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The Role of Gender in Telecommuting's Effect on Employee Engagement Dimensions and Employee Performance: A Moderated-Moderation Analysis

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Abstract: In South Africa's Information Communication Technology sector, where diversity manifests through differences such as race, culture, language, and socio-economic backgrounds, telecommuting offers unique possibilities for fostering inclusion and accommodating diverse workstyles. However, this potential must be understood in the context of gender, and its possible impact on employee engagement dimensions (physical, cognitive, emotional) and employee performance. Specifically, this study aims to contribute to the discourse on gender within the South African ICT sector, where telecommuting disparities and challenges remain critical. A study of 478 ICT employees used validated scales to measure telecommuting, employee engagement dimensions and employee performance. Using the PROCESS Macro technique in Smart-PLS 4, the study investigated the moderated-moderation relationship. The study's findings indicate that gender moderates the telecommuting moderated relationship between emotional engagement and employee performance. In addition, the telecommuting moderating effect on the relationship between emotional engagement and employee performance varies with respect to gender. The study's findings suggest that organisations should tailor their approaches to remote work and engagement strategies based on gender dynamics to optimize outcomes. This study is among the first to examine the moderated-moderation effects of gender on the

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telecommuting moderated relationship between employee engagement dimensions and performance in the context of the South African ICT sector.

Keywords: employee engagement; employee performance; gender; ICT sector; telecommuting

JEL Classification: J16, J24, J81, M12

1. Introduction

In the South African Information Communication Technology (ICT) sector where diversity manifests through differences in race, gender language, and socio-economic backgrounds (Long, Segalo & Laidlaw, 2016), telecommuting presents distinctive opportunities for promoting inclusivity and accommodating a variety of workstyles (Olawale et al., 2024). The ICT sector in South Africa has experienced a significant shift towards telecommuting arrangements in recent years, a trend that has been further accelerated by the COVID-19 pandemic (Enaifoghe & Zenzile, 2023). The COVID-19 pandemic has markedly expedited the trend of telecommuting (Denham, 2021), resulting in a greater number of employees working remotely and the development of hybrid work environments (Rožman et al., 2021). As millions of employees shift from conventional office environments to remote work, flexible solutions such as telecommuting have emerged as a crucial strategy for addressing the issues presented by the pandemic (Katsabian, 2020). This transition has secured business continuity and redefined work conceptualization (Bjursell et al., 2021), as numerous businesses embraced telecommuting to adhere to social distancing protocols (Martins, 2021). As a result, mandatory teleworking surfaced as an unexpected outcome of the pandemic (Singh & Verma, 2020), underscoring the changing nature of work and the increasing significance of flexible work arrangements for employees (Steidelmuller et al., 2020).

Further, the emergence of telecommuting as a prevalent work arrangement has reshaped traditional notions of workplace dynamics, offering employees greater flexibility and autonomy in managing their professional and personal lives (Vartiainen, 2021). As organisations increasingly adopt telecommuting practices, understanding its effects on the nexus of employee engagement (EE) and employee performance (EP) becomes paramount for ensuring productivity and well-being in the modern workforce (Nyathani, 2023; Rajarathnam et al., 2023). The relationship between telecommuting, EE, and EP has received considerable academic attention following the COVID-19 pandemic, which led to the widespread adoption of telecommuting (Coffie et al., 2023; Nkansah et al., 2023). However, the role of

gender in the context of telecommuting, EE and EP-focused research has not been extensively explored (Parent-Lamarche, 2022; Rožman et al., 2021). This is despite the fact that the examination of gender dynamics can be pivotal in understanding workforce diversity and inclusion, as they affect how employees experience engagement and perform under different work arrangements (Bhat, Yousuf & Saba, 2023; Kannaiyan & Neelamegam, 2023).

The relationship between EE and EP has been a subject of extensive research in service industries (Ghlichlee & Bayat, 2021; Govender & Bussin, 2020) such as the ICT sector. Emerging evidence suggests that the impact of EE on EP may be influenced by various contextual factors, such as telecommuting and gender (Albro & McElfresh; Bakaç, Zyberaj & Barela, 2023; Kakkar et al., 2023). Further, acknowledging the influence of gender on work-related behaviours and outcomes adds a layer of complexity to the relationship between EE and EP (D'Amico, Geraci & Tarantino, 2020; Feng & Savani, 2020; Topchyan & Woehler, 2021).

Most of the studies in recent years on women's access to and usage of ICTs argue that there is a significant gender divide in ICT access and usage, particularly in developing countries (Gillwald, Milek & Stork, 2010). According to Asongu and Odhiambo (2020), gender inequality is a dimension that will further dampen the negative responsiveness of extreme poverty to economic growth. This is important because continuing inequalities in societies and organisations also result in gender inequalities in work engagement (Banihani & Syed, 2020). For instance, previous research identifies preferences and challenges related to work-life balance, career progression, and workplace flexibility and particular attention was accorded to genders (Chung & Lippe, 2020; Kossek & Lautsch, 2018) in such studies.

In the specific case of South Africa, the ICT sector continues to be dominated by men, with a low retention rate of the relatively few women that do make it into the sector (Mamba & Singh, 2017). Meanwhile, a study by Asadullah et al. (2021) asserts that employees' gender characteristics significantly influence the differences in supervisor-rated helping behaviour and EP. Given that the motivation to telecommute differs by gender (Bae & Kim, 2016), it may well be that gender also influences the engagement and performance of employees in telecommuting settings (Metselaar, den Dulk & Vermeeren, 2023; Rodríguez-Modroño, 2022).

Against this backdrop the topicality of the role of gender in workplace-based studies cannot be understated. More so, societal norms often influence employee outcomes, leading to increased burnout among women due to their dual professional and

domestic responsibilities (Suar & Gochhayat, 2016; Toker et al., 2005). As it relates to the issue of gender with respect to telecommuting studies, Lu and Zhuang (2023) found that women are less likely to telecommute than men. This is partly because men enjoy the flexibility that stems from telecommuting, as it signals some degree of autonomy (Loezar-Hernández et al., 2023; Ramani et al., 2022). So, admittedly, while gender may not exclusively shape telecommuting (Salon et al., 2022; Zhang et al., 2020) behaviours, the nuances that it brings to telecommuting trends alongside its possible effects on EE aspects and performance, encourage scientific interest that could yield enriching insights.

This is pertinent and crucial in the context of a growing remote work landscape, especially post-COVID-19 epidemic, with the objective of enhancing telecommuting structures and promoting a more equal workplace. Consequently, this study aims to investigate the moderating effect of gender on the telecommuting moderated relationship between EE dimensions namely, physical engagement (PhyEng), cognitive engagement (CogEng), emotional engagement (EmoEng), and EP. By adopting a moderated-moderation analytical approach, this study seeks to contribute nuanced, empirically robust evidence to inform the evolving discourse on equitable telecommuting policies and practices.

2. Literature Review

2.1. Theoretical Perspective

This study integrates perspectives from the EE theory and Social Exchange Theory (SET) to provide a theoretical framework for examining the relationships between gender, telecommuting, EE dimensions, and EP. Kahn's EE theory serves as a cornerstone for understanding the psychological processes underlying EE (Decuyper & Schaufeli, 2020). The theory posits that EE is fostered when employees perceive their work roles as meaningful, feel psychologically safe to express themselves, and have the resources and support to fully invest themselves in their work (Chanana & Sangeeta, 2021; Yuan, Ye & Zhong, 2021). Accordingly, this study utilised the EE theory as the theoretical basis for understanding EE.

The EE theory as conceptualized by Kahn (1990) provides a valuable framework for understanding the integration of corporate participants' self to their work roles. In addition, the EE theory recognizes that higher levels of EE across the dimensions of PhyEng, CogEng, and EmoEng are associated with positive EP outcomes (Newton

et al., 2020). This is because engaged employees are more likely to attain positive outcomes such as performance, work productivity, satisfaction with job, and commitment toward the organisation (Rashmi & Singh, 2020). For this reason, this study also employs the EE theory as a theoretical perspective for EP.

As the theoretical perspective relates to telecommuting, this study utilizes the SET as a theoretical framework to investigate telecommuting. The SET posits that social exchange is constructed by reciprocity, which implies that what a person receives from another party should be returned in kind (Blau, 2017). The SET is widely applied in employee-employer relationships to explain specific employee behaviours, due to expected mutual benefits from their employers (Bordia, Bordia & Restubog, 2015). Fundamentally, the SET provides an explanatory theoretical framework because it assumes that reward and cost drive relationship decisions and that both parties take responsibility for one another and rely on one another (Sholesi, Matthew & Olorunisola, 2023). This study leverages the SET to theorize that when organisations invest in their employees, a mutually beneficial environment is created where employees, under certain conditions, reciprocate by exhibiting higher levels of discretionary behaviour during telecommuting.

2.1.1. Gender Differences in Telecommuting

Telecommuting offers opportunities for greater flexibility and autonomy in managing work and personal responsibilities (Jamal et al., 2021). However, according to Lu and Zhuang (2023), women tend to be less likely to telecommute than men, and the positive association between teleworking and certain outcomes (job satisfaction and enjoyment at work) are not significant among women. Notably, gender differences may manifest in the strategies and challenges associated with work-life integration and boundary management (Ghislieri et al., 2017). Women may be more adept at juggling multiple roles and responsibilities, leveraging telecommuting to accommodate caregiving duties and family commitments (Lyttelton, Zang & Musick, 2023). In addition, women may be more susceptible to the challenges associated with telecommuting, such as work-life balance issues and feelings of isolation, which could diminish the positive impact of EE on EP (Loezar-Hernández et al., 2023; Ramani, Suppramaniam & Dada, 2022).

Furthermore, the COVID-19 pandemic has profoundly influenced teleworking dynamics, particularly impacting women, who typically exhibit superior work quality and intensity relative to highly mobile workers, albeit at the expense of diminished skills, income, and career opportunities (Rodríguez-Modroño & López-

Igual, 2021). Telework evolved as a viable solution to the issues encountered prior to and during the pandemic, becoming more pertinent for women, who have traditionally borne a greater burden in both professional and personal domains (Nguyen & Armoogum, 2021). The pandemic has revealed and intensified pre-existing gender disparities, resulting in increased economic risk for women's employment and livelihoods relative to men's (Rožman et al., 2021). Specifically, while fathers have augmented their domestic duties, they have not escalated to the same degree as those of women which has led to a decline in mothers' productivity and performance (Chung, 2021). This disparity resulted in diminished job satisfaction, engagement, and productivity among women during the pandemic, underscoring the persistent difficulties of reconciling work and family obligations in a crisis situation (Carli, 2020).

On the contrary, men may encounter stigma or pressure to conform to traditional gender roles, impacting their ability to balance work and personal life effectively (Vandello et al., 2013). It may be the case that the challenges that women experience when telecommuting may diminish the impact of EE dimensions on EP, although men are likely to benefit from the autonomy and flexibility offered by telecommuting, potentially strengthening the relationship between EE dimensions and EP. Understanding these differences is crucial for promoting gender equity, enhancing workplace diversity, and optimizing the effectiveness of telecommuting arrangements. These gendered patterns in telecommuting highlight the need to examine how gender moderates the relationship between telecommuting, EE dimensions, and EP.

2.1.2. The Moderating Role of Gender

A study by Hossain, Arefin and Yukongdi (2024) conducted in Bangladesh, a developing economy, tested the moderating role of gender in the relationship between extraversion and emotional stability, reporting that they were not significantly moderated by gender. In a related investigation, Yağan (2022) found that the moderating influence of gender on the association between metacognitive awareness and academic procrastination behaviour lacks statistical significance. Salon et al. (2022) contend that gender is not a predictor of telecommuting. In harmony with this view, Zhang et al. (2020) report that telecommuting occurs irrespective of gender. In a study by Liébana-Cabanillas et al. (2021), gender was identified as a moderator influencing the relationship between antecedents and users' continuance intention to use near field communication mobile payment systems for both men and women. However, no significant moderating effect of gender was

observed on the relationship between hedonic motivation and satisfaction specifically among women. Likewise, in a study conducted by Xue et al. (2020) gender did not moderate the influence of perceived competence on purchase intention. Similarly, a study by Teeroovengadum (2022) reports that gender does not moderate the relationship between service quality and bank customer's satisfaction.

Interestingly, prior studies suggest that telecommuting can positively impact productivity and job performance for both men and women, with potential benefits such as reduced absenteeism, increased job satisfaction, and higher retention rates (Petcu et al., 2021). Meanwhile, the results of a study conducted by Stoltenberg, Batien and Birgenheir (2008) on the moderating role of gender on impulsivity and health-risk behaviours, revealed differences in the mean scores for men relative to women, which invariably highlights the existence of gender differences. This notwithstanding, literature remains scant as it pertains to the potential moderating role of gender in workplace-based relationships that connect EE and EP, particularly within the South African ICT sector even though gender has been identified as an important factor that influences telecommuting arrangements and collateral outcomes (Lyttelton, Zang & Musick, 2020).

Notably, López-Igual and Rodríguez-Modroño (2020) report that men in general are more likely to telecommute than women, although women tend to use more regular home-based telework. In addition, Feng and Savani (2020) opine that women working from home can handle a bigger share of housework and childcare than men without experiencing a decline in their self-reported work productivity and job satisfaction. A study by Zhong and Moon (2020) conducted on 305 employees in China revealed the moderating role of gender in the relationship between perceived price and food quality, with men displaying a stronger relationship than women. Further, a study by Abuhashesh et al. (2021) conducted on 404 employees in Jordan reports that gender impacts the relationship between culture and customer attitudes towards advertising. In a comparable manner, a study, Yurdagül et al. (2021) concludes that gender significantly moderates the direct relationship between problematic Instagram use and social anxiety. Furthermore, conclusions in a study by Moon (2021) indicate that gender has a moderating effect on the relationship between subjective norm and intention and the relationship was more pronounced among men.

Notably, a study by Pileri, Mondo, Sgualdini, and de Simone (2024) examining employees in the Italian commercial sector revealed that gender influences the relationship between workload and elements of the work-family interface. Batt and

Valcour (2003) discovered that supervisory work-family support correlated with reduced work-family conflict for women, but not for men. Additionally, Raghuram, Luksyte, Avery and Macoukji (2012) observed that men's overall stress levels remained unchanged irrespective of general supervisory support, whereas women experienced significantly lower stress levels when supervisory support was elevated. Furthermore, Xanthopoulou et al. (2023) discovered that personality factors substantially impact employees' attitudes towards teleworking, hence influencing their subjective well-being. While both genders exhibit comparable connections between personality traits and telework results, conscientiousness exerts a more pronounced influence on unfavorable sentiments regarding telework, especially among men.

It is noteworthy that previous studies have sought to analyze gender differences in telecommuting across various individual outcomes and professional contexts, revealing disparities based on gender. In the context of the South African ICT sector, which is characterized by high levels of diversity, inequality, and uncertainty (Olaitan, Issah & Wayi, 2021), the role of gender as a potential moderator of the effects of telecommuting on EE and EP has not been adequately addressed in the literature (González Ramos & García-de-Diego, 2022; Hamsa et al., 2016). This is despite the evidence that gender influences the preferences and experiences of employees, as well as telecommuting (Bloodhart & Swim, 2020; Peters, Tijdens & Wetzels, 2001).

Against this background, it is conceivable that gender affects how telecommuting influences EE and EP, since gender shapes the expectations, norms, and roles of employees in the workplace, and may create different opportunities and challenges for telecommuting employees. Though cognizant of the divergent findings reported in existing literature, this study anticipates that gender will exert a significant moderating influence in the telecommuting moderated relationship between EE dimensions and EP. Consequently, the study elects to hypothesize that:

H₁: Gender moderates the telecommuting moderated positive relationship between PhyEng and EP.

H₂: Gender moderates the telecommuting moderated positive relationship between CogEng and EP.

H₃: Gender moderates the telecommuting moderated positive relationship between EmoEng and EP.

Based on the hypotheses, the study conceptual framework is illustrated in Figure 1 below.

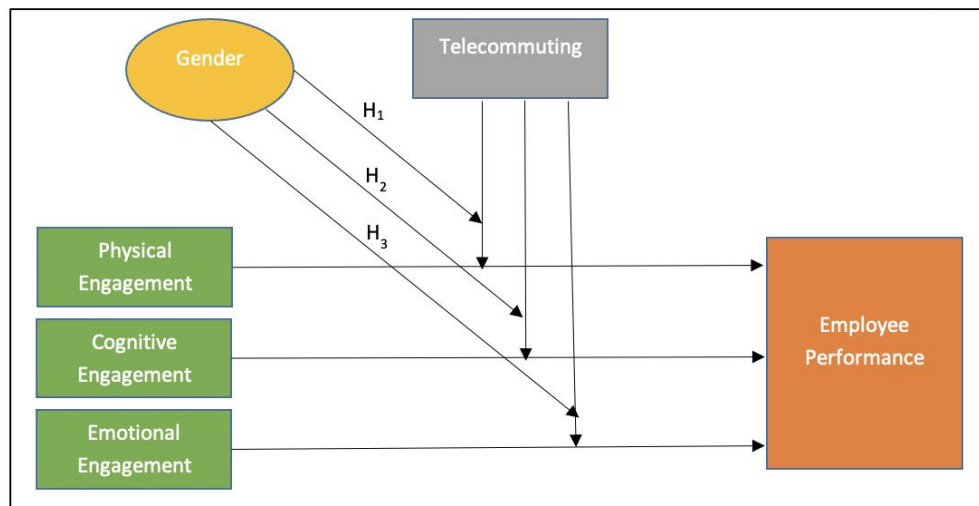


Figure 1. Conceptual Framework

3. Research Design and Methodology

3.1. Study Design and Participants

This study adopts a quantitative approach, emphasizing rigorous techniques for data collection and analysis. In this study, the Saunders et al. (2019) research onion framework serves as a methodological guide for the development and structuring of the research methodology. This framework allowed for a layered approach, encompassing different levels of research considerations and methods. This study aligns with a positivist philosophy, accentuating an objective and empirical approach to knowledge generation. Within this philosophical stance, the study adopts a deductive reasoning approach. Given that there is no single compendium of employees working in the ICT sector of South Africa, the study's recourse was a combination of snowball sampling, purposive sampling, and self-selection.

3.2. Data Collection

A cross-sectional survey design method was utilised, with a self-report questionnaire. The study used a sample of 478 responses which was considered

adequate based on Rahman (2023) assertion that a sample size of 200 is suitable in regression analysis. The demographic information from the study questionnaire highlighted that 55.23% ($n = 264$) of the respondents were males whilst 44.77% ($n = 214$) were females (see Table 1). Further, the study population was dominated by respondents between the ages 41 to 50 years (41.63%, $n = 199$), followed by 40.17% ($n = 192$) aged between 31 to 40 years. These age cohorts were, followed by respondents aged 21 to 30 years (9%, $n = 43$), 51 to 60 years (8.58%, $n = 41$), 61+ years (0.42%, $n = 2$) and those that were less than 21 years (0.21% $n = 1$), respectively. Most respondents worked in private sector organisations which accounted for 70.08% ($n = 335$) while 29.92% ($n = 143$) of the respondents worked in the public sector.

Table 1. Respondents Demographic Profile Descriptive Statistics ($n = 478$)

Demographic Factor	Category	Frequency	Percentage
Gender	Female	214	44.77
	Male	264	55.23
Age	0 – 21 years	1	0.21
	21 – 30 years	43	9.00
	31 – 40 years	192	40.17
	41 – 50 years	199	41.63
	51 – 60 years	41	8.58
	61+ years	2	0.42
Organisation Type	Public Organisation	143	29.92
	Private Organisation	335	70.08

3.3. Measurement Scales

Data was collected through an online survey instrument that included measurement scales for telecommuting, EE dimensions, and EP. The EE dimensions were measured with the scale developed by Rich, Lepine and Crawford (2010), while telecommuting was assessed using a scale adapted from Green (2019), and EP was measured through a scale developed by Pradhan and Jena (2017). The respondents reported their levels of telecommuting, EE dimensions, and EP based on statements accompanied by 5-point Likert-scale answer options ranging from strongly disagree (1) to strongly agree (5). For example, statements such as “*I strive as hard as I can to complete my job*”, “*At work, my mind is focused on my job*”, and “*I am enthusiastic*

about my job” were contained in the 16-item measurement scales of the PhyEng, CogEng and EmoEng constructs, respectively. The Cronbach’s alpha scores obtained for the five-item PhyEng, five-item CogEng and six-item EmoEng scales were 0.922, 0.897, and 0.947, respectively. A sample statement in the telecommuting scale is “*Telecommuting is common in my organisation*” and the Cronbach’s alpha for the six-item telecommuting measurement scale was 0.930. Similarly, a statement like “*I complete my assignments on time*” was part of the 22 items used for measuring the EP construct and the Cronbach’s alpha obtained for the EP scale was 0.950.

3.4. Ethical Considerations

The online survey included an informed consent statement detailing the study’s objective and participation guidelines. Respondents were assured that their responses would remain confidential and anonymous, as individual identification was not possible from the data collected. No incentives were provided to encourage participation. This procedure ensured that ethical research standards were diligently followed. Additionally, ethical approval for the study was secured from the authors’ affiliated university.

3.5. Data Analysis

To investigate the gender moderating effect on the telecommuting moderated relationship between EE dimensions and EP, the study utilised PROCESS macro technique extension in Smart-PLS version 4. Moderated-moderation was employed because according to Alghamdi and Khan (2020), this enables researchers to assess intricate relationships among variables in a study. In particular, moderated-moderation, involves a three-way interaction (Kundi et al., 2021). The three-way interaction model (Ugural & Giritli, 2021) includes independent variables (in this study, PhyEng, CogEng and EmoEng), the independent variable (in this study, EP) and two moderators (in this study, TC and Gender).

The PROCESS macro technique allows the utilization of bootstrapping techniques to estimate the significance of moderation effects, providing robust statistical inference (Igartua & Hayes, 2021). The PROCESS macro in Smart-PLS allows for the analysis of complex models involving multiple levels of moderation which provides a more comprehensive understanding of the relationships among variables (Hayes, 2022). This statistical approach is considered to be more robust and suitable

than other models like covariance-based structural equation modelling (CB-SEM) (Al Issa & Abdelsalam, 2021).

4. Results and Discussion

4.1. Results

Given that a single research instrument was used for data collection, it necessitated the assessment of common method bias (CMB). The study examined CMB using the Harman single factor test, which requires a variance percentage of less than 50% based on the precedence of Abbasi, Tiew, Tang, Goh and Thurasamy (2021). The results showed that a single factor accounted for 46.61% of the overall variance, indicating that CMB is not of concern in the present study.

A structural path model (as shown in Figure 2) was developed to examine the gender moderating effect on the telecommuting moderated relationship between EE dimensions and EP. The structural path model highlights the coefficient values, and t-statistics for the hypothesized relationships.

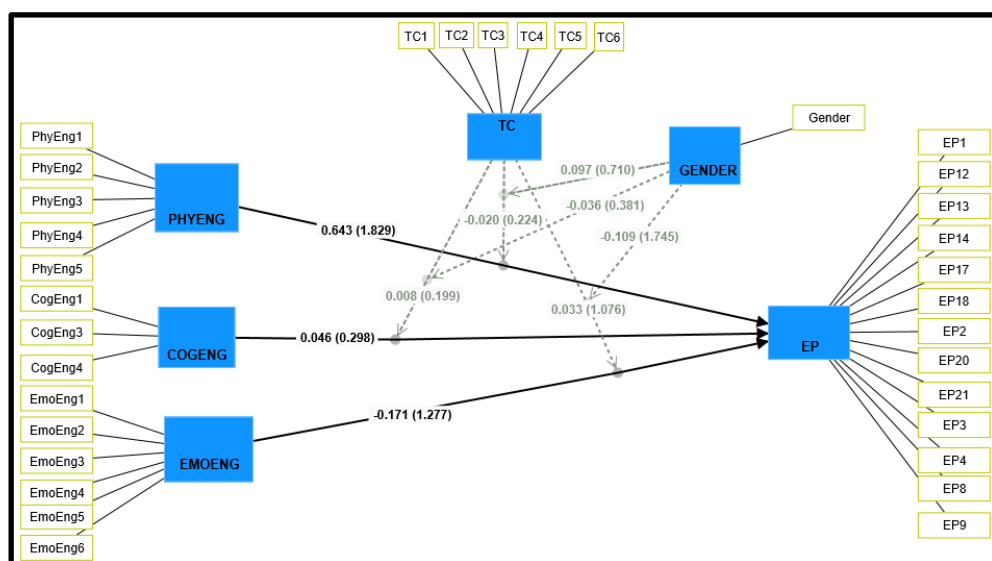


Figure 2. A path analysis model for gender moderating effect on the telecommuting moderated relationship between PhyEng, CogEng, and EmoEng

The moderated-moderation relationship path analysis results highlighted that the path coefficient for gender moderating effect on the telecommuting moderated

relationship between PhyEng and EP was positive ($\beta = 0.097$, $t = 0.710$). Additionally, the path coefficient for moderated-moderation relation between CogEng and EP was negative ($\beta = -0.036$, $t = 0.381$) and this was the case as well for EmoEng and EP ($\beta = -0.109$, $t = 1.745$). To have a deeper understanding of the moderated-moderation relationship between EE dimensions and EP, conditional analysis was performed, and the results are presented in Table 2. This includes the path coefficients, p -values, confidence intervals and statistical decisions related to the hypothesized relationships. To determine the statistical significance of the gender moderating effect on the telecommuting moderated relationship between PhyEng, CogEng, EmoEng and EP, the p -value as well as the 95% confidence interval were utilised. A moderated-moderation relationship is significant if at a 95% confidence level, the interval between the lower and upper limit does not include a zero.

Table 2. Moderated-Moderation Relationship Results

Hypothesis	Structural Path	β	p -value	95% CI		Decision
				LL CI	UL CI	
H ₁	Gender*Telecommuting*PhyEng $\rightarrow$ EP	0.097	0.239	-0.140	0.311	Not Supported
H ₂	Gender*Telecommuting*CogEng $\rightarrow$ EP	-0.036	0.352	-0.444	0.804	Not Supported
H ₃	Gender*Telecommuting*EmoEng $\rightarrow$ EP	-0.109	0.041	-0.223	0.019	Supported
Conditional Effects for EmoEng $\rightarrow$ EP						
		Females	Males			
High Telecommuting (Telecommuting at +1 SD)		-0.004	0.108			
Low Telecommuting (Telecommuting at -1 SD)		-0.092	0.095			

The results presented in Table 2 indicate that gender had a positive but statistically insignificant moderating effect on the telecommuting moderated positive relationship between PhyEng and EP ($\beta = 0.710$, $p = 0.239$, 95% CI [-0.140 0.311]), hence **H1** was not supported. These results suggest that gender neither strengthens nor weakens telecommuting's moderating effect on the relationship between PhyEng and EP for the studied cohort of employees in the South African ICT sector.

Furthermore, gender was found to have a statistically negative insignificant moderating effect on the telecommuting moderated relationship between CogEng and EP ($\beta = -0.036$, $p = 0.352$, 95% CI [-0.444 0.804]), therefore H_2 was not supported. The study's findings imply that gender does not influence the moderated relationship between telecommuting, CogEng and EP for the study's respondents.

The results presented in Table 2 also indicate that gender has a negative and statistically significant moderating effect on the telecommuting moderated relationship between EmoEng and EP ($\beta = -0.109$, $p = 0.041$, 95% CI [-0.223 - 0.019]). Accordingly, H_3 was supported. The results infer that gender influences the telecommuting moderated relationship between EmoEng and EP for the studied group of employees in South Africa's ICT sector. The negative coefficient of the interaction term ($\beta = -0.109$) implies that gender dampens the telecommuting moderating effect on the relationship between EmoEng and EP.

The conditional effects were further examined to have a better understanding of the moderating effects of gender on the telecommuting moderated relationship between men and women. Specifically, the conditional effects analysis that was conducted aimed at investigating whether the telecommuting dampening effect on the relationship between EmoEng and EP was much stronger and/or weaker for either women or men. The conditional effects results highlighted that at low levels of telecommuting (telecommuting = 2.398), the dampening effect of the variable on the relationship between EmoEng and EP is stronger for men ($\beta = 0.095$) and weaker for women ($\beta = -0.092$). However, at high levels of telecommuting (telecommuting = 5.000) the dampening effect of the variable on the relationship between EmoEng and EP is stronger for women ($\beta = -0.004$) and weaker for men ($\beta = -0.108$). The results indicate that the effects of telecommuting on the relationship between EE dimensions and EP varies by gender among employees in the ICT sector of South Africa.

4.2. Discussion

The study findings highlight that gender has a contributing effect on the telecommuting moderated relationship between EmoEng and EP, although gender has no significant influence on the telecommuting moderated relationships between PhyEng and EP as well as CogEng and EP. The study results assert that gender differences influence the telecommuting moderated relationship between EmoEng and EP, therefore, affirming that in virtual work environments the telecommuting moderated relationship between EmoEng and EP is much stronger for men as

opposed to women. Subsequently, ICT organisations in South Africa should consider gender disparities in implementing EmoEng strategies in virtual workplaces as the dampening effect of telecommuting on the relationship between EmoEng and EP is much stronger for women as compared to men. Moreover, gender disparities do not have either a strengthening or weakening effect on the telecommuting moderated relationship between PhyEng, CogEng and EP in the South African ICT sector. The study's results suggest that there is no need for organisations in the ICT sector to reconsider gender differences in implementing PhyEng and CogEng strategies and policies in telecommuting arrangements. This is important considering the findings of Lyttelton et al. (2020) who assert that gender has a crucial role in shaping telecommuting arrangements and their results.

The study results support Feng and Savani's (2020) assertion that women may manage a larger portion of household chores and childcare than men without a decrease in their self-reported work efficiency and job contentment. The moderating effect of telecommuting on the relationship between PhyEng, CogEng, EmoEng, and EP is influenced by work-life balance choices. It is plausible that gender norms and societal expectations influence individuals' choices on work-life balance. This is because women may value remote job alternatives more than men, especially when balancing caregiving duties. This could affect the level of engagement employees have in their telecommuting arrangements and, as a result, their performance. Notably, López-Igual and Rodríguez-Modroño (2020) found that men are generally more inclined to engage in telework compared to women, whereas women typically prefer regular home-based telework.

The study hypothesized that gender plays a moderating role in the impact of telecommuting and EE dimensions on EP. This is because the study also aimed to highlight gender-induced differences in experiences and strategies for work-life integration that could affect performance. However, the study's findings revealed statistically insignificant moderating effects of gender on the relationships between two of the three engagement dimensions and performance, suggesting that anticipated gender disparities may not be as pivotal as anticipated. Though gender appears to play a critical role in workplace dynamics, the evolving nature of telecommuting may have led to a convergence in how engagement translates into performance outcomes across genders.

As both men and women adapt to remote work environments, the fundamental drivers of engagement may overshadow gender-specific variables, resulting in more uniform performance-related outcomes. Additionally, broader structural and cultural

factors in the South African ICT sector, such as organisational support for telecommuting and increasing awareness of gender equity, may have mitigated the influence of gender on performance relationships. This notwithstanding, gender remains a critical lens for understanding workplace dynamics.

The study found that gender moderates the telecommuting moderated relationship between EmoEng and EP in the South African ICT sector. However, gender did not affect the telecommuting moderated relationship between PhyEng and EP, and CogEng and EP. These findings suggest that telecommuting fosters trust and mutual obligation between employees and employers, but this reciprocity is stronger when prioritising EmoEng, especially in specific gender contexts. The significant interaction effect for EmoEng indicates that gender dynamics influence how emotional connections during telecommuting translate into performance, aligning with the SET's proposition that emotional investments in work relationships elicit reciprocation in the form of higher performance.

The study's findings align with the SET, especially regarding the relationship between EmoEng and EP, indicating that exchange dynamics may vary by gender under telecommuting conditions. For instance, women employees might find organisational support in telecommuting particularly valuable due to its potential to address work-life balance challenges, which in turn could enhance their emotional connection and lead to higher levels of discretionary effort. In contrast, the lack of gender effects on the relationships between PhyEng and CogEng with EP indicates that these dimensions may be less influenced by social exchange processes in the context of telecommuting. It is possible that PhyEng and CogEng are driven more by individual factors or the nature of tasks, rather than the perceived organisational investment specific to telecommuting.

The study highlights the importance of promoting gender equity in the workplace and optimizing telecommuting arrangements. It suggests that organisations should develop inclusive policies that address the unique challenges faced by employees of different genders. This includes tailored support mechanisms like mentoring programs and flexible scheduling for caregiving responsibilities. Fostering an organisational culture that challenges traditional gender norms and promotes equal opportunities for professional development can help mitigate the stigma faced by men when balancing work and personal life. This study's findings underscore the need for policies and interventions that account for gender differences because the way EmoEng translates into EP while telecommuting may differ between men and women. Gender-responsive policies can mitigate potential disparities in engagement

levels and performance outcomes, particularly for women, who often encounter unique challenges in telecommuting, such as heightened caregiving responsibilities and reduced access to career development opportunities (Carillo et al., 2021; Awiti, 2022, Fine et al., 2020).

For example, women may value flexibility and remote job alternatives more than men, especially when balancing caregiving duties. This could affect the level of engagement that employees have in their telecommuting arrangements and, as a result, their performance. Instructively, men and women may have varied responses to the challenges and opportunities of distant work environments. This is because gender can impact individuals' ability to efficiently handle telecommuting and stay engaged with job responsibilities due to differences in access to resources, support networks, and technological proficiency (Xiong et al., 2023). These variations affect how efficiently individuals interact with their coworkers and supervisors while working remotely, ultimately affecting their performance results.

Notably, the study findings underline the broader implications for workplace diversity and inclusion policies, particularly in the context of telecommuting. The findings underscore the imperative for firms to incorporate gender-sensitive rules into remote work frameworks, guaranteeing that both men and women may prosper in virtual work settings. This corresponds with the increasing number of studies advocating for inclusive telecommuting solutions that account for gendered perspectives in managing professional and personal commitments (Carillo et al., 2021). Given that telecommuting disproportionately affects women due to increasing caregiving duties, businesses must actively promote equitable access to career progression opportunities and resources. Without focused measures, telecommuting could unwittingly perpetuate existing gender discrepancies in career progression and workplace influence (Fine et al., 2020).

In addition, the results indicate that organisations should transcend generic telecommuting rules and establish systematic initiatives that tackle gender-specific obstacles. Mentorship programs, flexible work schedules, and access to leadership training must be established to assist women in overcoming remote work problems, while also ensuring that men pursuing work-life balance are neither penalized nor stigmatized (Kley & Reimer, 2023). The study's correlation with SET substantiates the idea that employees react to perceived organisational support with heightened EE and EP. The degree of reciprocity differs by gender, requiring rules that promote EmoEng and psychological safety, especially for women who may experience social isolation linked to telecommuting.

This notwithstanding, workplace diversity plans must include measures to address the technology and resource inequalities that may impact various genders. Xiong et al. (2023) asserts that access to digital tools, training, and support networks profoundly influences employees' capacity to maintain engagement and productivity in remote environments. Ensuring that both men and women have equal access to such materials is vital for building an inclusive virtual work environment. This is especially significant in sectors such as ICT, where digital competence is essential for job success. Organisations ought to provide gender-inclusive virtual workspaces by promoting collaborative engagement, enhancing supervisory support, and mitigating unconscious prejudices that could influence performance assessments for distant employees.

Ultimately, these findings highlight the intertwining of gender and overarching workplace equality concerns, emphasizing the necessity for businesses to implement a comprehensive strategy for diversity and inclusion. Companies must not see telecommuting rules as neutral; they should actively evaluate their effects on various demographic groups and modify them as necessary. This entails reassessing performance indicators to guarantee they effectively represent productivity without penalizing employees due to caregiving obligations or conventional gender roles (López-Igual & Rodríguez-Modroño, 2020). The significance of gender-responsive policies is paramount as organisations increasingly transition to hybrid and totally remote models. By incorporating these factors into their comprehensive diversity and inclusion policies, organisations may establish equitable work environments that enable all employees to excel, irrespective of gender.

4.3. Contributions and Practical Implications

Gender plays a pivotal role in shaping workplace experiences and outcomes, particularly in telecommuting contexts. Existing literature highlights significant gender differences in work-life dynamics, career progression, and perceptions of workplace flexibility. This study contributes empirical evidence to the relatively underexplored area of gender moderation in the telecommuting moderated relationship between EE dimensions (PhyEng, CogEng, EmoEng), and EP. The findings have relevance for policymakers and industry stakeholders seeking to harness the potential of telecommuting to drive economic growth, innovation, and social development in the South African ICT sector. For instance, the study's

findings can be utilised for targeted interventions, such as enhanced support for work-life balance or tailored professional development opportunities.

The utilization of moderated-moderation analysis in this study provides a novel methodological approach for investigating the interactive effects of gender in complex organisational contexts, offering fresh insights into the gendered dynamics of telecommuting arrangements. Furthermore, this methodological innovation expands the analytical toolkit available for investigating complex organisational phenomena, paving the way for future research on gender dynamics in telecommuting contexts. For professionals in the South African ICT industry, the findings suggest that organisations should consider gender differences when implementing and supporting telecommuting programs. Ultimately, this study supports the broader goal of fostering diversity, equity, and inclusion in the workplace while enhancing overall EE and EP.

5. Conclusions and Recommendations

The purpose of this study was to investigate the moderating role of gender in the telecommuting moderated relationship between EE dimensions (PhyEng, CogEng, EmoEng) and EP, with the objective of addressing the gaps in extant literature. While gender did not notably influence the connections between telecommuting and PhyEng or CogEng for the sampled employees in the ICT sector of South Africa, it proved to be a crucial element in determining the EmoEng-performance relationship. This suggests that emotional experiences associated with remote work can vary by gender, indicating a necessity for organisations to recognize and address such disparities. To improve EP and promote a more inclusive remote work environment, organisations should establish telecommuting policies that prioritize EmoEng by providing customized emotional support programs that address the specific needs of both men and women for the sampled population.

Furthermore, gender sensitivity training for management and human resources staff is essential for enhancing awareness and comprehension of these emotional dynamics, hence facilitating more effective support for all employees. Implementing consistent feedback systems that motivate employees to communicate their experiences and requirements can enhance the adaptation of methods designed to serve a diverse workforce. By proactively operationalizing gender-sensitive approaches, organisations can enhance EP and foster a more equitable and supportive remote work culture in the context of the sampled employees.

Drawing from the study's findings and implications, this study recommends that organisations should understand the distinct needs of men and women in telecommuting settings. This can be achieved through awareness programs and education to mitigate potential gender-based disparities in telecommuting opportunities and experiences. This will benefit not only individual employees but also create more adaptable and fair workplaces that succeed in a more digital and connected world.

This study's results challenge conventional ideas of work-life balance, henceforth, offering gender sensitive telecommuting arrangements is crucial given that the study discovered that for the sampled population, gender moderates the telecommuting moderated relationship between EmoEng and EP.

5.1. Limitations and Future Study Direction

While this study provides valuable insights into the relationship between gender, telecommuting, EE dimensions, and EP, there are some limitations that should be acknowledged and addressed in future research. First, the study used a cross-sectional time dimension, and thus, the findings may not be representative of longer-term trends due to the snapshot of the population at a specific moment. Consequently, generalizing findings to different time periods or contexts can be challenging. Although according to Martinelli and Veltri (2024), this limitation is considered almost unavoidable, given the sudden nature of the COVID-19 pandemic, the context in which the study was conducted. Given that gender is typically understood as a social and cultural construct, future research should use longitudinal designs to examine its causal and temporal effects on EE dimensions and EP that occur over time.

Second, the study used self-reported measures, which may introduce biases and errors, such as social desirability, common method variance, and recall problems. Future research should use objective or external measures, such as performance ratings, productivity indicators, or behavioral observations, to complement and validate the self-reported measures. Third, the study used a combination of non-probability sampling techniques which may limit the generalizability and representativeness of the results. Future research should consider diverse samples representing a broader range of occupations, industries, and geographic regions to enhance the external validity of the findings. Also, future studies should examine the intersectionality of gender with other demographic factors such as age, socio-

economic status and ethnicity to provide a more comprehensive understanding of how diverse identities influence the telecommuting-employee engagement-performance relationship.

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