Africans cannot afford to lose or leave behind in terms of advancement. The construction industry will be better prepared to deal with remote working post COVID-19 as well as be able to adopt the necessary safety measures.

The purpose of this study is to examine the various aspects of pre and post COVID-19 effects worldwide using current knowledge and literature. In addition, data related to threats, social influences, scientific advances, moral dynamics, stress, and adaptation will be collected and presented. It is possible that other stakeholders in the industry will be able to determine whether risk management initiatives are appropriate for their companies based on the findings of this study.

## 1.6. Keywords

**Keywords:** Construction Industry, COVID-19, Coronavirus, Remote Working, White Collar, Blue Collar, Impact, South Africa.

# 2. LITERATURE REVIEW

## 2.1. Coronavirus (COVID-19)

### *2.1.1. Origin of the Coronavirus (COVID-19)*

Global health concerns were raised in December 2019 when an outbreak of untraceable cases of pneumonia broke out in Wuhan Province (Kumar et al., 2020). An outbreak of a novel Coronavirus, named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) or (2019-nCoV) has been reported in the Guangdong market province of China (Kumar et al. 2020). It spread throughout the world immediately after contracting COVID-19. According to Ciotti et al., (2020), World Health Organization (WHO) was informed that unfamiliar pneumonia cases were detected in Wuhan, China in December 2019 (WHO, 2020). WHO reported the first cases on 31 December 2019.

Approximately 200 countries have been infected with the virus since then (WHO, 2020). WHO declared a public health emergency of international concern on 30 January 2020 COVID-19 pandemic designation was announced on March 11, 2020 by the World Health Organization (WHO, 2020). The seafood and farmed wild animal markets in Wuhan were suspected to be the epicentre of the COVID-19 virus and the event was believed to have been caused by human-animal contact (WHO,2021). It was later discovered that there were additional new cases of the disease in December 2019, unrelated to the market in Huanan (Wuhan), which were never reported to the authorities (WHO,2021). This casts doubt over the COVID-19 virus origin in Wuhan.

The emergence of cases not associated with the Huanan market in December 2019 might be explained by transmission within the larger community (WHO, 2020). Possibly this was due to the presence of early cases not directly related to the Huanan market. According to (WHO, 2021) it is possible, however, that there were milder cases not yet been identified which related to the Huanan market. It is therefore impossible to definitively infer that the Huanan market played a role in the outbreak or that the infection entered the market at that time (WHO, 2021).

### *2.1.2. Global impact of COVID-19*

There has been a negative impact on the economy and the health of the public due to the COVID-19 outbreak. In the aftermath of Coronavirus, social, political, and economic disruptions have reached unprecedented levels (International Monetary Fund (IMF), 2020). According to Alsharef et al. (2021), the COVID-19 pandemic has caused many disruptions and hardships in different parts of the world. Income declines, unemployment increases, and disruptions to transportation, amenities, and industry are some of the major effects of pandemic disease extenuation (Mishra et al. 2020).

***Health Impact***

Several deaths and economic meltdown effects have been recorded in the international community as a result of the pandemic. Perkins et al., 2020 cited that SARS-CoV-2 and COVID-19 caused thousands of deaths worldwide. According to WHO, over six (6) million and eight hundred thousand people have died as a result of the virus, destroying national economies and causing the global economy to contract, resulting in devastating consequences for the poor of developing nations (International Monetary Fund,2020).

According to WHO reports, the epidemic had spread to almost 213 countries and had a significant impact on their economies as well as their health systems. In order to prevent this disease from spreading, many countries have imposed lockdowns on their facilities, amenities, educational institutions, industrial sectors, and everyday marketplaces (Mishra et al. 2020). COVID-19 has an impact that cannot be solely measured in economic terms. There was a high rise in infectious mortality and deaths across the United States and European countries, as well as in North China, Brazil, Mexico, Africa, and other Southern countries (Shang et al, 2021).

***Social and Political impact***

According to Shang et al., (2021), there are social and political impacts of pandemics, such as clashes between nations, population displacement, and increased societal tension. Several pre-modern pandemics impacted demographics, morals, and social and political life. The pandemic became a global threat and caused panic among mankind (Mishra et al. 2020). Moreover, it was recognized as one of the major causes of social disparity and insufficiency of progress, as well as an existential threat to the world (Mishra et al., 2020).

According to Donthu et al., (2020), several countries closed their borders, and confined citizens to quarantine at home for weeks. In a society where freedom of movement is the norm, this is rather unusual. As a result of the pandemic outbreak, people have been fined for going outside despite the risk of getting sick. Despite our societies' acceptance of these limitations and condemnation of those who do not follow the rules, we should ask ourselves how these limitations will impact the views of society in terms of freedom, healthcare and government's involvement (Donthu et al.,2020).

Due to the pandemic, people throughout the world have experienced a significant impact on their social lives (Mishra et al. 2020). Lockdowns imposed by the government have limited people's freedom of movements, except for those engaged in essential activities such as police, health, fire, army, pharmacies, supermarkets, and transportation, as well as informal food trading. Apart from those seeking medical attention, shopping for groceries, and purchasing medicines from pharmacies, everyone else is required to stay indoors (Sekyere ,2020).

***Economic Impact***

In substantial economic aspects, lockdowns have impacted Gross Domestic Product (GDP) of each nation (Mishra et al. 2020). The decline in the GDP of some Asian, European and South American countries during the pandemic has contributed to COVID-19's catastrophic effects (Mishra et al., 2020). The global economy is estimated to have contracted by 4.5% in 2020, with an estimated global loss of about $3.94 trillion dollars (Szmigiera, 2021). The exchange rates depreciated and supply shortages occurred, human costs rose and daily expenditures increased (Mbunge, 2020).

China's industrial value added declined by 13.5% in the first two months of 2020 as a result of the lockdown effect and the limited economic activity of world-leading manufacturers (Statistics, C, 2020). The pandemic, according to Harari (2020), may take years to recover, and it is imperative to implement effective strategies immediately to avoid the travail of humanity. There was no doubt that many companies around the globe faced unprecedented challenges during COVID-19. As a result, companies have implemented crisis management plans and implemented flexible work conditions in order to protect their employees in the event of unforeseen events (Boland et al, 2020).

***Technological impact***

Many aspects of our lives have been radically transformed by the arrival of COVID-19 pandemic and this includes technological transformations. Adapting to remain competitive and survive often requires proactive steps by societies. In particular, the Industrial Revolution fundamentally changed societies and economies by altering ways of working, living, and establishing a work-life balance (WLB). Work practices, relationships among employees, firms and localities, and work-life balance are similarly being affected by the Coronavirus disease pandemic (Vyas, 2022).

Technology adoption has been the most visible change in the labour market in the post-pandemic era (Vyas, 2022). There is evidence that digital technology was adopted by organizations before the pandemic, and that adoption accelerated during the pandemic. A more digital society has therefore emerged as a result of the pandemic or, to be precise, the real world is slowly disappearing and fast-paced technology is replacing it rapidly. For companies of all sizes to survive, digital transformation has become imperative, and a technology infrastructure adequate for the future is crucial.

### *2.1.3. Local impact of COVID-19.*

Several aspects of South African society have been affected by the COVID-19 epidemic, including social, economic, health, environmental, and technological aspects thereof. Following the pronouncement of COVID-19 as the global pandemic by WHO, the governments of a number of countries closed their borders and suspended social and commercial activities almost instantly to prevent the spread of the virus. Initially, the South African government underestimated the severity of COVID-19, resulting in delayed action. South Africa enacted a level five national lockdown protocol that took effect at midnight on 26 March 2020 (Amoah et al. 2021).

To mitigate the effects of COVID-19, South African authorities implemented physical distancing, self-isolation, closures of non-essential services, travel restrictions, and recursive national lockdowns (Mbunge, 2020). COVID-19 pandemic forced the South African government to temporarily close schools and universities. During this time, teaching and learning were suspended, impacting the academic calendar, reducing economic opportunities, and potentially increasing teenage marriages (Mbunge, 2020).

### *Health Impact*

A pandemic added to existing problems in the South African health system (Mbunge, 2020). There was an acute shortage of personal protective equipment (PPE) for frontline healthcare professionals as a result of disruptions in the global supply chain of medical equipment. A lack of health facilities, personal protective equipment, and self-isolation centres led to an increase in the number of healthcare workers infected with COVID-19. COVID-19 infections were highly prevalent in healthcare workers (Mbunge,2020).

Infection increased demand for intensive care beds and ventilators. Keeping hands clean, staying hydrated, staying indoors, avoiding handshakes, and practicing proper hygiene were recommended to prevent the spread of the virus (Sekyere et al, 2020). South Africans practiced all to the best of their abilities. In health and the environment, however, greater challenges were beyond the control of individuals. A first problem is inadequate sanitation and water infrastructure in some communities. Due to water shortages, many South African communities lack clean water. Poor sanitation facilities are also prevalent in many townships (Sekyere et al, 2020).

### *Social and Political impact*

According to Mbunge, (2020), South Africa experienced severe social and economic crises due to closed borders, global declining demand, supply disruptions, depreciating currencies, commodity and share prices plummeted, cancelled flights, and decreased human and industrial activities. Due to the inability to ship goods into and out of South Africa, the manufacturing and production industries were severely impacted. Consequently, business operations in South Africa have declined sharply. In response to the government-mandated lockdown, only essential service workers have been able to move around except for police, health, fire, army, pharmacies, supermarkets, traffic, and informal food traders (Sekyere et al., 2021).

Everyone was quarantined, with the exception of those needing medical attention, buying groceries at supermarkets, and getting medications at pharmacies. Additionally, the number of people inside these outlets should not exceed 50 at any given time. All mass gatherings such as, churches, schools, universities and social-cultural activities have been suspended due to the social distance policy. In order to accommodate the homeless, temporary shelters have been set up in a spaced-out manner (Sekyere et al., 2021). The

violence against children and gender-based violence in South Africa are serious issues. It has been reported by Sekyere et al., (2021) that 8,700 Gender Based Violence (GBV) cases have occurred between 26 March and 03 April 2020.

***Economic Impact.***

Due to the Coronavirus response measures, the already in recession South African economy was under tremendous pressure. In the wake of the crisis, the Reserve Bank of South Africa reduced its prime interest rate by 275 basis points (www.resbank.co.za). The result was a reduction in the short-term interest rate so that debtors, whether individuals or corporations, could manage their debt more affordably. In order to accommodate households and firms during and immediately after the lockdown, banks and other financial institutions offered three-month payment holidays. It was suggested by other financial institutions that consumers might be able to cover loans with their credit life insurance policies (Sekyere et al, 2020).

As a result of the global economic crisis, Moody's downgraded South Africa's sovereign credit rating to junk status (Ba1 with a negative outlook) at a time when many considered it insensitive (Sekyere et al, 2020). Consequently, South Africa was removed from the Global Bond Index and its borrowing costs increased on international financial markets as a result. This resulted in a high depreciation of the South African Rand (ZAR), for example, from R15 to USD$1 to R18.59 to the dollar, as a result. Post-COVID-19, South Africa's ability to recover from this dire economic situation will be challenging and depends on the global economy's recovery as well (Sekyere et al, 2020).

***Technological Impact***

The use of technology has made it possible for people to work from home during COVID-19. It has enabled churches and artists to livestream their services and performances. In addition, it has enabled schools to confer academic degrees and conduct lessons remotely. Through these practices, people have been prevented from congregating and spreading the disease (Sekyere et al., 2021). Cortez, (2020) notes that videoconferencing facilities and remote collaboration tools are becoming increasingly important for companies to continuously improve their remote-working processes for business and education.

Several organizations have adopted a variety of strategies to ensure the safety of their employees and to ensure their survival. The "Work-From-Home (WFH)" concept was developed by several organizations to allow their employees to run their business remotely (Gamil and Alhagar, 2020). There were, however, various issues that make implementing strategic measures difficult in developing countries like South Africa. Some of the challenges included lack of compliance, ignorance, and inadequate PPE (Amoah and Simpeh, 2021). In order to offer possible directions for future events, it is imperative to understand how organizations within this industry have responded to the pandemic.

## 2.2. Remote working

### *2.2.1. Origins*

Remote working is a practice that was previously considered a privilege of certain employees, or even a luxury, and therefore was not widely adopted (Vyas, 2022). It has become increasingly popular since the introduction of the latest Information and Communications Technology (ICT) (Soga et al, 2022). It is true that remote work is not a novel concept. However, it is a re-emerging phenomenon that is quickly becoming a preferred method of working throughout the globe (Rupietta & Beckmann, 2018).

Remote working was unexpectedly accelerated by the COVID 19 pandemic since March 2020. As a result, workplace practices have been reconsidered on a global scale on an unimaginable scale (Vyas, 2022). As a result, remote working became a viable solution to keep institutions and businesses functioning. There has been rapid and widespread experimentation with flexible work arrangements. In addition, there has been a shift in contact with centralized workplaces that has been triggered by the Coronavirus pandemic. After the pandemic, these approaches will likely extend to how work is organized in the post-pandemic period (Vyas, 2022).

### *2.2.2. Remote work within the construction industry*

Due to Coronavirus' need to adapt quickly to new conditions, remote working has become more popular in recent years. Using the system companies can accommodate stay-at-home orders and create a safer working environment for their employees (Overturff, 2021).

Working remotely can have benefits for employees and their organizations, but it is also challenging. For businesses to remain competitive and maintain employee productivity, they must adapt to rapidly changing conditions. As a result, remote work procedures have increased dramatically (Overturff, 2021).

It was crucial to resume construction safely. For subsequent lockdowns, future waves, and even future pandemics, a flexible approach would be needed (Stiles et al, 2021). The transition to new ways of working has halted or changed construction practices, and projects have been paused. There have been several site changes, including social distancing, better hygiene and PPE measures, and increased use of home work for non-frontline roles (Stiles et al, 2021). The likelihood of remote work becoming a common practice depends heavily on whether the work needs no physical presence (Lund et al., 2020).

There are many professions that require in-person participation, such as agriculture, tourism, or hotel services, where remote working is not feasible. According to Donthu et al., (2020), there are a number of situations and consequences that deserve further analysis, including how remote working could be adapted to industries such as the construction industry. Pickford (2020) states that construction sector uncertainty has increased due to the severe pandemic.

### *2.2.3. Impact of remote working on performance, culture and wellness*

Among the many ways COVID-19 revolutionized the workplace, remote work was perhaps the biggest. The option of working from home remains popular. Although the pandemic threat is no longer a concern, employers are unclear about how they will respond. As Hardill & Green (2003) argue, employees may feel isolated and negatively impacted by remote working if they lack face-to-face interaction with colleagues, social interaction, and limited or no opportunities for face-to-face interaction with role models, supervisors, and others they respect and trust.

According to Wright, (2019), large corporations have implemented large-scale remote work initiatives only to dissolve them, claiming that office-based collaboration and communications are superior. Remote working must be considered in organizational ethics. Sullivan (2012) states that this may violate the rights of employees in regards to the

perception of a fair number of working hours being provided, their availability, and balancing work and family responsibilities. Employees may be exploited by the 'privilege' of working at their own pace and commute savings (Donnelly & Johns, 2020).

In the event of increased commitment and workload, remote employees may feel exhausted and burnout may occur. Work-life boundaries are blurring due to an "always on" culture (Hunter, 2019); Smith, 2020). The pandemic sparked discussions and research on remote work. Remote work benefits include cost savings, improved talent acquisition, gender equality, and reduced employee turnover (Anz et al., 2019). Bloom et al (2015) found remote workers are more productive than office workers in a Chinese travel booking company.

## 2.3. Construction Industry

It is widely acknowledged that the construction industry plays a crucial role in the economic health of any nation. There is typically an increase in construction activities during a healthy economy, while in a depressed economy, there is a higher likelihood of project abandonment (Ayodele et al., 2011). It is essential to recognize that the construction sector is one of the most powerful drivers of economic growth and development in any country. There are billions of job opportunities in the construction industry globally, including jobs for inexperienced and experienced workers (Iqbal et al., 2021).

The construction industry is a key component of the global economy. International Labour Organization (ILO) estimates that the construction industry accounts for 10% of worldwide GDP, 7% of employment, and 10% of global GDP (ILO, 2015). In terms of socio-economic development, the industry is one of the key determinants of development, which has an impact on both developed and emerging countries (Aigbavboa et al., 2021). According to Statistics South Africa, the construction industry employs approximately 1.4 million people and generates 3.9% of the country's Gross Domestic Product.

The construction industry is also primarily a male occupation, with 98% of the workers being male (Catalyst, 2013). While the sector is an integral part of national development in nearly every country (including South Africa), it has received considerable criticism because of the difficulties it faces (Aigbavboa et al., 2021). The industry has been plagued by poor management and a lack of innovation over time (Agarwal et al., 2016). While

construction has been adversely impacted by COVID, it is critical to the economy following the outbreak.

### *2.3.1. COVID-19 impact to the construction industry*

Construction, among other diverse industries, has been impacted in a number of ways, including airlines, retail, restaurants, manufacturing, and the construction market itself (Alsharef et al., 2021). A decrease in economic growth has been attributed to COVID-19, especially in the construction sector (Ogunnusi et al., 2020). There has been a reduction in investment because of the pandemic crisis, which has decreased economic growth, increased unemployment, disrupted supply chains, and led to a reduction in employment (Bsisu, 2020).

In the short-term, the pandemic caused retrenchment among organizations, construction workers, and freelancers. The pandemic, from these contrasting viewpoints, has adversely impacted the South African Construction Industry (SACI) in the short-term, resulting in job losses. Some organizations may consider a remote working policy as a permanent solution (Philipps, 2020). South African construction companies can use this opportunity to embrace technological advancement as a tool to encourage remote working (Aghimien et al., 2020).

Two (2) meters of social separation between citizens was required to control the spread of the disease. Construction presents a massive challenge since workers are often close to each other, particularly in trench boxes for drainage works (Laskar, 2021). In COVID-19, the construction industry is experiencing a critical crisis that presents an unprecedented opportunity to resolve its critical problems. The construction sector stakeholders, such as developers, contractors, and owners, are currently facing a global crisis due to COVID-19 (Ogunnusi et al., 2020). Globally, stakeholders have been forced to focus on long-term and short-term strategies that can alleviate COVID-19's severe situation. As a consequence of the COVID-19 crisis, construction companies adopted long-term strategic goals and developed best safety practices (Afkhamiaghd and Elwakil, 2020).

### *2.3.2. Future of construction industry*

In the aftermath of the COVID-19 outbreak and the ensuing lockdown period, both the construction industry and its organizations are now under pressure to innovate and implement management initiatives that will ensure their long-term survival (Aigbavboa et al., 2021). Brick-and-mortar construction methods continue to dominate the construction industry due to slow adoption of technology. In spite of this, the sector is very significant to the GDP of the country as well as to the creation of jobs in the country (Aigbavboa et al, 2021). Gumble (2020) emphasized the fact that once the pandemic is over, society and construction industry will be different.

The construction activities will become more integrated into the virtual environment as a result of the adaptation of these technological tools. A similar statement was also made by Kale (2020) stating that there are likely to be many office-based construction roles that can be performed from home, and that such flexibility is likely to have been proven to be viable at this point. It was imperative for construction practitioners to show how they were capable of working safely and preventing COVID-19 to be able to support workers and their families during this crisis. Iqbal et al., (2021) indicated that globally, the construction industry employs more than 7.5 million people, according to the Bureau of Labor Statistics.

## 2.4. Summary

Specifically, the literature review has examined how the COVID-19 pandemic has impacted the economy and the construction industry, tracing its origins and the general impact. Remote working has been examined as an alternative work method before and after COVID-19 based on the opportunities it offers. This chapter examined how COVID-19 disrupted the business ecosystem and altered business models by illustrating that crisis situations present both opportunities and challenges. It was not linear that the pandemic impacted businesses, with some sectors and industries benefiting and others suffering negative impacts.

The COVID-19 pandemic has therefore forced organizations and offices to adjust their operations, according to Boland et al., (2020). COVID-19 presented unprecedented challenges to many companies around the world, and many have responded with pre-

designed crisis management plans and created new conditions to ensure workers were protected (Boland et al., 2020).

## 2.5. Delimitations and assumptions

The following are some of the delimitations and assumptions that this study has taken into consideration for this study to be a success:

### *2.5.1. Delimitations:*

- This study was borne out of curiosity by the researcher, so the objective was to evaluate how remote working would be incorporated into the construction industry post-COVID-19.
- South Africa's construction industry was the focus of this study. Having a limited number of participants based on their geographic location might compromise the external validity and generalizability of the study.
- The study also took place in an environment that was rapidly changing. As a result, reliability was at risk since the answers of participants might be influenced. It is possible that participants' answers could have been different if the study had been conducted during the hard lockdown period between March and September 2020, when stay-at-home orders were first issued and remote work procedures were first implemented.
- This research study avoided the inclusion of construction industry general workers due to practicality and stringent requirements of visiting construction sites for interviews as well as the limited time and tools required to collect and processing data.

### *2.5.2. Limitations:*

- A limitation of this study is the lack of available data regarding the construction sector, especially in countries with undocumented economies and unregulated sectors.

- Limited publications - there is very little information available about remote working in blue collar industries, in particular, when it comes to the construction industry, which is one of the biggest sectors in South Africa.

- The available literatures on remote working post-COVID-19 tend to put more focus on the future of remote working in the white collar industry (non-manual labour). This study aims to provide a valuable contribution to the field.

- Limited to region of interest - the research study was limited to the construction industry of South Africa and therefore some of the general views and information gathered from the limited available literature on this topic might not be applicable to the South African context.

### *2.5.3. Assumptions:*

- One of the assumptions made in this study was that the views gathered from the sampled population will be truly representative of the South African construction industry professionals.
- It was assumed that the survey reached out to heterogeneous group of construction employees, encompassing diverse levels, positions, genders, races, ages, experiences, and company sizes within the South African construction sector

# 3. RESEARCH METHODOLOGY

## 3.1. Introduction

The objective of this research was to assess the impact of remote working to the South African construction industry following the COVID-19 pandemic era. According to Gartner, 2020, remote working was introduced to the construction industries to explore new ways to carry out work under circumstances where remote working is essential (Gartner, 2020). This research will assess how COVID-19 impacted the workplace and identify possible drivers that will enable researchers to study, analyse, and monitor the future (Ancillo et al., 2021). The impact of changing work environment as a result of pandemics, like COVID-19, are of particular interest.

The purpose of research can be explored using different research techniques. To achieve the study objectives, the existing study was presented in an exploratory direction, as there was no clear Covid-19 situation (Igbal et al., 2021). This study was based on exploratory findings in which the data is presented to visualize the impact of remote working in the construction industry. Studies based on expert opinions are often used as part of the research process, such as those conducted by Iqbal et al., 2021b; 2021c, which used the quantitative technique in order to identify barriers and strategies towards energy efficiency technologies. In Hussain et al., (2019) article, they describe how imperative it is to adopt the right research methodology to classify the most relevant findings for the study.

Quantitative approaches are often suggested by researchers in order to evaluate the results of research studies (Iqbal et al., 2021). This study was designed to collect and analyse data using quantitative method. The online survey questionnaire was created using a google form, shared on professional platforms such as LinkedIn and construction professionals' forums, as well as direct emails sent to the key players in the built environment. Descriptive (open ended questions) to gather data about the level of impact experienced by construction industry professionals caused by remote working to the construction industry post COVID-19 era.

## 3.2. Population and Sample

A variety of professionals in the construction industry of South Africa including Architects, Project Managers, Construction Managers, Engineers, Quantity Surveyors, General Contractors, Safety Managers, Quality Managers and others were requested to participate in the survey. Data were collected using the Likert five-point scale by assessing working conditions before and after COVID-19 in the South African construction industry. The survey was circulated among an indeterminate population of participants through the university platform, industry platforms and various social media platforms, such as LinkedIn and other similar sites.

The survey targeted a heterogeneous group of construction employees, encompassing diverse levels, positions, genders, races, ages, experiences, and company sizes within the South African construction sector. In addition, the convenience and identity protection for participants were important factors when dealing with busy professionals and therefore the survey was distributed online for respondents to respond at their own convenience. The survey was completely voluntarily and the identity of each participant was kept anonymous throughout the process.

Welman et al. (2005) suggest sampling the target population in order to select those who can be used, since it is impossible to use everyone in the target population. This study was designed to target construction professionals, including construction managers, project managers, quantity surveyors, construction managers, health and safety professionals, and owners of construction companies working on construction sites or employing employees on construction sites in South Africa. For a study to be successful, it is critical to identify those who are qualified to contribute knowledge to the study.

Blumberg et al. (2008) emphasize the importance of identifying those who are capable of contributing to the study. Over 200 participants were expected to take part in the study, which would equate to at least 150 participants if a response rate of 75% was achieved. After disseminating the survey, 100 respondents responded. In this study, 95 participants completed a minimum of 80% of the questions and were deemed eligible to participate.

## 3.3. Data Collection

This research study which will measure the demographics, the experiences of the fellow professionals as the morale of those personnel that are involved in the in the construction industry of South Africa. The primary data will be collected using a well-distributed, broad-based online questionnaire survey that were distributed and completed at the convenience of the participants. In this study, construction practitioners were asked to assess the level of impact using a five-point Likert scale to gather quantitative data. The ultimate goal was to involve more than 200 participants in the study using various platforms such as LinkedIn and other social sites. Respondents were selected on the basis of their direct involvement in delivering construction projects and their importance within the construction industry of South Africa.

## 3.4. Data Analysis

There are research (open-ended) questions that need to be answered by gathering and analysing data from the relevant stakeholders. Literature review helped to explore the experiences from individuals who worked remotely to identify what factors might impact them positively or negatively. The Likert scale survey will be utilized to determine if these experiences also apply to employees in the construction industry. The study will conduct regression analysis in order to determine the relationship between a number of variables. The correlation will be shown between a dependent variable and any number of independent variables as well as any other factors that may impact the dependent variable.

The study will analyse the responses of the participants to open ended questions using data analysis software to derive different themes. There are three (3) open-ended questions in section 4 of the questionnaire that require participants to share their experiences. In the open questions, we will investigate the factors that emerged from the COVID-19 pandemic that have an impact staff morale; the challenges associated with remote working in the construction industry environment and the risks associated with remote working in the workplace.

Researchers typically analyse data to make inferences about a population from a sample of individuals. Statistic hypothesis tests are generally intended to determine the typicality or a-typicality of a sample in comparison to a population (Emmert-Streib, F., & Dehmer, M.

(2019)). An individual reading scientific or expert journals, as well as a researcher, should understand the basic concepts of the testing procedure in order to make accurate judgments and opinions about the results presented (Iqbal et al., 2021b; 2021c). Based on literature suggestions and exploratory research results, two testable hypotheses were developed. It is hypothesized that COVID-19 could have a significant impact on the adoption of remote working in the construction industry of South Africa.

### *3.4.1. Hypotheses testing*

One of the main objectives of this research study is to assess the impact of changing working conditions due to COVID-19 in relation to the performance of the construction sector. This study aims to answer whether the introduction of remote working to the construction industry brought about any changes (positive or negative) to the construction industry performance. The theoretical base achieved from the reviewed literature and understanding of the remote working concepts so far contributed to the proposal of the following hypothesis to assist in testing the above objective:

- $H_1$: COVID-19 will increase the usage of remote working methodologies in the construction industry of South Africa.

By comparing the participants' performance under both pre-COVID-19 and post-COVID-19 conditions, the researcher can determine its impact in the working practices in the construction industry. In this instance, the subjects are the participants, who are subjected to different conditions, such as the pre-COVID and post-COVID times. Based on the study design, paired samples t-tests are the appropriate statistical test for the first objective.

Two of the three research questions for this study were about assessing how remote working has impacted the employees' wellness and the organizational culture. The study aims to assess and compare the employee's perceptions about their performance during pre-pandemic working conditions with the post-pandemic conditions and derive the perceived impact. The theoretical base achieved from the reviewed literature and understanding of the remote working concepts contributed to the proposal of the following second hypothesis to assist in testing the above objective

- $H_2$: Remote working will improve the employee wellness and organizational culture in the construction industry of South Africa.

By comparing the participants' perceived views about their wellbeing under both pre-COVID-19 and post-COVID-19 conditions, the researcher can determine the impact of remote working practices in the construction industry. In this instance, the subjects are the participants, who are subjected to different conditions, such as the pre-COVID and post-COVID times. Based on the study design, paired samples t-tests are the appropriate statistical test for the first objective.

## 3.5. Instrument

This study will use questionnaire as the instrument for data collection because questionnaires allow social scientists to be objective and quantifiable in their research in social science research. In social research, questionnaires are one of the most widely used techniques, according to Blaxter et al. (2001). A questionnaire survey is also a methodical way of collecting data based on a sample, according to Tan (2011). There is no learning curve involved and a wide range of participants can be surveyed using it. The secondary data collected through previous research literatures reviews on remote working and COVID-19, will be used as secondary data used as basis for the design of the survey procedure for this study.

A survey questionnaire was structured into four (4) sections; the first section sought to gather demographic and profile information. The second section focused on employee experiences with remote working before COVID-19, and the third gathered participant experiences with remote working after COVID-19 with the intention of recording and comparing noticeable outcomes. Fourth and last section addressed staff morale and perceptions associated with the COVID-19 pandemic. Participants were also asked open ended questions regarding the risks and chances of remote working in the construction industry, as perceived by them.

## 3.6. Validity and reliability

Validity is the ability to measure what is intended to be measured accurately. Relationship reliability is characterized by trust and predictability between parties. Reliability is also a

repeated measure with similar results. For data reliability, persistent observations (repeated observations of survey responses), differences and similarities of responses in similar categories, and manual checks will all be used. Every respondent will be observed to ensure that their time spent completing the questionnaire is consistent with the average time expected. Additionally, respondents' time will be compared to the average time spent by other respondents.

# 4. ANALYSIS AND RESULTS DICUSSION

## 4.1. Introduction

In the preceding chapter, the research methodology employed for data collection and analysis was delineated. This chapter analyses and interprets research findings. It scrutinizes the repercussions of the COVID-19 pandemic on the South African construction industry, with a particular emphasis on remote working. The process entails validation, modification, and coding of the data, followed by data entry and organisation. The results are represented in tables, bar graphs, and pie charts, and statistical hypothesis testing is conducted. Initially, this chapter addresses the demographic data before delving into the ramifications of the COVID-19 pandemic on the construction industry in South Africa.

## 4.2. Demographic data

This section outlines the demographic characteristics of survey respondents. The study aimed to involve over 200 participants, anticipating a response rate exceeding 75%, which would amount to at least 150 participants. Upon disseminating the survey, 100 respondents responded to the questionnaire. Of these 100 participants, 95 completed a minimum of 80% of the questions and were deemed eligible for inclusion in the study.

### *4.2.1. Gender distribution*

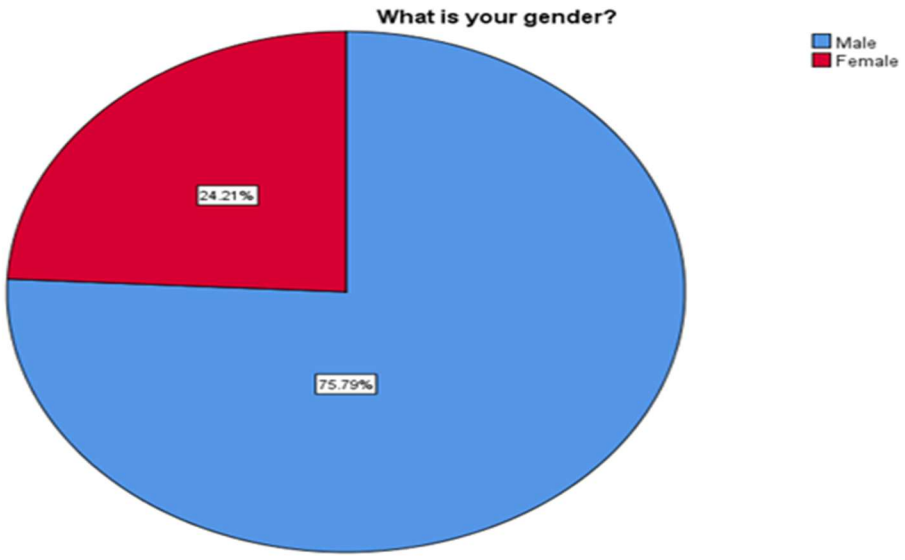



***Figure 4.1: Gender distribution***

According to the research, Figure 4.1 illustrates the gender distribution. Within the sample of 95 respondents, male participants accounted for 75.79%, while female participants accounted for 24.21%. As a result of this observation, there is a higher prevalence of males in the sample population than females. The findings are consistent with national statistics regarding the proportion of women in the South African construction industry, which ranges between 46 to 48 percent (Agherdien and Smallwood, 2008; Mariam, Olalusi, and Haupt, 2021).

It extends beyond the South African context to the global arena where women underrepresent themselves in the construction industry. Inadequate representation in leadership positions, traditional gender roles, and a lack of targeted recruitment efforts contribute to this gender imbalance. Consequently, women face additional barriers when entering or progressing in construction. Inclusion and diversity policies, mentoring programs, and training initiatives may address this disparity. The construction industry must also emphasize the importance of a diverse workforce. It can improve performance and competitiveness by increasing women's representation in this sector. Gender disparities need to be addressed through research and intervention strategies. The construction industry in South Africa and around the world will benefit from this.

### 4.2.2. Age distribution

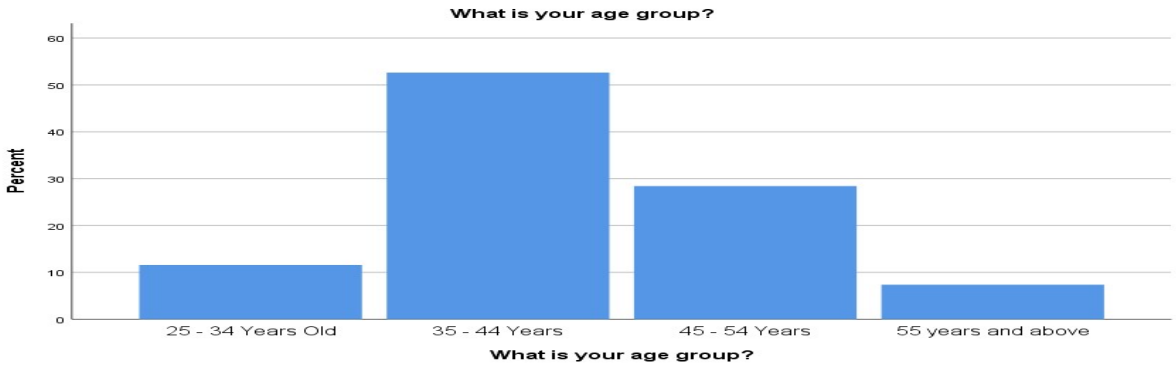



***Figure 4.2: Age distribution***

Figure 4.2 above visually portrays the age distribution of the participants; a more detailed analysis can be achieved through a frequency table. This provides an overview of the frequency, percentages, and cumulative percentages. Although the questionnaire allowed respondents under the age of 25, none of the participants fell into this category. As illustrated in Figure 4.2, majority of employees (80%) in the construction sector, within the sample population, are between the age of 35 and 54.

In contrast to expectations based on trends observed in countries such as the United States (refer to Zhao, 2019), the proportion of individuals above 54 is relatively low in the South African construction industry. This discrepancy can be attributed to the lower life expectancy in South Africa. Statistics South Africa (2022) estimates it to be 59.3 years for males and 64.6 years for females.

### 4.2.3. Highest level of education

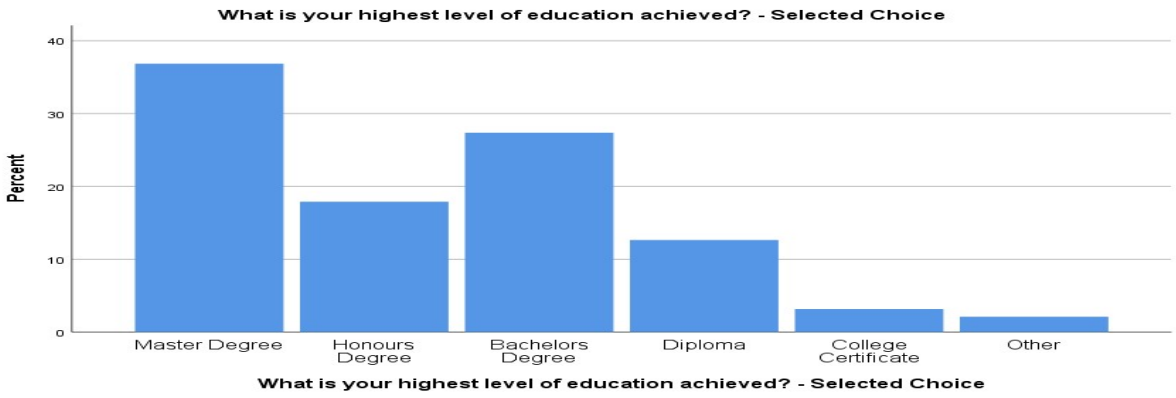



***Figure 4.3: Highest Level of Education attained***

It is plausible to assume that one of the factors influencing career advancement in the construction industry is the level of education attained. Consequently, this section explores the highest level of education attained by the study's participants. In Figure 4.3, the highest level of education attained by the respondents is illustrated. According to the survey, most construction industry employees in South Africa possess a post-matric qualification. More importantly, most of the participants held master's degrees.

### *4.2.4. Job descriptions*

After evaluating the participants' highest qualifications, we examine their job descriptions. As shown in Figure 4.4, respondents reported various job descriptions. In order to gain a deeper understanding of the characteristics and career trajectory of construction professionals, job descriptions are examined in conjunction with the demographic factors previously assessed, such as age distribution, qualifications, and tenure of employment. Research, policymakers, and industry stakeholders may find this information useful in addressing workforce development, diversity, and inclusion. By doing so, we can gain a better understanding of the sector's workforce.

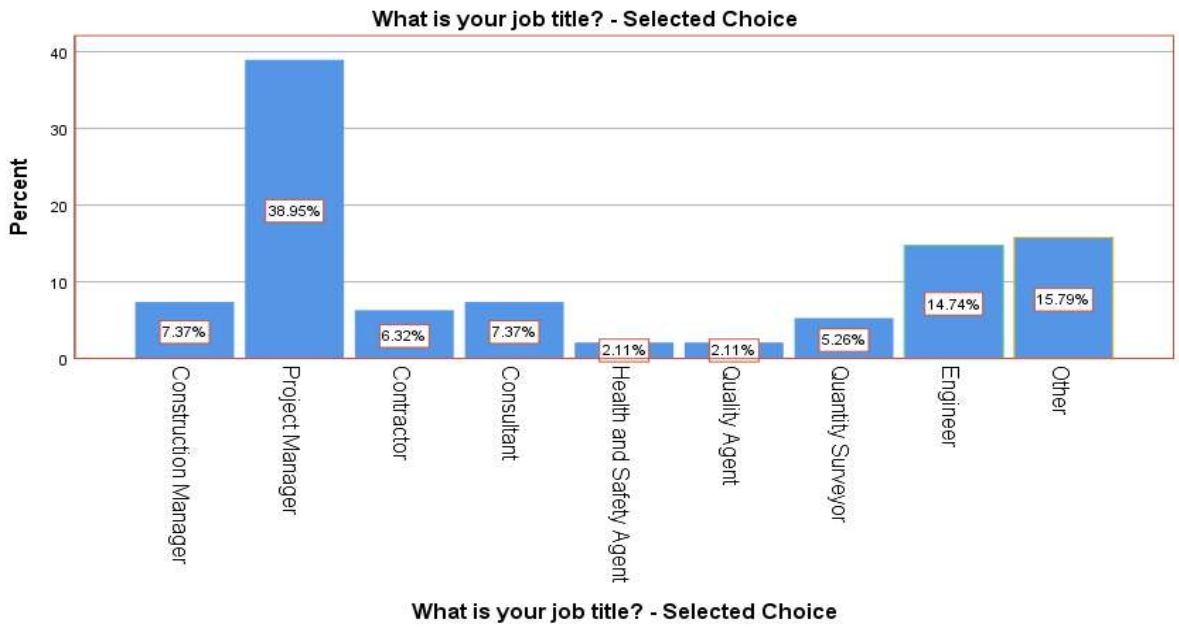



***Figure 4.4: Job Descriptions***

Construction professionals in the South African construction industry play a variety of roles that are vital to the success of construction projects, as revealed by job descriptions reported by study participants. Insights into workforce composition can be gained from the

distribution of these roles among respondents. Project Managers (38.95%) are a reasonable proportion of respondents, indicating their critical role in managing construction projects. This finding suggests that the sample population includes many experienced professionals capable of handling complex construction projects. The sample contained 14.74% engineers.

The percentages of Construction Managers, Contractors, and Consultants were relatively low at, 7.37%, 6.32%, and 7.37% respectively. Workforce composition and industry structure are revealed by roles within the sample. Combined with previous demographic data, this information can provide a more comprehensive picture of professional characteristics.

## 4.3. Working methodology of participants

After analysing respondents' demographic profile, it is pertinent to examine their working methodologies. Both before and after COVID-19. In the South African construction industry, COVID-19 transformed working methods. Respondents were asked about their working methodologies before the COVID-19 pandemic. As a result of the pandemic, this inquiry assists in understanding pre-pandemic work practices and assessing potential changes to working methodologies. The results of this analysis can be used to determine whether COVID-19 has impacted the workplace landscape in an important manner.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Remote Working (Home) | 9 | 9.5 | 9.5 | 9.5 |
| | Non-Remote Working (Office-based) | 50 | 52.6 | 52.6 | 62.1 |
| | Non-Remote Working (Site Based) | 18 | 18.9 | 18.9 | 81.1 |
| | Hybrid (Remote and Non-Remote) | 18 | 18.9 | 18.9 | 100.0 |
| | Total | 95 | 100.0 | 100.0 | |

***Table 4.1. Working methodology of participants before COVID-19***

The working methodology of participants before COVID-19 is shown in Table 4.1. The data reveals that a majority of respondents did not engage in remote working prior to the

pandemic. In fact, less than 10% of employees participated in remote work, while approximately 20% participated in hybrid work arrangements. This limited adoption of remote work may be attributed to the inherent characteristics of the construction industry. These characteristics often necessitate employees' physical presence to fulfil their responsibilities effectively.

The subsequent table, Table 4.2, displays the current work methodologies adopted by participants in response to COVID-19. This information reveals the extent to which the pandemic has influenced employees' work arrangements and routines. By examining the changes in work methodologies, it is possible to discern the overall impact of the COVID-19 pandemic on the manner in which employees engage with their professional responsibilities within the construction industry.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Remote Working (Home) | 10 | 10.5 | 10.5 | 10.5 |
| | Non-Remote Working (Office-based) | 25 | 26.3 | 26.3 | 36.8 |
| | Non-Remote Working (Site Based) | 9 | 9.5 | 9.5 | 46.3 |
| | Hybrid (Remote and Non-Remote) | 51 | 53.7 | 53.7 | 100.0 |
| | Total | 95 | 100.0 | 100.0 | |

***Table 4.2: Current working methodology***

According to table 4.2, a considerable number of employees adopted a hybrid working approach following the COVID-19 pandemic, which encompasses both remote and non-remote work arrangements. Only a marginal increase in remote work occurred, from 9.5% to 10.5%. The construction industry often presents challenges to virtualisation due to the nature of its work. Since the COVID-19 pandemic prompted workers in the construction industry to switch to hybrid working arrangements, balancing remote and in-person work, it is important to examine comparative working conditions before and after the pandemic. This section examines the working environment prior to the COVID-19 pandemic.

## 4.4. Descriptive statistics

In this study, descriptive statistics were used to discern patterns and summarize data. This analysis focused on three key measures of central tendency: the mean, median, and mode. When responses are ordered ascendingly, the median represents the central observation, and the mode represents the highest frequency. The closed-ended questions were answered on a 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). For analytical purposes, a mean of 5 implies that most participants agree. Strong disagreement is indicated by a mean closer to 1. As a result of positive or negative skewness, the median serves as the primary analytical measure.

Positive skewness occurs when a dataset has exceptionally high values, such as strong agreement. Negative skewness, on the other hand, occurs when extremely low values are present. Positive skewness occurs when the mode is lower than the median and the median is lower than the mean. Inverse skewness is negative. Negative skewness indicates most responses are in agreement or strongly in agreement. Positive skewness indicates strong disagreement or disagreement tendencies.

### *4.4.1. Working environment before the COVID-19 pandemic*

Participants were asked about their working environment before the COVID-19 pandemic. The responses to these questions will be analysed to learn how the working environment in the South African construction industry operates. The questions are discussed forthwith. Table 4.3 illustrates the descriptive statistics from the questions.

| Questions | Mean | Median | Mode | Skewness |
|---|---|---|---|---|
| Prior to the pandemic, non-remote working (physical labour) was the preferred methodology in your work environment? | 4.08 | 5.00 | 5 | -1.324 |
| Prior to the pandemic, remote-working was never or barely used in your construction industry environment? | 4.32 | 5.00 | 5 | -1.808 |
| Prior to the pandemic, many employees in your organization/construction sites were happy with physically executing work on site? | 4.37 | 5.00 | 5 | -1.833 |
| Prior to the pandemic, non-remote (physical) working had a big impact on the organizational effectiveness and positive performance of your company or projects? | 4.14 | 4.00 | 5 | -1.313 |
| Prior to the pandemic, physical presence of employees on site contributed to effective teamwork and positive team spirit in your organization? | 4.25 | 5.00 | 5 | -1.750 |
| Prior to the pandemic, companies in the construction industry/sector/projects had high operating costs due to high turnout employees on site? | 3.83 | 4.00 | 5 | -.780 |
| Prior to the pandemic, non-remote or physical presence of employees on site contributed towards high demanding safety requirements in the construction environment? | 4.07 | 5.00 | 5 | -1.261 |
| Prior to the pandemic, lack of technology and infrastructures in your work environment contributed to delayed usage for remote working in the construction sector? | 3.62 | 4.00 | 5 | -.760 |
| | | | | |

***Table 4.3: Descriptive Statistics for inferences on the working environment before the COVID-19 pandemic***

A moderate level of agreement was indicated by the mean score of 4.08 for the question regarding non-remote working preferences prior to the pandemic. However, the median score was 5.00, which indicates that the majority of respondents agreed or strongly agreed with this statement. Additionally, the mode was 5, indicating that this was the most frequently selected response. As indicated by the negative skewness value of -1.324, the data is skewed towards the higher end of the scale. Accordingly, there were probably fewer respondents who strongly disagreed or disagreed with the statement than those who agreed or strongly agreed with it.

In response to these results, non-remote working (physical labour) was the preferred method prior to the pandemic. Based on the data given, remote-working was rarely used or never used in the construction industry prior to the pandemic. According to the mean score of 4.32, there is moderate agreement with the statement. According to the median and mode scores of 5, the majority of respondents agreed or strongly agreed with the statement. A negative skewness value of -1.808 indicates that the data is skewed upward. The statement was strongly disagreed or strongly disagreed with by fewer respondents

than agreed or strongly agreed. In the construction industry environment, remote-working was not common before the pandemic, based on these results.

Before the pandemic, many employees were happy with physically executing work on site. Moderate agreement is indicated by a mean score of 4.37. Both the median and mode indicate the majority agreed or strongly agreed. The negative skewness value of -1.833 indicates that the data is skewed towards the higher end. Compared to those who agreed or strongly agreed, fewer respondents strongly disagreed or strongly disagreed. We can conclude from these results that many employees in construction sites or organisations were satisfied with physical work prior to the flu epidemic.

As part of the next question, we asked if physical working had an impact on the organizational effectiveness of the company or projects prior to the pandemic. According to the mean score of 4.14, there was a moderate level of agreement with the statement. Although most respondents agreed or strongly agreed with this statement, there were some who chose a lower score. In this case, a negative skewness value of -1.313 indicates a high degree of skewness. The statement was strongly disagreed with by fewer respondents than strong agreed.

Participants were asked if their physical presence on site contributed to effective teamwork and positive team spirit within their organizations. The purpose of the question was to gain an understanding of participants' perceptions of the role physical proximity plays in fostering collaboration and a positive working environment. Based on this question, we are interested in exploring how physical presence impacts team dynamics. It is also important to determine whether there is a perceived benefit to employees working in the same physical space. Additionally, the question sought to understand whether remote work or hybrid work arrangements negatively impact team dynamics.

Participants' attitudes and beliefs regarding physical presence in promoting effective teamwork and positive team spirit are revealed by this question. It's in their organizations. This question generated a mean score of 4.25, which indicates slightly stronger agreement. Most respondents agreed or strongly agreed with this statement based on the median and mode scores. This data is skewed towards the upper end of the scale with -1.750 negative skewness. There were fewer respondents who strongly disagreed or disagreed with the statement than those who agreed or strongly agreed. Teamwork and positive team spirit

are fostered through physical activity in organisations. Construction teams in South Africa rely heavily on physical work to generate team spirit and cohesion.

The high turnover of employees at construction sites contributes to high operating costs. An attempt was made to understand the economic impact of having a large number of employees physically present on a worksite. The purpose of this question was to determine whether there were expenses associated with having many employees on site. In addition to accommodation costs, transportation costs, and material costs were included in these expenses.

Construction companies or projects might benefit from remote work or hybrid work arrangements. Generally, this question had a lower mean score than those before it. To some extent, the participants disagreed that physical work wasn't cost-effective. A construction site's physical presence led to increased safety requirements, according to the following question. Almost all respondents agreed or somewhat agreed with the statement based on the median score of 4.07. A mean score of 5.00 indicates a high level of agreement. Having a mode of 5 indicates that this is the most common answer. It indicates that there were fewer respondents who strongly disagreed with the statement than those who strongly agreed, as indicated by the negative skewness value of -1.261.

According to these results, employees' physical presence on site contributed to high safety requirements in the construction environment prior to the pandemic. Accordingly, there may be an increased need for safety protocols and measures on a worksite when employees are physically present. This is potentially due to the higher risk of accidents or injuries. Stringent safety protocols and requirements are crucial for construction companies and policymakers to understand. This is to ensure employees' safety on construction sites. Regulations and policies related to safety may also be impacted by this data. The purpose of this is to ensure that workers on construction sites are adequately protected.

During the last question of the section, construction organizations were asked whether they were technologically prepared for the pandemic. The participants, on average, did not agree or disagree with the statement, indicating that they were indifferent to the topic of technology readiness.

### *4.4.2. Working environment after the COVID-19 pandemic*

The participants were also asked questions regarding working conditions post COVID-19 pandemic. The responses to these questions help compare the conditions before the COVID-19 pandemic. Furthermore, it helps bring any recent development and emerging information from COVID-19's genesis. Table 4.4 illustrates the descriptive statistics obtained from the questions.

| Questions | Mean | Median | Mode | Skewness |
|---|---|---|---|---|
| The physical nature of construction industry related work contributed to organizations' reluctance to adopt remote working? | 3.98 | 4.00 | 5 | -1.095 |
| After the pandemic, physical (manual) work is still the preferred practical working method for executing work in your construction environment? | 4.11 | 4.00 | 5 | -1.246 |
| After the pandemic, the level of knowledge and application of remote working increased in the construction industry due to Covid-19 requirements and challenges? | 4.39 | 5.00 | 5 | -1.948 |
| After the pandemic, remote working contributes towards organizational effectiveness and success of your company or projects? | 3.62 | 4.00 | 4 | -.747 |
| After the pandemic, remote working has negatively impacted on teamwork, team spirit and organizational working culture? | 3.05 | 3.00 | 4 | -.099 |
| After the pandemic, remote working is contributing positively towards the reduced operational expenses of your organization/project due to reduced presence of staff on site and travelling expenses? | 3.86 | 4.00 | 5 | -.890 |
| After the pandemic, remote working is contributing positively towards reduced safety requirements in the construction industry due to reduced number of workers on site? | 3.46 | 4.00 | 4 | -.541 |
| After the pandemic, there is an improved access to technology infrastructures and support of remote working by your organization? | 4.26 | 5.00 | 5 | -1.627 |
| Compared to your expectations before COVID (in 2020) how has remote working turned out for you in your work environment? | 3.79 | 4.00 | 4 | -1.032 |
| Compared to your expectations before COVID (in 2020) how has remote working turned out for you in your work environment? | 1.19 | 1.00 | 1 | 1.594 |

***Table 4.4: Descriptive Statistics for inferences on the working environment before the COVID-19 pandemic***

The first question examines if the physical nature of construction industry work may have been a contributing factor to organisations' reluctance to adopt remote working. The responses obtained show a moderate level of agreement with the statement. This is shown by a mean score of 3.98, a median score of 4, and a mode of 4. The negative coefficient of skewness of -1.095 indicates that the data is skewed towards the higher end of the scale, meaning that there were fewer respondents who disagreed or strongly disagreed with the statement than those who agreed or strongly agreed. These results suggest that the physical nature of construction industry-related work may have played a role in organisations' reluctance to adopt remote working.

Asked if manual work is still the preferred practical working method for executing work in their respective construction environments, on average, the participants somewhat agreed while most of them strongly agreed as given by the mode equivalent to 5. Possibly because of the nature of construction work. Again, it seems like South African construction industry employees gained increased knowledge and skills after COVID-19. This is denoted by the mean of 4.39 and the median and mode of 5. COVID-19 came with its own challenges, requiring different sets of skills to remain relevant in different professions.

The question that followed asked if after the pandemic, remote working contributed to organisational effectiveness and success of their companies or respective projects. On average, the responses were closer to indifferent responses than to strongly agreed. However, the negative skewness implies that most of the participants endorsed and strongly agreed than those who objected to the statement. The subsequent question asked if after the pandemic, remote working negatively impacted on teamwork, team spirit and organisational working culture. The median obtained was 3, which implies that no one disagreed nor agreed with the question. Some organisations have come up with measures to improve employee engagement to offset remote working's negative impact.

The question investigated whether remote working led to reduced operational expenses for organisations or projects following the pandemic. The question suggests that the reduced presence of staff on site and reduced travelling expenses resulting from remote work may have resulted in cost savings for organisations. The responses generated a mean score of 3.86 which indicates a moderate level of agreement with the statement that remote working has contributed positively towards the reduction of operational expenses of the projects due to the reduced presence of staff on site and travelling expenses.

The negative skewness value of -0.890 indicates that the data is slightly skewed towards the lower end of the scale, meaning that there were fewer respondents who strongly agreed with the statement than those who agreed or somewhat agreed. Overall, these results suggest that while there is some agreement that remote working has contributed positively towards the reduced operational expenses of the projects, there are also some who may not strongly agree with this statement.

### *4.4.3. Hypothesis results*

| | Hypothesis | Result |
|---|---|---|
| $H_1$ | COVID-19 => remote working methodology in construction in SA. | Not Supported |
| $H_2$ | Remote working => improved performance and organisational culture. | Not Supported |

***Table 4.5: Hypothesis Results***

Results from data analysis showed that the COVID-19 pandemic variable has a negative relationship with remote working methodology in the construction industry which means that there is not enough evidence that COVID-19 contributed to the growth of remote methodology in the construction sector of South Africa.

## 4.5. Findings in line with the research objectives

Now that we have provided the descriptive statistics for the questions. The plausible step is to address the study objectives. This section will address each of the above three objectives as stated in first chapter.

### *4.5.1. Objective 1: To compare remote working in the construction industry of South Africa post-COVID-19 with non-remote working prior to COVID-19.*

The first objective of the study sought to compare remote working in South Africa's construction industry with non-remote working prior to COVID-19. Since the study was based on a within subject's study design which involves testing the same group of participants under different conditions or treatments. In this type of design, each participant is responsible for his or her own guiding force. For example, if a researcher is interested in

the effects of caffeine on memory, he or she might administer a memory test to participants after they consume a caffeinated beverage and then again after they consume a non-caffeinated beverage.

By comparing the participants' performance on the memory test under both conditions, the researcher can determine caffeine's effects on memory. In this instance, the subjects are the participants, who are subjected to different conditions, such as the pre-COVID and post-COVID times. Based on the study design, paired samples t-tests are the appropriate statistical test for the first objective. Table 4.5 illustrates the results of the paired-sample t-tests.

| **Paired Samples Test** | | | | |
|---|---|---|---|---|
| | Mean | Std. Deviation | | Std. Error Mean |
| Before Remote Work | 4.20 | 1.05 | | 0.15 |
| After Remote Work | 4.10 | 0.87 | | 0.12 |
| **Paired Differences** | | | | |
| | Mean | Std. Deviation | | Std. Error Mean |
| Difference | 1.30 | 0.72 | | 0.10 |
| **Paired Samples Correlations** | | | | |
| | N | Correlation | | |
| | 95 | 0.70 | | |
| **t-test for Paired Samples** | | | | |
| | Mean Difference | t | df | Sig. (2-tailed) |
| Before Remote Work – After Remote Work | 0.10 | -6.45 | 189 | 0.0501 |

***Table 4.6: Paired samples t-tests results***

The top panel displays the means, standard deviations, and standard error of the means for the variables of interest, which are “before remote work" and "after remote work". The second panel shows the mean, standard deviation, and standard error of the differences between the two variables. This is the basis of the paired samples T-test. The third panel shows the correlation between the two variables, which indicates how strongly they are related to each other. A high correlation (0.72) suggests that the two variables are measuring the same construct, that is, an agreement with a statement about remote work, which is necessary for a paired samples t-test.

The fourth panel shows the results of the t-test, which tests whether the mean difference between the two variables is considerably different from zero. The output includes the t-value, degrees of freedom, and p-value, which indicate the strength and direction of the

difference and the likelihood of obtaining such a difference by chance. To interpret the output, the focus is on the p-value, which should be less than 0.05 to indicate statistical significance. The p-value is greater than 0.05, which implies that the mean difference between the two variables is considered statistically insignificant and suggests no meaningful change from before to after the pandemic. Therefore, regarding the first objective, it can be concluded that there was no meaningful change in the working environment in the construction sector before and after the pandemic.

### *4.5.2. Objective 2: To describe the factors emerging from the COVID-19 pandemic that have an impact on staff morale.*

To determine the factors that emerged from the COVID-19 pandemic that impacted staff morale, a thematic analysis of question 26 was performed. Semantic and latent approaches were used to identify themes, and the following themes were identified:

1. Flexibility
2. Reduced travelling costs and time saving
3. Increased accountability
4. Technology adoption

***Theme 1: Flexibility***

A number of participants expressed that the COVID-19 pandemic brought positive changes, particularly flexibility. They stressed the benefits of a balance between family and work. This may have increased staff morale.

***Theme 2: Reduced travelling costs and time-saving.***

The second theme identified was that participants save on travelling expenses. Furthermore, they save time travelling to work in traffic jams in the morning. Instead, time is devoted to their work. This positively impacts their morale.

***Theme 3: Increased Accountability***

In the third theme, employees were fully accountable for their actions when they worked remotely. Participants expressed that they became more accountable for their actions due to remote work. This may have also increased staff morale.

***Theme 4: Technology adoption***

As a result of the COVID-19 pandemic, the participants said their companies had to adapt to the technological wave and take advantage of the new opportunities. In turn, they harnessed the advantages of technology to benefit their employees.

### *4.5.3. Objective 3: To assess the risks and chances of remote working in the construction industry.*

The last question on the questionnaire read, “What are the risks associated with remote working in your work environment?” In turn, the responses were used to address the third objective of the study. Thematic analysis was performed using semantic and latent approaches. The following themes were identified:

1. Lack of a work-life balance
2. Lack of communication
3. Loss of organisational culture
4. Organisational security breach
5. Connectivity and Load shedding

***Theme 1: Lack of a work-life balance***

The participants stressed that some employees may work beyond working hours, which may impact their well-being. Besides working beyond the recommended working hours, some employees may fail to prioritize their work and spend less time on it.

***Theme 2: Lack of communication***

Communication can only be done virtually, and participation may suffer as a result. Therefore, the risk associated with remote working would be lack of communication among team members.

***Theme 3: Loss of organisational culture***

Organisational culture is the moral fibre that binds the entire organisation together. Lack of physical meetings among organisation workers may reduce organisational culture. Further,

concern over new employees who may join the company and never tap into the organization's culture was also expressed.

***Theme 4: Organisational security breach***

Some of the participants also expressed that employees working from home can subcontract part of their work. This may lead to breaches of organisational secrets and security.

***Theme 5: Connectivity and load-shedding***

One of the challenges raised by the participants is load shedding. They believe load shedding leads to connectivity issues and progress loss.

## 4.6. Summary

In order to address the research objectives, quantitative analyses and descriptive statics were used in the chapter. Regarding the first objective, it was found that there was no meaningful change in the working environment in the construction sector. This was before and after the pandemic. This was done through the use of paired samples and t-tests. For the second objective, semantic and latent approaches to thematic analyses were performed.

It was found that COVID-19 brought with it factors such as flexibility, reduced travelling costs and time savings, increased accountability and adoption of technology, which all increased staff morale. The third objective was on the risks of remote working in the construction industry. Most of the risks of remote working in the construction industry were centred on the following issues: lack of work-life balance, lack of communication, loss of organisational culture, breaches of organisational security, and loss of connectivity and load shedding.

# 5. CONCLUSIONS AND RECOMMENDATIONS

## 5.1. Introduction

South Africa's construction industry has been challenged by the COVID-19 pandemic. As a result of the pandemic, many organizations have adopted remote working to ensure employee safety and well-being. The concept of remote working involves working from home or other off-site locations using digital technologies and communication tools, rather than on site. By comparing remote working to non-remote working prior to COVID-19, this study investigated the impact of remote working on the construction industry of South Africa post-COVID-19, and described the factors impacting staff morale.

In addition, the study assessed the risks and opportunities of remote working. In addition, it made recommendations for stakeholders. The study used quantitative methods, including surveys and content analysis. The data collected was analysed using statistical methods such as paired samples t-tests, thematic analysis, and risk analysis. The findings of this study are likely to have major implications for the construction industry in South Africa and beyond. This article provides an overview of remote working challenges and opportunities in this industry. Additionally, it sheds light on the factors impacting employee morale and well-being.

Policy and practice in the industry may be informed by the recommendations generated by this study. Additionally, they can contribute to the development of a more resilient and sustainable construction industry post-pandemic. According to Virtanen, 2020, organizations around the world had to adapt quickly to remote working cultures due to the COVID-19 pandemic, but their level of development has a significant impact on their ability to adapt. In summary, remote work has both positive and negative aspects, and it is important that organizations are aware of both.

By recognizing the benefits as well as the challenges, organizations will eventually be able to overcome the challenges and succeed in remote work. A government support program to assist organizations in transitioning to remote work would also be beneficial. Organizations would also benefit from establishing remote work policies and practices (Virtanen, 2020). Leaders from diverse industries will reimagine remote working in creative

and bold ways based on lessons learned from this large-scale experiment (Boland et al., 2020).

## 5.2. Conclusions

### *5.2.1. Comparison of Remote Working (Pre vs Post COVID-19)*

The purpose of this study is to compare remote working in South Africa's construction industry post-COVID-19 with non-remote working prior to COVID-19. The survey data were analysed using paired samples and t-tests and the results showed that the construction work environment was not affected by the pandemic. The analysed data also showed that the construction industry in South Africa did not adopt remote working practices prior to the pandemic. The remote working practices are becoming more prevalent in construction in South Africa. No indications suggest the pandemic is directly contributing to this.

According to (Boland et al., 2020), companies around the world have responded swiftly, ensuring the safety of employees and implementing an alternative way of working that even the most extreme business continuity plans had not anticipated. Based on the results above and views of some of the authors, it is therefore safe to say that COVID-19 did not have any direct cause any change to the construction working environment. The conclusion is that the pandemic necessitated remote working practices in the construction industry due to safety and productivity concerns. COVID-19 did not alter the working environment in construction industry in South Africa however it necessitated the introduction of remote working to address safety concerns.

According to the study, remote working practices have not impacted the productivity and efficiency of the construction industry. Meanwhile, it is important to keep in mind that the construction industry relies heavily on physical labour and on-site labour. As a result, remote working practices may be limited in this sector, and may not be as effective. In conclusion, remote working practices were not widely adopted in the South African construction industry before the pandemic. This practice was, however, necessitated by the pandemic. In the post-pandemic construction industry, remote working practices remain unclear. Ultimately, the construction industry in South Africa needs further research on remote working.

### *5.2.2. Factors impacting staff morale (Pre vs Post COVID-19)*

The second objective of this study was to describe the factors emerging from the COVID-19 pandemic that impact staff morale in the construction industry of South Africa. To address this objective, open ended questions used from survey and focus groups with employees and managers in the construction industry. They were analysed using semantic and latent thematic analyses. The analysis revealed that the COVID-19 pandemic brought with it a number of factors that impacted staff morale in the construction industry of South Africa. One of the main factors was flexibility.

In recent years, remote working has become increasingly common and appreciated by employees. As a result, employees are able to organize their workdays in a flexible manner, while employers are able to access a larger talent pool since jobs are not dependent on a specific location. There are, however, some challenges associated with remote work, including decreased communication among employees and difficulties in separating work time from free time (Virtanen, 2020). The impact of remote work on life quality, especially among alone employees, is not well researched. Research on long-term effects on remote workers' mental health and life quality is crucial to considering the mental effects of remote work (Virtanen, 2020).

The results of this study are in agreement with views from (Virtanen, 2020) in that remote working allowed for more flexibility in work schedules, and reduced the stress and burden of commuting to and from work. This was particularly helpful for employees with family responsibilities. Another factor that emerged was the reduced travelling costs and time savings associated with remote working. This allowed for greater work-life balance and reduced financial strain for employees. The pandemic also led to increased accountability and technology adoption.

The shift towards remote working required employees to be more accountable for their work and adopt cutting-edge technologies and tools to enable remote work. This allowed for enhanced autonomy and professional development for employees. Remote working, however, poses some risks that negatively impact employee morale. As a result, organizational culture and sense of belonging were lost due to lack of communication. Additionally, load shedding resulted in a lack of connectivity due to breaches in organisational security.

According to this study, the COVID-19 pandemic impacted the morale of construction workers in South Africa. There were both positive and negative factors. Using remote working practices increases accountability, reduces travel costs, and saves time. Staff morale is also negatively impacted by remote working. South African construction industry policies and practices can benefit from the findings of this study.

### *5.2.3. Assessment of Risks and Chances of Remote Working*

This study assessed the risks and potentials of remote working in South Africa's construction industry. Risk analysis was conducted based on data collected from the survey (open ended questions) and focus groups with employees and managers. Construction industry remote working poses several risks, including a lack of work-life balance. There is often a blurring of boundaries between work and personal life when working remotely. The construction industry particularly faces these challenges, as much of its work involves physical labour.

Lack of communication and connection with colleagues was also identified as a risk. Employee morale and well-being can be negatively impacted by remote working, which can destroy organizational culture. Security breaches were also a concern. Companies can lose control over intellectual property and assets when working remotely. Data breaches and cyberattacks can increase as a result. In the construction industry, confidential and sensitive information may be shared. However, the analysis also revealed several advantages of remote working in construction. Among them are reduced operational costs, such as travelling expenses and office space costs. A more comfortable and personalized working environment can enhance productivity and efficiency. Commuting will be easier and less stressful.

In conclusion, this study suggests that remote working in South Africa's construction industry has both risks and advantages. The risks identified include lack of work-life balance, loss of organisational culture, and breaches of organizational security. The potential opportunities include reduced operational costs and increased productivity and efficiency. The findings of this study can inform policies and practices that address these risks and support the adoption of remote working in the construction industry of South Africa.

### *5.2.4. Overall conclusions*

This study aimed to explore the impact of remote working on the construction industry of South Africa post-COVID-19, and to provide a better understanding of the factors that impact staff morale and the risks and chances associated with remote working in this industry. The study utilized quantitative methods, including surveys, open ended questions, and content analysis.

This study suggests that the construction industry in South Africa did not adopt remote working practices prior to the pandemic. However, the pandemic necessitated remote working practices due to safety concerns and productivity. This resulted in a shift towards remote working practices in the construction industry in South Africa. This emerging pattern has been sustained even after the pandemic. The analysis showed that remote working practices had not significantly impacted the construction industry's productivity and efficiency.

The analysis also revealed that the COVID-19 pandemic brought about a number of factors that impacted staff morale in the construction industry of South Africa, both positively and negatively. Remote working practices allowed greater flexibility, reduced travelling costs and time savings, and increased accountability and technology adoption. However, remote working also negatively impacts staff morale. These risks included the lack of communication and connection with colleagues, breaches of organizational security, and loss of connectivity due to load shedding.

The findings of this study can inform policies and practices that address these concerns and support employee well-being in the construction industry of South Africa. The study highlights the need for a more comprehensive understanding of the risks and opportunities associated with remote working in the construction industry. It also highlights the importance of supporting employee well-being and organizational culture in remote working practices. While remote working has risks, there are also chances to increase productivity, efficiency, and reduce operational costs. Further research is needed to determine the long-term impact of remote working on the construction industry in South Africa, and to identify best practices for supporting employee well-being and organizational culture in the adoption of remote working practices.

## 5.3. Recommendations

Based on the findings of this study, several recommendations can be made for stakeholders in the construction industry of South Africa:

- Develop a comprehensive remote working policy: Organizations in the construction industry should develop a comprehensive remote working policy that addresses the risks and chances associated with remote working and provides guidelines for employees to ensure their well-being and productivity.
- Invest in technology and infrastructure: Organizations should invest in technology and infrastructure that support remote working practices, such as video conferencing tools, cloud storage, and high-speed internet.
- Prioritize communication and collaboration: Organizations should prioritize communication and collaboration among employees, using tools such as instant messaging and project management software to maintain organizational culture and support teamwork.
- Provide training and support: Organizations should provide training and support to employees to help them adjust to remote working practices and technology use effectively.
- Prioritize employee well-being: Organizations should prioritize employee well-being, providing opportunities for work-life balance, and addressing concerns such as mental health and physical safety.
- Monitor and evaluate the impact of remote working: Organizations should monitor and evaluate the impact of remote working practices on employee productivity, efficiency, and well-being, and make necessary adjustments to policies and practices.

In closing, the recommendations made in this study can inform policies and practices that address the risks and chances associated with remote working in the construction industry of South Africa, and support employee well-being and organizational culture through the adoption of remote working practices. These recommendations can contribute to the development of a more resilient and sustainable construction industry in the post-pandemic world.

## 5.4. Suggestions for future studies

This study provides insights into the impact of remote working on South Africa's construction industry post-COVID-19. However, future studies could focus on several areas to build on these findings:

i. Long-term impact of remote working: This study only provides a snapshot of the impact of remote working on the construction industry post-COVID-19. Future studies could focus on the long-term impact of remote working on the industry, including sustainability and scalability.
ii. Impact of remote working on different sectors of the construction industry: This study focuses on the impact of remote working on the construction industry as a whole. Future studies could focus on the impact of remote working on specific sectors of the construction industry, such as architecture, engineering, and project management.
iii. Comparative studies: This study compares remote working in the construction industry pre and post COVID-19. Future studies could compare the impact of remote working in the construction industry with other industries in South Africa.
iv. Cross-cultural studies: This study focuses on the construction industry in South Africa. Future studies could explore the impact of remote working on the construction industry in different cultural contexts and geographical regions.
v. Qualitative studies: This study utilizes quantitative methods. Future studies could focus on qualitative methods to provide a deeper understanding of the impact of remote working on employee well-being and organizational culture.
vi. Policy implications: This study provides recommendations for policies and practices that support remote working in the construction industry. Future studies could focus on the policy implications of remote working for the industry and broader society.

## 5.5. Summary

It was the purpose of this study to examine the impact of remote working on the construction industry of South Africa post-COVID-19. It was found that the construction industry in South Africa did not adopt remote working practices prior to the pandemic. Due to safety concerns and productivity concerns, remote working practices were necessary

during the pandemic. In South Africa, this led to a shift towards remote working practices in the construction industry. Although the pandemic has passed, this has survived. As a result of the study, it was determined that remote working practices had not adversely impacted the productivity and efficiency of the construction industry.

Moreover, the analysis revealed that the COVID-19 pandemic brought about a number of factors that impacted staff morale in the construction industry of South Africa, both positively and negatively. By utilizing remote working practices, flexibility could be increased, travel costs could be reduced and time could be saved, as well as accountability and technology adoption could be increased. The impact of remote working on staff morale is also negative. A number of risks were involved, including a lack of communication and connection with colleagues, breaches in organizational security, and a loss of connectivity as a result of load shedding.

Overall, this study suggests that remote working may have an impact on the construction industry in South Africa. It is true that remote working is associated with certain risks, but there are also opportunities to increase productivity, efficiency, and reduce operational costs. The study demonstrates the need for a more comprehensive understanding of the risks and opportunities associated with remote working in the construction industry. Additionally, it emphasizes the importance of supporting employee well-being and organizational culture in the context of remote working.

This study makes recommendations that can inform policies and practices that address the risks and opportunities associated with remote work in the construction industry of South Africa. Furthermore, remote working practices can contribute to employee well-being and organizational culture. By examining remote working's long-term impact, comparing its impact across industries and cultural contexts, and analysing its policy implications for the South African construction industry, future studies could build on this study's findings.

# 6. REFERENCES


Ancillo, A. D. L., del Val Núñez, M. T., & Gavrila, S. G. (2021). Workplace change within the COVID-19 context: a grounded theory approach. *Economic Research-Ekonomska Istraživanja*, *34*(1), 2297-2316.

Afkhamiaghd, A. and Elwakil, E. (2020), "Preliminary of Coronavirus (COVID-19) spread in construction industry", Journal of Emergency Management (Weston, Mass.), Vol. 18, pp. 9-17.

Agarwal, R., Chandrasekaran, S., & Sridhar, M. (2016). Imagining construction's digital future, McKinsey and Company. Online]. Tilgjengelig på: https://www. mckinsey. com/industries/capitalprojects-and-infrastructure/our-insights/imagining-constructions-digital-future. [Åpnet: 20-feb-2018].

Agherdien, S. & Smallwood, J. J., 2008. Women in South African Construction. *International Conference on Multi-National Construction Projects,* Volume Shanghai, China, pp. 21-23 Nov 2008.

Aghimien, D.O., Aigbavboa, C.O., Oke, A.E. and Thwala, W.D. (2020), "Mapping out research focus for robotics and automation in construction-related studies", Journal of Engineering, Design and Technology, Vol. 18 No. 5, pp. 1063-1079

Aigbavboa, C. O., Aghimien, D. O., Thwala, W. D., & Ngozwana, M. N. (2021). Unprepared industry meet pandemic: COVID-19 and the South Africa construction industry. *Journal of Engineering, Design and Technology*.

Alsharef, A., Banerjee, S., Uddin, S. M., Albert, A., & Jaselskis, E. (2021). Early impacts of the COVID-19 pandemic on the United States construction industry. *International journal of environmental research and public health*, *18*(4), 1559.

Amoah, C., & Simpeh, F. (2021). Implementation challenges of COVID-19 safety measures at construction sites in South Africa. Journal of Facilities Management 19, no 1 (2021): 111-128.

Angelucci, M., Angrisani, M., Bennett, D. M., Kapteyn, A., & Schaner, S. G. (2020). *Remote work and the heterogeneous impact of COVID-19 on employment and health* (No. w27749). National Bureau of Economic Research.

Arntz, M., Sarra, B. Y., & Berlingieri, F. (2019). Working from home: Heterogeneous effects on hours worked and wages. *ZEW-Centre for European Economic Research Discussion Paper*, (19-015).

Assaad, R., El-adaway, I.H., 2021. Guidelines for responding to COVID-19 pandemic: best practices, impacts, and future research directions. J. Manag. Eng. 37, 06021001

Ayodele, E.O. and Alabi, O.M. (2011), “Abandonment of construction projects in Nigeria: causes and effects”, Journal of Emerging Trends in Economics and Management Sciences, Vol. 2 No. 2, pp. 142-145.

Biswas, A., Ghosh, A., Kar, A., Mondal, T., Ghosh, B., & Bardhan, D. P. K. (2021, February). The impact of COVID-19 in the construction sector and its remedial measures. In *Journal of Physics: Conference Series* (Vol. 1797, No. 1, p. 012054). IOP Publishing.

Blaxter, L., Huges, C., and Tight, M., How to research, 2nd Edition, Open University Press, London, UK, 2001

Bloom, N., Liang, J., Roberts, J., & Ying, Z. J. (2015). Does working from home work? Evidence from a Chinese experiment. *The Quarterly Journal of Economics*, *130*(1), 165-218.

Boland, B., De Smet, A., Palter, R., & Sanghvi, A. (2020). Reimagining the office and work life after COVID-19. McKinsey & Company.

Bsisu, K.A.-D. (2020), "The impact of COVID-19 pandemic on Jordanian civil engineers and construction industry", International Journal of Engineering Research & Technology (Ahmedabad), Vol. 13, pp. 828-30.

Caramela, S. (2020). Working from home increases productivity. Business News Daily. Luettavissa: https://www. businessnewsdaily. com/15259-working-from-home-more-productive. html. Luettu, 24, 2020.

Catalyst. Catalyst Quick Take: Women in Male-Dominated Industries and Occupations in U.S. and Canada. New York: Catalyst, 2013.

Centers for Disease Control and Prevention (CDC). COVID-19 Hospitalization and Death by Race/Ethnicity. Available online: https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-raceethnicity.html (accessed on 14 December 2020

Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W. C., Wang, C. B., & Bernardini, S. (2020). The COVID-19 pandemic. Critical reviews in clinical laboratory sciences, 57(6), 365-388.

Cortez, J. (2020). Remote-Work Technology Fuels M&A Activity During Pandemic. Retrieved 2-9-20, from https://www.wsj.com/articles/remote-work-technologyfuels-m-a-activity-during-pandemic-11599211800? mod=searchresults&page=1&pos=1.

Creswell, J.W. & Creswell, J.D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches. California: SAGE Publications Ltd.

del Rio-Chanona, R.M., Mealy, P., Pichler, A., Lafond, F., Farmer, J.D., 2020. Supply and demand shocks in the COVID-19 pandemic: an industry and occupation perspective. Oxf. Rev. Econ. Policy 36, S94–S137.

Dlamini, S. (2012, June). Relationship of construction sector to economic growth. In International Congress on Construction Management, Canada.

Donnelly, R., & Johns, J. (2021). Recontextualising remote working and its HRM in the digital economy: An integrated framework for theory and practice. *The International Journal of Human Resource Management*, *32*(1), 84-105.

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of business research*, *117*, 284-289.

Drexler JF, C. V. (2014). Drosten C. Ecology, evolution and classification of bat coronaviruses in the aftermath of SARS. Antiviral Res, 101, 45-56.

Emmert-Streib, F., & Dehmer, M. (2019). Understanding statistical hypothesis testing: The logic of statistical inference. Machine Learning and Knowledge Extraction, 1(3), 945-962.

Erasmus, A. (2020). Remote working.

Gamil, Y. and Alhagar, A. (2020), “The impact of pandemic crisis on the survival of construction industry: a case of COVID-19”, Mediterranean Journal of Social Sciences, Vol. 11 No. 4, pp. 122-128.

Gartner. (2020). 9 future of work trends post-COVID-19. Gartner. https://www.gartner.com/ smarterwithgartner/9-future-of-work-trends-post-covid-19

Golden, T. D. (2006). Avoiding depletion in virtual work: Telework and the intervening impact of work exhaustion on commitment and turnover intentions. Journal of vocational behavior,69(1), 176-187.

Gumble, C. (2020). Making the best of a bad situation. Construction Manager, May, p. 18. Retrieved from https://www.constructionmanagermagazine.com/wp-content/uploads/2020/06/Construction_Manager_May_2020.pdf.

Harari, Y. N. (2020). The world after coronavirus. *Financial times*, *20*(03), 2020.

Hardill, I., & Green, A. (2003). Remote working—altering the spatial contours of work and home in the new economy. *New Technology, Work and Employment*,*18*(3), 212-222.

https://dictionary.cambridge.org/dictionary/english/remote-working

https://www.statista.com/statistics/1121217/construction-sector-value-added-to-gdp-in-south-africa.

Hunter, P. (2019). Remote working in research: An increasing usage of flexible work arrangements can improve productivity and creativity. *EMBO reports*, *20*(1), e47435.

Hussain, K., He, Z., Ahmad, N. et al. (2019), Green, lean, six sigma barriers at a glance: a case from the construction sector of Pakistan, Building and Environment, Vol. 161, pp. 106225.

International Labour Organisation (2015), Global Estimates of Modern Slavery: Forced Labour and Forced Marriage, ILO

International Labour Organisation (2020). COVID-19 and the world of work: Impact and policy responses. *ILO Monitor*.

International Monetary Fund. (2020). World economic outlook. IMF.

Iqbal, M., Ahmad, N., Waqas, M., & Abrar, M. (2021a). COVID-19 pandemic and construction industry: Impacts, emerging construction safety practices, and proposed crisis management. Brazilian Journal of Operations & Production Management, 18(2), 1-17.

Iqbal, M., Ma, J., Ahmad, N. et al. (2021b). Promoting sustainable construction through energy-efficient technologies: an analysis of promotional strategies using interpretive structural modelling, International Journal of Environmental Science and Technology, pp. 1-24.

Iqbal, M., Ma, J., Ahmad, N. et al. (2021c), Sustainable construction through energy management practices in developing economies: an analysis of barriers in the construction sector", Environmental Science and Pollution Research International, Ahead of print

Jiang, K., Hu, J.I.A., Liu, S., Lepak, D.P., 2017. Understanding employees' perceptions of human resource practices: effects of demographic dissimilarity to managers and co-workers. Hum. Resour. Manag. 56 (1), 69–91.

Kale, A. R. (2020). Impact of COVID-19 on infrastructure and environment. Purakala, 31(37), 98-105

Kumar, D., Malviya, R., & Sharma, P. K. (2020). Corona virus: a review of COVID-19. *EJMO*, *4*(1), 8-25.

Laskar, N. (2021). Post-Covid challenges in Civil Engineering Activities. ADBU Journal of Engineering Technology, 10(1).

Lund, E. M., Forber-Pratt, A. J., Wilson, C., & Mona, L. R. (2020). The COVID-19 pandemic, stress, and trauma in the disability community: A call to action. *Rehabilitation Psychology*, *65*(4), 313.

Mariam, A. T., Olalusi, O. B. & Haupt, T. C., 2021. A scientometric review and meta-analysis of the health and safety of women in construction: structure and research trends. *Journal of Engineering, Design and Technology,* 19(2), pp. 446-466

Marra, M. A., Jones, S. J., Astell, C. R., Holt, R. A., Brooks-Wilson, A., Butterfield, Y. S., ... & Roper, R. L. (2003). The genome sequence of the SARS-associated coronavirus. *Science*, *300*(5624), 1399-1404.

Mbunge, E. (2020). Effects of COVID-19 in South African health system and society: An explanatory study. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *14*(6), 1809-1814.

McKinsey. (2020). Reimagining the Office and Work Life After COVID-19. Mckinsey & Company, June, 1–5. https://www.mckinsey.com/business-functions/organization/ourinsights/reimagining-the-office-and-work-life-after-covid-1

Mishra, N. P., Das, S. S., Yadav, S., Khan, W., Afzal, M., Alarifi, A., ... & Nayak, A. K. (2020). Global impacts of pre-and post-COVID-19 pandemic: Focus on socio-economic consequences. *Sensors International*, *1*, 100042.

Nnaji, C., Jin, Z., & Karakhan, A. (2022). Safety and health management response to COVID-19 in the construction industry: A perspective of fieldworkers. *Process safety and environmental protection*, *159*, 477-488.

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., ... & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International journal of surgery*, *78*, 185-193.

Ogunnusi, M., Hamma-Adama, M., Salman, H. et al. (2020). “COVID-19 pandemic: the effects and prospects in the construction industry”, International Journal of Real Estate Studies, Vol. 14, No. 2, pp. 120-8.

Overturff, S. (2021). Perceptions of Remote Work Within the Construction Industry in the Current Pandemic Environment.

Perkins, T. A., Cavany, S. M., Moore, S. M., Oidtman, R. J., Lerch, A., & Poterek, M. (2020). Estimating unobserved SARS-CoV-2 infections in the United States. *Proceedings of the National Academy of Sciences*, *117*(36), 22597-22602.

Philipps, M. (2020), "Survey reveals trends in SA employer response to COVID-19 pandemic", available at: www.bizcommunity.com/Article/196/610/207247.html (accessed 23 September 2020)

Pickford, J. (2020). Coronavirus fears hit UK property market as viewings dry up. Access at: https://www. ft. com/content/e30ccb84-6799-11ea-800d-da70cff6e4d3.

Sekyere, E. Bohler-Muller, N. Hongoro, C. Makoae, M. (2020) The Impact of COVID-19 in South Africa

Shang, Y., Li, H., & Zhang, R. (2021). Effects of pandemic outbreak on economies: evidence from business history context. *Frontiers in Public Health*, *9*, 632043.

Smith, N. (2020, October 17). Working from home is here to stay: So let's get it right. Moneyweb. Retrieved October, 28, 2020, from https://www.moneyweb.co.za/news-fast-news/workingfrom-home-is-here-to-stay/

Soga, L. R., Bolade-Ogunfodun, Y., Mariani, M., Nasr, R., & Laker, B. (2022). Unmasking the other face of flexible working practices: A systematic literature review. *Journal of Business Research*, *142*, 648-662.

Statistics South Africa (2017), Quarterly Labour Force Survey, Quarter 2. Pretoria.

Statistics South Africa (2022), People of South Africa. [Online] Available at: https://www.gov.za/about-sa/people-south-africa [Accessed 28 March 2023].

Stiles, S., Golightly, D., & Ryan, B. (2021). Impact of COVID-19 on health and safety in the construction sector. Human factors and ergonomics in manufacturing & service industries, 31(4), 425-437.

Sullivan, C. (2012). Remote working and work-life balance. In *Work and quality of life* (pp. 275-290). Springer, Dordrecht.

Szmigiera, M. (2021). Impact of the coronavirus pandemic on the global economy-Statistics & Facts. *Accessed Sep*, *17*.

Tan, C. K. and Yeoh, K. C., A Study on the Use of Measurement Software in the Preparation of Bills of Quantities Among Malaysian Quantity Surveying Firms. In the 9th International Conference on ICT and Knowledge Engineering, 12-13 January, Bangkok, Thailand, 2011

Virtanen, M. (2020). The impact of remote working on employees' work motivation & ability to work.

Vyas, L. (2022). "New normal" at work in a post-COVID world: work–life balance and labor markets. Policy and Society.

Welman, C., Kruger, S.J. and Mitchell, B. (2005), Research Methodology, 3rd ed., Oxford University Press, Oxford

World Health Organization (WHO). (2021). WHO-convened global study of origins of SARS-CoV-2: China Part.

World Health Organization (WHO). Coronavirus Disease (COVID-19). Available online: https://www.who.int/health-topics/ coronavirus (accessed on 20 September 2020).

Zhao, N. A., 2019. Aging Construction Workforce. [Online] Available at: https://eyeonhousing.org/2019/06/aging-construction-workforce/ [Accessed 28 March 2023].

# Appendix I: Survey Questions

## Online Survey Questionnaire Questions

My name is Ramano Victor Singo. I am a Master of Business Administration (MBA) student at the Witwatersrand Business School. In partial fulfilment of the requirements of the degree of MBA, I am required to undertake a research project. I am therefore inviting you to participate in an anonymous survey as part of my research titled: "The impact of remote working post COVID-19 in the construction industry of South Africa" under the supervision of Prof. Christoph Maier.

This survey will take approximately 10 minutes of your time. Participation in this research is entirely voluntary. You will be required to complete some demographic information. However, rest assured that none of the questions will be used to personally identify you. If at any stage during the survey you experience any discomfort or you are unable to complete the questions for whatever reason, you are free to immediately discontinue the survey and you may complete the survey at another time that is convenient to you.

Thank you for taking the time to participate in this survey.

By proceeding with this survey, you are agree that you are 18 years and older.

Do you consent to the terms?

1. Yes, I do Consent
2. No, I do not consent

### Section 1: Demographic Questions/Candidates Profile:

**Please select the answer below that is more applicable to you.**

**1. What is your gender?**

1. Male; 2. Female; 3. Non-binary/third gender; 4. Prefer not to say

**2. What is your age group?**

1. 18 - 24 years old; 2. 25 – 34 years old; 3. 35 – 44 years; 4. 45 – 54 years old; 55 and above years;

**3. What is your highest level of education achieved?**

1. Doctorate's degree; 2. Master's degree; 3. Bachelor's Degree; 4. Honours Degree

5. Diploma; 6. College Certificate; 7. Other (specify)

**4. What is your job title?**

1. Construction Manager; 2. Project Manager; 3. Contractor; 4. Consultant; 5. Health and Safety Agent; 4. Quality Agent; 5. Architecture; 6. Quantity Surveyor; 7. Engineer; 8. Technician; 9. Other (Specify)

**5. How would describe your working methodology before Covid-19??**

1. Home (Remote working); 2. Office based (non-remote working); 3. Hybrid (remote and non-remote); 4. Site based (non-remote working)

**6. How would describe your current working methodology??**

1. Home (Remote working); 2. Office based (non-remote working); 3. Hybrid (remote and non-remote); 4. Site based (non-remote working)

## Section 2: Questions relating to working conditions before Covid-19 pandemic

**7. Do you work in the South African construction industry/sector/projects?**

1. Yes; 2. No

**8. Prior to the pandemic, non-remote working (physical labour) was the preferred methodology in your work environment?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**9. Prior to the pandemic, remote-working was never or barely used in your construction industry environment?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**10. Prior to the pandemic, many employees in your organization/construction sites were happy with physically executing work on site?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**11. Prior to the pandemic, non-remote (physical) working had a big impact on the organizational effectiveness and positive performance of your company or projects?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**12. Prior to the pandemic, physical presence of employees on site contributed to effective teamwork and positive team spirit in your organization?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**13. Prior to the pandemic, companies in the construction industry/sector/projects had high operating costs due to high turnout employees on site?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**14. Prior to the pandemic, non-remote or physical presence of employees on site contributed towards high demanding safety requirements in the construction environment?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**15. Prior to the pandemic, lack of technology and infrastructures in your work environment contributed to delayed usage for remote working in the construction sector?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**16. The physical nature of construction industry related work contributed to organizations' reluctance to adopt remote working?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

## Section 3: Questions relating to your working environment after Covid-19 (Remote working);

**17. After the pandemic, physical (manual) work is still the preferred practical working method for executing work in your construction environment?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**18. After the pandemic, the level of knowledge and application of remote working increased in the construction industry due to Covid-19 requirements and challenges?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**19. After the pandemic, remote working contributes towards organizational effectiveness and success of your company or projects?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**20. After the pandemic, remote working has negatively impacted on teamwork, team spirit and organizational working culture?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**21. After the pandemic, remote working is contributing positively towards the reduced operational expenses of your organization/project due to reduced presence of staff on site and travelling expenses?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**22. After the pandemic, remote working is contributing positively towards reduced safety requirements in the construction industry due to reduced number of workers on site?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**23. After the pandemic, there is an improved access to technology infrastructures and support of remote working by your organization?**

1. Strongly Disagree; 2. Somewhat disagree; 3. Neither Agree nor Disagree; 4. Somewhat agree; 5. Strongly agree

**24. Compared to your expectations before COVID (in 2020) how has remote working turned out for you in your work environment?**

1. Extremely negative; 2. Somewhat negative; 3. Neither positive nor negative; 4 Somewhat positive; 5. Extremely positive

**25. Do you think remote working has contributed significantly to the resumption of work in the South African construction industry post Covid-19??**

1. Yes; 2. No;

## Open ended questions

**26. What are the benefits that remote working has brought in your construction industry environment?**

**27. What are the challenges brought by remote working in the construction industry environment?**

**28. What are the risks associated with remote working in your work environment?**

03.08.2024

