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The Role of Psychological Capital in Work Engagement and Creativity of Information Technology Workers

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Abstract

Psychological capital has been considered a positive psychological resource that can be used to nurture workplace creativity among Information and Technology workers. However, there seems to be no study on how these psychological resources influence creativity and work engagement among Information and Technology workers in the Ghanaian context. This paper investigated the role of psychological capital and work engagement in creativity of Information and Technology workers. We obtained data in a cross-sectional survey involving 209 Information and Technology workers, comprising of 139 males and 70 females, with approximately 73% of them being between the ages 20-30 years. The data were analysed using Hayes PROCESS model and standard multiple linear regression. The result showed that psychological capital positively predicted employee engagement and creativity. Hayes (2022) PROCESS model for mediation analysis revealed that work engagement partially mediated the relationship between psychological capital and creativity among the I.T workers. The study found no significant differences in creativity between male and female I.T. workers. These findings emphasised the relevance of psychological capital in work engagement and creativity of workers. We therefore recommend that management of I.T. and other organisations should invest resources in training programmes that would nurture psychological resources in their employees, as this, has positive implication for their engagement and creativity at work.

Keywords: Psychological Resources, Work Engagement, Employee Creativity, Information and Technology Workers

Introduction

Global competition and dynamic business environment have propelled businesses and employees to be transformed by social and technological advancement to meet the constant changing needs of customers (Babu et al., 2021). This requires that organisations

adopt the best of strategies to achieve competitive advantage over their competitors in the external environment. The dynamic business environment demands that employees become creative to meet the changing needs and preferences of customers. As evident in the literatures, creativity is a critical factor in attaining competitive advantage by organisations (Duan et al., 2023). Creativity is thus, the process of initiating novel ideas for changing products, services, and processes to attain competitive advantage and business growth (Amabile, 2013). Creativity is seen as a topmost and indispensable requirement of employees by providing cutting edge solutions to achieve competitive advantage for businesses in the robust business environment (Bakker et al., 2020). Creatively inclined employees can provide varied and alternative work-related solutions for organisational effectiveness.

As a result of the rapid demand of creativity by customers, there has been a swift attention to the contribution of information technologies to the world economy, specifically in terms of employment and customer satisfaction (Kolade & Owoseni, 2022). Information Technology firms are of no exception to the demand of creative goods and services by customers, as they find themselves in a very competitive environment with organisations rendering similar services to customers (Uthaivoravit, 2017).

Nurturing creativity among individuals require building on Psychological Capital (PsyCap) which is the individual state of mind that propels him or her to accomplish a task, consisting of self-efficacy, Hope, Optimism and Resilience (Abbas & Raja, 2015). *Self-efficacy* involves the confidence of putting in maximum effort to succeed in challenging task, while *hope* entails devising alternative paths to achieve set goals. The state of having a positive mindset and making of positive attributions to succeed amidst challenges constitutes *optimism*, while one's ability to bounce back from atrocities with extra energy to pursue success irrespective of the difficulties denotes *resilience* (Luthans & Youssef-Morgan, 2017).

Psychological capital provides a broad, and a conceptual basis of understanding the psychological resources of employees to the success of organisations (Luthans & Youssef-Morgan, 2017). Other theories explain that psychological capital can influence positive behaviours of employees, as positive behaviour can result in positive affect and cognition that can facilitate creative performance among employees (Cenciotti et al., 2017). Psychological capital (PsyCap) emerged from positive psychology and it is a vital psychological resource that predicts positive workplace outcomes including, job satisfaction, work engagement and work place productivity (Alkahtani et al., 2021).

Studies have established that the dimensions of PsyCap could positively predict workplace creativity (Cai et al., 2019; Karatepe & Ozturk, 2018; Nurfaizal et al., 2018). This presupposes that individuals with this high level of psychological resources (self-efficacy, hope, optimism and resilience) have the tendencies to exhibit creativity on the job and are able to cope and deal with work-related stress. Similar studies have also established

that, PsyCap as a personal resource has a positive influence on creativity among employees for organisational growth (Cai et al., 2019; Wu & Chen, 2018). Notwithstanding the relevance of PsyCap in organisational outcomes, there is paucity of research on the influence of PsyCap on creativity among I.T workers in the Ghanaian context. This study studies to unravel in detail how PsyCap can predict creativity among I.T employees, through their work engagement. We modelled work engagement as a mechanism through which employees would exhibit their creativity.

Theoretical Framework

We adopted the JD-R theory (Bakker & Demerouti, 2014) and the Self-Determination Theory (SDT) by Ryan and Deci (2017) to explain the proposed relationship between psychological capital and work engagement in predicting creativity of I.T workers. Psychological capital is the personal resources of employees that have the potential of predicting workplace creativity (Cai et al., 2019), through the mediating role of work engagement (Tan et al., 2020). The Job Demand Resource Theory (JD-R Model**)** is appropriate for explaining how psychological capital relates to work engagement of employees. The JD-R model explains how employees encounter two components of their work, namely, job demands and or requirement and the job resources that are needed to accomplish the task. Job demand represents the physical and psychological demands that come with accomplishing a task, which include the cognitive and energetic cost of the job (Bakker & Demerouti, 2014). In the case of the I. T. workers in this study, the job demands them to engage and be creative to come out with innovative products. Their psychological capital would be an essential psychological resource that would enable them to take initiatives and engage in innovative task execution.

The job resources are the necessary personal and organisational factors that enable employees to deal with the demands of their work, such as support from supervisors, personal resources, skill variety needed to do a particular work (Bakker & Demerouti, 2014). Hope, resilience, self-efficacy and being optimistic are essential psychological job resources can serve as intrinsic motivation to influence employees to find meaning with their work (Bakker et al., 2020). The job resources propel employees to be fully engaged through dedication, vigour and absorption which enable them to deal with the demands that come with accomplishing a difficult task. Employees utilise their personal resources, such as psychological capital, to succeed amidst challenges (Bakker et al., 2020) and bounce back in the face of difficulties by finding alternative means to solve work-related challenges.

The Self-Determination Theory (Ryan & Deci, 2017) also emphasizes the roles of *Autonomy*, *Competence*, and *Relatedness* as three essential psychological needs of individuals. These are essential psychological resources that could complement the role of

psychological capital in promoting employee motivation to engage and be creative in their work. In essence, the SDT posits that when individuals have these three psychological needs of autonomy, competence, and relatedness satisfied, they experience optimum motivation which also promotes their psychological health and well-being. The need for *autonomy* denotes how individuals become engaged in an activity with the full sense of independence and willingness to succeed. Employees with a high sense of autonomy find meaning in their work with the intrinsic motivation to pursue creative and challenging tasks (Ryan & Deci, 2017). This is very critical in the case of the I. T. employees in this study, because they need a high degree of autonomy to take initiatives and come out with innovative products.

The second component, *competence***,** represents the desire to attain mastery and apply the knowledge and skills required in one's job to execute a task through the intrinsic motivation. A sense of competence enables a worker to fully engage in job tasks and take initiatives to accomplish work duties. This is very important in the case of I. T. workers work engagement and creativity. A sense of competence is essential for the satisfaction of the need for autonomy and these together, would facilitate the ability of a worker to accomplish the tasks with ease. The third component of *relatedness* relates to the need of a worker for connectedness and a sense of belonging with others within the organisation. The theory indicates that when people feelings they belong and are accepted as part of a caring work unit, they feel psychologically safe and are willing to engage progressively with other colleagues for the attainment of success on a challenging task.

The two theories appropriately complement each other to provide context and foundation for understanding and explaining how psychological capital could predict creativity and innovation, especially, in the I. T. work settings. The contentment of these psychological needs can serve as intrinsic motivation that energize individuals to actively engage in creative behaviours to achieve positive outcomes (Messmann et al., 2022). Employees with strong autonomy have full control in making relevant decisions on how to achieve success (Wu et al., 2019). Autonomy behaviour serves as intrinsic motivation for employees to engage in creative behaviour to accomplish a challenging task (Messman et al., 2022). The dimensions of PsyCap can serve as the psychological resources to initiate this intrinsic motivation which can propel employees to demonstrate creativity on the job irrespective of the challenges (Li et al., 2023). The psychological capital and a sense of autonomy and relatedness could enable employees to utilize their mastery and competence to execute tasks that demand creativity (Messmann et al., 2022). These would reinforce their motivation to become engaged with their work as they strive to succeed on creative tasks. As creativity is a core component of I.T. workers (Uthaivoravit, 2017), satisfaction of these psychological needs could enhance the motivation of the workers and subsequently, fostering positive outcomes, such as engaging in extra-role behaviours and creativity (Ryan & Deci, 2017).

Statement of the Problem

There is keen competition among firms in the I.T industry to continuously meet the creative demands of their customers and maintain greater share of the market (Babu et al., 2021). Creativity and innovation of employees is essential for the survival and success in the I. T. industry (Uthaivoravit, 2017). As a result, I.T firms are constantly seeking the relevant factors that can propel creativity among their employees for business growth (Anderson et al., 2014). Aside the physical and organisational resources, psychological resources are also very important in unearthing creativity among employees (Cai et al., 2019). This calls for empirical and context-relevant research to explore and provide evidence as to which psychological variables are relevant for reinforcing creativity within the I. T. industry.

Some studies in the African context (e.g., Guo et al., 2018; Niel & Kotze, 2017) have established the relevance of PsyCap in work engagement, organisational citizenship behaviour, burnout and job satisfaction. Also, in the Ghanaian context, Anokye and Asumeng (2019) and Humphrey (2019) have explored the impact of PsyCap on work engagement, organisational safety climate and job satisfaction among workers in non-Information and Technology work setting. These studies did not investigate how PsyCap relates to creativity and innovation of workers within the I. T. work context.

It therefore appears that there is limited, or no study has established the extent to which PsyCap and work engagement influence creativity among I.T workers in the Ghanaian setting. Giving the relevance of creativity in the I. T. industry, it is imperative that studies are conducted in various contexts to unravel the relevant psychological resources and variables that have implications for promoting creativity and innovation in the industry. Context is very important in the understanding of workplace psychosocial factors, behaviours and outcomes, and any appropriate intervention must be context relevant (Farzi et al., 2021). Identification of appropriate indicators of workplace creativity would be important in the selection and training of I. T. workers to promote positive work outcomes in I. T. organisations.

In addition, Knowles and Hanson (2018) intimated that demographic characteristics, such as age and gender of employees could influence their creative abilities on the job. However, there seems to be no clear direction as to how these could influence creativity. Gender difference in creativity have been explored by researchers with different results and there seem to be inconclusive findings (Nakano et al., 2021). While some studies indicated that younger adults could be better at creative tasks (Schloegel et al., 2018), others (e.g., Dordoni & Argentero, 2015) found no connection between age and creative task performance. These call for further studies to be conducted to find out what the situation would be within the Ghanaian I. T. work setting. The present study, therefore, investigated how PsyCap related with creativity among I.T workers through their work

engagement, and explored age and gender differences in creativity within the Ghanaian work context.

Empirical Review

Psychological Capital and Work Engagement

PsyCap has been found to have a positive influence on employees' engagement at work (Kotze, 2018; Soni & Rastogi, 2019) and it serves as an essential psychological resource that improves employees' work outcomes, such as engagement and dedication to work (Li et al., 2018). The rate at which employees continue to show dedication, vigour, and absorption with work may be contingent on the inherent psychological resources at their disposal (Gupta et al., 2017). Moreover, Gupta et al. (2017) assert that employees who possess high psychological resources (self-efficacy, hope, optimism, and resilience) exhibit high work engagement and execute extra tasks for organizational success. Such individuals can utilize their resources to execute challenging tasks through constant engagement with work.

Soni and Rastogi (2019) found a direct and a positive relationship between psychological capital and employees work engagement. They discovered that employees with higher resilience and optimism were highly engaged with their work as well. Also, Kotze (2017) found that all the dimensions of PsyCap had a positive relationship with the work engagement. That is, psychological resources such as self-efficacy, hope, optimism, and resilience motivate employees to become engaged on the job. Number of studies have established that PsyCap has a positive relationship with employee work engagement (Gupta et al., 2017; Li et al., 2018; Qi & Wu, 2018). Therefore, this provides the grounds to explore further how PsyCap can influence work engagement among I.T. workers in the Ghanaian setting.

Psychological Capital and Creativity

Studies by (Cai et al., 2019; Karatepe & Ozturk, 2018; Nurfaizal et al., 2018) have all established that the dimensions of PsyCap positively and significantly predict workplace creativity. This presupposes that individuals with this high level of psychological resources (self-efficacy, hope, optimism and resilience) have the tendency to exhibit creativity on the job and can cope with work-related challenges. It has been established that PsyCap as a personal resource has a positive influence on creativity among employees for organizational growth (Wu & Chen, 2018). Researchers have explored the relationship between the sub-dimensions of PsyCap and creativity among individuals, teams and at the organizational level.

Self-efficacy has been found to influence the creative functioning of employees such as divergent thinking, creative problem solving and creative thinking (Puozzo &

Audrin, 2021). Several studies (e.g., He, 2022; Nurfaizal et al., 2018; Wu & Chen, 2018) have all found a positive influence of self-efficacy in creativity among employees at the workplace. Moreover, studies have found optimism to positively predict positive affect and facilitate flexible creative thinking among employees at the individual levels and among teams (Lorenz et al., 2022; Lu et al., 2023). Again, the dimension of hope has shown to be a positive predictor of workplace creativity in a variety of context in schools, organisational and clinical setting (Lorenz et al., 2022; Lei & Lei, 2023). Finally, resilience is noted to predict creative performance by energizing employees to bounce back from adversities and find alternative means of achieving success (Lorenz et al., 2022; Lei and Lei, 2023; Sun et al., 2023).

More importantly, PsyCap as a composite construct is reported to predicts workplace creativity better than each of its four dimensions (Cai et al., 2019; Karatepe & Ozturk, 2018; Li et al., 2023 Nurfaizal et al., 2018; Sweetman et al., 2011). Nevertheless, each dimension of PsyCap may independently predicts workplace creativity among employees and thus, lead to other positive outcomes such as reduced burnout and stress, job commitment, and productivity (Wu & Chen, 2018). However, there is paucity of research on the influence of PsyCap on creativity in the Ghanaian context. Hence, the need for further studies to unravel in detail how PsyCap can predict creativity among I.T. employees through work engagement.

Work Engagement and Creativity

Work engagement represents employees' level of vigour, absorption and dedication to work (Bakker et al, 2020). It is the ability of an individual to sustain the physical and psychological energy to accomplish a task, and a positive organizational behaviour of positive fulfilment and the mentality to find happiness with one's job (Yoon et al., 2020). It comprises of employees' sense of dedication and vigour to be absorbed with work. These dimensions of work engagement (dedication, absorption and vigour) facilitate the sense of purpose for employees to find meaning with their work (Bakker & Demerouti, 2017). This can facilitate their abilities to find alternative and novel or creative means to achieve their set goals. Bakker et al. (2020) asserts that employees who are not are not engaged with work find it difficult to succeed in challenging task and perform less creatively; However, they posit that engaged employees are more prone to new ideas and are able to develop creative means of solving problems. Work engagement can influence creativity as engaged employees become prone to new experiences by using alternative means to perform their tasks. Providing the enabling environment for employees such as positive organizational support, conducive organizational climate, mutual respect motivates employees to become engaged and foster their ability to think creatively (Bakker & Demerouti, 2017).

Furthermore, employees with high sense of work engagement are better off to deal with stress and anxiety that comes with their work which enables them to succeed on task that demands creativity (Kim & Park, 2017). This presupposes that when employees are engaged with work, they find the need to succeed by brainstorming and devising creative ways of solving problems for the betterment of the organization. Employees cannot exhibit creativity if they are disengaged with work. Hence, work engagement can serve as the best medium through which employees can demonstrate workplace creativity on the job (Imran et al., 2020). Several researchers have found work engagement to be a good predictor of workplace creativity among employees (Asif et al., 2019; Bakker et al., 2020; Bindl et al., 2019; Imran et al., 2020; Nazir et al., 2018). *Meanwhile, there seem to be limited studies on how employees' engagement can predict creativity of I.T workers in the Ghanaian context, and this calls for further studies.*

Mediating Role of Work Engagement

Work engagement, as a positive attitude of employees in any organizational setting, has been found to mediate between organizational factors and outcomes. In organizational settings, work engagement can act as an antecedent and outcome variable for the betterment of the organization. This current study focuses on how psychological capital can predict creativity among I.T. workers through the medium of work engagement.

Several studies have discovered how work engagement acts as a mediator between organizational factors in different contexts (Bakker et al., 2020; Chaudhary & Akhouri, 2018; Coetzee & van Dyk, 2018; Gupta et al., 2017; Kim & Lee, 2022; Tan et al., 2020; Yeosock, 2020). The inference that can be drawn from these findings is that work engagement can act as the best means to achieve certain organisational outcomes. Some studies have found PsyCap as a personal resource to positively predict employees' work engagement (Kotze, 2018; Li et al., 2018; Soni & Rastogi, 2019; Qi & Wu, 2018). Similarly, work engagement has also been found to be a positive predictor of employees' creativity at the workplace (Asif et al., 2019; Bakker et al., 2020; Bindl et al., 2019; Imran et al., 2020; Nazir et al., 2018). From the foregoing, if psychological capital could predict work engagement, as demonstrated by some studies, and other studies have also established that work engagement could predict creativity, then it is sound to argue that work engagement could be an intervening variable between psychological capital and workplace creativity. This suggests that work engagement could account for more variance than psychological capital, if both are in a model to predict workplace creativity.

Again, emphasising the Job Demand-Resources theory (Bakker & Demerouti, 2014) which focuses on the job demand and the available resources, when employees have the needed resources at their disposal, it can serve as intrinsic motivation to become highly engaged with work by thinking creatively to execute challenging tasks. Disengaged

employees may lack the needed job resources which serves as a motivation to meet the demands of the job (Bakker, 2017). We, therefore, argue that work engagement can act as a good conduit through which PsyCap can predict the creativity of I. T. workers based on the findings in the literature.

Age and Gender Differences and Creativity

Demographics such as age and gender are notable characteristics of employees that could influence their creative abilities on the job (Knowles & Hanson, 2018). However, the nature of the influence has not been firmly established. There are inconsistencies in the evidence regarding the relationship between age, gender and creativity. For instance, while Schloegel et al. (2018) concluded that younger adults could produce creative ideas faster because of their desire to take risks by challenging their abilities on a task, Dordoni and Argentero (2015) and Frosch (2011) asserted that the competence and motivation to exhibit creative performance has no connection with age. Meanwhile, Hauk et al. (2018) have established that older I.T. employees are less likely to take risks to find alternative and creative ways to solve problems. Salthouse (2012) posited that young employees are likely to demonstrate more innovative skills as a result of their youthful exuberance and their ability to adventure into different situations.

The relationship between gender and creativity has also been explored by researchers with different results and there seem to be inconclusive findings (Bender et al., 2013; He & Wong, 2011; Nakano et al., 2021). Luksyte et al. (2017) found that male employees are more creative and do receive recognition for exhibiting creative performance compared to females. This confirms the conclusion drawn from a similar study by Proudfoot et al. (2015) that male employees are more capable to demonstrate creativity when encountered with challenging tasks, and are therefore provided with the needed support to exhibit more creativity for the betterment of the organisation. In contrast, some studies found no significant relationship between gender and creativity (Oniye et al, 2020; Uthaivoravit, 2017). Given these inconclusive findings in the literature on gender and age differences in employee work creativity, there is the need to explore further the age and gender differences in creativity of I.T workers in the Ghanaian context.

Research Hypotheses

The prime purpose of this study was to find out how the psychological capital could predict workplace creativity of I.T workers in Ghana through work engagement. We formulated and tested the following hypotheses, based on the review of the relevant literature:

1. Psychological capital will positively predict creativity of I. T workers.
2. Psychological capital will positively predict work engagement of I. T Workers.

3. Work engagement will mediate the relationship between psychological capital and creativity.
4. Younger I. T. workers will be more creative than older ones.
5. Male I.T workers will be more creative compared to female I.T workers

Methods

Research Design

We employed cross-sectional survey design in this study. A cross-section survey requires the researcher to measure the outcome and explanatory variables in the study at the same point in time and aims at describing generalized relationships between distinct elements and conditions within a population (Wang & Cheng, 2020). Menon et al. (2023) indicated that cross-sectional designs are appropriate for studies involving human respondents, such as customers, employees, and managers. Spector (2019) also observed that, "comparisons of corresponding cross-sectional versus longitudinal correlations in meta-analyses do not uniformly find larger correlations from cross-sectional designs (e.g., Nixon et al., 2011; Pindek & Spector, 2016), and even when cross-sectional correlations are larger, it is not necessarily due to common method variance" (p. 126). In line with this, Menon et al. (2023) concurred that, "… neither cross-sectional designs are weak nor are longitudinal designs always as valuable as commonly assumed" (p. ix). Spector (2019) further noted that, cross-sectional design is "…an efficient and invaluable go-to tool for investigating important organisational phenomena" (p. 136). In view of this, we consider the cross-sectional design appropriate for this study.

Participants

The sample for the study was 209 I. T. employees selected from various I.T firms and department in the Greater Accra Region of Ghana. Most I.T firms in Ghana are situated in this region, especially, in Accra, the capital city of the nation, due to the high demand of I.T related services and products by businesses and individuals. An initial sample of 250 questionnaires were distributed, of which 209 were fully completed and usable for the analyses, which represents 84% return rate. This comprised 139 males (66.5%) and 70 females (33.5%), with most of them (89.5%) being between the ages 20-35 years, and 69.4% of them were not married. Moreover, more than half of the respondents (118; 56.5%) had less than 5 years of working experience, and close to one-half (n = 101, 48.3%) of them had obtained first degrees. Table 1 presents the summary of the demographic characteristics of the respondents.

Table 1: Summary of demographic characteristics of the I.T employees

Demographic Variable	Frequency	Percentage (%)
Gender		
Male	139	66.5
Female	70	33.5
Age		
20 to 25 years	77	36.8
25 to 30 years	75	35.9
30 to 35 years	35	16.7
36years and above	22	10.5
Marital Status		
Single	145	69.4
Married	64	30.6
Qualification		
Certificate	23	11
Diploma	61	29.2
Degree	101	48.3
Postgraduate	24	11.5
Working Experience		
0 to 5 years	118	56.5
5 to 10 years	68	32.5
10 to 15 years	16	7.7
15 years and above	7	3.3
Total	**209**	**100**

Measures

We used standardised scales with minor adaptations to fit the context of our study. Detailed descriptions of the scales are presented below and we present the reliability coefficient for our sample in Table 2.

Psychological Capital

The 24-item psychological capital questionnaire (Luthans & Youssef-Morgan, 2017) was adapted for use within the Ghanaian context. The scale has four dimensions: *Efficacy, Optimism, Hope and Resilience*. For the present study, 19 items were retained, excluding five of the original items (Items 12, 13, 20, 23 & 24) that did not load adequately (loaded below .30). Responses were rated on a 6-point Likert-type scale, from 1 (strongly disagree) to 6 (strongly agree). Total scores are obtained by summing responses across the items, with scores ranging from 19 to 114, and higher score denoting higher psychological capital. Sample of the items include, *Efficacy* (*I feel confident helping to set targets in my*

work area, *Optimism* (*I usually expect the best, when things are uncertain at work*), *Hope* (*If I should find myself in a jam at work, I could think of many ways to get out of it)*, and *Resilience (I usually manage difficulties one way or other in accomplishing my work*). Table 2 presents the Omega ω and Cronbach α reliability coefficients for the composite and subscales.

Work Engagement

Work engagement was measured with the 17-item Utrecht Work Engagement Scale (Schaufeli, 2013). The scale consists of three dimensions, namely, *Vigour* (e.g., At my work, I feel bursting with energy; *Absorption* (e.g., I am immersed in my work) and *Dedication* (e.g., I am enthusiastic about my work). Responses are rated on a seven-point Likert-type scale ranging from 0 (never) to 6 (always). Scores for the dimensions and the composite are obtained by summing scores across the items, and Total scores range between 0 and 102, with higher scores denoting better work engagement. Reliability coefficients of Omega ω and Cronbach α ranged from .774 to .886 (see Table 2).

Employee Creativity

The 13-item creativity scale (Sigala & Chalkiti, 2015) was adapted to measure employee creativity of the I.T workers in the study. Five of the items (items 1, 2, 3, 12, 13) did not load adequately (loadings less than .30) and were excluded, leaving eight items for the analysis in this study. The scale is a uni-dimensional scale and responses are rated on a 5-point Likert-type scale, from 1 (strongly disagree) to 5 (strongly agree) and total scores are obtained by summing responses across the items. Score on the eight items ranged between 8 and 40, with higher scores represent higher level of employee creativity. Sample items include on the scale include, ‘‘I experiment with new approaches in doing my job’’, ‘‘I believe that I am currently very creative in my work’’. Omega ω and Cronbach α for this scale were .820 and .822 respectively, as presented in Table 2.

Table 2: Construct reliability of the measures in the study

Variable	Coefficient ω	Coefficient α
***Psychological Capital**	***0.873***	***0.857***
Self-efficacy	0.850	0.841
Hope	0.774	0.767
Optimism	0.700	0.732
Resilience	0.487	0.491
***Work Engagement**	***0.883***	***0.886***
Vigour	0.774	0.777
Absorption	0.792	0.802
Dedication	0.869	0.869
***Creativity**	***0.820***	***0.822***

**Composite scores in bold and italics*

Analytical Procedure

The prime purpose of the study was to investigate the extent to which psychological capital would predict the level of creativity at work of I.T workers. Work engagement was modelled as a mediating variable in the relationship between psychological capital and workplace creativity. Hayes (2022) PROCESS macro for mediation analysis, specifically, model 4, was used to test the hypotheses, using 95% confidence interval and 5000 bootstrapped samples.

Ethical Consideration

The study obtained ethical approval from the Departmental Research and Ethics Committee of the Department of Psychology, University of Ghana (Approval number: number DREC/006/19-20). We also sought and obtained institutional approval from the Directors and Managers of the I.T firms about the purpose of the study and the intention to engage their staff in responding to the questionnaires. There was an attached consent form sheet that outlined all the ethical information governing participating in the study. Again, participants were asked to append their signatures on the questionnaire to indicate a form of acceptance before responding to the questionnaires. Also, the participants were informed that their responses were solely for research purposes and would be kept with the maximum confidentiality. The researchers ensured anonymity of respondents by informing them not to indicate their names anywhere on the questionnaire but rather numbers would be used for coding and analysis purposes. Furthermore, the researchers explained that any of the participants can withdraw from the study if their emotional or psychological well-being is being affected.

Results

We first examined the nature of the distribution of the dependent variable (employee creativity) in the study, using the skewness and kurtosis statistics and the histogram. The skewness statistics was -.167 and the kurtosis was -.316; both being acceptable range, suggesting that there was no issue with the distribution of scores on the dependent variable. This is confirmed by the visual representation of the distribution in the histogram (Figure 1). We therefore proceeded to run the parametric linear regression models to test the hypotheses. Table 3 presents the descriptive statistics.

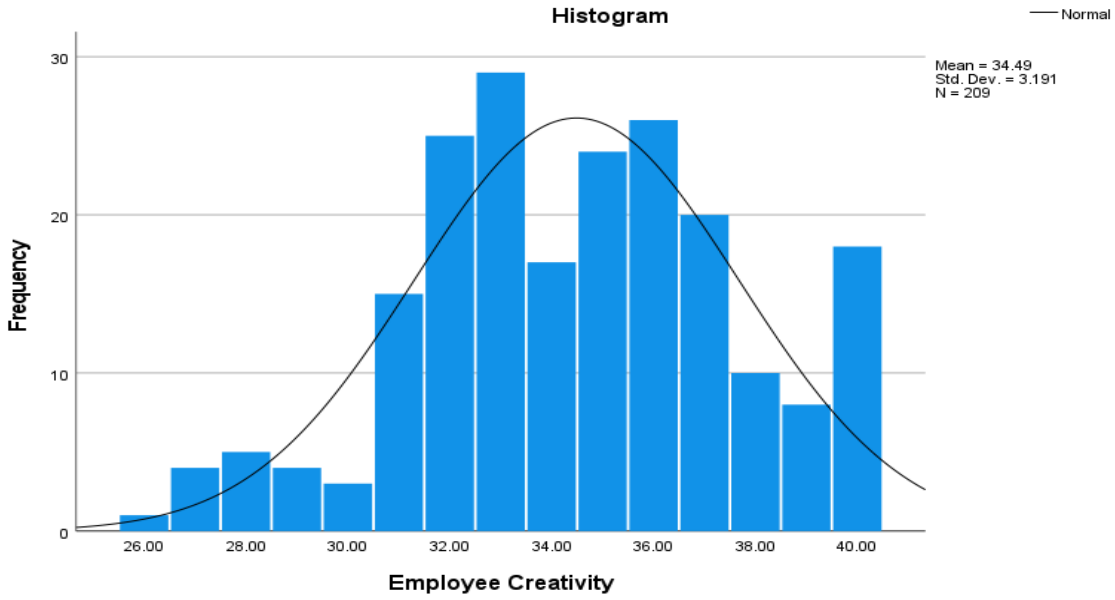

Figure 1: Histogram and normality plot of employee creativity

Table 3: Means, Standard Deviations, Skewness and Kurtosis of the mean variables and their dimensions

Variables	Mean	Std. Dev	Skewness		Kurtosis	
			Statistics	Std. Error	Statistics	Std. Error
Self-efficacy	28.46	4.04	-.990	.168	2.93	.335
Hope	23.86	3.24	-.951	.168	3.81	.335
Optimism	23.23	3.24	-.880	.168	1.86	.335
Resilience	13.99	2.05	-.607	.169	1.27	.336
Vigour	32.14	4.24	-.542	.169	1.08	.336
Absorption	31.72	5.07	-.848	.168	1.26	.335
Dedication	27.36	4.58	-.888	.168	2.30	.335
Employee Creativity	34.49	3.19	-.167	.168	-.316	.335
Psychological Capital	89.64	9.17	-.706	.169	1.86	.336
Work Engagement	91.18	11.30	-.921	.169	1.83	.336

Given that the main analytical procedure was multiple linear regression, we tested the linearity and multicollinearity assumptions. The Pearson's coefficients (see Table 4) showed that there were significant positive linear relationships between Employee Creativity (dependent variable) and the independent variables psychological capital and creativity. Thus, the data met the linearity assumption for linear regression. Also, the coefficients were moderate, suggesting that there were no issues with multicollinearity.

Table 4: Pearson's Correlations coefficients between the main variables

Variable		CRTV	PSYCAP	ENGT
1. CRTV	Pearson's r	—		
	p-value	—		
2. PSYCAP	Pearson's r	0.300	—	
	p-value	< .001	—	
3. ENGT	Pearson's r	0.351	0.481	—
	p-value	< .001	< .001	—

CRTV = Employee creativity, PSYCAP = Psychological capital, ENGT = Engagement

Common Method Bias

Given that the data was collected through a cross-section survey, the was the possibility of the presence of common method bias. Common method bias is a systematic error variance resulting from a common method used to measure the variables in a study

(Podsakoff et al., 2003). We used a post-data collection procedure (Menon et al., 2023) to assess the likelihood of the presence of common method bias in the data. The Harman's single factor test through exploratory factor analysis suggests that CMB is present if with all primary variables in the study are included and one factor accounted for more than 50% of the variance (Podsakoff et al., 2003). The first factor accounted for 19.12% of the variance, which suggests that there was threat of the presence of common method bias. Other methodologists (e.g., Hair et al., 2019; Kock, 2015; Kock & Lynn, 2012) also recommended using collinearity diagnostics, and a variance inflation factor (VIF) value greater than 3.3 signifies the presence of common method bias. The VIFs of our primary variables ranged between 1.17 and 1.38 (see Table 5), which supports the exploratory factor analysis approach, that the was no threat of the presence of common method bias.

Table 5: Collinearity diagnostics statistics

Variables	**Collinearity Statistics**	
(Constant)	**Tolerance**	**VIF**
Employee Creativity	.854	1.171
Psychological Capital	.747	1.339
Work Engagement	.724	1.382

Relationship between Psychological Capital, Work Engagement and Creativity

We tested the extent to which psychological capital predicted employee creativity through their work engagement, using the Hayes (2022) PROCESS macro for mediation (Model 4). The results indicated that psychological capital positively predicted work engagement ($\beta = .481$, $p < .001$) and accounted for 23.2% of the variance in work engagement ($R^2 = .232$, $p < .001$). Also, both psychological capital ($\beta = .180$, $p = .016$) and work engagement ($\beta = .262$, $p < .001$) positively predicted employee creativity, and jointly accounted for 14.6% of the variance in employee creativity ($R^2 = .146$, $p < .001$).

Mediation Analysis of Work Engagement between Psycap and Creativity

The results for the test of mediation hypothesis presented in Table 6 indicated that the total effect of psychological capital on employee creativity was, $\beta = .306$, $p < .001$. The direct effect was, $\beta = .180$, $p = .016$, and the indirect effect through work engagement was, $\beta = .126$; CI [.046; .221]. This means that work engagement partially mediated the relationship between psychological capital and workplace creativity.

Table 6: Mediation analysis of work engagement between PsyCap and Creativity

Paths	Unstandardised coeff	SE	T	P	LLCI; ULCI	Standardised coeff
Direct effect	.062	.025	2.43	.016	.012; .112	.180
Indirect effect	.043	.016	---	---	.016; .076	.126 CI [.046, .221]
Total effect	.105	.023	4.596	.000	.060; .151	.306

Test of Age Difference in Employee Creativity

We further compared the employee creativity level across four age ranges, using the one-way between-subject analysis of variance (ANOVA). The means and the standard deviation and errors for the age categories are presented in Table 7. The test of difference result indicated that there was no significant influence of age on the creativity levels of the I. T. workers, $F(3, 205) = .645$, $p = .587$.

Table 7: Means scores on employee creativity by age groups

					95% Confidence Interval for Mean	
Age Groups	N	Mean	Std. Dev.	Std. Error	Lower Bound	Upper Bound
20-25	77	34.09	3.10	.354	33.39	34.79
25-30	75	34.72	3.03	.349	34.02	35.42
30-35	35	34.80	3.40	.575	33.63	35.97
35 and above	22	34.59	3.74	.797	32.93	36.25
Total	209	34.49	3.19	.221	34.05	34.92

Test of Gender Difference and Employee Creativity

We also compared the creativity levels of male and female I. T. workers in our sample, using the independent samples t-test. The results showed no significant difference between the mean employee creativity of male (34.58, SD = 3.43) and female (34.28, SD = 2.66) I. T. workers, $t(172.5) = .71$, $p = .428$.

Discussion of Findings
Psychological Capital and Creativity

The results supported the first hypothesis that "*PsyCap will positively*

predict creativity among I.T workers''. Thus, I.T employees with enhanced psychological resources are more likely to exhibit creativity in accomplishing their task (Corbu et al., 2022; Wu & Chen, 2018). Considering the complexities and the cognitive demands that come with the job of information technology (Uthaivoravit, 2017), employees who find themselves in this field would need these psychological resources as their personal reservoir to deal with the demands that comes with their work.

This is consistent with the assumption of the JD-R theory that job resources are critical in facilitating creativity among employees. The psychological resources comprising of (self-efficacy, hope, optimism and resilience) which are part of the job resources can also serve as job resources that can aid employees to exhibit creativity at the work place ((Bakker et al., 2020; Bakker & Demerouti, 2014). It can also be said that the I.T workers sampled for the study received more supervisory support from their superiors coupled with utilizing the psychological resources to succeed in creative task. The outcome of this result is similar with findings by (Corbu et al, 2022; Karatepe & Ozturk, 2018). Again, it is evidenced in the literature that PsyCap which can also be considered as the personal resources can predict creative behaviours among employees such as divergent thinking and creative problem solving (Puozzo & Audrin, 2021).

Psychological Capital and Work Engagement

We tested the hypothesis that PsyCap would have a positive relationship with work engagement among I.T workers. The result showed that psychological capital positively predicted work engagement of the I.T workers. This outcome confirms the findings of previous research (e.g., Alkahtani et al., 2021; Cheng et al., 2017; Kang & Busser, 2018; Soni & Rastogi, 2019) who found positive relationships between psychological capital and work engagement in different context. This current finding is an add-on to the empirical evidence in the literature that the psychological resources of employees can be a motivating factor for employees to be engaged with their work. That is, even in the face challenges, psychological resources such as (self-efficacy, optimism, hope and resilience) propel employees to continuously engage with their work by finding alternative means to succeed.

The JD-R model also asserts that job resources such as supervisory support, autonomy, will-power and confidence enable employees to feel dedicated and absorbed with their work (Bakker, 2017). The task of I.T employees demands high technicalities in discharging their duties, hence, the need to become more dedicated and absorbed with their work. This would permeate constant brainstorming to find creative solutions to their work-related challenges.

Work Engagement and Creativity

It was also found that work engagement has a positive and significant relationship with creativity from the mediation analysis performed. This presupposes that when employees are engaged with their work, there is the likelihood of they are demonstrating workplace creativity. Engaged employees strive in the face of difficulties by looking for alternative solutions to accomplish their challenging task (Asif et al., 2019).

The relationship found in this present study that work engagement positively and significantly predict creativity is in support with the findings of (Asif et al., 2019; Imran et al., 2020; Toyama & Mauno, 2016) who found similar results of work engagement having a positive effect on workplace creativity. Employees in the I.T field are expected to handle all I.T related problems by thinking outside the box to provide the best possible solutions. This can be achieved by having full sense of engagement with their work through dedication, absorption and vigour to succeed on the task (Kim & Park, 2017).

The SDT theory asserts that employees with full autonomy become intrinsically motivated to be engage with work. This is because, they find meaning and purpose with their work by investing physical and mental effort to accomplish the task (Ryan & Deci, 2017). It can therefore be affirmed that I.T employees sampled for this study had positive organizational environment, positive feedback and positive organisational support that served as motivation to continuously engaged with their work. Constant engagement with their work might have facilitated of brainstorming to demonstrate creativity on the job.

Mediation Role of Work Engagement on PsyCap and Creativity

The findings of the current study indicated that work engagement partially mediated the relationship between PsyCap and creativity. Thus, work engagement alone did not account for the relationship between PsyCap and creativity of the I.T workers sampled for this study. This finding is similar to the findings of Bindle et al. (2019), Nazir et al. (2018) and Tan et al. (2020) who found work engagement partially mediating the relationships between psychological capital and Positive organisational support, employable skills and creativity in other organisational setting.

Consistent with the JD-R theory, the psychological resources, skill variety as well as supervisory support provided by the possession of psychological capital, have implications for employees work engagement, which in turn leads to a sense of innovation and creativity. When given clear guidance by their superiors on the job coupled with their psychological resources serve as the jo resources to deal with the

job demands. They become enthusiastic utilising the job resources to execute challenging task. The SDT theory emphasise on the contentment and motivation employees get after achieving the psychological needs which are autonomy, competence and relatedness. The achievement of full control, feeling of belonging and mastery serve as intrinsic motivation to engage in challenging task.

Therefore, we assume that positive organisational factors such as positive organisational culture, leadership styles of managers or supervisors might have also played a role in the creativity level of the I.T workers. Positive organisational culture can facilitate employees' creative way of thinking (Herrmann & Felfe, 2013). It can be attributed to the fact I.T workers sampled in this study found themselves in organisations that prioritise creativity as one of the positive organisational outcomes. Leadership styles of managers and supervisors of the various I.T workers might have played a role in the relationship between PsyCap and Creativity. Managers who adopt transformational leadership styles develop in their employees' the ability to find alternative means of solving problems (Mittal & Dhar, 2015).

Age Differences and Creativity

The fourth hypothesis that younger I.T workers would be more creative than the older I.T workers was not supported. This is similar to findings by Beins and McCarthy (2017) and Hauk et al. (2018) who also found no significant influence of age on employee creativity. It does seem that the factors that serve as preconditions to motivate employees to engage in creative behaviours as espoused by both JD-R theory and SDT, are not subject to age differences. This suggests that, I.T workers, whether young or old would be willing and interested in pursuing creative and innovative means of executing their task when provided with the needed organisational and supervisory support. Employees become engaged with their work when they find it to be motivating in executing the task that comes with the job irrespective of their age differences (Bakker, 2017).

Gender Differences and Creativity

We also found no significant difference in employee creativity between male and female I. T. workers in our sample. This finding affirms the findings by (Oniye, 2020; Papousek & Fink, 2022; Uthaivoravit, 2017) who found no significant gender difference in workplace creativity. This could be that, the psychological resources that facilitates employees' positive organisational outcomes including creativity are not based on gender disparity. Also, the Ghanaian organisational environment is not gendered in the sense that both males and females can occupy any position when they possess the required skills and mastery that come with the job.

Again, this confirms the assertion made by Halpern (2011) that both male and female employees are capable of striving to exhibit creativity when given the same supervisory support and clear guidance and are given autonomy to take decisions on how the job should be done. Furthermore, it can be attributed that the personal resources and the autonomy as well as the mastery to demonstrate creativity as proposed by the JD-R model and SDT theory does not necessary depend on gender.

Contributions of the Study to Practice

The findings of this research support the need for organisations to nurture the psychological resources among their employees which can stimulate creativity at the work place. The need to have intervention and training programmes to improve their employees' psychological resources such as self-efficacy, hope, optimism and resilience as these have been found to have a positive influence in creativity (Corbu et al., 2022; Puozzo & Audrin, 2021).

Again, managers and supervisors of I.T firms are expected to offer supervisory support and clear guidance to their employees. This serve as job resources needed to execute the physical and cognitive demands that come with the job. In addition, since the SDT emphasise on motivation through the achievement of the psychological needs, organisations can create positive organisational atmosphere coupled with positive feedback, positive organisational culture and autonomy which can facilitate employees intrinsic desire to engage in creative task at the workplace (Ryan & Deci, 2017). Furthermore, the findings of the study underscore the need for HR managers and supervisors to include employees with higher level of psychological capital in building creative teams, which can enhance collective creative performance of employees.

Strengths and Limitations of the Study

The main limitation of the study was the sample used which can limit the generalisation of the results found to all employees in Ghana. Given that the sample comprised only I. T. workers, the generalisability of the findings might be limit in the Ghanaian work context. This is because the organisational culture, leadership or managerial styles of I.T firms might be different from employees in different organisations. Therefore, the study of the influence of psychological capital and work engagement on employee creativity among different participants in future studies may yield different results due to different organisational culture and other demographic factors. Nevertheless, aside these limitations, the originality and authentication of the findings in this study are valid and were not compromised.

Implications for Future Research

This paper explored how psychological capital and work engagement can predict work place creativity of I.T workers. Future studies can be done on how psychological capital can be nurtured among employees to predict positive organisational outcomes such as organisational citizenship behaviour, collaboration and team work and workplace productivity in the Ghanaian setting.

Future studies should consider larger sample size and not participants only from the I.T firms. This would help in making a good generalisation to the larger population of employees in the Ghanaian organisational setting. Again, longitudinal design can be adopted by similar studies to examine the impact of psychological resources (self-efficacy, hope, optimism and resilience) on creativity of I.T workers over a period of time.

Conclusion

The findings of this study emphasised the relevance of psychological capital in employee work engagement and creativity within the Ghanaian context among information and technology workers. Employee self-efficacy, resilience, hope and optimism are essential psychological resources that could engender investment of energy at work and taking initiatives to become innovative. Our findings, thus suggest that a psychologically empowered worker is an engaged and creative worker and these attributes did not vary based on a workers age or sex.

Declarations

Conflict of Interest

The authors declare that there were no conflicts of interest.

Informed Consent

Informed consent was obtained from all participants before participation.

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Ethical Approval

The study received ethical approval from Departmental Research & Ethics

Committee of the Department of Psychology, University of Ghana, with number DREC/006/19-20. The study was conducted in accordance with the ethical standards of the institutional and/or national research committee where the study was conducted.

Data Availability

The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

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