The effect of technology-based instant messaging applications on employee engagement

Name: Priya Mahilal Mistry Govind

Student number: 19401770

A research project submitted to the Gordon Institute of Business Science,
University of Pretoria, in partial fulfilment of the requirements for the degree
of Master of Business Administration.

29 March 2021

ABSTRACT

This quantitative study examines the interaction between technology-based instant messaging applications (technology applications) and employee engagement. Technology applications are frequently used as a mode of communication between managers and employees. Internal communication is cited as an antecedent of employee engagement and employee engagement is positively correlated with productivity and organisational success. Hence, the study is directed at understanding the impact of communication technology on employee engagement, due to the indirect link between internal communication and organisational success. In the current context of the global Covid-19 pandemic, this topic is of renewed interest as leaders and employees grapple with new ways of working and communicating. The existing literature provides contradictory conclusions on the relationship between technology use and employee outcomes. A quantitative, deductive approach was adopted to measure (i) the relationship between the frequency of use of technology applications (independent variable) and the antecedents of employee engagement (psychological climate, affective commitment, perceived supervisor support), (ii) frequency of use of technology applications as a moderating variable on the relationship between the antecedents of employee engagement and employee engagement (meaningfulness, safety, availability) and (iii) frequency of use of technology applications as a moderating variable on the relationship between the employee engagement and the outcomes of employee engagement (discretionary effort and intention to turnover). The correlation test revealed a weak correlation between frequency of use of technology applications and the antecedents of employee engagement. The moderated regression analysis revealed that frequency of use of technology applications does not moderate the relationship between (i) the antecedents of employee engagement and employee engagement (meaningfulness, safety, availability), and (ii) the relationship between the employee engagement and the outcomes of employee engagement (discretionary effort and intention to turnover). The findings have relevance for academic research and practical implications for managers.

KEYWORDS

Internal Communication

Modes of Communication

Frequency of Communication

Technology-based Instant Messaging Applications

Employee Engagement

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Priya Mahilal Mistry Govind

29 March 2021

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

AC	-Affective Commitment
CFA	-Confirmatory Factor Analysis
CMC	-Computer-Mediated Communication
DE	-Discretionary Effort
EE	-Employee Engagement
EFA	-Exploratory Factor Analysis
FoU	-Frequency of Use
GDP	-Gross Domestic Product
IC	-Internal communication
ICASA	-Independent Communications Authority of South Africa
ICT	-Information and communication technology
ITT	-Intention to Turnover
JD-R	-Job Demand-Resources
KMO	-Kaiser-Meyer-Olkin Measure of Sampling Adequacy
PC	-Psychological Climate
POS	-Perceived Organisational Support
PSS	-Perceived Supervisor Support
TAM2	-Technology Acceptance Model 2
Technology applications	-Technology-based Instant Messaging Applications
USA	-United States of America
UWES	-Utrecht Work Engagement Scale
α	-Cronbach's Alpha
ρ	-Spearman's rho

LIST OF TABLES

LIST OF FIGURES

Chapter 1: Research problem and purpose

1.1 Introduction

Numerous authors (Jena et al., 2018; Menguc et al., 2013; Rich et al., 2010; Shuck et al., 2011) have reported that employee engagement is central to an organisation's success. Coupled with this, internal communication forms the foundation for engagement (Karanges et al., 2015; Mishra et al., 2014; Walden et al., 2017; Welch, 2011). Despite the importance of both employee engagement and internal communication, there is a paucity of research on the effect of technology-based instant messaging applications (technology applications) on employee engagement.

The aim of this research is to understand how the frequency of use of technology applications impacts employee engagement, including the antecedents and outcomes of employee engagement. This is visualised in Figure 1 below.
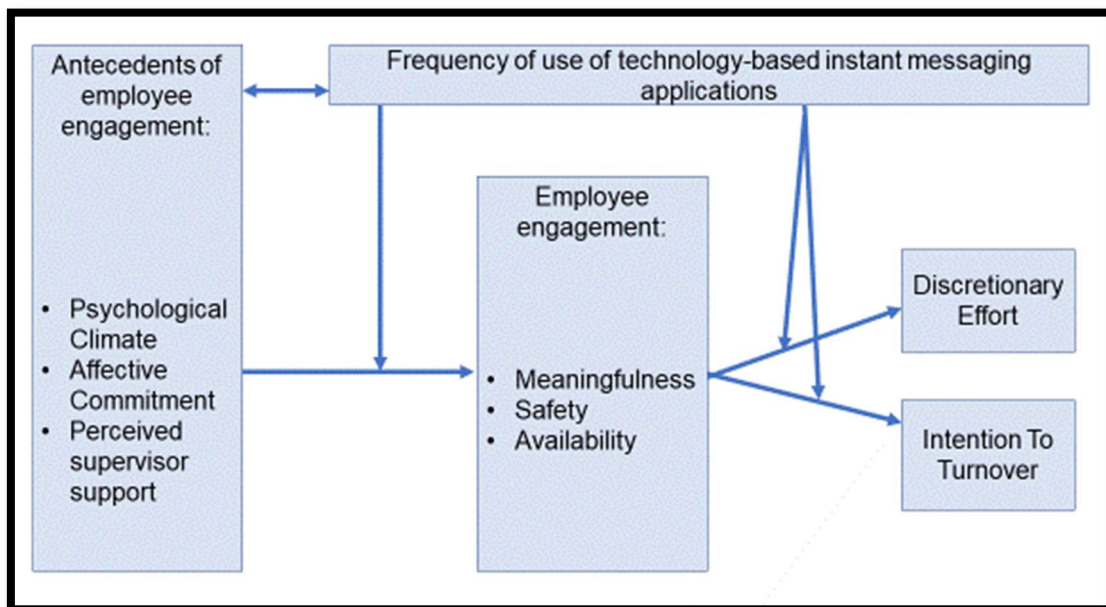
Figure 1: Visual representation of the conceptual model that will be examined in this research paper

Source: Author's own (2021)

Symmetrical communication was identified as a predictor of a positive emotional environment, which in turn influenced employees' support for the organisation (Men & Yue, 2019). Whilst it is recognised that symmetrical communication can be achieved in many ways (e.g., phone call, face-to-face), further research is required to identify whether synchronous symmetrical communication (e.g., face-to-face) and asynchronous symmetrical communication (e.g., instant messaging) produce similar employee-related outcomes. Internal communication research has evolved from

many angles and it is evident that internal communication (as an activity) and internal communication satisfaction (employee feelings about internal communication) is critical to an organisation's success (Jiang & Luo 2018; Welch, 2011). As communication channels evolve, coupled with an acceleration in communication technology adoption due to the Covid-19 pandemic, there is a need for renewed research on modes of communication and its impact on employee engagement.

Although internal communication and employee engagement are important and relevant to all sectors, the manufacturing sector has been selected for this research. The reason for focussing on the manufacturing sector is that it is widely recognised as critical to the economic growth of an emerging economy (Haraguchi et al., 2017), yet it has faced many years of decline. South Africa has had a consistent decline in manufacturing value added % of Gross Domestic Product (GDP), from 21.61% in 1990 to 11,78% in 2019 (The World Bank, 2021). One of the reason's cited for the contraction of the manufacturing sector, is a lack of competitiveness and low productivity compared to other manufacturing nations (Mongale, 2019). Globally, workers classified in the "construction/ manufacturing / production" (p. 26) group reported the lowest levels of engagement at 12%, which is much lower than the "manager/executive /official" (p. 26) category that reported a 28% engagement level (Gallup, 2017).

Traditionally, businesses have focussed on increasing employee engagement in an effort to increase productivity, based on the belief that employee engagement is a driver of productivity. In a narrative synthesis based on 214 studies, Bailey et al. (2017) found that 42 studies examined the relationship between level of performance and employee engagement. From these 42 studies, the majority concluded that higher levels of employee engagement was positively associated with higher levels of firm and individual performance (Bailey et al., 2017). From a South African perspective, a quantitative study conducted at a sugar factory in Kwazulu-Natal concluded that there was a positive correlation between employee engagement and productivity (Moletsane et al., 2019). This research is focussed on employee engagement due to the linkage with employee productivity, which ultimately impacts the organisation's productivity and ability to remain competitive.

Research on the role of communication in a company's transition from a traditional manufacturing operation to a lean manufacturing environment, highlighted the importance of communication and management support in achieving a successful transition (Worley & Doolen, 2006). Mouelhi (2009) found that Tunisian

manufacturing firms could derive greater efficiencies from the adoption of information and communication technology (ICT). Furthermore, the study found that those firms that had a relatively high rate of ICT use where about 5% more efficient than those firms that did not display the same intensity of ICT use (Mouelhi, 2009). Therefore, emerging countries should consider the adoption of information and communication technologies to maintain competitiveness. However, this should be done in a manner that does not create the unintended negative consequences associated with technology use.

From the above, it can be concluded that an enhanced understanding of employee engagement drivers is necessary to narrow management's focus to the relevant variables and levers, which will contribute to enhanced individual and firm's productivity. On the other end of the spectrum, an understanding of the levers that do not have a significant correlation with employee engagement, can allow management to eliminate or reduce the focus on these inconsequential factors. As the adoption of technology increases, there is a need for research into technology-based communication channels (including instant messaging applications) and its influence on employee engagement (Ishii et al., 2019).

1.2   Research problem

As smartphones continue to proliferate society, the use of technology applications has increased in both social and work contexts (Statista, 2020). Independent Communications Authority of South Africa (ICASA) (2020) reported that smartphone adoption in South Africa has increased from 43.5% in 2016 to 91.2% in 2019, with approximately 53.4 million smartphone subscriptions which reflects that most South Africans have access to smartphone devices. With the increase in smartphone use, there has been an increase in use of technology applications, with WhatsApp being the most popular mobile app in South Africa (Statista, 2020). This is consistent with global trends, which indicate that WhatsApp is the leading messaging application (Statista, 2021). Technology applications have emerged as both an alternative to and complement for traditional modes of communication such as face-to-face, e-mail and telephonic communication (van den Berg et al., 2012).

As new technologies emerge, there is an increase in the choice of communication channels available to employers and employees (Verčič & Špoljarić, 2020), which adds to the variability of the drivers that influence employee engagement. Employee engagement is defined as a state of mind in which an employee is mentally available to perform the task at hand, finds the work meaningful, within an that environment

provides psychological safety (Kahn,1990; Shuck & Wollard, 2010). Communication, at the most basic level is the exchange of information between a sender and receiver (Stevens, 1950) and is thus essential to the process of building employee engagement.

Choosing the appropriate channel of communication in organisational communication is not straightforward as it is dependent on many variables such as (i) the information that is required to be communicated, (ii) geographic dispersion of employees, (iii) time pressure, and (iv) company guidelines (Stich et al., 2015; Verčič & Špoljarić, 2020). To contextualise technology applications as a mode of communication, a discussion on the pervasive modes of communication (i.e., face-to-face and e-mail) is warranted.

The oldest form of business communication is face-to-face. In a study of 265 employees, through an on-line survey, Braun et al. (2019) noted that employees' preferred mode of communication was face-to-face. This contrasts with the social phenomenon observed amongst millennials who tend to use their smartphones even when they find themselves in face-to-face social settings (Drago, 2015). This highlights the complex relationship between communication technology and other modes of communication. Over time, social norms tend to influence workplace dynamics, therefore, the interaction between communication channels and employee outcomes needs to be explored further.

Moving on to e-mail communication, Sillars and Zorn (2020) explained that the lack of auditory and physical cues in e-mail resulted in the recipient's tendency to make assumptions about potentially ambiguous messages. This is particularly damaging in negative communication climates, where recipients were more likely to have a hyper-negative impression of an ambiguous e-mail, even where the e-mail could be interpreted in multiple ways (Sillars & Zorn, 2020). To add to the negative findings on e-mail, Stich et al. (2019) found a positive correlation between e-mail load and workplace stress (Stich et al., 2019).

Some studies have taken a wider view of electronic communication and focussed on communication technology as a communication channel, even though this is an umbrella term for many types of electronic communication with varying degrees of similarity (e.g., video calls, smartphones, e-mails). Stich et al. (2018) reported that increased frequency of electronic communication and access to communication technology tools can result in technostress. Coined in 1984, technostress is a term

that describes the stress resulting from an overload of new technologies and a person's inability to cope with it in a sustainable manner (Chiappetta, 2017).

In researching the impact of smartphone addiction on work productivity, Duke and Montag (2017) noted from self-reported data that employees' perception of smartphone use was that it had a negative impact on their work productivity. Other negative spillover effects of smartphones and technology applications include burnout, exhaustion, employee disengagement, increased stress due to greater frequency of interruptions, pressure to be permanently available and work-home conflict (Gardner et al., 2017; Leonardi et al., 2010; Lutz et al., 2020; Valle, et al., 2021). To add to the paradox, Salanova and Schaufeli (2000) tested whether the impact of technology use on burnout was mediated by the employee's feelings towards technology. Their findings revealed that an increase in exposure to technology (through frequency and length of time used), resulted in an employee giving the technology a positive appraisal, which was then associated with reduced burnout levels (Salanova & Schaufeli, 2000). Bearing in mind that this study was in 2000, prior to the widespread adoption of smartphones, there is a need to re-test impact of communication technology, post 2000.

According to Sonnentag et al. (2018), interruptions from on-line messages were associated with increased feelings of pressure (negative effect), whilst simultaneously contributing to a feeling of task accomplishment (positive feeling). To add further nuance to the debate, Gadeyne et al. (2018) found that smartphone use outside working hours did not have an impact on work-home conflict. However, the use of laptops after hours increased work-home conflict (Gadeyne et al., 2018). It is posited that a reason for this difference is that smartphones are used for both work and personal reasons, hence they are seen as less invasive than laptops, when employees are at home (Gadeyne et al., 2018). A second reason is that smartphones are most probably used for shorter and quick-response activities, thus allowing employees the ability to discretely utilise the smartphone whilst still participating in home activities, whereas laptop use precludes the ability to multi-task at home (Gadeyne et al., 2018).

In direct contrast to the conclusions drawn by Gadeyne et al. (2018), Lutz et al. (2020) found that violation of work-home boundaries through instant messaging, had a negative impact on emotional well-being of employees. This was supported by the findings of Ghislieri et al. (2017) who noted that off-work hours technology use had a positive correlation with work-family conflict. Academic attention has recently been

drawn to the examination of the impact of technostress on cyberslacking and it was found that work-related technology interuptions during an individual's personal time was a predictor of cyberslacking in the workplace (Güğerçin, 2020). Cyberslacking is a form of deviant behaviour, where an employee utilises technology for non-work related reasons (e.g., scrolling through Facebook and Instagram) (Güğerçin, 2020). The researcher suggested that the reason for this is that the invasion of technology in an employee's private time allowed employees to justify their non-work related technology use whilst at work (Güğerçin, 2020).

Communication technology enables flexible work arrangements, remote work, virtual teamwork, increased frequency, and speed of information flow across physical boundaries (Leonardi et al., 2010; Ter Hoeven et al., 2014). Ewing et al. (2019) performed a qualitative study to understand how the use of internal social media impacted internal communication and employee engagement and concluded that whilst there is qualitative evidence of the positive impact of social media use on employee engagement, there is a need for quantitative studies to understand the influence of internal social media on employee engagement. As illustrated thus far, the many nuanced, and contradictory findings on technology use and employee-related outcomes demonstrates the need for further academic research on the impact of technology applications on employee engagement. From a communication technology perspective, past research has prioritised the understanding of the negative impact of communication technology (i.e., technostress, burnout, and negative impact on face-to-face communication). The bias towards negative effects is one of the reasons that a neutral stance has been assumed as the starting point for this research.

Over the years, since Kahn (1990) conceptualised employee engagement, numerous frameworks have developed to describe the drivers and antecedents of employee engagement. To illustrate the variability, key antecedents identified over the years are as follows: (i) psychological climate, (ii) affective commitment, (iii) job fit, (iv) psychological empowerment, (v) perceived supervisor support, (vi) perceptions of procedural and distributive justice, and (vii) rewards and recognition (Holland et al., 2017; Saks, 2019; Shuck et al., 2011; Stander & Rothmann, 2010). Johlke and Duhan (2000) were early proponents of the assertion that job satisfaction was influenced by the frequency, mode, content, and direction of the communication. Welch (2011) recognised a gap in the literature that there was no comprehensive model linking internal communication and employee engagement and consequently developed a model to demonstrate the linkage between these constructs. A

shortcoming of the Welch (2011) model is that it only addressed the link between internal corporate communication and employee engagement and did not address the link between internal line management communication and employee engagement. Although research has been conducted on the drivers of internal communcation and their impact on employee outcomes, technological advancements have created the vaccum for further research on the interaction between internal communication and employee engagement.

Academic literature and media reports frequently cite the importance of employee engagement in maximising an organisation's productivity, reputation, customer loyalty and competitive advantage (Segalla & DeNisi, 2019; Uddin et al., 2019). Whilst employee engagement is widely recognised as a human resources strategy for achieving competitive advantage in organisations due to its positive correlation with performance and organisational outcome variables (Albrecht et al., 2015; Anitha, 2014; Macey et al., 2009), there is little consensus on the mechanisms and tools required to maintain the optimal level of employee engagement. The ongoing research on this topic highlights the fluid state of EE and the many factors that impact it. Leaders need to challenge themselves to identify and remove barriers to EE and create platforms for increased EE (Kahn, 2010).

The inconsistency and fluctuation in employee engagement levels is illustrated by the Gallup survey, which revealed that EE in the United States of America (USA) was 38% in May 2020 and then dropped to 31% in June 2020, before rising to 40% in July 2020 (Harter, 2020). In the latest available comparative information for sub-Saharan Africa, for the period 2014 to 2016, sub-Saharan Africa recorded an engagement level of 17% which is significantly lower than the USA. These statistics reveal that employee engagement remains an elusive goal for business leaders and ongoing effort is required to maintain and improve EE levels globally.

A survey conducted to evaluate the correlation between internal communication and employee engagement concluded that satisfaction with internal communication had a positive impact on employee engagement (Verčič & Vokić, 2017). In addition to the linear relationship, there is a circular relationship between IC and EE (Verčič & Vokić, 2017). Karanges et al. (2015) contributed the finding that internal communication (at both organisational and supervisor level) had a significant impact on employee engagement. After an extensive literature review spanning the period 1970 to 2019, Lee and Yue (2020) concluded that research in the area of internal communication is growing, but still remains an under-researched field.

Current academic literature has not revealed a clear and consistent relationship between frequency of use of technology applications and employee engagement. Whilst some research reveals that communication technology has a negative impact on employees (e.g., Lutz et al., 2020), other research reveals that it has a positive impact (e.g., Ragsdale & Hoover, 2016). Within the field of business research, there exists a need to constantly build and maintain the bridge between academic research and the current context of business. Models and theories that have held firm in previous contexts, require retesting to assess their relevance. Therefore, as new technologies emerge, ongoing research is required on the impact of its use in the workplace.

1.3 Scope and context of the research

The scope of this research is bound by the following definitions:

Communication: Communication occurs between two beings when one voluntarily responds to the stimulus provided by the other (Stevens, 1950).

Employee Engagement: EE occurs when there is congruence between an employee's emotional condition, mental state, and behavioural characteristics and the organisation's objectives (Kahn, 1990; Shuck & Wollard, 2010).

Technology-based instant messaging applications: Electronic on-line communication channels (such as WhatsApp, Facebook Messenger, Telegram) available on smartphones that facilitates the exchange of multi-media messages (such as text, video, and pictures) (Statista, 2020).

Furthermore, this study is bound by the **South African manufacturing sector**.

1.4 Academic need for the research

This study has academic significance as it contributes to expanding the understanding of how EE is influenced by frequency of use of technology applications in the workplace. Existing literature (e.g., Verčič & Vokić, 2017) has focussed on the relationship between IC satisfaction and employee well-being (including stress, burnout, and work-home conflict). Furthermore, in the field of communication technology, there has been a significant focus from researchers (e.g., Gardner et al., 2017; Leonardi et al., 2010; Lutz et al., 2020; Sonnentag et al., 2018) on testing the relationship between communication technology and individual employee outcomes (e.g., well-being, burnout, stress) as opposed to the focus of this research. There is scant literature on the impact of communication technology (including technology

applications) on EE. Given the recent proliferation of communication technology in the South African context (Statista, 2020), there is a need to expand research in this area so that academic effort is aligned with current business context. The results of this research will be important in developing the literature on IC and EE (including the antecedent and outcome variables) in the South African manufacturing context.

1.5   Business rationale for the research

In 2020, the world was impacted by the Covid-19 pandemic, which forced millions of employees to work from home whilst governments, around the world, attempted to fight the spread of the virus. Prior to the pandemic, the abundant modes of communication available and the ease of switching between the available modes of communication was well established and taken for granted. When this choice was taken away due to the shift to work from home, the importance of modes of communication began emerging in business press. In a nationwide survey, conducted by Colliers International, of 5 000 people who were working from home during the Covid-19 lockdowns, it was noted that 37% missed spontaneous meetings, 19% missed the ease of access to managers and 63% missed the face-to-face collaboration with colleagues (Van Dijk, 2020). In South Africa, a survey conducted by Giant Leap found that 86% of South Africans would prefer to work in the office due to the loneliness and the lack of social interactions that is a by-product of working from home (Van Dijk, 2020). Although there is evidence that employees miss the face-to-face interaction, it does not provide evidence that the mode and frequency of communication influences EE. The pandemic has accentuated the significance of communication technology, beyond the realm of the traditional tele-worker and geographically disperse organisation.

1.6   The Purpose Statement

The purpose of this research is to contribute to the research on frequency of use of technology applications and employee engagement in the manufacturing sector of South Africa. The understanding of these relationships will guide internal communication strategies of manufacturing business leaders and managers, in their efforts to increase employee engagement. The recommendations will guide the thinking on the adoption of new technology in the communication process and bring clarity around pre-conceived notions that supervisors may have about communication channels and employee preferences.

1.7   The Aim of the Research

The overarching research question, located within the domain of EE, was how EE is impacted by frequency of use of technology applications. In order to answer the overarching research question, the following three sub-research questions are stated:

i.   The relationship between the **FoU of technology applications** and PSS, PC, and AC (antecedents to EE) is positively correlated
ii.   The effect that **FoU of technology applications** has on the relationship between the antecedents of EE (PC, AC, PSS) and EE
iii.   The effect that **FoU of technology applications** has on the relationship between EE and its outcome variables (DE and ITT)

The sub-constructs within EE have been narrowed to three elements of meaningfulness, safety and availability that were articulated by Kahn (1990). The antecedents that have been included in the scope of the research are psychological climate (PC), affective commitment (AC), and perceived supervisor support (PSS). These antecedents are directly linked with relationships and therefore, have a link with communication (Burke et al., 2002; Karanges et al., 2015). The outcome variables were limited to discretionary effort (DE) and intention to turnover (ITT), which has a proven link to the employee-supervisor relationship.

1.8   Layout

The next section of the research report has been structured as follows:

(i) Chapter 2 Literature Review and Theory

As the name suggests, Chapter 2 gives recognition to existing academic research through the review of literature applicable to the constructs of EE and IC.

(ii) Chapter 3 Research Hypotheses

Chapter 3 is a presentation of the hypotheses selected to support the overarching research question.

(iii) Chapter 4 Research Methodology and Design

Chapter 4 is an explanation of the research methodology and the defence of those methods.

(iv) Chapter 5 Results

Chapter 5 is a record of the data analysis and statistical tests performed.

(v) Chapter 6 Discussion of Results

Chapter 6 builds on Chapter 2 and 6 in offering an interpretation and explanation of the results presented in Chapter 5.

(vi) Chapter 7 Conclusion

Chapter 7 concludes the research with a summary of the research presented, including suggestions for future research and acknowledgement of the limitation of the study.

Chapter 2:   Literature Review and Theory

2.1   Introduction

The purpose of the literature review is to provide evidence of the previous research and perspectives regarding the topic of employee engagement (EE), internal communication (IC), and technology-based instant messaging applications (technology applications) (Denney & Tewksbury, 2012). This section begins with an overview of EE and IC, before moving into the linkage between the two constructs. Thereafter modes of communication are explained, highlighting any linkages to employee and organisational outcomes. Finally, it is necessary to explain Job Demands-Resources (JD-R) model, which is theoretical lens that has been selected for the purpose of this study.

2.2   Defining Employee Engagement

EE is a popular topic amongst academic scholars and business leaders. Although research has been built on the work of Kahn (1990), divergent and inconsistent definitions have sprung up in literature since then (Shuck & Wollard, 2010). According to Shuck and Wollard (2010), some of these definitions lack academic merit, therefore, should not be perpetuated in academic research. Survey instruments are usually based on academic definitions. Thus, an in-depth exploration was conducted prior to the selection of the definition that guided this study.

Kahn (1990), conceptualised and explained the constructs of personal engagement and personal disengagement in his pioneering work on EE. Personal engagement in the workplace occurs when an employee expresses his authentic self through his work, resulting in no distinction between the individual and the role that is occupied (Kahn, 1990). Other scholars (e.g. Anitha, 2014; Brown & Leigh, 1996; Shuck et al., 2011; Rich et al., 2010) have added to the work of Kahn (1990) and the term EE has superceded the term personal engagement (Welch, 2011). Consulting firm Gallup is credited for coining the term EE and devising a workplace survey for establishing EE (Welch, 2011).

Kahn's (1990) seminal qualitative study concluded with the theory that engagement is influenced by psychological "meaningfulness, safety and availability" (p. 703). These three psychological conditions are elaborated on in section 2.2.1 below. In their seminal review of the definitions of EE, Shuck and Wollard (2010) observed that as the popularity of EE grew, so did the multitude of definitions, many of which lack

academic support. Having conducted a historical review of the definitions proposed, it was noted that most literature acknowledged that EE starts with a state of mind (Shuck & Wollard, 2010). Having synthesised the historical literature, Shuck and Wollard (2010) concluded that EE is an employee's state of mind (mental and emotional states) that is demonstrated through positive, constructive behaviour aligned with the organisation's objectives. This definition links back to Kahn's (1990) definition of personal engagement and the psychological conditions required for personal engagement. Kahn's (1990) definition of engagement, including the three psychological conditions, was utilised as the basis for developing the survey questions that measure EE.

2.2.1 Sub-constructs of Employee Engagement

2.2.1.1 Psychological Meaningfulness

Psychological meaningfulness describes a state of mind where an individual feels valued, competent and fulfilled by the work performed (Kahn, 1990). From an employee's perspective, meaningfulness is experienced as a sense of accomplishment and a belief that the work is rewarding and impactful (Kahn, 1990; Lysova et al., 2019). Psychological meaningfulness is influenced by inter-personal exchanges with colleagues and emotional connections that reinforce a feeling of appreciation, care and respect (Demirtas et al., 2017; Kahn, 1990). Meaningfulness is also associated with the ability to use one's role to influence others and shape the world (Kahn, 1990). As one would expect in inter-personal relationships, the feelings associated with meaningfulness, are built through communication between employees, co-workers, supervisors and other individuals that interact with the employee on a regular basis (Kahn, 1990; May et al., 2004).

Demirtas et al. (2017) found that ethical leadership, demonstrated through a leader's actions and expressed through symmetrical communication, had a positive effect on the meaningfulness that employees perceived about their work. This was supported by Lysova et al. (2019) who found that leaders who act as facilitators allow employees to find meaning in their work. This emphasises the importance of line management communication in contributing to an employee's meaningfulness experience.

2.2.1.2 Psychological Safety

Psychological safety describes an environment where the individual is not afraid to express an opinion, against a backdrop of trust and respect in the workplace (Kahn, 1990). When an individual displays vulnerability and is prepared to take risks, it can be posited that they are in a state of psychological safety (Kahn, 1990). A harsh tone of voice communicated by a manager, may send the signal that the environment is unsafe for expression of upward communication (Kahn, 2002; Van Dyne et al., 2003). Ruck et al. (2017) found that employee voice is statistically significantly associated with organisational engagement. Therefore, creating an environment which is conducive to the expression of the employee's voice is an important foundation for internal two-way communication. The relationship between psychological safety and supervisor support was affirmed by the results of a field study performed by May et al. (2004) who concluded that "supportive supervisor and rewarding co-worker relations had positive relations with feelings of psychological safety" (p.30).

The concept of psychological safety has been researched from the perspective of the individual, the team and the organisation (Newman et al., 2017). In their systematic review of literature on this subject, Newman et al. (2017) noted that 29 studies focused on individual-level measures, 42 studies on team-level measures and two focused on organisation-level measures. Therefore, the dominant focus from an academic perspective has been on team-level measures. For the purpose of this research, the individual-level measure has been utilised because the unit of analysis is the individual.

Psychological safety is associated with communication due to the linkage through supervisor relationships and support (Younas et al., 2020). Whilst Kahn (1990) posits that communication is an antecedent to psychological safety, subsequent research has concluded that communication is both an antecedent and outcome of psychological safety (Newman et al., 2017). This was further supported by the work of Javed et al. (2017) who contributed that inclusive leadership (that promotes openness, employee voice, opinion exchange) was positively associated with psychological safety. Thus further supporting the research that IC is directly related to psychological safety.

2.2.1.3 Psychological Availability

Psychological availability is the willingness of the employee to bring all elements of their mind, physical being and spirit to their work role (Kahn, 1990). Availability is

influenced by "depletion of physical energy, depletion of emotional energy, individual insecurity and outside lives" (Kahn, 1990, p. 714). Of these four distractions, IC can influence physical availablity, emotional availability and feelings of insecurity. Agarwal (2019) argued that the nature and style of supervisor communication (either assertive, passive or aggressive) correlated directly with subordinates engaging in cyberloafing, a deviant behaviour that distracts an employee from the task at hand. Roberts et al. (2017) found that when employees found their supervisor distracted by smartphones during face-to-face conversations, there was a negative impact on psychological availability, as the supervisor's behaviour undermined trust. In addition to frequency (Johlke & Duhan, 2000; Sandoval-Reyes et al., 2019) and mode of communication (Sandoval-Reyes et al., 2019), this finding demonstrates that quality of communication is an antecdent of psychological availability.

Van Laethem et al. (2018) observed that most research on smartphone use has focussed on the off-work use of smartphones for work-related activities. Therefore, the focus of their research was on smartphone use both during and after hours (Van Laethem et al., 2018). Their research noted that the excessive use of smartphones during a normal working day did not have an impact on an employee's mental availablity, unless it was accompanied by an elevated pre-occupation with and desire to respond to every work-related message (Van Laethem et al., 2018). Their findings revealed that smartphone use, under normal circumstances, did not impact availablity. This finding makes an important contirbution to the research on the influence of smartphones on employee engagement by observing that self-control (on the part of the employee) is a key element in determining whether smartphones are perceived as a burden or as a useful resource (Van Laethem et al., 2018).

Sandoval-Reyes et al. (2019) observed that technology tools have increased the ability of an employee to remain connected to work after hours, resulting in an increased frequency of communication and perceived overload of work. As a result, those employees are unable to psychologically detach themselves from work at the end of the day, resulting in excessive psychological availablity (Sandoval-Reyes et al., 2019). Thus, psychological availability can have a negative effect on employees' wellbeing, even though it indicates engagement in terms of Kahn's (1990) definition of employee engagement.

2.2.2 Employee disengagement
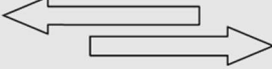
To understand the spectrum of engagement, it is necessary to understand disengagement, which is associated with unfavourable employee behaviour (e.g.

poor customer service) (Menguc et al., 2013). Kahn (1990) described personal disengagement as the "simultaneous withdrawal and defence of a person's preferred self" (p. 701) resulting in a disconnect between the employee's authentic self and the role performed in the workplace (Kahn, 1990). Disengagement can present itself as auto-pilot behaviour, lack of genuine interest in the role, lethargy, aloofness and a feeling of being disconnected from the work and fellow employees (Kahn, 1990). Lemon and Palenchar (2018) added to this discourse by defining disengagement as "going through the motions in such a way that an employee carries out the minimum job requirements" (p. 152). In some cases, disengagement presents as burnout, fatigue or exhaustion, which are not optimal psychological conditions for EE (Schaufeli, 2017).

Linking disengagement to communication, employee silence (deliberate lack of expression of views), arising from a feeling of helplessness, lack of self-efficacy (Van Dyne et al., 2003) or fear of consequence (Prouska & Psychogios, 2018), is considered an undersirable outcome which can have negative consequences (e.g., complaining, depreciatory and cynical behaviour) for an organisation (Caylak & Altuntas, 2017). Consequently, disengagement has been posited as a reason for firms' decline in profitablity and productivity (Rastogi et al., 2018). Thus, a lack of IC combined with disengagement is toxic and not conducive the the long-term sustainability of an organisation (Prouska & Psychogios, 2018).

In linking disengagement with smartphone use, MacCormick et al. (2012) found that disengagement occurred on two ends of the spectrum of smartphone use. Extreme over-use and extreme avoidance of smartphone use were both associated with employee disengagement (MacCormick et al., 2012). Functional EE occurred between these two ends of the continuum of smartphone usage (MacCormick et al., 2012). Refer to Table 1 below for categorisation system developed by MacCormick et al. (2012). Although the table was based on a qualitative assessment of Blackberry use within a banking environment, it provides a starting point for understanding the employee behaviours associated with smartphone use.

Table 1: Engagement behaviours of smartphone users

Table 1	Engagement Behaviors and Smartphone User Types.		
Level of impact	Smartphone user types		
	Hypo-connectors (disengagement)	Dynamic connectors (functional engagement)	Hyper-connectors non-stop work (disengagement)
Smartphone enabled engagement behaviors			
Individual	• Fear of loss of control/addiction • Boundary protection • Distracted • Low work focus • Avoidance	• Autonomy • Control • Flexibility • Involvement • Boundary management • Self-efficacy • Ambidextrous	• Burnout • Workaholic/addiction • No boundaries • Antisocial behaviors • Work-life conflict • Lack of recovery time
Organizational	• Out-of-connection, out-of-the loop • Misrepresentation • Unavailability • Disinterest	• Proactivity • Coordination • Collaboration • Responsiveness (internal and external customers) • Feedback • Flexible work design	• Shallow, diffused, superficial communication • Job creep • Disruptive • Role modeling excess • Over-communication • Reactivity • Absent presence • Reduced delegation

Source: MacCormick et al. (2012)

Even though MacCormick et al. (2012) did not provide the explanation of employee engagement (from the interviewee's perspective), what is useful is that behavioural outcomes have been related with smartphone use. This provides a useful benchmark for the results of this study.

2.3   Internal Communication

IC is a broad topic and requires a succinct explanation so that the research can be appropriately located within the literature review. IC which refers to the communication within the boundaries of the organisation versus external communication which occurs with stakeholders beyond the borders of the organisation (Kalla, 2005).

Having synthesised the information from published articles from 1970 to 2019, Lee and Yue (2020) noted the consensus in academic literature that whilst IC has a variety of definitions, fundamentally, it is considered to be formal and informal interactions between workers within an organisation. Welch and Jackson (2007) adopted a stakeholder approach in conceptualising IC and posited a view of IC as "strategic management of interactions and relationships between stakeholders within organisations across a number of interrelated dimensions including, internal line manager communication, internal team peer communication, internal project peer communication and internal corporate communication" (p. 184).

Previous studies have linked IC with various individual outcomes (e.g., trust, job satisfaction, commitment, and performance) (Becerra & Gupta, 2003; Jarvenpaa & Leidner, 1999; Jiang & Luo, 2018; Jo & Shim, 2005; Johlke & Duhan, 2000), but did not explicitly test the relationship between IC and EE. The exception to this was research performed by Jian and Luo (2018), who confirmed that transparent organisation communication was an antecedent to employee engagement. However, the elements of organisation communication that were assessed were (i) the extent of participation, (ii) substance of the information and (iii) accountability for information (Jiang & Luo, 2018). Thus, the research was focussed on the content of internal communication rather than the frequency and mode of communication which is the focus of this study.

In another study, Johlke and Duhan (2000) tested the impact of frequency, mode, content and direction on job performance, job satisfaction and role ambiguity amongst service employees and the results are depicted in Figure 2 below. Based on the results, high frequency, indirect content, and bidirectional flows had a positive impact on one or more of the following outcomes: job satisfaction, job performance and reducing role ambiguity (Johlke & Duhan, 2000). Interestingly, informal mode of communication did not have any impact on the outcome variables tested.
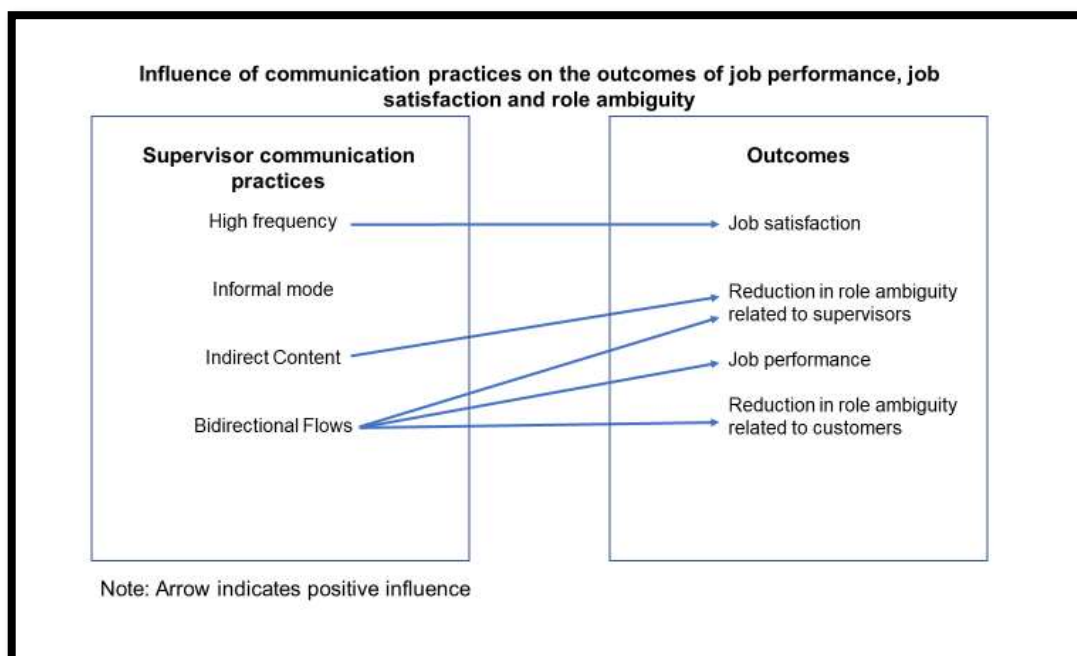
Figure 2: Research findings on supervisor communication practices and service employee job outcomes

Source: Constructed from the findings reported by Johlke and Duhan (2000)

The purpose of IC encompasses the following non-exhaustive list: (i) the intention to

influence another human being, (ii) transfer knowledge, (iii) build common understanding (iv) eliminate ambiguity and clarify meaning and (v) build trust and (vi) provide emotional support (Johlke & Duhan, 2000; Karanges et al., 2015; Mishra et al., 2014). Communication is layered within an organisation and is generally conducted at three levels: organisation level, team level and individual level. For the purpose of this study, the level of focus is the individual level of communication.

IC in published journal articles is sometimes referred to as "employee communication" (Walden et al., 2017, p. 73). This reference to internal and employee communication envisages all communication that occurs within an organisation, including information flow between departments. In performing the literature review, the emphasis was placed on communication between supervisor and subordinate. The researcher was guided by the following definition of internal line management communication: "Superior-subordinate communication is an exchange of information and influence among individuals of an organization, where the superior has formal authority to instruct and evaluate the task performance by other individuals" (Lybarger et al., 2017, p. 125).

Verghese (2017) adds to the claim that IC is an under-studied area in the context of human resources, which further supports the need for this study. One of the reasons posited for this under-study is that there is little consensus on where IC needs to be situated within the various functional areas of an organisation (Verghese, 2017). This is consistent with the researcher's finding during the literature review process. The researcher's conclusion from performing the search for literature is that communication is a multi-disciplinary topic that has been researched within the fields of marketing, advertising, public relations, leadership and to a lesser extent within human resources, which further supports the need for this study.

2.3.1 Internal communication and internal communication satisfaction as separate constructs

The distinction between IC and ICS is explained because these two concepts are sometimes confused in research papers. IC satisfaction is a social, emotional, and mental outcome of IC, where IC is defined as the process of information exchange which occurs within an organisation (Verčič, 2021). IC satisfaction has been studied extensively in the last three decades (due to its popularity in the Public Relations domain) (Verčič, 2021), however the link to EE is an under-studied area. Scholars have recently added to the literature by establishing that IC satisfaction is a driver of EE (Verčič & Vokić, 2017). Interestingly, the opposite holds true in the research by

Verčič (2021) who found that EE is a significant predictor of IC satisfaction.

Whilst IC satisfaction has been linked with EE, (Verčič, 2021), the direction of influence between the constructs has not been proven. Whilst there is a significant volume of research emphasising the importance of IC in relation to EE, there appears to be limited research conducted on the impact of the granular variables that drive IC and the linkage of those variables with EE. This study is focussed on IC and does not seek to research ICS.

2.4 Link between Internal Communication and Employee Engagement

Welch and Jackson (2007) recognised the need for a communication model that could be utilised by organisations in formulating IC strategies. This matrix model is reproduced in Table 2 below.

Table 2: Internal communication matrix

Dimension	Level	Direction	Participants	Content
1. Internal line management communication	Line managers/ supervisors	Predominantly two-way	Line managers-employees	Employees' roles Personal impact, e.g. appraisal discussions, team briefings
2. Internal team peer communication	Team colleagues	Two-way	Employee-employee	Team information, e.g. team task discussions
3. Internal project peer communication	Project group colleagues	Two-way	Employee-employee	Project information, e.g. project issues
4. Internal corporate communication	Strategic managers/top management	Predominantly one-way	Strategic managers-all employees	Organisational/corporate issues, e.g. goals, objectives, new developments, activities and achievements

Source: Welch and Jackson (2007)

The model recognises that communication occurs across multiple levels in the organisation and each dimension has a direct impact on the employee (Welch & Jackson, 2007). In each case, as visualised in the matrix, IC is a conduit for the passage of information, feedback and stimuli. IC thus provides the thread that keeps the various elements of the organisation connected, informed and aligned with the organisational objectives. Although the model explains the facets of IC, it does not demonstrate the linkage to EE. A review of literature, both prior to and subsequent to the article by Welch and Jackson (2007), revealed that research on the linkage between IC and EE is fragmented, lacks depth and has not evolved in a linear or

sequential manner.

More recently, attempts have been made to increase academic focus on the interaction between IC and EE. For example, Mishra et al. (2014) performed a qualitative study on the role of IC in driving EE. A shortcoming of this qualitative study is that the term EE is utilised in its business-normative sense, and no mention is made of consistency in the definition from an interviewee's perspective. Although the respondents indicated that they considered communication to be a driver of EE, this research could not be relied upon because of the lack of academic rigour in attempting to understand the respondent's definition of EE. This shortcoming in the qualitative study highlights the researcher's preference for a quantitative study.

Menguc et al. (2013) found that manager feedback had a positive effect on EE, thus highlighting the importance of line manager communication. Later, Karanges et al. (2015) conducted a pilot quantitative study on the influence of IC on EE, within the field of public relations as it was acknowledged that emperical research on the relationship between organisational and supervisory level communication, and EE was lacking in the academic arena. Based on a sample of 200 employees within a single organisation (which represented 10% of the population) it was noted that "internal supervisor communication accounted for 32.38% of the variance in employee engagement" (Karanges et al., 2015, p. 130). Building on the research in this domain, the linkage between direction of communication and EE was tested and it was concluded that high quality symetrical communication led to greater levels of EE and improved employee-organisation relationships (Kang & Sung, 2017). If IC has been defined as a significant contributor to EE, then it naturally leads to the research question of understanding the impact that new communicaton methods have on EE.

2.4.1 Link between Communication Technology and Employee Engagement

As discussed in Chapter 1, there is a paucity of research on the impact of technology applications and EE. However, there have been numerous studies on communication technology as a broad, overarching concept. Most of this research was focussed on the risks associated with communication technology (Gardner et al., 2017; Stich et al., 2018; Ter Hoeven et al., 2016). Communication technology (for example, e-mail and smartphones) has been positively correlated with home-life conflict, burnout, and stress, due to the distraction and lack of balance arising from being too accessible (Gardner et al., 2017; Stich et al., 2018; Ter Hoeven et al.,

2016). Sandoval-Reyes et al. (2019), in support of research on the negative effects, found that technology use resulted in work overload and an inability to mentally detach from work, resulting in ineffective recovery periods. Research on the positive outcomes has found that technology afford employees flexbility and direct accessibility to fellow co-workers (Ter Hoeven et al., 2016).

Ghislieri et al. (2017) studied the impact of off-work hours technology use on work-family interface and found support for both positive and negative effects. The study found that there was a positive correlation between (i) job demands (i.e., off-work hours technology use and work load) and work-family conflict and (ii) off-work hours technology use and work-family enrichment (Ghislieri et al., 2017).

The literature review reveals that many studies have focussed on the links between technology use and employee / organisational outcomes, however, none of the research has focused on the impact of technology-based instant messaging applications on employee engagement.

2.5   Frequency of communication

Frequency is a term used to describe the rate at which something occurs over a period of time (Cambridge Dictionary, n.d.). Frequency of communication varies depending on a number of factors such as social network characteristics, resources available for communication, geographical proximity, and time constraints (van den Berg et al., 2012).

Johlke and Duhan (2000) concluded that there was a positive relationship between frequency of supervisor communication and job satisfaction amongst service employees. This was supported by the findings of Jenkins and Delbridge (2013) who noted that employees who did not have the opportunity for frequent interactions with management, suffered from low morale.

Excessive use of smartphones has been found to be negatively associated with employee well-being, due to an employee's inability to mentally detach from the work context, during periods designated as recovery periods (e.g., during the holidays) Van Laethem et al., 2018). The biggest concern arising from the literature review (e.g., Gardner et al., 2017; Lutz et al., 2020) was the over-use and over-dependence on smartphones, thus highlighting frequency of communication as a risk to an employee's well-being.

Based on the above, it is concluded that optimal frequency of communication is

dependent on the specific circumstances of the employee and the organisation.

2.6   Modes of communication

Communication mode refers to the medium or channel of communication. These take the form of formal, informal, written, or verbal communication. Mode of communication is central to medium theory which is premised on the belief that the mode of communication has an influence over the following: (i) quality of the communication, (ii) the consequences of the communication, (iii) the perception of the recipient, and (iv) the probability that the sender's intention has been achieved (Welch, 2012).

Modes of communication are described as "rich" or "lean" (p. 126), where historically on the one end of the spectrum, rich media was considered synchronous face-to-face communication, whilst on the other end asynchronous text messaging was considered lean (Ishii et al., 2019). Daft and Lengel (1983) asserted that that the choice of communication channel should be influenced by the complexity of information communicated.

Verčič and Špoljarić (2020) conducted a study of 1 524 employees, to determine the impact of communication channels on IC satisfaction. This study analysed both organisation level (for example, town hall meetings) and team level communication (for example, team building meetings) The findings noted that there is a significant correlation between mode of communication and internal control satisfaction (Verčič & Špoljarić, 2020).

Oral and written communication have been positioned on opposite ends of the richness spectrum (Daft & Lengel, 1983; Maltz, 2000). These two modes of communication are explored in more detail below with a focus on face-to-face communication as the oral form of communication and computer-mediated communication as the written form.

2.6.1 Face-to-face communication

Face to face communication is information exchange that take place between individuals that are present in the same physical space. This is a commonly understood term in both professional and personal contexts.

328 participants, in a quantitative survey across a variety of industries, were asked about their preferred mode of communication with their supervisors and the actual volume of communication per communication channel (Braun et al., 2019). The

questionnaire provided a choice between e-mail, phone calls, face-to-face and other. The results reflected a preference for face-to-face communication with supervisors, followed by e-mail and then telephone (Braun et al., 2019). The study also tested the relationship between quality of the communication channel and its correlation with employees' impression of their supervisors and found that quality (as measured by clarity, leadership behaviour and reliability) was positively associated with perceived supervisor effectiveness. Even though this relationship was proved for all communication channels, it was most significant in face-to-face communication thus providing evidence that face-to-face communication is still considered the richest medium of communication (Braun et al., 2019). The authors explain that the likely reason for this phenomenon is that face-to-face communication has the advantage of multiple communication cues that are both verbal and non-verbal (Braun et al., 2019).

Lemon (2019) found that face-to-face communication emerged as a theme that impacted the EE experience. The trend amongst respondents indicated that dialogue was a precursor of EE and regular dialogue was required to maintain EE (Lemon, 2019). Participants also suggested that the face-to-face communication resulted in opportunities to build trust and create context "which lead to meaningful EE experiences rooted in dialogue" (Lemon, 2019, p. 188). Based on the literature review, there remains a preference for face-to-face communication based on studies that demonstrate a positive correlation between face-to-face communication and employee-related outcome variables.

2.6.2 Computer-mediated communication

When e-mail was first introduced, research focussed on the comparison between face-to-face communication and e-mail and found that the challenges with e-mail included the lack of nonverbal cues, recipient's inability to gauge emotional expression, and risk of ambiguous communication. This perception of challenges created the impression that face-to-face communication was most preferred (Derks & Bakker, 2010). In contrast, Mehra and Nickerson (2019) tested preference of communication channel amongst managers and found that face-to-face was not the most preferred mode of communication. On the richness spectrum moderately-rich media (e.g. video calls / chats) was preferred by all managers over rich (e.g. face-to-face meetings) and lean media (e.g. email) (Mehra & Nickerson, 2019). These juxtaposed findings reflect a lack of consensus in the literature regarding the preferred mode of IC.

In the past two decades, most research on computer-mediated communication (CMC) has focussed on e-mail due to it being the most widely used form of digital communication (Derks & Bakker, 2010). "Digital technologies are also changing the speed, mobility, and timeliness of communications" (p. 12) to the extent that even e-mail is considered slow and cumbersome (McKee & Porter, 2017). Although studies (e.g., Braun et al., 2019; Lemon, 2019) highlight face-to-face communication as the preferred mode of communication based on media rich theory, the emergence and use of emoticons and stickers in mobile instant messaging applications has significantly increased the richness of digital modes of communication (Hsieh & Tseng, 2016). Rather than resulting in technostress, as previously assumed, technology applications increase perceived playfulness, entertainment value and feelings of connectedness between participants (Hsieh & Tseng, 2016). Other benefits of digital channels are the low cost, speed of information flow and ability to establish and maintain contact over long distance (Kovaitė et al., 2020; van den Berg et al., 2012). With the blurring of work-related usage and social usage of instant messaging applications, further study is required to evaluate whether PSS and EE are impacted by the FoU of technology applications.

Research points to four relationships between face-to-face communication and computer-mediated communication, which can be summarised as follows: "substitution, complementarity, neutrality and modification" (van den Berg et al., 2012, p. 988). Substitution describes a scenario where an increase in computer-mediated communication results in a decrease in face-to-face communication (van den Berg et al., 2012). Based on the assessment of the literature reviewed, the researcher asserts that technology applications do not have the ability to act as a substitute of face-to-face communication. Therefore, it is hypothesised that FoU of technology applications moderates the relationship between the antecedents of EE and EE.

2.6.3 Preference for media rich communication

The preference for face-to-face communication can be explained by media richness theory, which was developed in the 1980s, and has at its core the belief that media richness can be determined by a set of objective characteristics (Daft & Engel, 1983). IC satisfaction was observed to be greater when the main form of communication was through rich and moderate media compared to lean media (Verčič & Špoljarić, 2020). These characteristics of media richness was explained by Daft and Engel (1983) as per Figure 3 below.

Information Richness	Medium	Feedback	Channel	Source	Language
High ↑	Face-to-Face	Immediate	Visual, Audio	Personal	Body, Natural
	Telephone	Fast	Audio	Personal	Natural
	Written, Personal	Slow	Limited Visual	Personal	Natural
	Written, Formal	Very Slow	Limited Visual	Impersonal	Natural
Low	Numeric, Formal	Very Slow	Limited Visual	Impersonal	Numeric

Figure 2. Characteristics of media that determine richness of information processed.

Figure 3: Characteristics of media that determine richness of information processed

Source: Daft and Lengel (1983)

With the advancements in technology, communication channels previously considered lean are being augmented with new features, resulting in richness of media not previously envisaged (Ishii et al., 2019). Consequently, in recent years, scholars have questioned the relevance of media richness theory (Ishii et al., 2019). Whist there is still relevance in the media richness theory, the criteria by which richness is analysed has evolved to include the subjectivity that arises from "social influence, accessibility, experience with the medium, symbolic meaning (e.g., phone for immediacy), etc." (Ishii et al., 2019, p. 128). Furthermore, advances in technology have enriched text messaging channels through enhancements in smart phone capability that meet the needs of technology-driven social needs (Ishii et al., 2019). Due to the complexity described above, it cannot be assumed that the most preferred mode of communication is face-to-face.

Media theory has since evolved to include media synchronicity theory which proposes that the individual's perception of importance of a communication channel is dependent on the communication patterns and behavioural norms of a team (Ishii et al., 2019). Media multiplexity theory having evolved from media richness theory offers another perspective by claiming that the relationship strength between employees is dependent on the number of communication channels utilised to maintain the relationship (Ishii et al., 2019).

26

2.7   Theoretical lens

The theoretical lens used in this study is the Job-Demands Resources (JD-R) Model, with support from the Technology Acceptance Model (TAM2). JD-R model has been used as the theoretical lens by Ghislieri et al. (2017) in research on the interaction between communication technology and work-life balance. It is argued that smartphones (as a tool) act as a conduit to job demands (e.g., requests for information or expectation of responsiveness) whilst also being a valuable resource by facilitating flexibility, accessibility, and social connectedness (Ragsdale & Hoover, 2016). Van Laethem et al. (2018) utlised the JD-R model for testing the relationship between smartphone use, workplace telepressure, engagement and psychological detachment, and concluded that smartphones are both a job demand and job resource. The technology itself is a neutral variable and takes on descriptor of demand or resource based on the reasons for its use and the impact on the psychological and physical wellbeing of the employee. As this research is seeking to understand the impact of technology applications on employee engagement, the JD-R model is considered appropriate.

2.7.1   Job demands-resources framework

Bailey et al. (2017) conducted a literature review on EE and revealed that the most widely utilised theory that has formed the foundation for the development of EE research is the JD-R framework. The JD-R framework is based on the premise that resources (e.g., culture, team environment, supervisor support, decision-making power) made available to the employee and the related demands (e.g., deadlines, role ambiguity, unsatisfactory work environment) of the job influence the level of engagement (Bakker & Demerouti, 2007; Radic et al., 2020; Rattrie et al., 2020). Job demands or resources can either influence employee engagement individually or combination with each other. Figure 4 below provides a visual explanation of the interaction between job demands, job resources and organisational outcomes (which includes employee engagement).
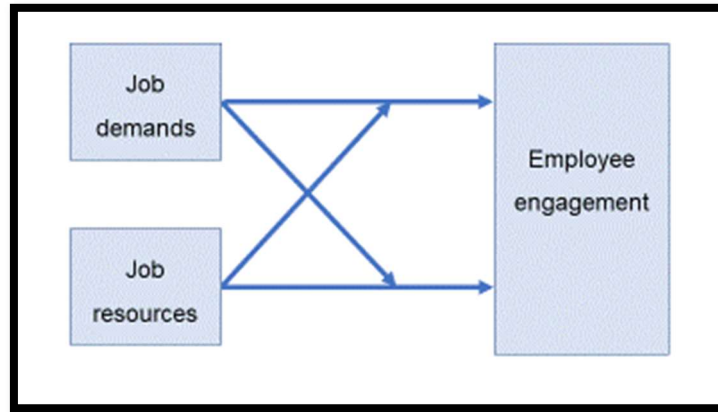
Figure 4: The Job Demands-Resources model (simplified)

Source: Author's own based on interpretation of research performed by Bakker and Demerouti (2007), Radic et al., 2020 and Rattrie et al., 2020

This study is focussed on the technology applications as the independent variable, and based on the literature review, there are two schools of thought on the classification of technology applications. In the context of communication technology, when it facilitates the enrichment of the individual's life, the technology is perceived as a job resource (Ghislieri et al., 2017). When communication technology is seen as invasive during off-work hours, it is perceived as a job demand (Ghislieri et al., 2017).

2.7.1.1 Job resources and job demands explained

Job resources are defined as those elements of a job that enrich an employee's work experience, reduces the effect of job demands, promotes growth, facilitates learning opportunities, and enables achievement of professional and work objectives (Demerouti et al., 2001).

Based on the literature the following variables have been identified and proven to be job resources: (i) coaching from supervisor (Ghislieri et al., 2017), (ii) communication technology (Ghislieri et al., 2017), (iii) autonomy (Van den Broeck, et al., 2017) and (iv) skills utilisation in a manner that provides variety in daily work life (Van den Broeck, et al., 2017).

Ragsdale and Hoover (2016) found support for the assertion that cellphones are a job resource, based on the employees' emotional attachment to the cellphone. Those employees that were attached to their cellphones, were more likely to have it integrated into their home life, thus leading the employee to perceive the cellphone as supportive, rather than invasive. Van Laethem et al. (2018) opposed this view and found that those employees who are unable to switch off from their smartphones did

not get enough recovery during their non-work hours. This had a negative impact on their availablity during work hours. Van Laethem et al. (2018) offered a more nuanced view that self-control was essential to deriving the maximum benefit of smartphone-as-a-resource.

Job demands are defined as physical, mental, or environmental stimuli, that when exerted on an employee, requires the exertion of sustained cognitive or physical effort to respond to the stimulus (Demerouti et al., 2001). Responding to the job demand creates an outcome or cost to the employee that is either mental (e.g., burnout) or physical (e.g., exhaustion) (Demerouti et al., 2001).

Based on the literature the job demands include the following: (i) unreasonable deadlines (Radic et al., 2020), (ii) micro-management by supervisors (Radic et al., 2020), (iii) smartphone use (Van Laethem et al., 2018), and (iv) role conflict (Saks & Gruman, 2014).

Radic et al. (2020) found that even though cruise-ship employees experienced multiple job demands, the negative effect of job demands did not have a negative impact on employee engagement. Radic et al. (2020) explains that the reasons for the lack of relationship between job demands and employee engagement is that these employees have developed mental coping strategies (including job resources) in response to the job demands. These mental strategies include (i) lowering expectations in anticipation of the long working hours, (ii) rationalisation of the working conditions as a trade-off for the financial benefits, (iii) and forming close social bonds with co-workers adjustments to expectations prior to joining the cruise ship. Lastly, Radic et al. (2020) observed a decoupling of employee engagement and well-being as evidenced by the acceptance of the hypothesis that there is a negative relationship between job demands and well-being (i.e., described as cheerful, calm, relaxed, energised and fulfilled). Therefore, leaders should not assume that employee engagement and well-being are collinear or positively correlated.

2.7.2 The extended technology acceptance model (TAM2)

A visual depiction of TAM2 has been reproduced in Figure 5. Understanding the location of communication technology within the context of JD-R model can be most suitably explained through TAM2. Technology applications can be viewed either as a job demand or a job resource. In applying the theory to technology applications, employees are likely to view technology applications as a job resource if it is

perceived as useful and easy to use by the employee. Ultimately, the ease of use and perceived usefulness drives the intention and actual usage of the technology (Venkatesh & Davis, 2000). This is influenced by the following antecedents: (i) subjective norm, (ii) image, (iii) job relevance, (iv) output quality, (v) result demonstrability (Venkatesh & Davis, 2000).
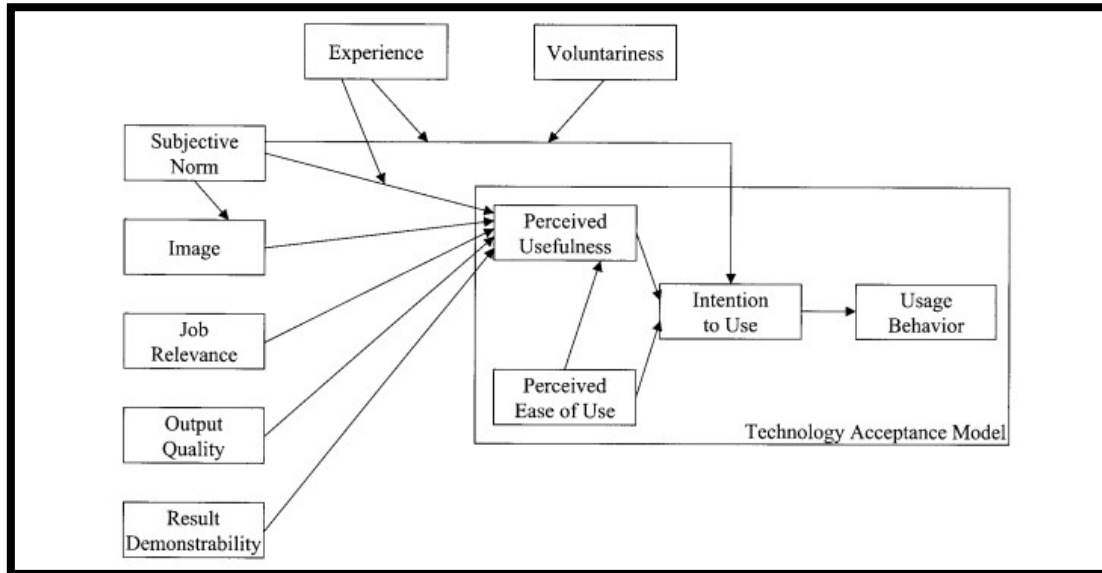
Figure 5: Technology Acceptance Model 2

Source: Venkatesh and Davis (2000)

2.7.3 Conclusion on the need for the JD-R model as a lens for this study

JD-R framework is considered appropriate as it is flexible in its approach to determining whether an independent variable (e.g., technology use, supervisor support) is valuable or harmful to an employee's engagement level. This flexibility in categorising variables into demands or resources, arises from the employee's perception of the impact of the variable. With regard to technology, the TAM2 offers the perspective that once technology use becomes second nature to an employee, the level of adoption increases, thus allowing it to become a job resource. However, from the literature review (e.g., Van Laethem et al., 2018), it is evident that a job resource can become a job demand if not managed and controlled.

2.8   Antecedents of Employee Engagement

2.8.1   Psychological Climate

Psychological climate (PC) refers to the perception that employees have of the work environment (Brown & Leigh, 1996). PC is posited as an indicator of the employee's

perception of psychological meaningfulness and safety, therefore, forms a foundation for EE (Brown & Leigh, 1996). Shuck et al. (2011) tested the relationship between PC and discretionary effort (DE) and found that DE was likely to decrease in the absence of perceived managerial support. Supervisors are usually approached for workplace support, and an absence of supervisor support can be detrimental to PC (De Cieri et al., 2019). Furthermore, negative supervisor communication (e.g., workplace bullying) can have a detrimental impact on the psychological climate (De Cieri et al., 2019).

2.8.2 Affective Commitment

Affective commitment (AC) is a term used to describe an employee's emotional attachment to the organisation (Rhoades et al., 2001). AC contributes to the employee's dedication, loyalty, desire to remain with the organisation and DE (Rhoades et al., 2001). Yalabik et al. (2013) found that affective commitment influenced work engagement as measured by the Utrecht Work Engagement Scale (UWES). Whilst affective commitment is considered an antecedent of EE, more recently, it has been identifed as an outcome of perceived organisational support (Nazir & Ul Islam, 2017) and inclusive leadership (Choi et al., 2015). The research conducted on AC point to the generally accepted assertion that employees' with positive emotional feelings towards an organisation will demonstrate greater commitment to the organisation's objectives.

Hansen et al. (2014) demonstrated that the interpersonal leadership skills of management (e.g. fairness in treatment of subordinates, openess, respect) led to affective commitment, thus proving that IC had a positve impact on an employee's feelings towards the organisation. Similary, Choi et al. (2015) found that affective commitment mediates the relationship between an open, communicative leadership style and EE.

2.8.3 Perceived Supervisor Support

Perceived supervisor support (PSS) is a concept that has evolved from perceived organisational support (POS). POS is rooted in organisational support theory and encapsulates the employee's perception of the level of care and commitment received from the organisation (Eisenberger et al., 2002; Kottke & Sharafinski, 1988; Rhoades & Eisenberger, 2002). PSS is the impression that employees have about the level of support that is received from supervisors (Kottke & Sharafinski, 1988).

Although an organisation is not a living being, it is argued that employees associate the organisation with the agents who conduct business on behalf of the organisation (Rhoades & Eisenberger, 2002). In a cross-sectional study of 506 employees across a wide range of industries, Men and Yue (2019) observed that a manager who utilised a responsive style of communication, positively influenced workplace behaviour and emotions of employees. In addition, they found that as a result of the positive influence of a responsible style of communication, employees, in their communication with external stakeholders, were more likely to advocate for the organisation (Men & Yue, 2019). To add to this finding, Jin and McDonald (2017) found that PSS had a positive impact on EE and POS. Thus, the behaviour of supervisors and managers has an impact on how an organisation is perceived and the level of engagement demonstrated by the employee. Eisenberger et al. (1986) recommends that POS can be increased through "praise and approval" (p. 504) which is a form of inter-personal communication. Full-time employees spend the majority of their day within the workplace. The nature of the supervisor-subordinate relationship is such that a supervisor is expected to communicate the goals of the organisation, the requirements task objectives, provide feedback on performance and contribute to the overall work environment (Mikkelson et al., 2019). Therefore, it is theorised that the relationships with supervisors and co-workers have an impact on the level of EE. In a study of 1 039 nursing and related professionals, it was noted perceived supervisor support had a direct correlation with EE (Holland et al., 2017).

Frequency and modes of communication are posited to have an impact on the perceived supervisor support due to the nature of supervisor-subordinate relationships. The literature review revealed extensive research on the relationship between style of supervisor communication, change-related communication, crisis communication and the employee's perception of PSS.

2.9   Outcomes of employee engagement

The research performed in the area of EE revealed numerous outcomes at an individual, team and organisational level. At an individual level, some of the common and widely tested outcomes are (i) discretionary effort, (ii) intention to quilt, (iii) organisational commitment, (iv) job satisfaction, (v) job performance, (vi) perceived stress, (vii) burnout, (viii) well-being, and (ix) life satisfaction (Bailey et al., 2017; Shuck et al., 2011). The purpose of this study is to focus on the individual outcomes and these have been narrowed down to the two outcomes identified by Shuck et al. (2011), as explained in section 2.9.1 and 2.9.2 below.

2.9.1 Discretionary effort

DE in layman's terms is best captured by the phrase "to go the extra mile" (Collins Dictionary, n.d.). Whilst DE itself is not an observable behaviour, the activities associated with discretionary effort can be observed (Lloyd, 2008). Importantly, discretionary effort cannot be enforced, therefore, is a construct that is separately identifiable from performance (Lloyd, 2008). Examples of DE include (i) exerting oneself, (ii) sacrificing personal time to complete a task, (iii) voluntarily working additional hours without remuneration, (iv) working harder than usual and (v) not giving up when dealt a setback (Lloyd, 2008). In their sample of 283 employees, Shuck et al. (2011) found that PC, AC, and job fit were predictors of DE, thus concluding that when employees perceived managers as more supportive, the level of DE is likely to increase.

2.9.2 Intention to turnover

"Turnover is the movement of members across the boundary of an organisation…" (Price, 2000, p. 600). The research on intention to turnover (ITT) is typically from the perspective of an employee's voluntary intention to quit an organisation (Price, 2000). Voluntary ITT is believed to have a negative impact on an organisation's performance and efficacy (Price, 2000). In a study on 304 teaching staff at a university, Afzal et al. (2019) observed that PSS did not have a direct impact on intention to turnover. However, when supervisor support creates a sense of self-efficacy within the subordinate, the resulting effect is a decrease in ITT (Afzal et al., 2019). A supervisor's support is generally expressed through mentoring, coaching, words of encouragement and feedback, which are examples of communication. Therefore, one would expect that communication has a relationship with ITT.

2.10 Conclusion of Literature Review

Communication is central to inter-personal relationships and feelings of trust and support in the workplace. The literature review reveals depth of research on the topics of EE and the need for robust IC strategies and frameworks. Research on technology use has revealed conflicting views on whether communication technology is a job demand or a job resource. The classification of smartphones as job demand or job resource is dependent on the employee's perception of the smartphone. Whilst the impact of smartphones on employee well-being has been investigated, there is a paucity in research on the implications for employee engagement. With the increase in richness of technology applications, it is possible that modes of communication

that previously existed on opposite ends of the richness spectrum are starting to converge towards a single point on the richness spectrum. As a result, there is a need to understand whether face-to-face communication is still preferred over CMC. The aim of this research is to obtain empirical evidence to understand the impact of technology applications on employee engagement.

Chapter 3: Research Hypotheses

3.1 Introduction to the hypotheses

The over-arching question that this research seeks to understand is how the FoU of technology applications affects EE, since it has been punted in the literature that modes of communication have an impact on EE. The hypotheses itemised below has been formulated to support the overarching question.

3.2 Hypothesis one

The objective of hypothesis one is to evaluate whether a relationship exists between the FoU of technology applications and psychological climate, affective commitment, and perceived supervisor support (antecedents of EE). Each of the antecedents has been hypothesised individually as sub-hypothesis to allow for simplified and clear testing and reporting of results.

> H_{01a}: *There is a relationship between the FoU of technology applications and PC*

> H_{01b}: *There is a relationship between the FoU of technology applications and AC*

> H_{01c}: *There is a relationship between the FoU of technology applications and PSS*

3.3 Hypothesis two

The objective of hypothesis three is to evaluate whether the frequency of use of technology-based instant messaging applications moderates relationship between PC, AC and PSS (together the antecedents) and EE.

> H_{02}: *The FoU of technology applications moderates the relationship between the antecedents of employee engagement (identified as psychological climate, affective commitment, and perceived supervisor support) and employee engagement (EE) (identified as meaningfulness, safety, and availability)*

3.4 Hypothesis three

The objective of hypothesis three is to evaluate whether the frequency of use of technology-based instant messaging applications moderates relationship between

EE and the outcome variables of EE.

> H_{03}: *The FoU of technology applications moderates the relationship between EE and the outcome variables (discretionary effort and intention to turnover)*

3.5 Conclusion

The location of the hypothesis within the constructs is displayed in Figure 6 below.
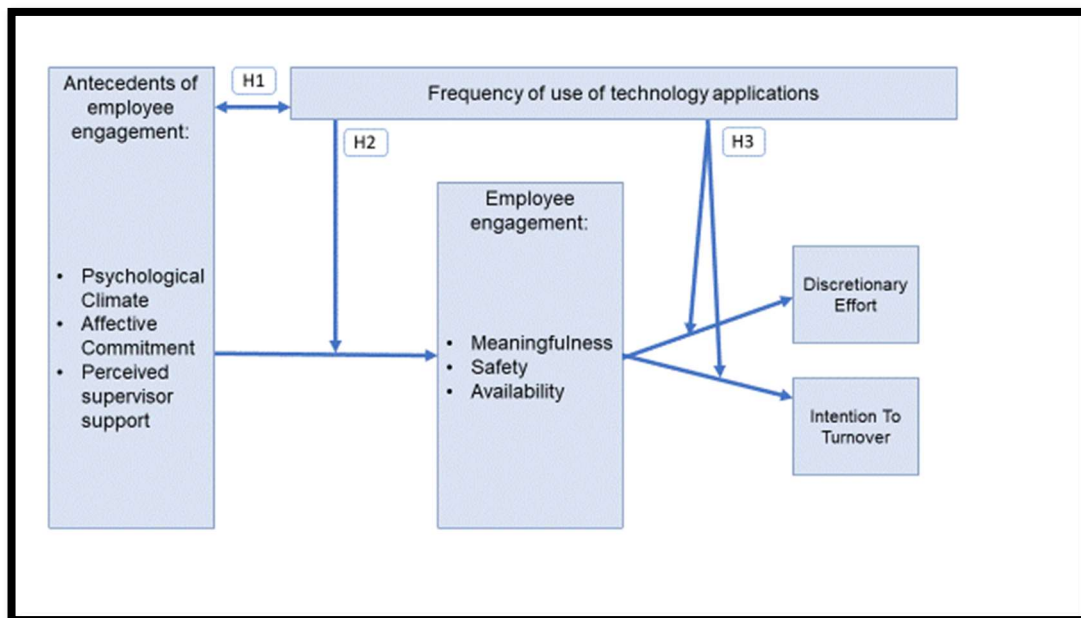
Figure 6: Visual representation of hypotheses in context of literature review

Source: Own construct (2021)

The methodology applied in conducting the research on the hypothesis is explained Chapter four.

Chapter 4:   Research Methodology and Design

4.1   Introduction

This study was designed to understand whether communication between employee and supervisor through technology applications influenced EE. This chapter outlines the philosophy that underpins the research and the research process that was followed in arriving at the results and conclusion.

A research route starts from the philosophy and ends with the collection and analysis of data (Saunders & Lewis, 2018). It is expected that a logical thread is maintained as the researcher travels from philosophy to the conclusion of the data analysis (Saunders & Lewis, 2018). This golden thread of logic gives the research credibility which is an essential characteristic of a successful research endeavour (Saunders & Lewis, 2018).

4.2   Research philosophy

Research philosophy is located on a continuum that ranges between the subjectivist and objectivist positions (Holden & Lynch, 2004). A subjectivist philosophy is underpinned by the belief that the knowledge is relative, and human beings are responsible for crafting their reality, whereas the objectivist approach is based on the belief that the real world existed prior to the existence of human beings (Holden & Lynch, 2004). Therefore, an objectivist approach to research is to observe the environment and then generalise or draw conclusions from measurable data (Holden & Lynch, 2004; Saunders et al., 2019). Since research philosophy is found within a range, it is necessary to choose a point on the continuum from which to start the research journey. The literature review has highlighted many theories have been extensively tested in prior research. Therefore, the research has been approached from the perspective that the theory exists but requires verification (Punch, 2013), which is typical of an objectivist approach.

On the objectivist end of the spectrum is the positivist philospohy which has been selected as the foundation for this research. This is aligned with the researcher's values and beliefs that research should be based on pure, observable data (Saunders & Lewis, 2018). The intention of the research was to study observable data to draw conclusions and appropriate generalisations, which is a foundation of the positivism philosophy (Saunders et al., 2019). The research is based on data collected from an on-line anonymous survey, which affords the researcher the

opportunity to remain neutral in the data collection process, which is an important objective of a positivist (Saunders & Lewis, 2018). The researcher's preference is to validate findings with statistical data, which points to a bias towards quantitative studies.

4.3　Research Methodology and Design

Many theories (e.g., JD-R model, social exchange theory, TAM2) exists in the realm of EE and IC as noted from the literature review (Blau, 1964; Demerouti et al., 2001; Venkatesh & Davis, 2000). Consequently, a deductive approach was adopted which is characterised by rooting the research questions (i.e., the impact of technology applications on employee engagement) in the existing literature (Kahn's (1990) definition of employee engagement), aligning questions with the theories (i.e., selection of measurement scales for dependent variables that were already designed and previously tested), collecting, and analysing data, resulting in the confirmation of the initial theory or a modification to the existing theory (i.e. identification of whether technology applications impacts employee engagement) (Saunders & Lewis, 2018).

The overarching research questions was designed to understand the impact of FoU of technology applications on employee engagement. This was designed to be answered through the use of a structured survey. Interaction between the researcher and the research participant was limited to the researcher's request for participation via direct and indirect methods. Direct methods involved e-mail, WhatsApp, and LinkedIn direct messages to the individual targeted for a response. Indirect methods included public posts on social media. Thus, the risk of influencing the participant's response was practically eliminated, which further supports the concept of a neutral and bias-free perspective (Saunders et al., 2019, p. 147).

Data was collected utilising one method, commonly referred to as a mono method (Saunders & Lewis, 2018). Due to the selection of mono method, all data was collected through on-line surveys only. This is classified as a mono method quantitative study, where only a single collection technique is employed to collect the data (Saunders & Lewis, 2018). As this is a quantitative study, the measurement instrument would typically comprise survey, experiments, or case studies. A survey strategy was adopted to collect data. This is a popular method for collecting a high volume of data for quantitative analysis (Saunders & Lewis, 2018).

Self-completed on-line questionnaires enabled the researcher to reach a greater sample of participants compared to interviewer-administered surveys. The choice for

the on-line tool was Google Forms, an on-line, free survey tool commonly used for research. Mono method quantitative studies are more precise than qualitative studies due to the prescriptive nature of the survey method of data collection (Saunders & Lewis, 2018). To allow for some exploratory data collection, a free text, optional section was added to the end of the questionnaire which allowed participants to make any comments that they wished to do so. Of the 200 qualifying responses received on the survey, only 58 participants chose to add comments in the free text section. From the 58 comments, 36 comments were either "No", "None", "No thanks", "No comment", "Not really" or "No worries". The high level of non-response on the free text section may be attributed to a lack of interest in contributing new insights to the survey or could be that respondents have survey fatigue as the survey was conducted at the end of the year. The low level of response on the free text section provides further evidence of the appropriateness of a survey method rather than an interview approach.

The research was done at a single point in time which is referred to as a cross-sectional study (Saunders & Lewis, 2018). The short period of time between submission of the research proposal and the submission of the thesis, precludes the option of a longitudinal study, which would require a longer timeframe. The purpose of the study usually guides the design and method. In this case, purpose of the study was to understand the relationship between FoU of technology applications between employees and their managers/supervisors and EE. Thus, the research purpose is primarily explanatory in nature with a minor focus on descriptive research (Saunders & Lewis, 2018). Explanatory studies focus on the discovery of relationships between distinct variables (Saunders & Lewis, 2018). In this study, the researcher is examining the relationship between antecedents of EE, EE, outcomes of EE and FoU of technology applications. Each of these constructs represent distinct variables.

Descriptive studies are characterised by an analysis of measurable data (Saunders & Lewis, 2018) that describes the reality of the current circumstance and environment (Hair et al., 2019). For example, one of section of the survey asks for the employee's most and least preferred mode of communication. The purpose of this question is to objectively identify the communication channels that are most and least preferred and to then utilise that information in explanatory study to determine whether the frequency of use of the most and least preferred modes of communication provides context to the results in Chapter 5.

4.4   Population

The targeted population of this study are individuals employed within the manufacturing sector of South Africa, who utilise technology applications in communicating with their supervisor / manager. Based on the latest employment statistics available around the time of the early phase of data collection, there were an estimated 1,1 million individuals employed in the manufacturing sector in South Africa (Statistics South Africa, 2020). This number represented the maximum sampling frame (Saunders & Lewis, 2018), although it is not possible to determine the actual sampling frame due to lack of available statistics from any recognisable institution in South Africa. Smartphone penetration in South Africa was estimated at 91.2% in 2019 (Independent Communications Authority of South Africa, 2020). Due to the pervasive adoption of smartphones in South Africa, it was assumed that all employees within the manufacturing sector have access to mobile technology and utilise a smartphone within their work environment. From the responses received on the survey, it was noted that only eight respondents indicated that they do not use technology applications in the workplace. This represented only 4% of the respondents. On that basis, the researcher's assumption that the population be defined as all employees within the manufacturing sector was proved to be a reasonable and supportable assumption.

4.5   Unit of analysis

Employee engagement is a variable applicable to an individual. Employee engagement is evaluated at an employee's individual level as it is based on the individual's state of mind. The data collection (by individual) supported the individual unit of analysis, thus ensuring consistency between data analysis and unit of analysis.

Whilst there was inconsistency on whether employee engagement is an individual or organisational level variable (Shuck and Wollard, 2010), the conclusion from the literature review is that it starts with the employee and the individual experience, therefore, it is more appropriate to be analysed at an individual variable rather than an organisational-level variable. This research is aligned with this ideology. Therefore, the unit of analysis is the individual.

4.6   Sampling method

The ideal starting point for sample selection is a list with a defined list of individuals

that comprise the population (Blair & Blair, 2015), which allows for a probability sampling technique (Saunders & Lewis, 2018). In the absence of a list, the researcher is required to resort to non-probability sampling techniques such as convenience, snowball sampling and self-selection sampling (Saunders & Lewis, 2018). The sampling method was convenience, combined with snowball and self-selection sampling (Saunders & Lewis, 2018, p.146-147) as the size of the target population could not be determined with accuracy and there was no publicly available comprehensive list of individuals employed within the manufacturing sector in South Africa. This was considered appropriate as the researcher could not identify every individual within the sample.

Snowball sampling is a method of data collection, where an appropriate respondent is identified to assist with identification and further respondents (Saunders & Lewis, 2018). In this way, the researcher hoped that the questionnaire would gather momentum as each person who was approached to complete the survey was requested to volunteer other members of the target population.

4.7   Sample Size

The population total is not known, as it is not possible to obtain a reliable estimate of total number of employees in the manufacturing sector who utilise technology applications. For correlation and regression analysis, a sample of 50 is considered reasonable (VanVoorhis & Morgan, 2007)). Furthermore, for a factor analysis, 200 is considered acceptable (VanVoorhis & Morgan, 2007). Similar quantitative studies were reviewed to identify the sample size obtained by those researchers in order to determine the desired sample size. Shuck et al. (2011), in their correlational study of employees across a range of industries in the United States of America, achieved a sample size of 283 individuals. In an EE and wellbeing study that targeted healthcare workers globally, a sample size of 217 was achieved (Shuck & Reio Jr, 2014). In their study on the mediating effect of technology appraisal on the relationship between exposure to technology and burnout, Salanova and Schaufeli (2000) utilised a sample of 202 respondents. In research requiring a linear regression analysis, Karanges et al. (2015) utilised a sample of 200 respondents.

Considering the guidance above, the researcher targeted a response rate of 200 responses, which is within the range of previous studies and recommendations from statistics experts (VanVoorhis & Morgan, 2007). In conclusion, the key point regarding sample size is that there is subjectivity in determining quantitative sample sizes in business research (Bartlett II et al., 2001). Therefore, adequate disclosure

of the researcher's thought process should be made so as to allow the reader to form their own assessment of the researcher's assumptions and methodology (Bartlett II et al., 2001).

4.8 Measurement Instrument

The measurement instrument was an electronic, on-line survey form created in Google Forms. The survey was structured as follows:

Section one: This section contained the consent form and an explanation of the purpose of the research. Respondents were advised that completion of the survey equated to consent to participate.

Section two: A screening question was included up-front to ensure that only those employees within the manufacturing sector in South Africa were included in the results. For descriptive statistics, this section included a question to identify which sub-category of manufacturing sector, and whether the respondent was employed in manufacturing sector for more than one year.

Section three: This section included all the questions related to psychological safety, psychological meaningfulness, psychological availability, psychological climate, affective commitment, discretionary effort, and intention to turnover. Surveys identified and tested in previous research studies were utilised to enhance the credibility of the research. The survey questions were drawn from the sources reflected in Table 3 below:

Table 3: Source of survey questions

Construct	Source of questions
Psychological meaningfulness	(May et al., 2004)
Psychological safety	(May et al., 2004)
Psychological availability	(May et al., 2004)
Psychological climate	(Brown & Leigh, 1996)
Affective commitment	(Eisenberger et al., 2001)
Discretionary effort	(Lloyd, 2008)
Intention to turnover	(Colarelli, 1984)

Source: Author's own (2021)

Literature review revealed that the UWES questionnaire is a more popular measurement instrument utilised by researchers in the domain of EE. Rich et al. (2010) rejected the use of UWES in favour of other measurement instruments for the reason that UWES did not link directly to the individual sub-constructs within

EE. Bailey et al. (2017) in their narrative synthesis, based on a review of 214 studies (of which 172 were empirical studies), found that UWES was utilised in 86% of empirical studies. However, even though it is the most popular measurement tool, several researchers observed that there are questions about the discriminant validity of the sub-constructs (being vigour, dedication, and absorption) within the UWES model. Taking into consideration the points noted above, and the need to remain aligned with Kahn's model of EE, the UWES questionnaire was relegated in favour of the measurement instruments noted in Table 3 which were more directly linked to Kahn's (1990) definition of EE and Shuck et al. (2011) model of antecedents and outcomes of EE.

Section four: The questions in this section relate to the effectiveness of the communication between the employee and their supervisor / manager, including the perception of the support that is received from the supervisor. It was explained in the introduction to the section that a manager (sometimes referred to as a supervisor) is the person that the employee is accountable to and reports to directly on a day-to-day basis. These questions were drawn from two sources that measured perceived supervisor support (DeConinck & Johnson, 2009) and interaction supportiveness (Rhee & Moon, 2009). Based on a review of the wording of both surveys, it was noted that there were overlapping questions. Both sets of questions focussed on the managers behaviour and attitude towards the employee. For example, the DeConinck and Johnson (2009) PSS survey asked about the manager's willingness to help, manager's consideration of the employee's goals and values, and wellbeing and whether the manager has a sense of pride in the employee's mind. The Rhee and Moon Interaction Supportiveness' survey focussed on supervisor behaviour that demonstrated support (for example, manager listening skills, manager's ability to clarify top-down communication and give clear instructions. The common factor in all the questions was the manager (both attitude and behaviour). Both surveys have received support since their introduction. Lee and Kim (2021) utilised seven questions from the Rhee and Moon survey in their quantitative study of 405 full-time employees in the United States. The measurement scale was tested for internal consistency through the Cronbach's alpha which equated to 0.901, thus demonstrating that the measurement scale was reliable.

The survey for PSS was derived from the original 36 item Survey of Organisational Support (SPOS). Worley et al. (2009) noted that there is strong relationship between the eight-item version, 16-item version, and the 36-item version of the

SPOS. Therefore, the use of either the eight-item version or 16-item version is justifiable. Due to the number of survey items, in aggregate with the other constructs to be tested, the eight-item version was utilised. For the purpose of testing supervisor support, the word "supervisor" was inserted in the survey in place of "organisation". Rhoades and Eisenberger (2002) observed that this is a common trend amongst researchers who measure perceived supervisor support.

Section five: This section sought to obtain data on the frequency of use of various communication channels in the communication between the employee and the supervisor. The channels of communication were included as pre-selected options with a frequency choice that ranged from never to multiple times a day.

Section six: This section was a multiple-choice section where employees were asked to choose their most preferred and least preferred mode of communication. The choices were between the following options: (i) Face-to-face – informal meetings, (ii) Face-to-face – formal meetings, (iii) E-mail, (iv) Phone call (landline / cellphone), (v) Video call (e.g., Microsoft Teams, Zoom) or (vi) Technology-based messaging apps (for example, WhatsApp, Messenger, Slack, Notion).

Section seven: Participants were asked to provide demographic information such as job level, education level, race, age, and gender, to allow for a granular analysis of the results and comparison of the sampled population to the target population (Lavrakas, 2008).

Section eight: This section was a simple free text section which invited participants to post comments, suggestions or recommendations related to the research. This was the only section of the survey that was categorised as optional.

The questions were designed in a manner that facilitated ease of completion by requiring the respondent to select their answers from a pre-determined list of options. This allows for standardisation of responses, which facilitates statistical analysis of data. For example, section two included a question designed to identify which sub-sector, within the manufacturing sector, the respondent worked in. Rather than an open, free text field, a pre-defined list was provided which standardised the descriptive statistical analysis. The question in section eight was deliberately defined as a free text, optional field to allow for expression of any views that were not encapsulated in section one to seven.

The questions in section 3 and 4 utilised a Likert scale. A Likert-scale is an interval

scale and considered numeric for statistical analysis purposes (Greener, 2008). Likert-scales have been used previously in quantitative studies on EE (Anitha, 2014). According to Nemoto and Beglar (2014), the advantages of Likert-scale questionnaires include the ease and speed with which data can be collected from a large number of respondents. For consistency in the data analysis phase, a 5-point scale was used for all Likert-scales in the questionnaire. The disadvantage of a Likert scale is that the respondent has no choice but to select one of the pre-populated options for answering the question. This answer may not be the exact preference, thus resulting in the Likert scale not capturing the precise response to the question (Kandasamy, et al., 2020). That being said, the Likert scale has been used to increase the ease of use of the questionnaire and facilitate standardised data analysis.

The entire questionnaire has been reproduced in Appendix A.

4.9   Ethical considerations

During the course of building the business case for the research, the ethical considerations centred around the following themes: (i) aim of the research, (ii) type of research, (iii) rights of the research participants, and (iv) obligations of the researcher.

(i) Aim of the Research

The research purpose was to understand the impact of FoU of technology applications on EE. The topic was within the field of business research and was applicable to employees over the age of 18 within the manufacturing sector. None of these factors gave rise to ethical concerns. The researcher does not have any conflict of interest in this study.

(ii) Type of Research

The research was designed to be non-invasive, with data gathered solely via the on-line link, on the basis of informed consent.

(iii) Rights of the research participants

Informed consent explained that the survey was voluntary, that the participant could withdraw from the research without penalty (at any time prior to final submission) and that no names would be recorded, to ensure anonymity. The research participants

also had the right to ignore the survey request, without being harassed or coerced by the researcher.

The researcher considered the sensitivity of demographic information by including an option of "prefer not to say" for the following categories of information: (i) gender, (ii) education level achieved, (iii) English as a first language, (iv) position in the organisation, (v) functional area that the employee works within. This option provided the research participant with additional ways to maintain anonymity by limiting traceability from this information. Information about the respondents' racial classification was not included as it was not considered relevant to the survey.

(iv) Obligations of the researcher

No rewards were offered for assisting with snowball sampling or completion of the questionnaire. The researcher included only those questions considered to be relevant to the topic and that the time estimate provided as a guide was realistic and not misleading. Most importantly, the research did not commence data collection until ethics clearance was received from the University of Pretoria. Ethics clearance e-mail has been included in Appendix E.

4.10   Pre-testing the survey

To enhance the quality of the survey, a survey should be tested pre-tested to establish whether participants comprehend the questions in a consistent manner, as intended by the researcher (Anitha, 2014; Collins, 2003; Karanges et al., 2015). In the research conducted by Shuck (2010), the "Tailored Design Method" (p. 72) was utilised to incorporate quality control into the pre-survey process. This approach was adopted in preparing for the survey. The questions were piloted with five individuals who utilise communication technology in the workplace. Any ambiguity, confusion or inconsistency identified through this process was addressed prior to the survey being rolled out to the sample population. Pre-testing is used to test for "content validity" (Karanges et al., 2015, p. 130). The pre-testing also guided the estimation of the time required for a participant to complete the survey. After pre-testing, the survey was modified and tested again before mass distribution of the survey.

4.10.1 Results of the pre-testing

The table below summarise the significant feedback comments received and how the feedback was actioned in formulating the final survey.

Pilot survey feedback	Impact on final survey
The survey was too long, and not user-friendly. There were no explanations leading into the survey questions.	Sub-sections were created to improve user-friendliness. The number of questions were reduced, whilst still maintaining the essence of the research.
Some questions were repetitive. For example, the following questions were recommended for removal from the final survey: "The work I do on this job is worthwhile" and "My job activities are significant to me".	Repetitive questions were removed.
The terms boss, supervisor and manager were used inter-changeably. It was recommended that reference to "boss" be replaced with supervisor / manager to avoid confusion.	References to "boss" were replaced.
Minor grammatical errors were noted.	Grammatical errors arose due to the researcher using the original survey, without modification for local conditions. This was corrected in the final survey.

Source: Author's own (2020)

4.11 Data Collection Process

The questionnaire was set up in Google Forms, a free platform for on-line surveys. To maintain the anonymity of the participants, no e-mail addresses or respondent identifiers were collected. The objective of the questionnaire was to obtain primary data, which is defined as data that is collected for the sole purpose of the study being conducted (Saunders & Lewis, 2018). Secondary data, which is data that has originated from other sources (Saunders & Lewis, 2018), was not utilised in this study. Data was collected between 26 November 2020 and 7 March 2021.

4.11.1 Questionnaire distribution

The researcher works in the automotive component manufacturing sector, therefore has an existing network of contacts within the sector. In an attempt to gather momentum for the survey convenience sampling was adopted and individualised messages were sent within the researcher's network on LinkedIn, WhatsApp, and e-mail. A minimum of 100 requests personalised requests were made through this method. Even though the survey was anonymous, many of the participants responded to indicate that they had completed the survey.

Self-selection sampling technique was employed on Facebook and LinkedIn social

media sites. The researcher's network was encouraged to like and share the posts, to further extend the reach of the request for participants. The Facebook post was done on 1 December 2020 and was liked six times and shared ten times. The LinkedIn post was done four times in December 2020 on the researcher's profile and one post was done to an alumni group (PricewaterhouseCoopers (PwC) employees and alumni – unofficial group) that the researcher belonged to. The researcher reached out to the automotive component sector industry body, National Association of Automotive Component and Allied Manufacturers, who agreed to distribute the survey to members on their distribution list. This e-mail was distributed on 7 December 2020. The researcher reached out to additional industry bodies (namely The Southern African Footwear & Leather Industries Association, The Steel and Engineering Industries Federation of Southern Africa, The South African Paint Manufacturing Association, The Paper Manufacturers Association of South Africa, and the eThekwini Maritime Cluster) to solicit a similar agreement to distribute the survey to members on their distribution list. However, this effort did not yield the desired result.

4.12   Data Analysis

The data from Google Forms was downloaded into Microsoft Excel and filtered for respondents who confirmed that they were employed in the manufacturing sector, per the screening question in Section two. Of the 208 responses, 200 indicated that they were employed in the manufacturing sector in South Africa. The dataset applicable to these 200 responses were uploaded into IBM SPSS for statistical analysis. Data was then coded to facilitate the analysis.

4.12.1 Identification and management of missing data

Google Forms has the option to set questionnaire responses as required or optional. Sections one to seven of the questionnaire was set as required responses to ensure Google Forms has the option to set questionnaire responses as required or optional. completeness of the responses. Section eight, being the free text section asking for comments was deliberately marked as optional as it was incidental to the research objective. As part of the due diligence on data integrity, each column of the dataset (comprising the 200 responses from employees in the manufacturing sector) was inspected to identify missing fields. The researcher did not expect to find missing responses in section one to seven due to the fact that the required option being selected at the time of creating the questionnaire on Google Form.

On further investigation it was noted that Google cloud had experienced data loss in December 2020, which could have had a bearing on the completeness of the data. The impact of missing data was considered insignificant because there were only 6 missing fields in the entire dataset. These missing fields were limited to Section 5 of the questionnaire which asked about the frequency of use of the various modes of communication. These data fields were for questionnaires six different questionnaires that were completed between the 26 November 2020 and 18 December 2020. It was announced on 15 December 2020, that Google experienced a service outage that may have resulted in data loss. This is the most plausible reason for the missing data fields, given that these were mandatory fields in the data collection questionnaire.

Table 5: Missing data in Section 5, Modes of Communication

Data field	Number of missing inputs	% of final sample size	Mean
Frequency of use of Technology-based messaging apps (for example, WhatsApp, Messenger, Slack, Notion)	1	0.5%	4.33
Frequency of use of Video call (e.g., Microsoft Teams, Zoom)	1	0.5%	3.68
Frequency of use of Phone call (landline/cell phone)	2	1.0%	4.15
Frequency of use of Face-to-face - formal meeting	2	1.0%	3.69

Source: Author's own (2021)

4.12.2 Methodology for imputed results

Missing data is not unusual in quantitative studies. A common method for disposing of this issue is to insert the mean result for the missing data. Due to the fact that the missing data represented up to 1% of each of the four variables, imputation by mean was applied to create the data for the missing field. This approach meant that the questionnaires could remain in the sample rather than opting for deletion of those questionnaires. The applicable means that were utilised for missing data is disclosed in Table 5.

4.12.3 Final sample size

There were 208 responses to the survey of which 200 respondents indicated that they worked in the manufacturing sector. Therefore, the remaining 8 responses were

discarded in compiling the final sample. Of the 200 relevant responses, the data was complete, except for 6 item responses, which was addressed through the utilisation of imputed mean. The final sample size was therefore 200, which met the minimum required sample size that was indicated in section 4.5 above.

4.13   Analysis Approach

Prior to analysing data, it is necessary to identify the nature of the data. The questionnaire was designed to collect categorical and numerical data. Categorical data is divided further into nominal and ordinal data (Saunders & Lewis, 2018). Nominal and ordinal data was collected to provide descriptive statistics. Numerical data was used to test the hypotheses.   To add to the richness of the research findings, frequency, mean, and standard deviation were calculated for the demographic variables. This information is presented in graphical and tabular format, as appropriate.

4.13.1 Construct validity

Construct validity is defined as "the extent to which the questions asked actually collect the data about what they are intended to measure" (Saunders & Lewis, 2018, p. 149). For the survey questions related to EE and perceived supervisor support, existing questionnaires from academic literature were utilised. These questions have been used previously and found to be robust and directly linked with the objective of the research. For each sub-construct within EE and perceived supervisor support, a computed variable called "Item_Total_Variablename" was created which grouped the individual questions within that construct into one variable. The following item totals were created: (i) Meaningfulness, (ii) Safety, (iii) Availability, (iv) Psychological climate, (v) Affective commitment, (vi) Discretionary effort, (vii) Intention to Turnover and (viii) Perceived supervisor support. To establish validity, a bivariate correlation using Pearson correlation coefficient was executed in SPSS to assess whether there was internal validity.   Where significant correlation was established (i.e., less than 0.05), the item total was accepted. For frequency and modes of communication, questions were designed by the researcher based on the objective of the research. These were the independent variables in the research and comprised unique questions that were not suitable for grouping, therefore there was no need to perform internal validity tests. Table 6 summarises the results of the Pearson Co-efficient tests.

Table 6: Results of Pearson correlation test for internal validity

Construct	Correlation between individual questions and item total
Meaningfulness	0.000
Safety	0.000
Availability	0.000
PC	0.000 – 0.002 (range)
AC	0.000
PSS	0.000
ITT	0.000
DE	0.000

Source: Own construct from SPSS results (2021)

The results revealed that the individual questions correlated with the item total as the sig. value was less than 0.05. Based on the above, the validity testing was accepted.

4.13.2 Reliability

For all measurement scales, Cronbach's alpha test was used to establish internal consistency between the items being measured (Lavrakas, 2008). For reliability to be established through the Cronbach's alpha test, the value computed should be greater than 0.65. Therefore, the measurement scale is considered reliable. As noted in Table 7 below, the initial Cronbach's alpha test was acceptable for all measurement scales excluding the ITT. This scale comprised 3 questions and the statistical analysis revealed that removal of the third question would improve the Cronbach's alpha measurement. For this reason, ITT was updated to remove the third question. The recalculated alpha was greater than 0.65, thus the measurement scales were accepted as reliable.

Table 7: Summary of Cronbach's alpha test results

Scale item	Scale name per SPSS	Number of questions per scale	Cronbach's alpha result	Decision
Meaningfulness	Meaningfulness	2	0.781	Construct reliable
Safety	Safety	3	0.769	Construct reliable
Availability	Availability	5	0.836	Construct reliable
Psychological climate	PC	14	0.841	Construct reliable
Affective commitment	AC	6	0.924	Construct reliable
Discretionary effort	DE	7	0.913	Construct reliable
Intention to	ITT	3	0.347	Construct not reliable therefore

turnover			(0.807*)	question *"If I have my own way, I will be working for this organisation one year from now"* was removed
Perceived supervisor support	PSS	12	0.949	Construct reliable
*Revised Cronbach's alpha after removal of one question				

4.13.3 Exploratory factor analysis

Due to the sheer number of questions within EE and perceived supervisor support, it was considered appropriate to perform a dimension reduction. This can be performed through the following techniques: (i) Exploratory Factor Analysis (EFA) or (ii) Confirmatory Factor Analysis (CFA) (Beaver, et al., 2013; Suhr, 2006). The main difference between the two techniques is that the CFA is usually utilised for dimension reduction of existing and previously tested measurement instruments, whilst EFA is used for measurements instruments that have been developed, without previous modelling and factor analysis (Suhr, 2006). Importantly, both CFA and EFA achieve the same objective of dimension reduction (Suhr, 2006). EFA was chosen over a confirmatory factor analysis (CFA) due to expectation of poor model fit for CFA (Suhr, 2006). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were utilised to determine appropriateness of factor analysis (Beaver, et al., 2013). A KMO score of 0.5 and above was considered acceptable. The Bartlett's Test of Sphericity Sig. value of less than 0.05 was needed. Both tests indicated that factor analysis was appropriate, as per the results in Appendix C. Finally, Principal Component Analysis weas utilised to identify the number of components extracted (Beaver, et al., 2013). The results of the tests allowed for dimension reduction and the extracts of the test are included in Appendix B below. Based on the outcome of the principal component analysis, all constructs tested loaded onto one component except PC. Therefore, PC was reduced to 4 dimensions whilst all other constructs were reduced to one dimension. Table 8 below explains the grouping of the questions related to PC. Based on the component analysis and the loading of the factor, the questions were grouped into PC_1, PC_2, PC_3 and PC_4.

Question code	Survey question	Component
EE11	My manager is flexible about how I accomplish my job objectives	PC_1
EE12	My manager is supportive of my ideas and ways of getting things done	PC_1
EE13	My manager gives me authority to do my job as I see fit	PC_1
EE14	I am careful in taking responsibility because my manager is often critical of new ideas	PC_4
EE15	I can trust my manager to back me up on decisions I make	PC_1
EE16	I feel very useful in my job	PC_2
EE17	Doing my job well really makes a difference	PC_2
EE18	I feel like a key member of my organisation	PC_2
EE19	The work I do is very valuable to the organisation	PC_2
EE20	I rarely feel my work is taken for granted	PC_3
EE21	My superiors generally appreciate the way I do my job	PC_3
EE22	The organisation recognises the significance of the contribution I make	PC_3
EE23	My job is very challenging	PC_4
EE24	It takes all my resources to achieve my work objectives	PC_4

Source: Author's own (2021)

4.13.4 Test for normality

An underlying assumption of parametric tests is normality of the distribution of the data, which can be assessed mathematically or visually. There are a number of competing tests that achieve the same objective (e.g., kurtosis, chi-square), however, the Shapiro-Wilk is considered superior to these alternatives (Salkind, 2007). The original Shapiro-Wilk test was designed for a sample of 50 or less, however since then it has been modified to cater for sample sizes up to 2 000 (Salkind, 2007). Therefore, Shapiro-Wilk test was be utilised to test for normality. As noted in Table 9, all items except Item_Total_PC had sig-values less than 0.05. This means that the data was not normally distributed for each of the variables, except psychological climate This confirms the appropriateness of utilising the Spearman's correlation coefficient test as this is a non-parametric test.

Table 9: Results of the Shapiro-Wilk test

	Statistic	Df	Sig.
Item_Total_Meaningfulness	.708	200	.000
Item_Total_Safety	.853	200	.000
Item_Total_Avail	.867	200	.000
Item_Total_PC	.980	200	.006
Item_Total_AC	.875	200	.000
Item_Total_DE	.828	200	.000
Item_Total_ITT	.970	200	.000

Item_Total_PSS	.937	200	.000
[Technology-based messaging apps (for example, WhatsApp, Messenger, Slack, Notion)]	.642	200	.000

Source: Author's own (2021)

4.13.5 Approach to hypothesis one

The data collected from the Likert-scale responses was classified as numeric data, as it is presumed that the options exist on a continuum. The nature of the data determines the type of test that can be applied to determine correlation and relationships between data sets. The objective of hypothesis one was to evaluate whether there was a significant relationship between the FoU of technology applications and the antecedents of EE (being psychological climate, affective commitment, and perceived supervisor support).

For hypothesis one, a Spearman's rank correlation coefficient (r) test was performed to test the strength of the relationship between the independent variables (FoU of technology applications) and dependent variables (PC, AC, PSS). The reason for selecting the Spearman's correlation test is that it does not require data to be normally distributed and requires fewer assumptions to be met compared to a parametric test such as the Pearson's correlation coefficient test (Saunders & Lewis, 2018).

4.13.6 Approach to hypothesis two

The purpose of hypothesis two was to test whether the FoU of technology applications moderates the relationship between the antecedents of EE (Psychological climate, Affective Commitment and Perceived Supervisor Support) and EE. A moderated linear regression analysis was performed. A linear regression analysis is a test designed to measure the predictive value, on the dependent variable, of more than one independent variable (Wegner, 2016). A moderated regression analysis can only be performed if certain assumptions are validated, to avoid Type I and Type II errors. A Type 1 error is probability of not accepting the null hypothesis when it should in fact be accepted. A Type II error is when the null hypothesis is accepted when it is not meant to be accepted (Wegner, 2016). There are eight assumptions which need to be met to run a moderated regression test. Assumptions were not violated (no Type I or Type II errors were noted) therefore, the moderated regression considered valid and reliable (Laerd, n.d.).

4.13.7 Approach to hypothesis three

The purpose of hypothesis three was to understand whether the frequency of use of technology applications moderates the relationship between EE (Meaningfulness, Safety and Availability) and Discretionary Effort and Intention to Turnover. A moderated linear regression analysis was performed, using the same methodology described in 4.13.6 above. There are eight assumptions which need to be met to run a moderated regression test. Assumptions were not violated (no Type I or Type II errors were noted) therefore, the moderated regression considered valid and reliable (Laerd, n.d.).

4.14 Quality Controls

The pre-survey process was the first step in quality control of survey questions and intended outcomes. Screening questions were included to ensure that only relevant participants participate in the survey. Incomplete surveys were evaluated to ensure that appropriate consideration was given to the treatment of the missing data.

4.14.1 Reliability

Saunders and Lewis (2018) define reliability as "the extent to which data collection methods and analysis procedures will produce consistent findings" (p. 135). The key factors impacting reliability are "subject error", "subject bias", "observer error" and "observer bias" (Saunders & Lewis, 2018, p. 135). Subject error was considered low risk because the survey was made available on-line, therefore time of research was not relevant as participants were able to complete the survey at a time suitable for them. However, there was a possibility that participants who have to pay for access to the internet or mobile data may have chosen to ignore the survey due cost implications. However, this is not considered significant within the context of this research as the focus is on the impact of technology, therefore, those without access to communication technology are not the primary focus of this research. Subject bias is considered low as the topic is not controversial. Furthermore, the respondents have anonymity therefore, the risk of receiving biased responses is considered low. Observer error is not applicable as there was only one method of data collection which was online. No responses were received in paper format or via other channels of communication. Observer bias was considered low because this was a quantitative study which used established statistical methods of data analysis and reporting.

4.15   Limitations of research methodology

A hallmark of good research is the acknowledgement of the assumptions and limitation of the research methodology adopted. There are several limitations that should be noted. The research was designed as a quantitative study and therefore, the questions were designed as closed-response to allow for standardised responses and ease of coding (Ekinci, 2015). Ekinci (2015) recommends that to overcome this limitation, open-ended questions be included in the survey to allow participants to full express themselves. Therefore, although the study was designed as a quantitative study, the last question was designed as an open-response question. However, of the 200 respondents only 58 provided some comments. The success of open-ended questions in a self-administered survey is dependent on the willingness of the respondent to provide additional insight and the time available to comment (Ekinci, 2015). As a result of the lack of substantial responses on the open-ended question, these comments were not coded for further analysis. Therefore, this study is bound by the responses received through the closed-response questions.

Due to the cross-sectional nature of the study, the responses are at a point in time, rather than over a period of time. Consequently, the respondents' answers may be influenced by events or circumstances on the day that the questionnaire was completed. Furthermore, due to the Covid-19 pandemic, the choice of communication channels may be restricted within certain sectors of the economy, thus influencing the responses related to the section on modes of communication.

A further limitation relates to the sampling technique. The majority of the respondents (156 respondents representing 78% of the sample) indicated that they were employed in the "motor vehicles, parts and accessories and other transport equipment" category.   Whilst the survey was targeted towards the entire manufacturing sector in South Africa, the results are skewed towards the automotive sector and generalisation of results across the entire manufacturing sector should be avoided. Furthermore, the research is bound by geography therefore, the results of this research should not be extrapolated or generalised outside South Africa, as each country has societal and cultural nuances that could influence the results of the survey (Hofstede, 2001).

Chapter 5:   Results

5.1   Introduction

Chapter 5 explains the results of the research methods explained in Chapter 4. As explained the Chapter 1 and Chapter 3, the purpose of this research was to understand the statistical relationship between the FoU of technology applications and the various constructs of EE, including its antecedent and outcome variables. technology applications are pervasive in the working world for the majority of the participants of the study. Of the 200 participants, only 8 participants indicated that they do not ever use technology applications in their communication with their manager / supervisor. Furthermore, of the 192 participants that used technology applications, 73,44% indicated that they used the mode multiples times a day. This illustrates the observations from the literature review that communication technology has become mainstream in the workplace.

The FoU of technology applications was the independent variable utilised in the testing performed for all three hypotheses. In hypothesis one, FoU of technology applications was tested for correlation with psychological climate, affective commitment, and perceived supervisor support. The null hypothesis was not accepted. In hypothesis two, the moderating effect of FoU of technology applications on the relationship between the antecedents of EE (PC, AC, PSS) and EE (meaningfulness, safety, and availability) was explored. This hypothesis was not accepted as the FoU of technology applications did not have a significant impact on the relationship between the independent and dependent variables. In hypothesis three, the moderating effect of FoU of technology applications on the relationship between EE (meaningfulness, safety, and availability) and the outcomes of EE (discretionary effort, intention to turnover) was explored. This hypothesis was not accepted as the FoU of technology applications did moderate the relationship between EE and DE and ITT. The descriptive statistics will be discussed as a precursor before the details of the inferential statistics that support the conclusions described above.

5.2   Descriptive statistics

5.2.1   Description of data collected

A total of 208 responses were received, of which 8 respondents indicated that they were not employed in the manufacturing sector. Consequently, the 8 respondents

were removed from the sample and not included in any further descriptive of inferential statistical analysis. The targeted sample was 200 and 200 responses that met the screening criterion were received. Therefore, the target sample size was achieved.

5.2.2 Industry classification

The research was bound by the manufacturing sector. Within the manufacturing sector, the responses were dominated by employees within the motor vehicles, parts and accessories and other transport equipment sector. 78% of the respondents noted this sector as their current industry classification. The weighting towards this sector is probably due to the snowball sampling technique employed within the researcher's professional network, as the researcher is employed within this sector. There were no other sectors of individual significance as noted in Table 10 below.

Table 10: Industry classification of respondents

Industry classification	Number of respondents	% participation
Motor vehicles, parts and accessories and other transport equipment	156	78.00%
Other	19	9.50%
Petroleum, chemical products, rubber, and plastic products	8	4.00%
Food and beverages	6	3.00%
Wood and wood products, paper, publishing and printing	5	2.50%
Basic iron and steel, non-ferrous metal products, metal products and machinery	3	1.50%
Textiles, clothing, leather, and footwear	2	1.00%
Furniture and other manufacturing	1	0.50%
Total	**200**	**100.00%**

Source: Author's own based on survey responses (2021)

5.2.3 Gender profile

As noted in Figure 7 below, 60% of the respondents were male, 35% were female

and 5% made the deliberate choice to not reveal their gender.
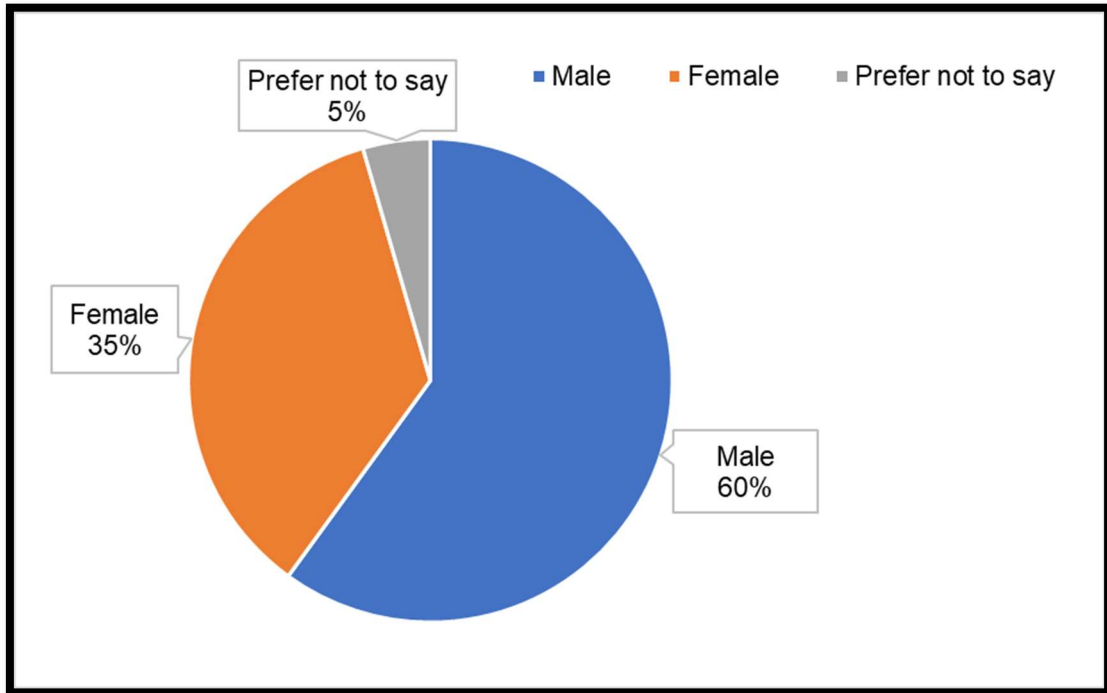
Figure 7: Gender profile of respondents

Source: Author's own (2021)

A further analysis of the preferred mode of communication by gender revealed that e-mail was the most popular choice for preferred mode of communication, as noted in Table 11 below. The second most common choice for preferred mode of communication was technology applications for females (21.1%) compared to face-to-face formal meeting (28.3%) for males. The understanding of the variance in frequency of the data by gender is beyond the scope of this research and should be considered for further research.

Mode of communication	Female		Male		Unknown	
	Count	%	Count	%	Count	%
E-mail	20	28.2%	36	30.0%	3	33.3%
Face-to-face - formal meeting	14	19.7%	34	28.3%	3	33.3%
Face-to-face - informal meetings (e.g., in the corridor)	6	8.5%	9	7.5%	1	11.1%
Phone call (landline/cell phone)	9	12.7%	9	7.5%	0	0.0%
Technology-based messaging apps (for example, WhatsApp, Messenger, Slack, Notion)	15	21.1%	13	10.8%	0	0.0%
Video call (e.g., Microsoft Teams, Zoom)	7	9.9%	19	15.8%	2	22.2%
Total	71	100%	120	100%	9	100%

Source: Own construct based on survey responses (2021)

5.2.4 Length of service

The length of service was chosen as a demographic variable as it may assist in the interpretation of the results. The results are displayed in Figure 8. 84 respondents (42% of the sample) indicated that they were in employment in excess of 15 years with their current employer. On the opposite end of the continuum, only 2.5% of the respondents indicated that they were in employment for less than 1 year with their current employer.
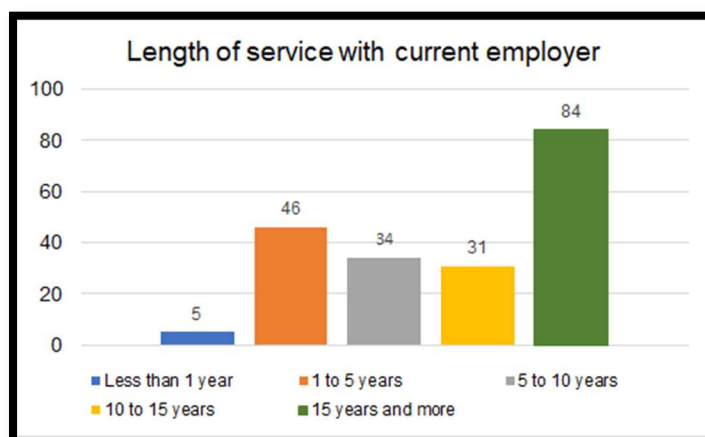
Figure 8: Length of service with current employer
Source: Author's own (2021)

5.2.5 Frequency of Use of technology applications

The results revealed that a majority of respondents (68 %) reported that they utilised technology applications multiples times a day, in their communication with their supervisor / manager. The details are visualised in Figure 9. Only 4% of the respondents indicated that it is never used in supervisor communication. This skewness in the responses, may be due to the fact that majority of respondents (71%) were manager (junior, middle, and senior manager) and director level. At those levels, greater complexity of communication is assumed.
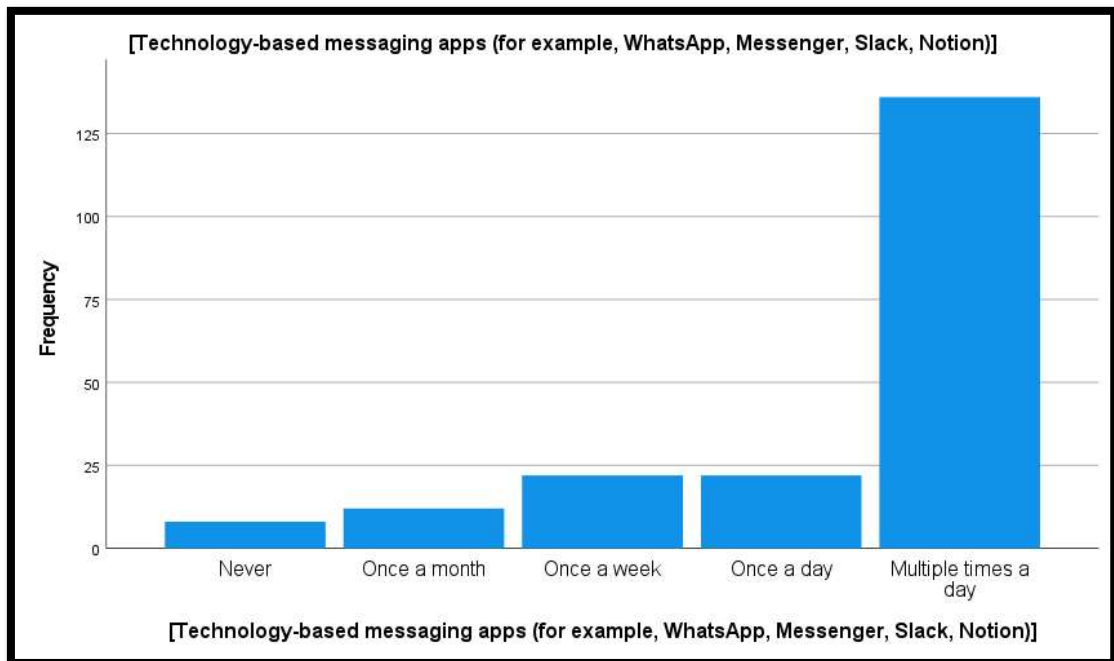
Figure 9: FoU of technology applications

Source: Author's own (2021)

5.2.6 Modes of communication that are utilised multiple times a day

Table 12: Number of modes of communication utilised multiple times a day

Number of modes that are used multiple times a day	Number of respondents	% of respondents
Zero	16	8.0%
One	22	11.0%
Two	31	15.5%
Three	34	17.0%
Four	41	20.5%
Five	25	12.5%
Six	31	15.5%
Total	**200**	**100%**

Source: Author's own based on survey responses (2021)

Table 12 above, summarises the number of modes of communication that are utilised multiple times a day. For example, 31 respondents indicated that they used all six modes of communication multiple times a day. Within the table above, the most common response (20.5%) was that four of the six methods of communication were utilised multiple times a day.

5.2.7 Comparison of frequency of use of all modes of communication

Table 13: Comparison of frequency of use of all modes of communication

Frequency	Technology applications	Video call	Phone call	E-mail	Face-to-face - formal meeting	Face-to-face - informal meetings
Never	4.0%	9.5%	4.5%	1.0%	5.0%	8.0%
Once a month	6.0%	9.5%	6.0%	0.5%	12.0%	5.5%
Once a week	11.0%	24.5%	14.5%	4.0%	26.0%	17.0%
Once a day	11.0%	16.0%	20.0%	11.5%	22.5%	20.0%
Multiple times a day	68.0%	40.5%	55.0%	83.0%	34.5%	49.5%

Source: Author's own (2021)

5.2.8   Position within the organisation

Please select a category that best describes your position in the organisation
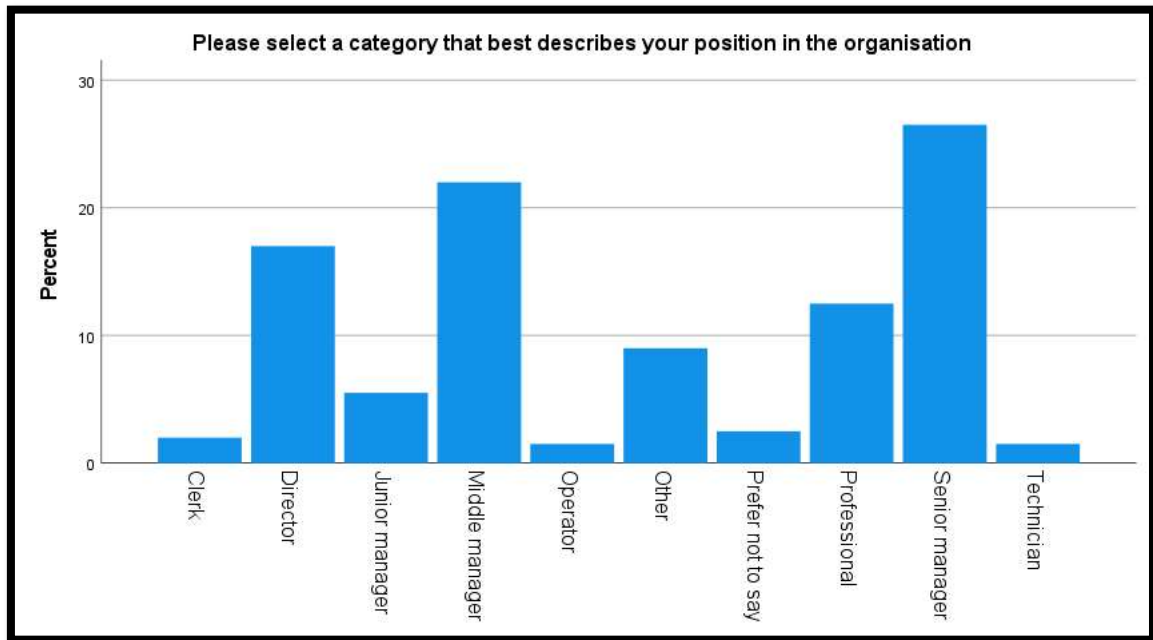
Figure 10: Position within the organisation

Source: Author's own (2021)

Figure 10 reflects the respondents' position within their organisation. The most frequently selected position within the organisation was the senior manager tile (26.5%), followed by the middle manager level (22%). A contributing factor to the uneven representation of positions within the organisation may be the utilisation of the convenience and snowball sampling technique applied within the researcher's professional network.

5.2.9   Functional area within the organisation

The majority of respondents indicated that they worked within manufacturing division of their organisation. This was followed by the Finance Department. The analysis by functional area is visualised in Figure 11.
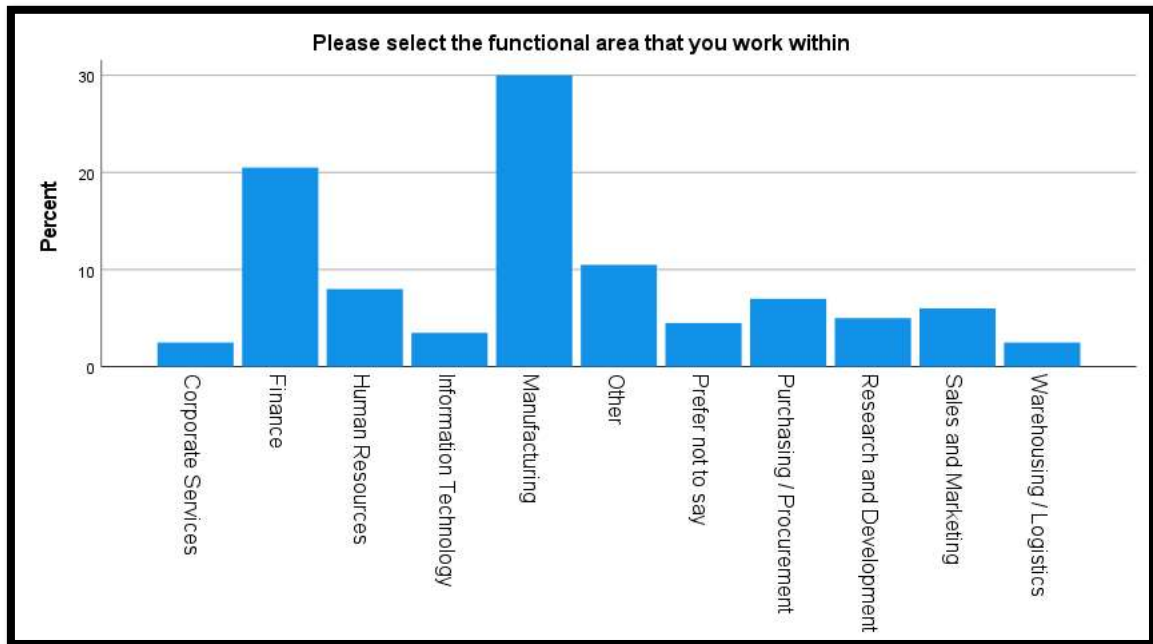
Figure 11: Functional area within the organisation

Source: Author's own (2021)

5.2.10 Education level of respondents

Table 14: Education level of respondents

Highest education level	Frequency	Percentage
University degree - honours degree level	55	27.5%
Diploma	53	26.5%
University degree - undergraduate level	40	20.0%
Master's degree	27	13.5%
Matric	16	8.0%
Prefer not to say	8	4.0%
Doctorate	1	0.5%

Source: Author's own (2021)

Most respondents had some level of tertiary education.

5.2.11 Age of respondents

Table 15 displays the frequency of the age category selected by respondent. Most of the respondents were in the 36 – 45 years old category. This skewness in the frequency may be attributable to the convenience and snowball sampling technique adopted by the researcher as the researcher is in the same age category.

Table 15: Age category of respondents

Age category	Number of respondents	% of total
18-25 years old	4	2.0%
26-35 years old	38	19.0%
36-45 years old	70	35.0%
46-55 years old	59	29.5%
56 years and older	29	14.5%

Source: Author's own (2021)

Table 16: Frequency of preferred mode of communication by age category

Age category	Most preferred communication mode					
	Technology applications	Video call	Phone call	E-mail	Face-to-face - formal meetings	Face-to-face - informal meetings
18-25 years old	0	2	0	1	1	0
26-35 years old	7	3	5	10	10	3
36-45 years old	13	7	11	16	15	8
46-55 years old	3	10	1	22	18	5
56 years and older	5	6	1	10	7	0
Total	28	28	18	59	51	16

Source: Author's own (2021)

Table 16 contains the analysis of the most preferred mode of communication, analysed by age grouping. Although the sample was small, the age category 18 – 25 years old showed a marginal preference for Video call over the other modes of communication and the 26 – 35 years old category showed equal preference for e-mail and face-to-face formal meetings. These were the only two categories that deviated from the overall total preference for e-mail communication.

5.2.12 Most and least preferred modes of communication

The most preferred method of communication, as selected by the research participants was E-mail (29.5%), followed by Face-to-Face formal communication (25.5%). This is visualised in Figure 12.
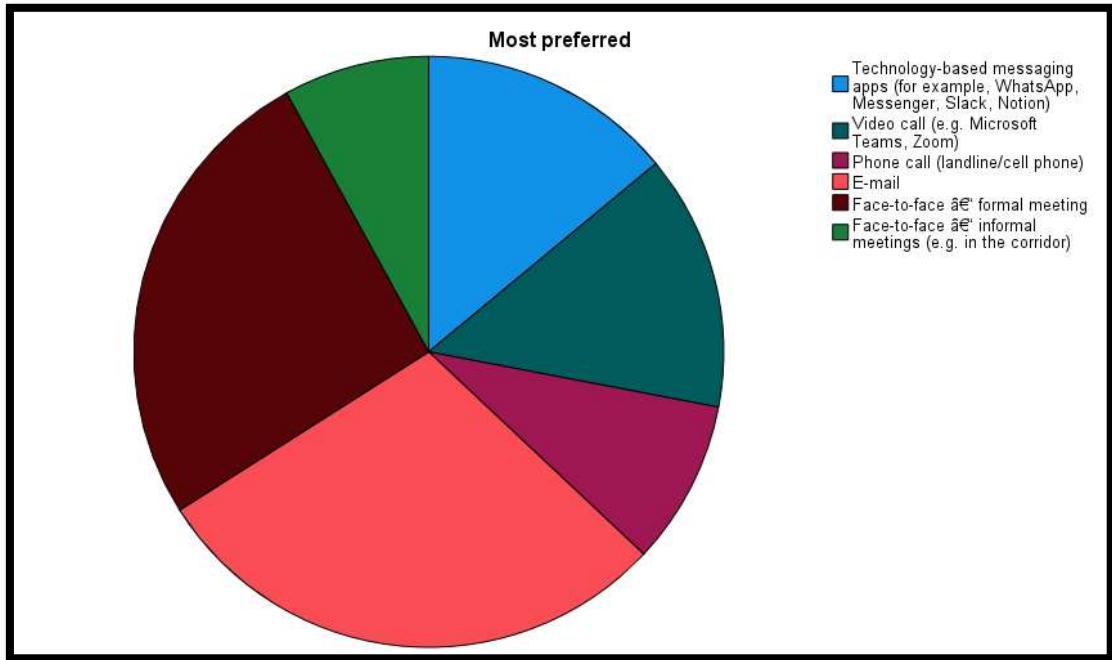
Figure 12: Most preferred mode of communication

Source: Author's own (2021)

The least preferred method of communication, as selected by the research participants was technology applications (19%) and video calls (19%), followed by face-to-face formal communication (18%). This is visualised in Figure 13.
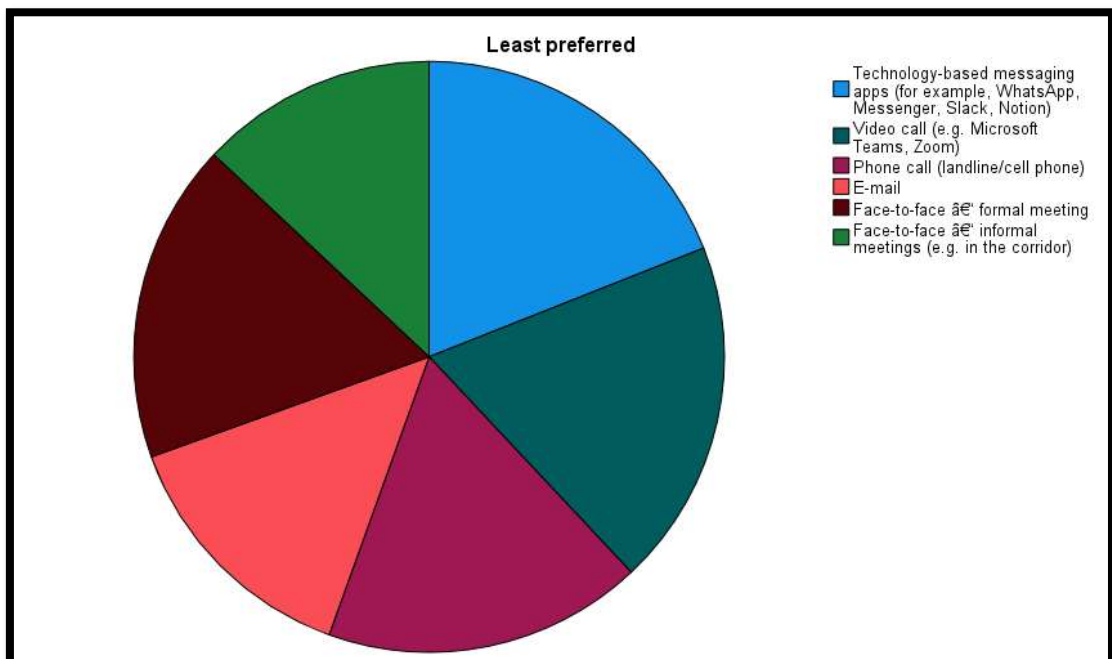
Figure 13: Least preferred mode of communication

Source: Author's own (2021)

5.3 Results of hypothesis testing

Construct validity and reliability of measurement scales was explained in Chapter 4. This section provides the results of the research methodology applied to the data set.

5.3.1 Hypothesis 1

The objective of hypothesis one was to evaluate whether a relationship exists between the FoU of technology applications and psychological climate, affective commitment, and perceived supervisor support (antecedents of EE). For this test a Spearman rank correlation analysis was performed between the construct technology applications and the sub-constructs of the antecedents of EE (i.e., PC, AC and PSS) because the data has violated the assumption of normality. All statistical tests were performed at the 95% confidence level. The results are shown in Table 17 below.

Table 17: Spearman's correlation between FoU of technology applications and antecedents

Variable	Correlation coefficient with FoU of Technology applications (p-value)	Interpretation
Affective commitment (AC)	$\rho = 0.134 \ (0.058)$	No significant correlation
Psychological commitment (PC1)	$\rho = 0.02 \ (0.775)$	No significant correlation
Psychological commitment (PC2)	$\rho = 0.089 \ (0.208)$	No significant correlation
Psychological commitment (PC3)	$\rho = 0.082 \ (0.251)$	No significant correlation
Psychological commitment (PC4)	$\rho = 0.092 \ (0.195)$	No significant correlation
Perceived Supervisor Support (PSS)	$\rho = 0.086 \ (0.224)$	No significant correlation

Source: Author's own (2021)

There was a weak to no correlation between the antecedents of EE and FoU of technology applications. Based on the above, the null hypothesis was not accepted.

5.3.2 Hypothesis 2

Hypothesis 2 sought to understand whether FoU of technology applications moderates the relationship between the antecedents of EE (psychological climate, affective commitment, and perceived supervisor support) and EE (as measured by meaningfulness, safety, and availability). To perform this test, it was necessary to

standardise the data set through a method called "centering". This is performed by making the mean of each variable as close to zero as possible and getting the standard deviation as close to 1 as possible. This calculation was performed and resulted included in Appendix C below. Once the variables were centered, interaction variables were created by taking each antecedent variable and multiplying it by the FoU of technology applications. The results of the moderated regression analysis are summarised below.

Table 18 explains that 37.8% (per the Adjusted R Square) of the variance in Meaningfulness is explained by PC, AC and PSS. When factoring in the FoU of technology applications, there is only a 0.2% change in the Adjusted R Square. Therefore, the FoU of technology applications does not have a moderating impact on the relationship between PC, AC and PSS and Meaningfulness. The second indicator on the model summary is the Sig. F change (referred to as p-value). The p-value for Model 2 is 0.360 which is greater than 0.05 therefore, technology applications is not a significant contributor to Meaningfulness.

Table 18 Model summary for the regression analysis between PC, AC, and PSS interaction terms and Meaningfulness (centered)

					Change Statistics				
Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.630[a]	.397	.378	.41041	.397	21.141	6	193	.000
2	.646[b]	.417	.380	.40973	.021	1.107	6	187	.360

a. Predictors: (Constant), AC_Centered, PC_4_Centered, PC_1_Centered, PC_3_Centered, PC_2_Centered, PSS_Centered

b. Predictors: (Constant), AC_Centered, PC_4_Centered, PC_1_Centered, PC_3_Centered, PC_2_Centered, PSS_Centered, AC_Tech_Interaction, PC_4_Tech_Interaction, PC_3_Tech_Interaction, PSS_Tech_Interaction, PC_2_Tech_Interaction, PC_1_Tech_Interaction

Source: Author's own based on SPSS output (2021)

Table 19 measures whether FoU of technology applications has a moderating effect between the individual interaction terms and Meaningfulness. The p-value is greater than 0.05 for all Interaction variables, thus proving that FoU does not moderate the relationship between PC, AC and PSS and Meaningfulness.

Table 19: Moderated regression results for interaction terms and Meaningfulness (centered)

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	Upper Bound
1	(Constant)	3.203E-6	.029		.000	1.000	-.057	.057
	PC_1_Centered	.109	.066	.142	1.653	.100	-.021	.239
	PC_2_Centered	.382	.072	.396	5.310	.000	.240	.524
	PC_3_Centered	-.053	.048	-.080	-1.106	.270	-.149	.042
	PC_4_Centered	-.025	.043	-.034	-.566	.572	-.110	.061
	PSS_Centered	-.002	.059	-.003	-.036	.971	-.118	.114
	AC_Centered	.177	.050	.276	3.573	.000	.079	.275
2	(Constant)	.004	.030		.128	.898	-.055	.062
	PC_1_Centered	.081	.069	.105	1.176	.241	-.055	.217
	PC_2_Centered	.413	.074	.428	5.613	.000	.268	.558
	PC_3_Centered	-.052	.049	-.078	-1.075	.284	-.148	.044
	PC_4_Centered	-.028	.045	-.039	-.628	.531	-.117	.061
	PSS_Centered	.014	.060	.020	.238	.812	-.104	.132
	AC_Centered	.177	.050	.275	3.550	.000	.079	.275
	PC_1_Tech_Interaction	.109	.070	.174	1.558	.121	-.029	.247
	PC_2_Tech_Interaction	.013	.068	.017	.191	.849	-.122	.148
	PC_3_Tech_Interaction	.025	.045	.045	.563	.574	-.064	.115
	PC_4_Tech_Interaction	-.024	.035	-.044	-.683	.496	-.094	.046
	PSS_Tech_Interaction	-.019	.050	-.038	-.375	.708	-.116	.079
	AC_Tech_Interaction	-.055	.048	-.097	-1.163	.246	-.149	.039

a. Dependent Variable: Meaningfulness_Centered

Source: Author's own based on SPSS output (2021)

Table 20 explains that 24.4% (per the Adjusted R Square) of the variance in Safety is explained by PC, AC and PSS. When factoring in the FoU of technology applications, there is only a 1.5% change in the Adjusted R Square. Therefore, the FoU of technology applications does not have a moderating impact on the relationship between PC, AC and PSS and Safety. The p-value for Model 2 is 0.884 which is greater than 0.05 therefore, technology applications is not a significant contributor to Safety.

Table 20 Model summary for the regression analysis between PC,AC, and PSS interaction terms and Safety (centered)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	.516[a]	.267	.244	.38207	.267	11.701	6	193	.000
2	.525[b]	.276	.229	.38574	.009	.391	6	187	.884

a. Predictors: (Constant), AC_Centered, PC_4_Centered, PC_1_Centered, PC_3_Centered, PC_2_Centered, PSS_Centered

b. Predictors: (Constant), AC_Centered, PC_4_Centered, PC_1_Centered, PC_3_Centered, PC_2_Centered, PSS_Centered, AC_Tech_Interaction, PC_4_Tech_Interaction, PC_3_Tech_Interaction, PSS_Tech_Interaction, PC_2_Tech_Interaction, PC_1_Tech_Interaction

Source: Author's own based on SPSS output (2021)

Table 21 measures whether FoU of technology applications has a moderating effect between the individual interaction terms and Safety. The p-value is greater than 0.05 for all Interaction variables, thus proving that FoU does not moderate the relationship between PC, AC and PSS and Safety.

Table 21: Moderated regression results for interaction terms and Safety (centered)

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	Upper Bound
Coefficients[a]								
1	(Constant)	1.006E-5	.034		.000	1.000	-.067	.067
	PC_1_Centered	.256	.077	.271	3.323	.001	.104	.408
	PC_2_Centered	.193	.084	.162	2.287	.023	.026	.359
	PC_3_Centered	.180	.057	.220	3.179	.002	.068	.291
	PC_4_Centered	-.040	.051	-.046	-.793	.429	-.141	.060
	PSS_Centered	.006	.069	.007	.083	.934	-.130	.142
	AC_Centered	.154	.058	.195	2.650	.009	.039	.268
2	(Constant)	-.003	.035		-.085	.932	-.072	.066
	PC_1_Centered	.260	.081	.275	3.193	.002	.099	.420
	PC_2_Centered	.180	.087	.152	2.075	.039	.009	.352
	PC_3_Centered	.181	.057	.222	3.160	.002	.068	.294
	PC_4_Centered	-.046	.053	-.052	-.866	.388	-.151	.059
	PSS_Centered	.006	.071	.006	.078	.938	-.134	.145
	AC_Centered	.156	.059	.198	2.650	.009	.040	.272
	PC_1_Tech_Interaction	-.076	.083	-.099	-.921	.358	-.239	.087
	PC_2_Tech_Interaction	-.060	.081	-.062	-.743	.459	-.220	.100
	PC_3_Tech_Interaction	.037	.053	.054	.702	.483	-.068	.143
	PC_4_Tech_Interaction	.003	.042	.004	.066	.947	-.080	.085
	PSS_Tech_Interaction	.052	.059	.086	.886	.377	-.064	.167
	AC_Tech_Interaction	.003	.056	.004	.049	.961	-.108	.114

a. Dependent Variable: Safety_Centered

Source: Author's own based on SPSS output (2021)

Table 22 explains that 43.5% (per the Adjusted R Square) of the variance in Availability is explained by PC, AC and PSS. When factoring in the FoU of technology applications, there is only a 0.9% change in the Adjusted R Square. Therefore, the frequency of use of technology applications does not have a moderating impact on the relationship between PC, AC and PSS and Availability. The p-value for Model 2 is 0.834 which is greater than 0.05 therefore, technology applications is not a significant contributor to Availability.

Table 22 Model summary for the regression analysis between PC, AC, and PSS interaction terms and Availability (centered)

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.673[a]	.452	.435	.48018	.452	26.583	6	193	.000
2	.679[b]	.461	.426	.48423	.008	.464	6	187	.834

a. Predictors: (Constant), AC_Centered, PC_4_Centered, PC_1_Centered, PC_3_Centered, PC_2_Centered, PSS_Centered

b. Predictors: (Constant), AC_Centered, PC_4_Centered, PC_1_Centered, PC_3_Centered, PC_2_Centered, PSS_Centered, AC_Tech_Interaction, PC_4_Tech_Interaction, PC_3_Tech_Interaction, PSS_Tech_Interaction, PC_2_Tech_Interaction, PC_1_Tech_Interaction

Source: Author's own based on SPSS output (2021)

Table 23 measures whether FoU of technology applications has a moderating effect between the individual interaction terms and Availability. The p-value is greater than 0.05 for all Interaction variables, thus proving that FoU does not moderate the relationship between PC, AC and PSS and Availability.

Table 23: Moderated regression results for PC, AC, and PSS interaction terms and Availability (centered)

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	-3.395E-6	.027		.000	1.000	-.053	.053
	PC_1_Centered	.140	.061	.215	2.280	.024	.019	.261
	PC_2_Centered	.300	.067	.367	4.472	.000	.167	.432
	PC_3_Centered	.049	.045	.088	1.094	.275	-.040	.138
	PC_4_Centered	-.071	.040	-.117	-1.761	.080	-.151	.009
	PSS_Centered	-.068	.055	-.115	-1.249	.213	-.177	.040
	AC_Centered	.023	.046	.042	.496	.620	-.068	.114
2	(Constant)	.004	.028		.141	.888	-.051	.059
	PC_1_Centered	.144	.065	.221	2.218	.028	.016	.271
	PC_2_Centered	.298	.069	.365	4.303	.000	.161	.435
	PC_3_Centered	.052	.046	.093	1.145	.254	-.038	.142
	PC_4_Centered	-.071	.042	-.116	-1.665	.098	-.154	.013
	PSS_Centered	-.076	.056	-.127	-1.344	.181	-.187	.035
	AC_Centered	.022	.047	.040	.467	.641	-.071	.115
	PC_1_Tech_Interaction	-.005	.066	-.010	-.082	.934	-.135	.124
	PC_2_Tech_Interaction	.041	.064	.062	.637	.525	-.086	.168
	PC_3_Tech_Interaction	-.034	.043	-.071	-.808	.420	-.118	.050
	PC_4_Tech_Interaction	-.011	.033	-.025	-.344	.731	-.077	.054
	PSS_Tech_Interaction	-.024	.047	-.058	-.513	.609	-.116	.068
	AC_Tech_Interaction	-.002	.045	-.005	-.050	.960	-.091	.086

a. Dependent Variable: Availability_Centered

Source: Author's own based on SPSS output (2021)

5.3.3 Hypothesis 3

Table 24 explains that 17.4% (per the Adjusted R Square) of the variance in DE is

explained by EE. When factoring in the FoU of technology applications, there is only a 1.3% change in the Adjusted R Square. Therefore, the FoU of technology applications does not have a moderating impact on the relationship between EE and DE. The second indicator on the model summary is the Sig. F change (referred to as p-value). The p-value for Model 2 is 0.105 which is greater than 0.05 therefore, technology applications is not a significant contributor to DE.

Table 24 Model summary for the regression analysis between EE interaction terms and DE (centered)

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.432[a]	.187	.174	.45122	.187	14.985	3	196	.000
2	.460[b]	.212	.187	.44756	.025	2.075	3	193	.105

a. Predictors: (Constant), Availability_Centered, Meaningfulness_Centered, Safety_Centered

b. Predictors: (Constant), Availability_Centered, Meaningfulness_Centered, Safety_Centered, Safety_Tech_Interaction, Meaningfulness_Tech_Interaction, Availability_Tech_Interaction

Source: Author's own based on SPSS output (2021)

Table 25 measures whether FoU of technology applications has a moderating effect between the individual interaction terms and DE. The p-value is greater than 0.05 for all Interaction variables, thus proving that FoU does not moderate the relationship between (i) Safety and DE, (ii) Availability and DE and (iii) Meaningfulness and DE.

Table 25 Moderated regression results for EE interaction terms and DE (centered)

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	1.429E-5	.032		.000	1.000	-.063	.063
	Meaningfulness_Centered	.193	.070	.202	2.746	.007	.054	.332
	Safety_Centered	.110	.061	.142	1.796	.074	-.011	.231
	Availability_Centered	.221	.089	.195	2.485	.014	.046	.396
2	(Constant)	.007	.032		.222	.824	-.056	.070
	Meaningfulness_Centered	.209	.070	.219	2.968	.003	.070	.348
	Safety_Centered	.110	.061	.142	1.808	.072	-.010	.230
	Availability_Centered	.210	.089	.186	2.359	.019	.034	.386
	Meaningfulness_Tech_Interaction	-.051	.078	-.050	-.652	.515	-.206	.103
	Safety_Tech_Interaction	-.014	.054	-.023	-.267	.790	-.121	.092
	Availability_Tech_Interaction	-.110	.080	-.115	-1.362	.175	-.268	.049

a. Dependent Variable: DE_Centered

Source: Author's own based on SPSS output (2021)

Table 26 explains that 10.4% (per the Adjusted R Square) of the variance in ITT is

explained by EE. When factoring in the FoU of technology applications, there is only a 0.7% change in the Adjusted R Square. Therefore, the FoU of technology applications does not have a moderating impact on the relationship between EE and ITT. The second indicator on the model summary is the Sig. F change (referred to as p-value). The p-value for Model 2 is 0.216 which is greater than 0.05 therefore, technology applications is not a significant contributor to ITT.

Table 26 Model summary for the regression analysis between EE and ITT

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.343[a]	.118	.104	1.07574	.118	8.740	3	196	.000
2	.372[b]	.138	.111	1.07165	.020	1.500	3	193	.216

a. Predictors: (Constant), Availability_Centered, Meaningfulness_Centered, Safety_Centered

b. Predictors: (Constant), Availability_Centered, Meaningfulness_Centered, Safety_Centered, Safety_Tech_Interaction, Meaningfulness_Tech_Interaction, Availability_Tech_Interaction

Source: Author's own based on SPSS output (2021)

Table 27 measures whether FoU of technology applications has a moderating effect between the individual interaction terms and ITT. The p-value is greater than 0.05 for all Interaction variables, thus proving that FoU does not moderate the relationship between EE and ITT.

Table 27 Moderated regression results for interaction terms and ITT

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	Upper Bound
1	(Constant)	5.194E-16	.076		.000	1.000	-.150	.150
	Meaningfulness_Centered	-.543	.168	-.249	-3.238	.001	-.874	-.212
	Safety_Centered	-.378	.146	-.212	-2.585	.010	-.666	-.090
	Availability_Centered	.267	.212	.103	1.261	.209	-.151	.684
2	(Constant)	-.014	.076		-.188	.851	-.165	.136
	Meaningfulness_Centered	-.576	.169	-.263	-3.411	.001	-.908	-.243
	Safety_Centered	-.368	.146	-.207	-2.520	.013	-.655	-.080
	Availability_Centered	.327	.213	.126	1.533	.127	-.094	.748
	Meaningfulness_Tech_Interaction	-.273	.188	-.116	-1.455	.147	-.643	.097
	Safety_Tech_Interaction	-.110	.129	-.075	-.850	.397	-.364	.145
	Availability_Tech_Interaction	.339	.193	.155	1.757	.080	-.041	.719

a. Dependent Variable: ITT_Centered

Source: Author's own based on SPSS output (2021)

5.4 Conclusion

The results proved that the FoU of technology applications did not have a significant correlation with the antecedents of EE (PC, AC, PSS). The FoU of technology applications did not have a moderating impact on the relationship between the antecedents of EE (PC, AC, PSS) and the sub-constructs of EE (Meaningfulness, Safety and Availability). Furthermore, the FoU of technology applications did not have a moderating effect on the relationship between EE and the outcome variables of DE and ITT.

Chapter 6:   Discussion of Results

6.1   Introduction

The objective for this chapter is to discuss the results in the context of the literature review and the overarching question. The overarching research question was to understand the impact of FoU of technology applications (between supervisor and employee) on EE. This research question was approached from three perspectives. In hypothesis one, the relationship between FoU of technology applications and the antecedents of EE (PC, AC, PSS) was tested through a Spearman's correlation analysis. In hypothesis two, through a regression analysis, the moderating impact of FoU of technology applications was measured in the relationship between the antecedents of EE (PC, AC, PSS) and Meaningfulness, Safety and Availability (i.e., sub-constructs of EE). In hypothesis three, through a regression analysis the moderating impact of FoU on technology applications was measured in the relationship between EE and the outcome variables (DE and ITT).

Before delving into the discussion of the results, a summary of Chapter 2 is presented. From the literature review, the concepts of EE and IC were defined. EE was defined through the three sub-constructs of Meaningfulness, Safety, and Availability (Kahn, 1990). In summary, EE is about an employee's psychological state of mind relative to the workplace (Kahn, 1990; Lysova et al., 2019; Shuck & Wollard, 2010). This includes feelings towards supervisors, subordinates, and co-workers (Agarwal, 2019; Roberts et al., 2017). Engagement occurs on a continuum with disengagement at the other end. Studies have linked smartphone use with disengagement; therefore, it is necessary to understand the concept of disengagement. Disengagement is considered the mental, cognitive, and emotional withdrawal from the workplace (Kahn, 1990; MacCormick, 2012; Prouska & Psychogios, 2018). EE engagement is driven by antecedents and demonstrated through outcomes. For the purpose of this study, the antecedents were psychological climate (PC) (Brown & Leigh, 1996), affective commitment (AC) (Rhoades et al., 2001) and perceived supervisor support (PSS) (Rhoades & Eisenberger, 2002), which are well established and proven antecedents of EE. The outcome variables were defined as intention to turnover (ITT) and discretionary effort (DE) (Shuck et al., 2011).

The importance of IC between supervisor / manager and employee was explored and it was noted that frequency, mode, quality, and symmetry of communication were predictor variables of employee outcomes such as job satisfaction, job performance

IC satisfaction and role clarity (Johlke & Duhan, 2000; Kang & Sung, 2017; Karanges et al., 2015; Menguc et al., 2013). Within the concept of IC, it was identified that technology has permeated the employer-employee relationship (Sandoval-Reyes et al., 2019; Stich et al., 2018; Ter Hoeven et al., 2016; Van Laethem et al., 2018) with recent research examining the role of communication technology (specifically smartphone use) and specific employee outcomes (e.g., well-being, psychological detachment, stress, work-family conflict) (Sandoval-Reyes et al., 2019; Stich et al., 2018; Ter Hoeven et al., 2016; Van Laethem et al., 2018).

The current literature on the main modes of communication (face-to-face and computer-mediated communication) was examined and it was noted that face-to-face is the preferred mode of communication amongst employees (Braun et al., 2019; Lemon, 2019), due to its perceived richness, as defined by media richness theory (Daft & Engel, 1983). By contrast, Mehra and Nickerson (2019) found that managers video calls / chats (moderately rich media) rather than face-to-face meetings (rich media). This highlights the potential for unmatched expectations if the supervisor has a preferred mode that is not aligned with the employee's preference.

The theoretical lens that has been used to examine the results was introduced. The JD-R model is a well-established model that explains the impact of job demands and job resources on employee engagement (Bailey et al., 2017; Bakker & Demerouti, 2007; Radic et al., 2020; Rattrie et al., 2020). Job demands and job resources can have a negative or positive impact on employee engagement, depending on how the variable is perceived (Demerouti et al., 2001; Radic et al., 2020). Research on communication technology has identified smartphones as both a job demand and job resource, depending on the employee's perception and response (Ghislieri et al., 2017; Van Laethem et al., 2018). Job demands can have a moderating impact on the relationship between job resources and employee engagement. Similarly, job resources can have a moderating impact on the relationship between job demands and employee engagement. The Technology Acceptance Model 2 (TAM2) was explored as a decision-making tool for determining whether a specific type of technology will be perceived as a job demand or job threat. According to the TAM2, the perceived usefulness and perceived ease of use drives the intended and actual usage of a technology (Venkatesh & Davis, 2000).

6.1.1 Preferred mode of communication

The findings indicated that employees preferred mode of communication with supervisors was via e-mail. The findings differed from that of Braun et al. (2019) who

found that employees preferred mode of communication with their leaders was through the face-to-face channel.

Cultural influences may also be the cause for the variance in the findings (Hofstede, 2001) as well as the fact that the survey was conducted nine months into the lockdown in South Africa, by which time employees had become accustomed to communication technology as the dominant mode of communication. The findings also contrast with the recent survey done by Giant Leap who noted that 86% of South Africans polled would prefer to work in the office rather than at home (Van Dijk, 2020), because they missed the social interactions afforded by being in close physical proximity with colleagues.

The least preferred mode of communication was video calls (19%) and technology applications (19%). This represents a nuanced finding because the statisitcal findings below reflect that technology applications do not have an impact on EE, even though technology applications are the least preferred. This may reflect an acceptance by employees that technology applications are here to stay, and are therefore accepted as part of the new-normal of the workplace.

It was also observed that employees were accustomed to using multiple modes of communication, therefore multiple modes of communication complement each other instead of competing with each other. The fact that employees still have access to their preferred mode of communication, may negate the negative impact of utilising the least preferred mode of communication. It is presumed that employees treat technology applications as a job resource rather than a job demand. Consequently, there is no impact on employee engagement.

6.1.2 Media richness and media synchronicity

The richness and synchronicity of technology applications may be perceived as similar to other mediums of communication. Although the survey did not seek to understand the respondent's perception of richness and synchronicity, it is postulated based on the research that this may be a contributor to the null hypothesis not being accepted. The table below has been adapted from Braun et al. (2019) who prepared a table comparing face-to-face, electronic mail and telephone communication. The researcher proposes an assessment of technology applications, reflected in Table 28 below. Future research could focus on validating the assessment of channel richness and channel synchronicity of technology applications.

Table 28: Comparison of channel richness and channel synchronicity

Channel Richness and Channel Synchronicity	Face-to-face communication Source: Braun et. al, 2019)	Technology applications (Source: Author's own, 2021)
Utilisation of information cues	High	Medium
Extent of personalization	High	High
Capacity of feedback	High	High
Degree of language variety	High	High
Overall channel richness	High	High
Transmission velocity	High	High
Parallelism	Medium	High
Symbol sets	Few-many	Few-many
Rehearsability	Low	Medium
Reprocessability	Low	High
Information transmission	Fast	Fast
Information processing	Low	Medium
Overall synchronicity	High	High

Source: Adapted from Braun et al. (2019)

6.2 Hypothesis 1: There is a correlation between FoU of Technology applications and PC, AC, PSS

The objective of this research question was to understand whether there was a significant relationship between the sub-constructs of the antecedents of EE (PC, AC, PSS) and FoU of technology applications. The results of the Spearman correlation test revealed that there was no correlation between PC, AC and PSS and the FoU of technology applications. Therefore, it is concluded that the relationship between the PC, AC and PSS and FoU of technology applications is not significant.

Men and Yue (2019) concluded that symmetrical IC resulted in a culture that embodied feelings such as joy and pride. The survey questions on PC included a number of questions about manager behaviour (such as flexibility, support, autonomy, appreciation, and recognition for good work). Bearing in mind that this construct included questions about the relationship with the manager, it was expected that the frequency of communication through technology applications would have a significant relationship with PC. Similarly, questions on PSS included questions directly aimed at measuring the relationship with the supervisor (for example, "I feel a sense of familiarity with my manager, which makes me comfortable in the workplace", "My manager really cares about my well-being", and "My manager listens carefully to my opinions"). Therefore, it was surprising that the FoU of technology applications and PSS are independent of each other. Questions on AC were directed at the relationship with the organisation, rather than with the supervisor

(for example, "I am proud to tell others I work at my organisation", "Working at my organisation has a great deal of personal meaning to me", "I would be happy to work at my organisation until I retire"). AC measures the perception of the organisation, which is more likely to relate to macro variables rather than micro variables. Therefore, the result of a weak relationship between AC and FoU of technology applications is not surprising.

A possible explanation of the results is that technology applications has been accepted by employees as a norm in the workplace, therefore the FoU of technology applications has no relationship with PC, AC and PSS. As noted in Table 12, 65.5% of respondents indicated that they utilised atleast three modes of communication multiple times a day, which provides evidence that employees have adapted to an increase in the communication channels and have accepted the need to switch between the various modes of communication within a normal work day. It is also possible that the content of the communication is more important than the mode of communication. In the context of the changes to working patterns during the Covid-19 pandemic, it is possible that these results might have been different had the research been performed one year earlier, when traditional modes of communication were dominant in the manufacturing sector. The findings support the view of Ter Hoeven et al. (2014) that smartphones are a job resource rather than a job demand.

6.3   Hypothesis 2: FoU of Technology applications moderates the relationship between PC, AC and PSS (together the antecedents) and EE

Given the nature of the independent variable FoU of technology applications, and studies that have confirmed its impact on psychological well-being, it was expected that the FoU of technology applications would moderate the relationship between PC, AC, PSS (antecedents) and EE. However, the results concluded that FoU of technology applications did not moderate the relationship between PC, AC, PSS, and the sub-constructs of EE (being Meaningfulness, Safety and Availability). It is surprising that the FoU of technology applications did not moderate the relationship between antecedents (PC,AC, and PSS) and EE. Most of the literature reviewed provided evidence that smartphone use was associated with the challenges of feeling overwhelmed from being connected to the office 24/7, burnout, exhaustion, and stress (Tarafdar et al., 2020). Therefore, the researcher expected that FoU of technology applications would impact on the psychological conditions of the employee as measured through meaningfulness, safety, and availability.

The results reflected that the effect of the moderating variable on relationship

between antecedents of EE and Meaningfulness was 0.2%. What this means is that once technology interaction was factored into the results, the antecedents predicted only an additional 0.2% of the Meaningfulness employees experienced. Although inconsequential, it was the only result that showed an increasing effect. The moderated regression for safety and availability showed that FoU of technology applications had a negative impact (1.5% and 0.9%) on EE. Although inconsequential, it is interesting to note that the interaction did not impact the sub-constructs of EE in the same manner.

One reason for this result is that employees may have developed coping mechanisms (e.g., distraction) to remain engaged even though technology use is pervasive and multiple times a day. As explained by Tarafdar et al. (2020), there is evidence amongst social media users that distraction is a coping behaviour amongst those who experience technostress. Rather than the user spending less time with the stress-inducing technology environment, the user spends more time in technology environment, thus reinforcing a novel coping behaviour (referred to as distraction).

Another reason is that employees may be the blurring of the perception of the various modes of communication. Emojis allow for the expression of emotion, similar to verbal cues in face-to-face meetings (Hsieh & Tseng, 2016), thus allowing employees to full express their emotional cues whilst communicating with their supervisor / manager. The wide range of emojis and the applicability of it to both formal and informal communication makes it a close substitute for non-verbal cues that are received in face-to-face meetings.

Thirdly reason may be that the range of alternatives in communication channels allows for channel switching, to an extent that a single mode of communication does not become a predictor of EE. Thus, employees may be self-managing their levels of engagement by adapting to what may be more suitable for them.

A fourth reason may be that technology applications have become an accepted norm in the working world and seen as a blessing during the Covid-19 pandemic. The majority of respondents were managerial level and above, thus the access to communication technology would have allowed those employees to work from home during the Alert-level 5 lockdown effected in March 2020.

6.4 Hypothesis 3: The FoU of Technology applications moderates the relationship between EE and the outcome variables (DE and ITT)

Given the nature of the independent variable FoU of technology applications, and studies that have confirmed technology applications impact on behavioural outcomes, it was expected that the FoU of technology applications would moderate the relationship between EE and outcome variables. However, the results concluded that FoU of technology applications did not moderate the relationship between EE and the outcomes of EE (being DE and ITT). From the moderated regression analysis, the Adjusted R^2 showed an increase of only 1.3% for discretionary effort (from 17.4% to 18.7%). With ITT the results were surprising on two fronts. Firstly, before introducing technology applications as the moderating variable, EE only predicted 10.4% of an employee's ITT. Thus, the study proves that EE is not a significant predictor of ITT, even though there is a significant correlation between high levels of engagement and low levels of ITT (Shuck et al., 2011). Secondly, after inclusion of the moderating variable, EE only predicted an additional 1.3% of ITT (i.e., adjusted R^2 = 11.4%).

The reason for the lack of predictability between EE and ITT may be due to the fact that the Covid-19 pandemic has resulted in an increase in unemployment. Consequently, employees are more likely to stick with what they have regardless of the level of engagement. South Africa reported an increase in unemployment during the lockdown due to the fact that many companies had to scale back their operations due to a significant drop in local and global demand for products.

Another reason may be that employees have found the optimal, functional level of technology applications use (MacCormick et al., 2012) thus resulting in the manifestation of optimal behaviours and state of mind. Furthermore, it is observed that the majority of the respondents (79%) are over the age of 36, who have probably had enough time to adjust to the changes in technology and developed maturity and adaptability in handling the demands of multiple modes of communication, including technology applications.

6.5 Discussion of comments from respondents

Although very few responses were received in the comments section, and generalisation is not possible, the sample of relevant comments revealed that participants had considered the backdrop of Covid-19, in providing responses to the survey. Three respondents specifically mentioned the impact of Covid-19 and the

changes that have arisen as a result. Therefore, the discussion of the results should be understood in this context.

6.6   Conclusion

Smartphones have been in use for a number of years. However, the use of technology applications as a mode of communication has not been quantitatively tested. This study provides empirical evidence that the FoU of technology applications is not correlated with PC, AC and PSS (antecedents of EE). It goes on to prove that FoU of technology applications does not have a moderating impact on the relationship between the antecedents of EE and the sub-constructs of EE (i.e., meaningfulness, safety, availability). In the relationship between EE and the outcome variables (DE and ITT), no moderating effect was noted from the FoU of technology applications.

Chapter 7:   Conclusion

7.1   Introduction

The overall purpose of this chapter is to provide a synthesis of the findings of the research in response to the research questions. The principal findings for IC and EE are discussed followed by practical implications for management. Thereafter, the contribution to theory will be explained. Limitations of the research are explained to allow for an appreciation of the research context and scope. Finally, the recommendations for future research are proposed as it is hoped that this research will be built upon in coming years.

7.2   Principal findings

The overall research question was: How is EE impacted by the FoU of technology applications? The research found that the FoU of technology applications did not have a significant moderating impact on EE and the outcomes of EE. Furthermore, there was no correlation between FoU of technology applications and PSS, PC and AC (the antecedents of EE). This is despite the fact that technology applications (coupled with video calls) were the least preferred mode of communication out of the six choices in the survey. In terms of most preferred mode of communication, technology applications ranked behind e-mail and face-to-face. Despite its ranking (in the context of most and least) technology applications did not display correlation or moderation effects.

7.3   Contribution made towards theory

To date, research (Braun et al., 2019; Jarvenpaa & Leidner, 1999; Jiang & Luo, 2018) has hypothesised that modes of communication have an impact on employee and organisational outcomes. Until now, the relationship between IC and EE has been considered a linear or circular relationship (Welch, 2011). However, this study empirically reveals that EE is not impacted by FoU of technology applications, within the South African manufacturing sector. This may be due to the acceptance of multiple modes of communication as a norm. This is supported by the data collected which indicated that 15.5% of respondents reported utilising all 6 modes of communication multiple times a day. Furthermore, the majority of the respondents had tertiary education, which may reflect the ability to handle multiple modes of communication in the workplace. Hence, a contribution to the academic literature is the rebuttal of the model that states that there is a relationship between mode of communication and EE.

A second contribution to the theory is that the findings suggest that South African manufacturing sector employees classify technology applications as a job resource rather than a job demand, thus allowing them to optimise their engagement levels.

7.4 Practical implications for management

Considering the evidence that FoU of technology applications does not moderate EE, management should prioritise content and quality of communication in formulating IC strategies, over communication channels. That being said, existing research on technostress and cyberslacking should not be ignored in policy formulation. The key is to retain a balance between the various modes of communication so as to utilise each mode based on its comparative advantage. For example, sharing of straight-forward factual information is best done through e-mail. In negative climates, e-mails should be used with caution due to the risk of negative interpretation of ambiguous statements.

7.5 Limitations of the research

Limitations of a research reflect the parameters and the imperfections of the study due to trade-offs in decision-making around research methodology, sampling methods and demographics of sampled population.

Firstly, the research was bound by the South African manufacturing sector. Within the manufacturing sector, there was a disproportionate weighting of responses from the automotive sector (78%). This response bias was most likely due to the method of sampling which relied heavily on convenience and snowball sampling.

The age distribution amongst respondents was skewed towards the 36 – 45 years old category (35%). This represents a limitation as the other categories of age are not proportionately represented. For example, there were only 4 respondents in the 18 – 25 years old category. This category represents the millennials who may have a different perspective on communication channel preference, being the only generation in the workforce that has grown up as digital natives.

7.6 Suggestions for future research

This study was bound by the frequency and modes of communication as the independent variables. Therefore, questions on the content and quality of information were not included in the survey. It is proposed that future research focus on the content and quality of communication as a predictor of EE.

The research relied on self-reported usage. Future research, should consider the use of objective, observable data. The reason being that self-reported data cannot be considered free of bias, as it requires the participant to answer questions based on memory and recollection of events, which can be subjective. Due to the cross-sectional nature of the study, the data was collected only once for each respondent. It is recommended that a longitudinal study be undertaken to assess whether the results will be similar if data is collected over a period of time (longitudinal study) rather than at a point in time.

Of the three electronic communication channels (e-mail, technology applications and video calls), e-mail was most preferred (29.5%), with technology applications (14%) and video calls (14%) ranking a distant joint 5th place. One reason posited by the researcher is that the research was conducted during the Covid-19 lockdown at a time when many employees had already spent many months utilising communication technology as the primary mode of communication. Future research could be performed on a qualitative basis to understand why technology applications are not as popular as e-mail.

Future focus of research into IC and EE could be approached from the subjectivist, qualitative approach which will facilitate the revelation of insights from the perspective of the research participant, in a less restrictive format, rather than providing the research participant with a limited number of choices as is the approach from a positivist approach.

The research was bound by the South African manufacturing sector. Although a few non-manufacturing sector responses were received, these were discarded in the analysis. Future research could be aimed at other sectors of the economy.

The research measured the moderating effect of technology applications on two EE outcome variables (DE and ITT) only. Future research can extend the testing to other outcome variables (e.g., organisational citizenship behaviour, advocacy, trust, cyberslacking, work-life conflict).

7.7   Closing comments

Management is a complex discipline, and each new technology development or global event brings a new set of challenges to the workplace. For this reason, technology applications use should be driven by a set of guiding principles rather than rules and procedures. Based on the research, it was observed that technology applications do not moderate the relationship between the (i) antecedents of

employee engagement and employee engagement and (ii) employee engagement and the outcome variables. Furthermore, there is no correlation between the frequency of use of technology applications and the antecedent variables (i.e., psychological climate, affective commitment, and perceived supervisor support).

References

Afzal, S., Arshad, M., Saleem, S., & Farooq, O. (2019). The impact of perceived supervisor support on employees' turnover intention and task performance. *Journal of Management Development, 38*(5), 369-382. doi:10.1108/JMD-03-2019-0076

Agarwal, U. (2019). Impact of Supervisors' Perceived Communication Style on Subordinate's Pyschological Capital and Cyberloafing. *Australasian Journal of Information Systems, 23*.

Albrecht, S. L., Bakker, A. B., Gruman, J. A., Macey, W. H., & Saks, A. M. (2015). Employee engagement, human resource management practices and competitive advantage. *Journal of Organizational Effectiveness, 2*(1), 7-35.

Anitha, J. (2014). Determinants of employee engagement and their impact on employee performance. *International Journal of Productivity and Performance Management, 63*(3), 308-323.

Bailey, C., Madden, A., Alfes, K., & Fletcher, L. (2017). The meaning, antecedents and outcomes of employee engagement: A narrative synthesis. *International Journal of Management Reviews*, 31-53.

Bakker, A. B., & Demerouti, E. (2007). The Job Demands-Resources model: state of the art. *Journal of Managerial Psychology, 22*(3), 309-328. doi:10.1108/02683940710733115

Bartlett II, J. E., Kotrlik, J. W., & Higgins, C. C. (2001). Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning and Performance Journal, 19*(1), 43-50.

Beaver, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. (2013). Practical Consider actical Considerations for Using Explor ations for Using Exploratory Factor Analysis in or Analysis in Educational Research. *Practical Assessment, Research, and Evaluation, 18*.

doi:10.7275/qv2q-rk76

Becerra, M., & Gupta, A. K. (2003). Perceived Trustworthiness Within the Organization: The Moderating Impact of Communication Frequency on Trustor and Trustee Effects. *Organization Science, 14*(1), 32-44. doi:10.1287/orsc.14.1.32.12815

Blair, E., & Blair , J. (2015). Chapter 2 | Defining and Framing the Population. In E. Blair, & J. Blair, *Applied Survey Sampling.* Retrieved from https://dx-doi-org.uplib.idm.oclc.org/10.4135/9781483394022.n2

Blau, P. M. (1964). Chapter 4 Social Exchange. In P. M. Blau, *Exchange and power in social life* (pp. 88-114). Wiley.

Braun, S., Bark, A. H., Kirchner, A., Stegmann, S., & van Dick, R. (2019). E-mails From the Boss - Curse or Blessing? Relations Between Communication Channels, Leader Evaluation, and Employees' Attitudes. *International Journal of Business Communication, 56*(1), 50-81. doi:10.1177/2329488415597516

Brown , S. P., & Leigh, T. W. (1996). A New Look at Psychological Climate and Its Relationship to Job Involvement, Effort, and Performance. *Journal of Applied Psychology, 81*(4), 358-368.

Burke, M. J., Borucki, C. C., & Kaufman, J. D. (2002). Contemporary perspectives on the study of psychological climate: A commentary. *European Journal of Work and Organizational Psychology*, 325-340. doi:10.1080/13594320244000210

Cambridge Dictionary. (n.d.). *Cambridge Dictionary*. Retrieved December 22, 2020, from https://dictionary.cambridge.org/dictionary/english/frequency

Caylak, E., & Altuntas, S. (2017). Organizational Silence Among Nurses: The impact on organizational cynicism and intention to leave work. *Journal of Nursing Research, 25*(2), 90-98. doi:10.1097/JNR.0000000000000139

Chiappetta, M. (2017, April 11). The Technostress: definition, symptoms and risk prevention. *Senses & Sciences* .

Childers, L. (1989). J. Grundig's Asymmetrical and Symmetrical Models of Public

Relations: Contrasting Features and Ethical Dimensions. *IEEE Transactions on Professional Communication, 32*(2), 86-93.

Choi, S. B., Tran, T. B., & Byung, I. P. (2015). Inclusive leadership and work engagement: Mediating roles of affective organizational commitment and creativity. *Social Behavior and Personality: an international journal, 43*(6), 931-944. doi:10.2224/sbp.2015.43.6.931

Colarelli, S. M. (1984). Methods Of Communication and Mediating Processes in Realistic Job Previews. *Journal of Applied Psychology, 69*(4), 633-642.

Collins Dictionary. (n.d.). *Collins Dictionary*. Retrieved February 24, 2021, from https://www.collinsdictionary.com/dictionary/english/to-go-the-extra-mile

Collins, D. (2003). Pretesting survey instruments: an overview of cognitive methods. *Quality of Life Research, 12*(3), 229-238.

Cropanzano, R., & Mitchell, M. S. (2005). Social Exchange Theory: An Interdisciplinary Review. *Journal of Management*, 874-900. doi:10.1177/0149206305279602

Daft, R. L., & Lengel, R. H. (1983). *Information Richness: A new approach to managerial behaviour and organization design.* College of Business Administration. Texas: Texas A&M University College.

De Cieri, H., Sheehan, C., Donohue, R., Shea, T., & Cooper, B. (2019). Workplace bullying: an examination of power and perpetrators. *Personnel Review, 48*(2), 324-341. doi:10.1108/PR-02-2018-0057

DeConinck , J. B., & Johnson, J. T. (2009). The effects of perceived supervisor support, perceived organizational support, and organizational justice on turnover among salespeople. *Journal of Personal Selling & Sales Management*, 333-350. doi:10.2753/PSS0885-3134290403.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499-512. doi:10.1037//0021-9010.86.3.499

Demirtas, O., Hannah, S. T., Gok, K., & Arslan, A. (2017). The moderated influence of ethical leadership, via meaningful work, on followers' engagement, organizational identification, and envy. *Journal of Business Ethics, 145*(1), 183-199. doi:10.1007/s10551-015-2907-7

Denney, A. S., & Tewksbury, R. (2012). How to Write a Literature Review. *Journal of Criminal Justice Education*, 218-234. doi:10.1080/1051125.2012,730617

Derks, D., & Bakker, A. B. (2010). The Impact of E-mail Communication on Organizational Life. *Journal of Psycosocial Research on Cyberspace, 4*(1).

Drago, E. (2015). The effect of technology on face-to-face communication. *Elon Journal of Undergraduate Research in Communications, 6*(1).

Duke, E., & Montag, C. (2017). Smartphone addiction, daily interruptions and self-reported productivity. *Addictive Behaviors Reports, 6*, 90-95. doi:10.1016/j.abrep.2017.07.002

Eisenberger, R., Armeli, S., Rexwinkel, B., Lynch, P. D., & Rhoades, L. (2001). Reciprocation of Perceived Organizational Support. *Journal of Applied Pschology, 86*(1), 42-51.

Eisenberger, R., Huntington , R., Hutchison, S., & Sowa, D. (1986). Perceived organizational support. *Journal of Applied Psychology, 71*(3), 500-507. doi:10.1037/0021-9010.71.3.500

Eisenberger, R., Stinglhamber, F., Vandenberghe, C., Sucharski, I. L., & Rhoades, L. (2002). Perceived Supervisor Support: Contributions to Perceived Organizational Support and Employee Retention. *Journal of Applied Psychology*, 565-573. doi:10.1037//0021-9010.87.3.565

Ekinci, Y. (2015). *Designing research questionnaires for business and management students.* ProQuest Ebook Central. Retrieved from https://ebookcentral-proquest-com.uplib.idm.oclc.org

Ewing, M., Men, L. R., & O'Neil, J. (2019). Using Social Media to Engage Employees: Insights from Internal Communication Managers. *International Journal of Strategic*

Communication, 13(2), 110-132. doi:10.1080/1553118X.2019.1575830

Gadeyne, N., Verbruggen, M., Delanoeije, J., & De Cooman, R. (2018). All wired, all tired? Work-related ICT-use outside work hours and work-to-home conflict: The role of integration preference, integration norms and work demands. *Journal of Vocational Behavior, 107*, 86-99. doi:10.1016/j.jvb.2018.03.008

Gallup. (2017). *State of the Global Workforce.* Retrieved from https://www.gallup.com/workplace/238079/state-global-workplace-2017.aspx#formheader

Gardner, C., Hailey, A., Nguyen, C., Prichard, C., & Newcomb, P. (2017). The Relationship Between Electronic Connectedness to Work and Nurse Manager Satisfaction. *The Journal of Nursing Administration, 47*(1), 16-23. doi:10.1097/NNA.0000000000000431

Ghislieri, C., Emanuel, F., Molino, M., Cortese, C. G., & Colombo, L. (2017). New Technologies Smart, or Harm Work-Family Boundaries Management? Gender Differences in Conflict and Enrichment Using the JD-R Theory. *Frontiers in Psychology, 8*. doi:10.3389/fpsyg.2017.01070

Greener, S. (2008). *Business Research Methods.* BookBoon.

Güğerçin, U. (2020). Does techno-stress justify cyberslacking? An empirical study based on the neutralisation theory. *Behaviour & Information Technology, 39*(7). doi:10.1080/0144929X.2019.1617350

Hair Jr, J. F., Page, M., & Brunsveld, N. (2019). *Essentials of business research methods.* Routledge.

Halfmann, A., & Rieger, D. (2019). Permanently on Call: The Effects of Social Pressure on Smartphone Users' Self-Control, Need Satisfaction, and Well-Being. *Journal of Computer-Mediated Communication*, 165-181. doi:10.1093/jcmc/zmz008

Hansen, A., Byrne, Z., & Kiersch, C. (2014). How interpersonal leadership relates to employee engagement. *Journal of Managerial Psychology, 29*(8), 953-972.

doi:10.1108/JMP-11-2012-0343

Haraguchi, N., Cheng, C. F., & Smeets, E. (2017). The Importance of Manufacturing in Economic Development: Has This Changed? *World Development, 93*, 293-315.

Harter, J. (2020, July 22). *U.S. Employee Engagement Hits New High After Historic Drop.* Retrieved from www.gallup.com.

Hofstede, S. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations.* Sage publications.

Holden, M. T., & Lynch, P. (2004). Choosing the appropriate methodology: Understanding research philosophy. *The marketing review, 4*(4), 397-409.

Holland, P., Cooper , B., & Sheehan, C. (2017). Employee Voice, Supervisor Support, and Engagement: The Mediating Role of Trust. *Human Resource Management, 56*(6), 915–929. doi:10.1002/hrm.21809

Hsieh, S. H., & Tseng, T. H. (2016). Playfulness in mobile instant messaging: Examining the influence of emoticons and text messaging on social interaction. *Computers in Human Behavior*, 405-414. doi:10.1016/j.chb.2016.12.052

Independent Communications Authority of South Africa. (2020). *The State of the ICT Sector Report in South Africa.* Retrieved from https://www.icasa.org.za/legislation-and-regulations/state-of-the-ict-sector-in-south-africa-2020-report

Ishii, K., Lyons, M. M., & Carr, S. A. (2019). Revisiting media richness theory for today and future. *Human Behavior and Emerging Technologies* , 124-131.

Jarvenpaa, S. L., & Leidner, D. E. (1999). Communication and trust in global virtual teams. *Organization Science, 10*(6), 791-815. doi:10.1287/orsc.10.6.791

Javed , B., Naqvi, S. R., Khan, A. K., Arjoon, S., & Tayyeb, H. H. (2017). Impact of inclusive leadership on innovative work behavior: The role of psychological safety. *Journal of Management & Organization*, 1-20. doi:10.1017/jmo.2017.3

Jena, L. K., Pradhan, S., & Panigrahy, N. P. (2018). Pursuit of organisational trust: Role of employee engagement, psychological well-being and transformational

leadership. *Asia Pacific Management Review*, 227-234. doi:10.1016/j.apmrv.2017.11.001

Jenkins, S., & Delbridge, S. (2013). Context matters: examining "soft" and 'hard" approaches to employee engagement in two workplaces. *The International Journal of Human Resources Management, 24*(14), 2670-2691. doi:10.1080/09585192.2013.770780

Jiang, H., & Luo, Y. (2018). Crafting employee trust: from authenticity, transparency to engagement. *Journal of Communication Management , 22*(2), 138-160. doi:10.1108/JCOM-07-2016-0055

Jin, M. H., & McDonald, B. (2017). Understanding employee engagement in the public sector: The role of immediate supervisor, perceived organizational support, and learning opportunities. *American Review of Public Administration, 47*(8), 881-897. doi:10.1177/0275074016643817

Jo, S., & Shim, S. W. (2005). Paradigm shift of employee communication: The effect of management communication on trusting relationships. *Public Relations Review, 31*, 277-280. doi:10.1016/j.pubrev.2005.02.012

Johlke, M. C., & Duhan, D. F. (2000). Supervisor Communication Practices and Service Employee Job Outcomes. *Journal of Service Research*, 154-165.

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *The Academy of Management Journal, 33*(4), 692-724.

Kahn, W. A. (2010). Chapter 2: The essence of engagement: lessons from the field. In S. Albrecht (Ed.), *Handbook of employee engagement* (pp. 20-30). Cheltenham, UK: Edward Elgar.

Kalla, H. K. (2005). Integrated internal communications: a multidisciplinary perspective. *Corporate Communications: An International Journal, 10*(4), 302-314. doi:10.1108/13563280510630106

Kandasamy, I., Kandasamy, W. V., Obbineni, J. M., & Smarandache, F. (2020). Indeterminate Likert scale: feedback based on neutrosophy, its distance

measures and clustering algorithm. *Soft Computing, 24*(10), 7459–7468. doi:10.1007/s00500-019-04372-x

Kang, M., & Sung, M. (2017). How symmetrical employee communication leads to employee engagement and positive communication behaviours The mediation of employee-organization relationships. *Journal of Communication Management, 21*(1), 82-102.

Karanges, E., Johnston, K., Beatson, A., & Lings, I. (2015). The influence of internal communication on employee engagement: A pilot study. *Public Relations Review*, 129-131.

Kottke, J. L., & Sharafinski, C. E. (1988). Measuring Perceived Supervisory and Organizational Support. *Educational and Psychological Measurement*, 1075-1079.

Kovaitė, K., Šūmakaris, P., & Stankevičienė, J. (2020). Digital Communication Channels in Industry 4.0 Implementation: The Role of Internal Communication. *Journal of Contemporary Management Issues, 25*(1), 171-191. doi:10.30924/mjcmi.25.1.10

Laerd. (n.d.). Retrieved March 10, 2021, from https://statistics.laerd.com/spss-tutorials/ordinal-regression-using-spss-statistics.php

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods.* Thousand Oaks: Sage Publications. doi:10.4135/9781412963947

Lee, Y. (2018). Dynamics of Symmetrical Communication Within Organizations: The Impacts of Channel Usage of CEO, Managers and Peers. *International Journal of Business Communications*, 1-19. doi:10.1177/2329488418803661

Lee, Y., & Kim, J. (2021). Cultivating employee creativity through strategic internal communication: The role of leadership, symmetry, and feedback seeking behaviors. *Public Relations Review, 47*(1), 1-11.

Lee, Y., & Yue, C. A. (2020). Status of internal communication research in public relations: An analysis of published articles in nine scholarly journals from 1970 to

2019. *Public Relations Review*, 1-10. doi:10.1016/j.pubrev.2020.101906

Lemon, L. L. (2019). The employee experience: how employees make meaning of employee engagement. *Journal of Public Relations Research, 31*(5-6), 176-199. doi:10.1080/1062726X.2019.1704288

Lemon, L. L., & Palenchar, M. J. (2018). Public relations and zones of engagement: Employees' lived experiences and the fundamental nature of employee engagement. *Public Relations Review, 44*(1), 142-155.

Leonardi, P. M., Treem, J. W., & Jackson, M. H. (2010). The Connectivity Pradox: Using Technology to Both Decrease and Increase Perceptions of Distance in Distributed Work Arrangements. *Journal of Applied Communication Research, 38*(1), 85-105. doi:10.1080/00909880903483599

Lloyd, R. (2008). Discretionary Effort and the Performance Domain. *Australian and New Zealand Journal of Organisational Psychology, 1*(1), 22-34.

Lutz, S., Schneider, F. M., & Vorderer, P. (2020). On the downside of mobile communication: An experimental study on the influence of setting-inconsistent pressure on employees' emotional wellbeing. *Computers in Human Behavior, 105*, 1-9.

Lybarger, J. E., Rancer, A. S., & Lin, Y. (2017). Superior-Subordinate Communication in the Workplace: Verbal Aggression, Nonverbal Immediacy, and Their Joint Effects on Perceived Superior Credibility. *Communication Research Reports*, 124-133. doi:10.1080/08824096.2016.1252909

Lysova, E. I., Allan, B. A., Dik, B. J., Duffy, R. D., & Steger, M. F. (2019). Fostering meaningful work in organizations. *Journal of Vocational Behavior, 110*, 374-389. doi:10.1016/j.jvb.2018.07.004

MacCormick, J. S., Dery, K., & Kolb, D. G. (2012). Engaged or just connected? Smartphones and employee engagement. *Organizational Dynamics, 41*, 194-201. doi:10.1016/j.orgdyn.2012.03.007

Macey, W. H., Schneider, B., Barbera, K. M., & Young, S. A. (2009). *Employee*

Engagement: Tools for Analysis, Practice, and Competitive Advantage. West Sussex: Wiley-Blackwell.

Maltz, E. (2000). Is all communication created equal?: An investigation into the effects of communication mode on perceived information quality. *Journal of Production Innovation Management: An International Publication of the product development & management association, 17*(2), 110-127.

May, D. R., Gilson, R. L., & Harter, L. M. (2004). The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *Journal of Occupational and Organizational Psychology*, 11-37.

McKee, H. A., & Porter, J. E. (2017). *Professional communication and network interaction: A rhetorical and ethical approach* (Vol. 33). New York : Taylor & Francis.

Mehra, P., & Nickerson, C. (2019). Does technology divide or unite generations? Testing media richness and communication climate effects on communication satisfaction in the Indian workplace. *International Journal of Organizational Analysis, 27*(5).

Men, L. R., & Yue, C. A. (2019). Creating a positive emotional culture: Effect of internal communication and impact on employee supportive behaviors. *Public Relations Review*, 1-12.

Menguc, B., Auh, S., Fisher, M., & Haddad, A. (2013). To be engaged or not to be engaged: The antecedents and consequences of service employee engagement. *Journal of Business Research, 66*(11), 2163-2170. doi:10.1016/j.busres.2012.01.007

Mikkelson, A. C., Sloan, D., & Hesse, C. (2019). Relational Communication Messages and Leadership Styles in Supevisor / Employee Relationships. *International Journal of Business Communication*, 586-604. doi:10.1177/2329488416687267

Mishra, K., Boynton, L., & Mishra, A. (2014). Driving Employee Engagement: The

Expanded Role of Internal Communications. *International Journal of Business Communication,* *51*(2), 183-202. doi:https://doi-org.uplib.idm.oclc.org/10.1177/2329488414525399

Moletsane, M., Tefera, O., & Migiro, S. (2019). The Relationship between Employee Engagement and Organisational Productivity of Sugar Industry in South Africa: The Employees' Perspective. *African Journal of Business and Economic Research, 14*(1), 113-134. doi:10.31920/1750-4562/2019/v14n1a6

Mongale, I. P. (2019). The Implications of Labour Productivity and Labour Costs on the South African Economy. *Journal of Reviews on Global Economics*, 1298-1307. doi:10.6000/1929-7092.2019.08.113

Mouelhi, R. B. (2009). Impact of the adoption of information and communication technologies on firm efficiency in the Tunisian manufacturing sector. *Economic Modelling, 26*, 961-967.

Nazir, O., & Ul Islam, J. (2017). Enhancing organizational commitment and employee performance through employee engagement. *South Asian Journal of Business Studies, 6*(1), 98-114.

Nemoto, T., & Beglar, D. (2014). Developing Likert-scale questionnaires. *JALT 2013 Conference Proceedings* (pp. 1-8). Tokyo: Jalt.

Newman, A., Donohue, R., & Eva, N. (2017). Psychological safety: A systematic review of the literature. *Human Resource Management Review*, 521-535. doi:10.1016/j.hrmr.2017.01.001

Price, J. L. (2000). Reflections on the determinants of voluntary turnover. *International Journal of Manpower*, 600-624.

Prouska, R., & Psychogios, A. (2018). Do not say a word! Conceptualising employee silence in a long-term crisis context. *The International Journal of Human Resources Management, 29*(5), 885-914. doi:10.1080/09585192.2016.1212913

Punch, K. F. (2013). *Introduction to social research: Quantitative and qualitative approaches.* Sage.

Radic, A., Arjona-Fuentes, J. M., Ariza-Montes, A., Han, H., & Law, R. (2020). Job demands–job resources (JD-R) model, work engagement, and well-being of cruise ship employees. *International Journal of Hospitality Management, 88*, 1-9. doi:10.1016/j.ijhm.2020.102518

Ragsdale, J. M., & Hoover, C. S. (2016). Cell phones during nonwork time: A source of job demands and resources. *Computers in Human Behavior, 57*, 54-60. doi:10.1016/i.chb.2015.12.017

Rastogi, A., Pati, S. P., Krishnan, T. N., & Krishnan, S. (2018). Causes, contingencies, and consequences of disengagement at Work: An integrative literature review. *Human Resource Development Review, 17*(1), 62-94. doi:10.1177/1534484317754160

Rattrie, L. B., Kittler, M. G., & Paul, K. I. (2020). Culture, Burnout, and Engagement: A Meta-Analysis on National Cultural Values as Moderators in JD-R Theory. *Applied Psychology: An International Review, 69*(1), 176-220. doi:10.1111/apps.12209

Rhee, Y., & Moon, B. (2009). Organizational culture and strategic communication practice: Testing the competing values model (CVM) and employee communication strategies (ECS) model in Korea. *International Journal of Strategic Communication, 3*(1), 52-67.

Rhoades , L., & Eisenberger, R. (2002). Perceived Organizational Support: A Review of the Literature. *Journal of Applied Psychology*, 698-714.

Rhoades, L., Eisenberger, R., & Armeli, S. (2001). Affective commitment to the organization: The contribution of perceived organizational support. *Journal of Applied Psychology*, 825-836.

Rich, B. L., Lepine, J. A., & Crawford, E. R. (2010). Job engagement: Antecedents and effects on job performance. *Academy of management journal, 53*(3), 617-635.

Roberts, J. A., Williams, B. H., & David, M. E. (2017). Put down your phone and listen

to me: How boss phubbing undermines the psychological conditions necessary for employee engagement. *Computers in Human Behaviour*, 206-217. doi:10.1016/j.chb.2017.05.021

Rothmann, S., & Rothmann Jr, S. (2010). Factors associated with employee engagement in South Africa. *SA Journal of Industrial Psychology, 36*(2). doi:10.4102/sajip.v36i2.925

Ruck, K., Welch, M., & Menara, B. (2017). Employee voice: An antecedent to organisational engagement? *Public Relations Review*, 904-914.

Saks, A. M. (2019). Antecedents and consequences of employee engagement revisited. *Journal of Organizational Effectiveness: People and Performance*, 19-38.

Saks, A. M., & Gruman, J. A. (2014). What do we really know about employee engagement? *Human Resource Development Quarterly, 25*(2). doi:10.1002/hrdq.21187

Salanova, M., & Schaufeli, W. B. (2000). Exposure to information technology and its relation to burnout. *Behaviour & Information Technology, 19*(5), 385-392.

Salkind, N. J. (2007). Shapiro-Wilk Test for Normality. In *Encyclopedia of Measurement and Statistics.* doi:10.4135/9781412952644

Sandoval-Reyes, J., Acosta-Prado, J. C., & Sanchís-Pedregosa, C. (2019). Relationship Amongst Technology Use, Work Overload, and Psychological Detachment from Work. *International Journal of Environmental Research and Public Health, 16*(23), 1-11. doi:10.3390/ijerph16234602

Saunders , M., & Lewis, P. (2018). *Doing research in business and management* (2nd ed.). Pearson Education.

Saunders, M. N., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson Education.

Schaufeli, W. B. (2017). Burnout: A short socio-cultural history. In *Burnout, fatigue, exhaustion* (pp. 105-127). Palgrave Macmillan. doi:10.1007/978-3-319-52887-8

Segalla, M., & DeNisi, A. (2019). International Perspectives On Employee Engagement: Are American Firms Leading The Way Or Walking Alone? *International Studies of Management & Organization*, 1-6.

Shuck, B., & Reio Jr, T. G. (2014). Employee engagement and well-being: A moderation model and implications for practice. *Journal of Leadership & Organizational Studies, 21*(1), 43-58.

Shuck, B., & Wollard, K. (2010). Employee Engagement and HRD: A Seminal Review of the Foundations. *Human Resource Development Review, 9*(1), 89-110.

Shuck, B., Reio Jr, T. G., & Rocco, T. S. (2011). Employee engagement: an examination of antecdent and outcome variables. *Human Resource Development International, 14*(4), 427-445.

Shuck, B., Twyford, D., Reio Jr., T. G., & Shuck, A. (2014). Human resource development practices and employee engagement: Examining the connection with employee turnover intentions. *Human Resource Development Quarterly, 25*(2), 239-270. doi:10.1002/hrdq

Sillars , A., & Zorn, T. E. (2020). Hypernegative Interpretation of Negatively Perceived Email at Work. *Management Communication Quarterly*, 1-30. doi:10.1177/0893318920979828

Sonnentag, S., Reinecke, L., Mata, J., & Vorderer, P. (2018). Feeling interrupted—Being responsive: How online messages relate to affect at work. *Journal of Organizational Behavior, 39*, 369-383. doi:10.1002/job.2239

Stander, M. W., & Rothmann, S. (2010). Psychological empowerment, job insecurity and employee engagement. *SA Journal of Industrial Psychology*. doi:10.4102/sajip.v36il.849

Statista. (2020). *Statista*. Retrieved from www.statista.com: https://www.statista.com/statistics/1103151/most-popular-mobile-apps-south-africa/

Statista. (2021). *Statista*. Retrieved from www.statista.com:

https://www.statista.com/statistics/258749/most-popular-global-mobile-messenger-apps/

Statistics South Africa. (2020, December 15). *www.statssa.gov.za.* Retrieved from http://www.statssa.gov.za/publications/P0277/P0277September2020.pdf

Stevens, S. S. (1950). Introduction: A definition of communication. *The Journal of the Acoustical Society of America*, 689-690. doi:10.1121/1.1906670

Stich, J., Farley, S., Cooper, C., & Tarafdar, M. (2015). Information and communication technology demands: outcomes and interventions. *Journal of Organizational Effectiveness: People and Performance, 2*(4), 327-345. doi:10.1108/JOEPP-09-2015-0031

Stich, J., Tarafdar, M., & Cooper , C. L. (2018). Electronic communication in the workplace: boon or bane? *Journal of Organizational Effectiveness: People and Performance, 5*(1), 98-106. doi:10.1108/JOEPP-05-2017-0046

Stich, J., Tarafdar, M., Stacey, P., & Cooper, C. L. (2019). E-mail load, workload stress and desired e-mail load: a cybernetic approach. *Information Technology & People, 33*(2), 430-452. doi:10.1108/ITP-10-2017-0321

Suhr, D. D. (2006). Exploratory or confirmatory factor analysis?

Tarafdar, M., Maier, C., Laumer, S., & Weitzel, T. (2020). Explaining the link between technostress and technology addiction for social networking sites: A study of distraction as a coping behavior. *Information Systems Journal, 30*(1), 96-124. doi:10.1111/isj.12253

Ter Hoeven, C. L., van Zoonen, W., & Fonner, K. L. (2016). The practical paradox of technology: The influence of communication technology use on employee burnout and engagement. *Communication Monographs, 83*(2), 239-263. doi:10.1080/03637751.2015.1133920

The World Bank. (2021). *The World Bank*. Retrieved February 21, 2021, from www.worldbank.org:

https://data.worldbank.org/indicator/NV.IND.MANF.ZS?contextual=default&end=

2019

Uddin, M. A., Mahmood, M., & Fan, L. (2019). Why individual employee engagement matters for team performance? Mediating effects of employee commitment and organizational citizenship behaviour. *Team Performance Management: An International Journal*, 47-68. doi:10.1108/TPM-12-2017-0078

Valle, M., Carlson, D. S., Carlson, J. R., Zivnuska, S., Harris, K. J., & Harris, R. B. (2021). Technology-enacted abusive supervision and its effect on work and family. *The Journal of Social Psychology, 161*(3), 272-286. doi:10.1080/00224545.2020.1816885

van den Berg, P., Arentze, T., & Timmermans, H. (2012). New ICTs and social interaction: Modelling communication frequency and communication mode choice. *new media & society, 14*(6), 987–1003. doi:10.1177/1461444812437518

Van den Broeck, A., Vander Elst, T., Baillien, E., Sercu, M., Schouteden, M., De Witte, H., & Godderis, L. (2017). Job Demands, Job Resources, Burnout, Work Engagement, and Their Relationships: An Analysis Across Sectors. *Journal of Occupational & Environmental Medicine, 59*(4), 369-376. doi:10.1097/JOM.0000000000000964

Van Dijk, M. (2020, July - September). Place of Work. *The Johannesburg Stock Exchange Quarterly*, pp. 59-62.

Van Dyne, L., Ang , S., & Botero, I. C. (2003). Conceptualizing Employee Silence and Employee Voice as Multidimensional Constructs. *Journal of Management Studies, 40*(6).

Van Laethem, M., van Vianen, A. E., & Derks, D. (2018). Daily Fluctuations in Smartphone Use, Psychological Detachment, and Work Engagement: The Role of Workplace Telepressure. *Frontiers in Psychology, 9*. doi:10.3389/fpsyg.2018.01808

VanVoorhis, C. W., & Morgan, B. L. (2007). Understanding Power and Rules of

Thumb for Determining Sample Sizes. *Tutorials in Quantitative Methods for Psychology, 3*(2), 43-50.

Venkatesh, V., & Davis, F. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science, 46*(2), 186-204. doi:10.1287/mnsc.46.2.186.11926

Verčič, A. T. (2021). The impact of employee engagement, organisational support and employer branding on internal communication satisfaction. *Public Relations Review, 47*(1). doi:10.1016/j.pubrev.2021.102009

Verčič, A. T., & Špoljarić, A. (2020). Managing internal communication: How the choice of channels affects internal communication satisfaction. *Public Relations Review* , 1-7. doi:10.1016/j.pubrev.2020.101926

Verčič, A. T., & Vokić, N. P. (2017). Engaging employees through internal communication. *Public Relations Review, 43*(5), 885-893. doi:10.1016/j.pubrev.2017.04.005

Verghese, A. K. (2017). Internal Communication: Practices and Implications. *SCMS Journal of Indian Management, 14*(3), 103-113.

Walden, J., Jung, E. H., & Westerman, C. Y. (2017). Employee communication, job engagement, and organizational commitment: A study of members of the Millenial Generation. *Journal of Public Relations Research, 29*(2-3), 73-89. doi:10.1080/1062726X.2017.1329737

Wegner, T. (2016). *Applied Business Statistics: Methods and excel-based applications* (4th ed.). Cape Town: Juta and Company Limited.

Welch, M. (2011). The evolution of the employee engagement concept: communication implications. *Corporate Communications: An International Journal*, 328-346. doi:10.1108/13563281111186968

Welch, M. (2012). Appropriateness and acceptability: Employee perspectives of internal communication. *Public Relations Review, 38*(2), pp. 246-254.

Welch, M., & Jackson, P. R. (2007). Rethinking internal communication: a

stakeholder approach. *Corporate Communications: An International Journal*, 177-198. doi:10.1108//13563280710744847

Worley, J. M., & Doolen, T. L. (2006). The role of communication and management support in a lean manufacturing implementation. *Management Decision, 44*(2), 228-245.

Yalabik, Z. Y., Popaitoon, P., Chowne, J. A., & Rayton, B. A. (2013). Work engagement as a mediator between employee attitudes and outcomes. *The International Journal of Human Resource Management, 24*(14), 2799-2823. doi:10.1080/09585192.2013.763844

Younas, A., Wang, D., Javed, B., Rawwas, M. Y., Abdullah, I., & Zaffar, M. A. (2020). Positive psychological states and employee creativity: The role of ethical leadership. *The Journal of Creative Behavior, 54*(3), 567-581. doi:10.1002/jocb.391

Appendices

Appendix A: Questionnaire as per Google Forms

On-line survey: The influence of modes of communication on employee engagement in the manufacturing sector - a South African perspective

CONSENT FORM

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and am completing my research in partial fulfilment of a manufacturing- focused MBA.

I am conducting research on employee engagement, perceived supervisor support and modes of communication in the manufacturing sector. The purpose of the research is to understand the impact that modes of communication have on perceived supervisor support and employee engagement.

Your participation is voluntary, and you can withdraw at any time without penalty.

Your participation is anonymous, and no names will be reported. The survey will take approximately 15 minutes to complete. By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns, please contact me or my supervisor. Our details are provided below.

Researcher name: Priya Govind
Email: 19401770@mygibs.co.za
Phone: 031 7194163

Research Supervisor: Manoj Chiba
Email: chibam@mygibs.co.za
Phone: 011 7714000

*Required

Who should complete the survey?

This survey is applicable to individuals employed within the manufacturing sector in South Africa and is aimed at those who utilise multiple modes of communication in the workplace.

Please proceed if you are an employee in the manufacturing sector in South Africa. Thank you.

1. I am currently employed in the manufacturing sector in South Africa: Yes/No *

   Mark only one oval.

   ◯ Yes
   ◯ No

Mark only one oval.

- ◯ Food and beverages
- ◯ Textiles, clothing, leather and footwear
- ◯ Wood and wood products, paper, publishing and printing
- ◯ Petroleum, chemical products, rubber and plastic products
- ◯ Glass and non-metallic mineral products
- ◯ Basic iron and steel, non-ferrous metal products, metal products and machinery
- ◯ Electrical machinery
- ◯ Radio, television and communication apparatus and professional equipment
- ◯ Motor vehicles, parts and accessories and other transport equipment
- ◯ Furniture and other manufacturing
- ◯ Other

3. I have been employed in the manufacturing sector in South Africa for at least one year: Yes/No *

Mark only one oval.

- ◯ Yes
- ◯ No

Skip to question 4

Employee engagement

The questions in this section relate to your feelings about your work, your relationship with your manager and the organisation.

106

4. Survey questions *

Mark only one oval per row.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The work I do on the job is important to me	◯	◯	◯	◯	◯
My job activities are personally meaningful to me	◯	◯	◯	◯	◯
I can be myself at work	◯	◯	◯	◯	◯
I am free to express my opinions at work (for example, I can bring up problems and tough issues without fear of being ridiculed or ostracised)	◯	◯	◯	◯	◯
I feel physically safe at work	◯	◯	◯	◯	◯
I am confident in my ability to handle competing demands at work	◯	◯	◯	◯	◯
I am confident in my ability to deal with problems that come up at work	◯	◯	◯	◯	◯
I am confident in my ability to think clearly at work	◯	◯	◯	◯	◯
I am confident in my ability to display the appropriate emotions at work	◯	◯	◯	◯	◯
I am confident that I can handle the physical demands at work	◯	◯	◯	◯	◯
My manager is flexible about how I accomplish my job objectives	◯	◯	◯	◯	◯
My manager is supportive of my ideas and ways of getting things done	◯	◯	◯	◯	◯
My manager gives me authority to do my job as I see fit	◯	◯	◯	◯	◯

107

I am careful in taking responsibility because my manager is often critical of new ideas	◯	◯	◯	◯	◯
I can trust my manager to back me up on decisions I make	◯	◯	◯	◯	◯
I feel very useful in my job	◯	◯	◯	◯	◯
Doing my job well really makes a difference	◯	◯	◯	◯	◯
I feel like a key member of my organisation	◯	◯	◯	◯	◯
The work I do is very valuable to the organisation	◯	◯	◯	◯	◯
I rarely feel my work is taken for	◯	◯	◯	◯	◯

granted					
My superiors generally appreciate the way I do my job	◯	◯	◯	◯	◯
The organisation recognises the significance of the contribution I make	◯	◯	◯	◯	◯
My job is very challenging	◯	◯	◯	◯	◯
It takes all my resources to achieve my work objectives	◯	◯	◯	◯	◯
I feel a strong sense of belonging to my organisation	◯	◯	◯	◯	◯
I feel personally attached to my work organisation	◯	◯	◯	◯	◯

108

I am proud to tell others I work at my organisation	○	○	○	○	○
Working at my organisation has a great deal of personal meaning to me	○	○	○	○	○
I would be happy to work at my organisation until I retire	○	○	○	○	○
I enjoy discussing the organisation with people who do not work here	○	○	○	○	○
When I work, I really exert myself to the fullest, beyond that what is expected	○	○	○	○	○
I finish a job even if it means sacrificing breaks or lunches	○	○	○	○	○
I do more than is expected of me	○	○	○	○	○
I voluntarily put in extra hours to achieve a result faster	○	○	○	○	○
I persist in overcoming obstacles to complete an important task	○	○	○	○	○
I put in extra effort when I find it necessary	○	○	○	○	○
I work harder than expected to help my organisation be successful	○	○	○	○	○
I frequently think of quitting my job	○	○	○	○	○
I am planning to search for a new job during the next 12 months	○	○	○	○	○
If I have my own way, I will be working for this organisation one year from now	○	○	○	○	○

109

Communication and support	The questions in this section relate to the effectiveness of the communication between you and your supervisor / manager as well as your perception of the support that you receive. A manager (sometimes referred to as a supervisor) is the person that you are accountable to and report to directly on a day-to-day basis.

5. *

Mark only one oval per row.

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
My manager clarifies top-down communication from senior management	⬭	⬭	⬭	⬭	⬭
My manager checks for accuracy when reviewing or checking my work	⬭	⬭	⬭	⬭	⬭
My manager manages employees' conflict	⬭	⬭	⬭	⬭	⬭
My manager gives me clear instructions	⬭	⬭	⬭	⬭	⬭
My manager actively listens to me	⬭	⬭	⬭	⬭	⬭
My manager empathetically listens to me	⬭	⬭	⬭	⬭	⬭
I feel a sense of familiarity with my manager, which makes me comfortable in the workplace	⬭	⬭	⬭	⬭	⬭
My manager listens carefully to my opinions	⬭	⬭	⬭	⬭	⬭
My manager is willing to help me if I need help	⬭	⬭	⬭	⬭	⬭
My manager strongly considers my goals and values	⬭	⬭	⬭	⬭	⬭
My manager really cares about my well-being	⬭	⬭	⬭	⬭	⬭
My manager takes great pride in my accomplishments	⬭	⬭	⬭	⬭	⬭

Modes of communication

For each mode of communication, please select the frequency with which the mode of communication is utilised between you and your supervisor / manager

6.

Mark only one oval per row

	Multiple times a day	Once a day	Once a week	Once a month	Never
Technology-based messaging apps (for example, WhatsApp, Messenger, Slack, Notion)	◯	◯	◯	◯	◯
Video call (e.g. Microsoft Teams, Zoom)	◯	◯	◯	◯	◯
Phone call (landline/cell phone)	◯	◯	◯	◯	◯
E-mail	◯	◯	◯	◯	◯
Face-to-face – formal meeting	◯	◯	◯	◯	◯
Face-to-face – informal meetings (e.g. in the corridor)	◯	◯	◯	◯	◯

Preferred mode of communication

As modes of communication continue to expand, the researcher is interested in understanding your most preferred and least preferred mode of communication.

7. Please select your MOST PREFERRED mode of communication: (choose from drop-down list of the five modes listed above) *

Mark only one oval.

◯ Technology-based messaging apps (for example, WhatsApp, Messenger, Slack, Notion)

◯ Video call (e.g. Microsoft Teams, Zoom)

◯ Phone call (landline/cell phone)

◯ E-mail

◯ Face-to-face – formal meeting

◯ Face-to-face – informal meetings (e.g. in the corridor)

111

8. Please select your LEAST PREFERRED mode of communication: *

Mark only one oval.

◯ Technology-based messaging apps (for example, WhatsApp, Messenger, Slack, Notion)

◯ Video call (e.g. Microsoft Teams, Zoom)

◯ Phone call (landline/cell phone)

◯ E-mail

◯ Face-to-face – formal meeting

◯ Face-to-face – informal meetings (e.g. in the corridor)

Demographic information

9. Age category *

Mark only one oval.

◯ 18-25 years old

◯ 26-35 years old

◯ 36-45 years old

◯ 46-55 years old

◯ 56 years and older

10. Gender *

Mark only one oval.

◯ Female

◯ Male

◯ Prefer not to say

11. Length of service with current employer *

Mark only one oval.

- ◯ Less than 1 year
- ◯ 1 to 5 years
- ◯ 5 to 10 years
- ◯ 10 to 15 years
- ◯ 15 years and more

12. Are you a full-time employee (i.e. standard working hours of at least 40 hours per week) *

Mark only one oval.

- ◯ Yes
- ◯ No

13. What is your highest education level achieved? Choose from the dropdown box below *

Mark only one oval.

- ◯ Matric
- ◯ Diploma
- ◯ University degree - under graduate level
- ◯ University degree - honours degree level
- ◯ Masters degree
- ◯ Doctorate
- ◯ Prefer not to say

14. Is English your first language? *

Mark only one oval.

◯ Yes

◯ No

◯ Prefer not to say

15. Please select a category that best describes your position in the organisation *

Mark only one oval.

◯ Operator

◯ Professional

◯ Technician

◯ Clerk

◯ Junior manager

◯ Middle manager

◯ Senior manager

◯ Director

◯ Prefer not to say

◯ Other

Figure 14: Questionnaire as per Google Forms

Source: Author's own (2021)

Appendix B: Results of Principal Component Analysis

Table 29: Principal Component Analysis for Meaningfulness

Component Matrix[a]	Component 1
Survey questions [The work I do on the job is important to me]	.911
Survey questions [My job activities are personally meaningful to me]	.911
Extraction Method: Principal Component Analysis. a. 1 components extracted.	

Source: Author's own based on SPSS output (2021)

Table 30: Principal Component Analysis for Safety

Component Matrix[a]	Component 1
Survey questions [I can be myself at work]	.848
Survey questions [I am free to express my opinions at work (for example, I can bring up problems and tough issues without fear of being ridiculed or ostracised)]	.850
Survey questions [I feel physically safe at work]	.793
Extraction Method: Principal Component Analysis. a. 1 components extracted.	

Source: Author's own based on SPSS output (2021)

Table 31: Principal Component Analysis for Availability

Component Matrix[a]	Component 1
Survey questions [I am confident in my ability to handle competing demands at work]	.840
Survey questions [I am confident in my ability to deal with problems that come up at work]	.870
Survey questions [I am confident in my ability to think clearly at work]	.827
Survey questions [I am confident in my ability to display the appropriate emotions at work]	.719
Survey questions [I am confident that I can handle the physical demands at work]	.678
Extraction Method: Principal Component Analysis. a. 1 components extracted.	

Source: Author's own based on SPSS output (2021)

Component Matrix[a]				
	Component			
	1	2	3	4
Survey questions [My manager is flexible about how I accomplish my job objectives]	.658	-.552	.032	.227
Survey questions [My manager is supportive of my ideas and ways of getting things done]	.743	-.466	-.140	.252
Survey questions [My manager gives me authority to do my job as I see fit]	.735	-.368	-.154	.199
Survey questions [I am careful in taking responsibility because my manager is often critical of new ideas]	-.008	.439	.421	.400
Survey questions [I can trust my manager to back me up on decisions I make]	.676	-.286	-.110	.262
Survey questions [I feel very useful in my job]	.718	.099	-.249	-.306
Survey questions [Doing my job well really makes a difference]	.709	.165	-.329	-.204
Survey questions [I feel like a key member of my organisation]	.678	.305	.072	-.402
Survey questions [The work I do is very valuable to the organisation]	.641	.351	-.213	-.326
Survey questions [I rarely feel my work is taken for granted]	.483	.058	.657	-.080
Survey questions [My superiors generally appreciate the way I do my job]	.777	-.076	.400	-.067
Survey questions [The organisation recognises the significance of the contribution I make]	.714	.104	.432	-.076
Survey questions [My job is very challenging]	.454	.618	-.252	.352
Survey questions [It takes all my resources to achieve my work objectives]	.365	.639	-.134	.479
Extraction Method: Principal Component Analysis.				
a. 4 components extracted.				

Table 33: Principal Component Analysis for AC

Component Matrixᵃ	Component 1
Survey questions [I feel a strong sense of belonging to my organisation]	.872
Survey questions [I feel personally attached to my work organisation]	.873
Survey questions [I am proud to tell others I work at my organisation]	.850
Survey questions [Working at my organisation has a great deal of personal meaning to me]	.928
Survey questions [I would be happy to work at my organisation until I retire]	.833
Survey questions [I enjoy discussing the organisation with people who do not work here]	.778
Extraction Method: Principal Component Analysis. a. 1 components extracted.	

Source: Author's own based on SPSS output (2021)

Table 34: Principal Component Analysis for DE

Component Matrixᵃ	Component 1
Survey questions [When I work, I really exert myself to the fullest, beyond that what is expected]	.761
Survey questions [I finish a job even if it means sacrificing breaks or lunches]	.736
Survey questions [I do more than is expected of me]	.845
Survey questions [I voluntarily put in extra hours to achieve a result faster]	.807
Survey questions [I persist in overcoming obstacles to complete an important task]	.870
Survey questions [I put in extra effort when I find it necessary]	.863
Survey questions [I work harder than expected to help my organisation be successful]	.863
Extraction Method: Principal Component Analysis. a. 1 components extracted.	

Source: Author's own based on SPSS output (2021)

Table 35: Principal Component Analysis for ITT

Component Matrix[a]	Component 1
Survey questions [I frequently think of quitting my job]	.918
Survey questions [I am planning to search for a new job during the next 12 months]	.918
Extraction Method: Principal Component Analysis. a. 1 components extracted.	

Source: Author's own based on SPSS output (2021)

Table 36: Principal Component Analysis for PSS

Component Matrix[a]	Component 1
[I feel a sense of familiarity with my manager, which makes me comfortable in the workplace]	.803
[My manager really cares about my well-being]	.864
[My manager takes great pride in my accomplishments]	.854
[My manager manages employees' conflict]	.717
[My manager clarifies top-down communication from senior management]	.755
[My manager checks for accuracy when reviewing or checking my work]	.498
[My manager is willing to help me if I need help]	.873
[My manager listens carefully to my opinions]	.874
[My manager strongly considers my goals and values]	.840
[My manager empathetically listens to me]	.837
[My manager actively listens to me]	.878
[My manager gives me clear instructions]	.853
Extraction Method: Principal Component Analysis. a. 1 components extracted.	

Source: Author's own based on SPSS output (2021)

Appendix C: Results of moderated regression utilising FoU of technology applications as the independent variable

Table 37: Descriptive statistics for PC1, PC2, PC3, PC4, AC, PSS (interaction terms) and Meaningfulness (centered)

Descriptive Statistics

	Mean	Std. Deviation	N
Meaningfulness_Centered	.0000	.52032	200
PC_1_Centered	.0000	.67674	200
PC_2_Centered	.0000	.53873	200
PC_3_Centered	.0000	.78187	200
PC_4_Centered	.0000	.72378	200
PSS_Centered	.0000	.73701	200
AC_Centered	.0000	.80951	200
PC_1_Tech_Interaction	.0266	.83195	200
PC_2_Tech_Interaction	.0474	.66349	200
PC_3_Tech_Interaction	.0693	.91340	200
PC_4_Tech_Interaction	.0819	.95082	200
PSS_Tech_Interaction	.0920	1.06055	200
AC_Tech_Interaction	.0969	.90868	200

Source: Author's own based on SPSS output (2021)

Table 38: Descriptive statistics for relationship between PC1, PC2, PC3, PC4, AC, PSS (interaction terms) and Safety (centered)

Descriptive Statistics

	Mean	Std. Deviation	N
Safety_Centered	.0000	.63909	200
PC_1_Centered	.0000	.67674	200
PC_2_Centered	.0000	.53873	200
PC_3_Centered	.0000	.78187	200
PC_4_Centered	.0000	.72378	200
PSS_Centered	.0000	.73701	200
AC_Centered	.0000	.80951	200
PC_1_Tech_Interaction	.0266	.83195	200
PC_2_Tech_Interaction	.0474	.66349	200
PC_3_Tech_Interaction	.0693	.91340	200
PC_4_Tech_Interaction	.0819	.95082	200
PSS_Tech_Interaction	.0920	1.06055	200
AC_Tech_Interaction	.0969	.90868	200

Source: Author's own based on SPSS output (2021)

Table 39: Descriptive statistics for PC1, PC2, PC3, PC4, AC, PSS (interaction terms) and Availability (centered)

Descriptive Statistics

	Mean	Std. Deviation	N
Availability_Centered	.0000	.43940	200
PC_1_Centered	.0000	.67674	200
PC_2_Centered	.0000	.53873	200
PC_3_Centered	.0000	.78187	200
PC_4_Centered	.0000	.72378	200
PSS_Centered	.0000	.73701	200
AC_Centered	.0000	.80951	200
PC_1_Tech_Interaction	.0266	.83195	200
PC_2_Tech_Interaction	.0474	.66349	200
PC_3_Tech_Interaction	.0693	.91340	200
PC_4_Tech_Interaction	.0819	.95082	200
PSS_Tech_Interaction	.0920	1.06055	200
AC_Tech_Interaction	.0969	.90868	200

Source: Author's own based on SPSS output (2021)

Table 40: Descriptive statistics for Meaningfulness, Safety, Availability (interaction terms) and DE (centered)

Descriptive Statistics

	Mean	Std. Deviation	N
DE_Centered	.0000	.49651	200
Meaningfulness_Centered	.0000	.52032	200
Safety_Centered	.0000	.63909	200
Availability_Centered	.0000	.43940	200
Meaningfulness_Tech_Interaction	-.0006	.48192	200
Safety_Tech_Interaction	.0506	.78072	200
Availability_Tech_Interaction	.0582	.51987	200

Source: Author's own based on SPSS output (2021)

Table 41: Descriptive statistics for Meaningfulness, Safety, Availability (interaction terms) and ITT (centered)

Descriptive Statistics

	Mean	Std. Deviation	N
ITT_Centered	.0000	1.13677	200
Meaningfulness_Centered	.0000	.52032	200
Safety_Centered	.0000	.63909	200
Availability_Centered	.0000	.43940	200
Meaningfulness_Tech_Interaction	-.0006	.48192	200
Safety_Tech_Interaction	.0506	.78072	200
Availability_Tech_Interaction	.0582	.51987	200

Source: Author's own based on SPSS output (2021)

Appendix D: KMO and Bartlett's test results

Table 42: KMO and Bartlett's test results for Meaningfulness

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	113.592
	df	1
	Sig.	.000

Source: Author's own based on SPSS output (2021)

Table 43: KMO and Bartlett's test results for Safety

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.691
Bartlett's Test of Sphericity	Approx. Chi-Square	162.944
	df	3
	Sig.	.000

Source: Author's own based on SPSS output (2021)

Table 44: KMO and Bartlett's test results for Availability

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.829
Bartlett's Test of Sphericity	Approx. Chi-Square	427.037
	df	10
	Sig.	.000

Source: Author's own based on SPSS output (2021)

Table 45: KMO and Bartlett's test results for PC

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.851
Bartlett's Test of Sphericity	Approx. Chi-Square	1428.506
	df	91
	Sig.	.000

Source: Author's own based on SPSS output (2021)

Table 46: KMO and Bartlett's test results for AC

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.893
Bartlett's Test of Sphericity	Approx. Chi-Square	924.192
	df	15
	Sig.	.000

Source: Author's own based on SPSS output (2021)

Table 47: KMO and Bartlett's test results for PSS

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.953
Bartlett's Test of Sphericity	Approx. Chi-Square	1996.379
	df	66
	Sig.	.000

Source: Author's own based on SPSS output (2021)

Table 48: KMO and Bartlett's test results for DE

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.903
Bartlett's Test of Sphericity	Approx. Chi-Square	940.317
	df	21
	Sig.	.000

Source: Author's own based on SPSS output (2021)

Table 49: KMO and Bartlett's test results for ITT

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	124.776
	df	1
	Sig.	.000

Source: Author's own based on SPSS output (2021)
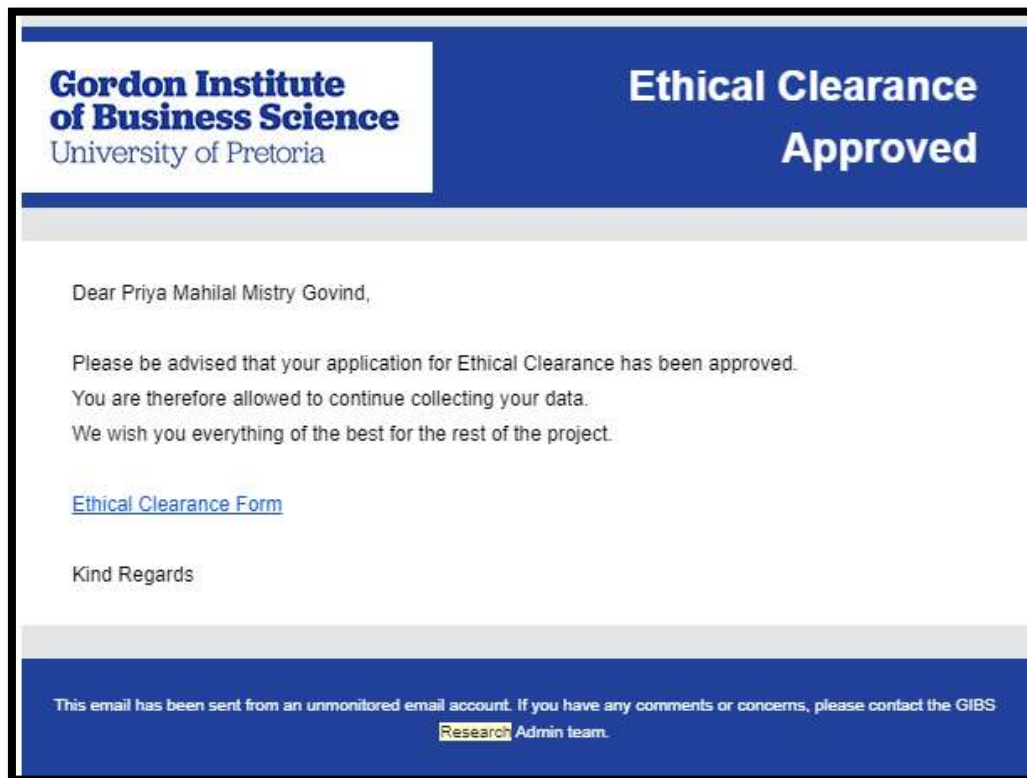
Appendix E: Ethics clearance

Figure 15: Ethical Clearance

Source: P Govind (personal communication, November 8, 2020)