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The Relationship between Error Management, Safety Climate, and Job-Stress Perception in the Construction Industry: The Mediating Role of Psychological Capital

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Abstract: Job stress (JS) is a significant issue in the construction industry of developing countries. This study aims to examine the impact of error-management climate (EMC), safety climate (SC), and psychological capital (PC) (as a mediator) on employee JS in the construction industry, and establish relationships between these constructs. A questionnaire survey was conducted to gather data from 144 respondents. The study's hypothesized relationships were tested using partial-least-squares structural-equation modeling (PLS-SEM). The analysis indicated a positive association between EMC and PC. Conversely, EMC did not have a negative impact on JS. The study also established a constructive relationship between SC and PC, and a significant negative association between SC and JS. Regarding mediation, PC was found to partially mediate the effect of EMC on JS, accounting for 55% of the variance accounted for (VAF). The study's innovative contribution lies in exploring the limited research on PC within the construction industry, and investigating the interactions among SC, EMC, PC, and JS.

Keywords: error-management climate; safety climate; psychological capital; job stress; construction industry

1. Introduction

The construction industry has a significant impact on economic growth and employment opportunities [1]. The 2017 Economic Survey reported a 9.1% growth in the construction sector, leading to a 2.7% increase in the national GDP [2]. Construction is a demanding industry that poses significant challenges to worker safety and often leads to high levels of job stress (JS). As a result, researchers have recently taken a keen interest in this field [3]. Despite the positive impact of the construction industry, safety remains a major challenge in this sector; for example, Azhar et al. [4] noted that the construction industry has an exceptionally high rate (about 20%) of worker injuries. Moreover, the physical safety risks associated with construction work and the high levels of JS experienced by workers can contribute to mental health issues [5]. Bettio et al. [6] highlighted that in the construction industry, factors such as unsafe work environments, group working styles, social relations, and high job demands can increase the risk of adverse psychological consequences. If left unaddressed, these pressures can ultimately harm workers' well-being and productivity [7].

According to Chen et al. [8], safety-related job injuries in the construction industry can lead to workplace deaths and permanent disabilities, consequently, there is an urgent need for studies to measure employee stress levels. While some studies have focused on accident proneness, others have examined factors such as mental breakdown, emotional resilience, self-confidence, and job-related stress to understand the link between accidents and safe behavior [5,9]. Adopting a safety culture is crucial for reducing job-related stress and improving the workplace climate in the construction industry. As safety culture and workplace climate are negatively correlated with job-related stress, organizations that prioritize safety culture are likely to see improvements in safety and efficiency [10]. Developing a safety culture in the construction industry is essential for reducing the likelihood of employees being exposed to hazardous situations. However, assessing safety culture can be challenging, and it often depends on other variables such as error-management climate (EMC), and safety climate (SC) [11]. Furthermore, cultivating psychological capital (PC), which encompasses an optimistic mindset, positive outlook, productivity, and task versatility, can be effective in reducing job-related stress and promoting mental health and safety efficiency in the construction industry [12].

JS is a significant issue, particularly in developing countries where there is limited research on this topic. Various scholars in their studies recognized construction industry as stressful and being intrinsically hazardous due to its ever-changing characteristics, which include contractual arrangements, employer and employee turnover, varying work environments, and multiple employers and crafts operating concurrently at the same worksite [13,14]. To reduce the stress and enhance safety performance in the construction industry, it is recommended to implement flexible psychological capital training and interventions, as well as bolster communication skills among construction workers [15]. Additionally, previous studies examining the relationship between workplace climates and JS have primarily focused on measures such as job performance, employee absenteeism, and job satisfaction. Further, these studies were focused on other sectors but not the construction sector [3,11]. Trinh and Feng asserted that it is imperative to adopt error-management practices to effectively respond to errors and their repercussions following their occurrence on construction sites [16]. The study by Chen et al. revealed that safety climate has the ability to reduce job stress among workers and it can have an impact not only on the physical well-being but also on the psychological health of employees [8]. They asserted that it is essential to investigate how safety climate is utilized to reduce stress and enhance safety performance in diverse regions since safety climate can be influenced by geographical factors. He et al. [17] identified that the presence of psychological capital (PsyCap) has the potential to have an impact on the mental well-being and job performance of construction employees, therefore, its role needs to be explored [15]. Referring to aforementioned studies, it can be observed that rare studies have been conducted to investigate the impact of workplace climates (SC and EMC) on the job stress of construction employees. Further, the role of psychological capital (PC) needs to be explored. This identified gap in the extant literature warrants investigation as it is expected that the findings will allow both researchers and practitioners to appreciate whether SC and EMC have a role in influencing workers' PC. Also, it will provide empirical basis to understand the antecedents in reducing job stress that has been identified as one of the factors for workers' unsafe behavior on construction projects.

There is a need for a study that focuses on the positive aspects of the workplace environment to promote a better safety culture in the construction industry. Therefore, the primary objective of this novel research is to investigate the relationship between positive workplace climates, including EMC and SC, and JS. Additionally, the study aims to examine the mediating role of PC in the relationship between EMC, SC, and JS within the construction industry. The study did not find support for the relationship between

EMC and JS. However, the relationship between EMC and PC found support from the data, indicating that cultivation of EMC in a construction project organization could go a long way in influencing psychological capital of individuals working on construction projects. More importantly, the study found that PC fully mediates the relationship between EMC and JS. In contrast to EMC, SC was found to have a significant negative influence on JS. Also, the results indicate that SC has a significant influence on PC. Thus, the findings indicate that both facet specific climates, EMC and SC, influence PC. The study however did not find support for the mediating role of PC for the relationship between SC and JS.

The paper comprises six sections. The Section 1 presents the study's background, research gap, and purpose. The Section 2 discusses the literature related to workplace climate, PC, and JS theory. The Section 3 describes the research methodology, which involved the use of Smart PLS for hypotheses testing, and its results are presented in the Section 4. The Section 5 includes a discussion of the repercussions drawn from the research findings. Finally, the Section 6 presents the conclusions and implications of the study.

2. Theoretical Development

2.1. Workplace Climate

EMC is defined as an element of an organization's management culture in which the organization seeks meaningful and productive ways to deal with errors to mitigate the effects of those errors [18]. EMC has a significant impact on employee behavior and organizational management performance, so it is essential that all errors are treated constructively [19]. Despite advancements in technology, construction workers still face safety threats due to the inherent nature of their work [20]. Although significant progress has been made to improve the working conditions of construction workers, they still face a wide range of safety and health hazards. Anuka [21] suggests that promoting safety coordination and establishing an EMC are two essential elements for enhancing workplace safety. A better EMC within the workplace can lead to improved employee morale and ethical behavior. On the other hand, failing to acknowledge self-inflicted errors can result in significant negative consequences for organizational performance [22]. It is commonly observed that organizational workers view errors as detrimental and try to avoid them at any cost. However, having a positive EMC shapes employees' perceptions of errors and allows the error-management team to correct them and reduce their impact on the organization [3]. Improving safety behavior among team members is crucial for minimizing the number of incidents at construction sites, which, in turn, would result in an improvement in the organization's EMC [23]. While the error-management team may be able to effectively handle most organizational errors, there may be certain errors that go uncorrected. These errors can have a detrimental effect on the organization's outcomes as well as on the employees' perceptions [24].

The SC of an organization refers to the safety principles that are evident within the organization at any given time [25,26]. Jha [27] stated that a team could give its best only when all members are mentally healthy. Casey [28] found that interventions, such as leadership, safety, and behavior monitoring, have a positive influence on an organization's SC. Physical and mental hazards are also associated with SC. For instance, inconsistencies in SC in the construction industry can create communication barriers that significantly reduce employee productivity [29].

2.2. Psychological Capital

Luthans et al. [30] defined PC as a "positive psychological state of an individual's growth and development", which is commonly demonstrated by indications of efficacy, motivation, hope, and resilience. The hierarchical linear model (HLM) was used in studies by Walumbwa et al. [31] and Ren et al. [32] to investigate cross-level interpersonal interaction of psychological resources. Other studies have found that a leader's PC can have an impact on their followers' PC, thereby promoting organizational citizenship behavior and job performance. PC can also enhance an employee's job-related requirements, such as job satisfaction, organizational commitment, and overall health. A meta-analysis by Avey et al. [33] indicated that PC improves employees' organizational citizenship behavior and job performance. The authors also found that PC can reduce employee turnover and abnormal behaviors, such as work stress and job burnout. According to Bandura [34] and Walumbwa, Peterson, Avolio, and Hartnell [31] social learning theory, leaders in a work team can demonstrate their high levels of positive PC by serving as role models for their followers. This allows followers to become familiar with their leaders' actions through observational learning methods. Followers can then imitate the actions of their leaders by adopting optimistic attitudes and behaviors, resulting in positive PC.

According to social identity theory, a leader's PC may influence the PC of their followers through the followers' organizational identification [35]. A leader's psychological characteristics can help to establish a positive team climate that has an impact on a follower's organizational identity and PC. However, this process can sometimes be slow [30]. Leaders who possess high levels of PC have greater resources and are more engaged compared to those who lack this trait [36]. Leaders who possess higher levels of psychological resources are typically more resilient and better equipped to handle stress, which allows them to perform at a higher level and achieve better outcomes. They are also more likely to exhibit positive work attitudes, which can have a positive impact on their followers' PC.

2.3. Job Stress Theory

Regarding workplace health and safety, it is widely acknowledged that work-related psychological stress is one of the most significant problems facing people today [37]. The term "stress" is used to describe the negative effects of a demanding environment that can be harmful or have adverse consequences [38]. JS is a widespread problem in the construction industry worldwide, affecting the physical health and well-being of those who work in the industry [39]. As a result, construction organizations are classified as high-risk organizations [8]. According to Hanson [40], many construction managers experience JS due to a lack of awareness of emerging technologies and approaches used in projects. Additionally, the workload and irregular working hours are two other variables that can increase the pressure felt by managers [41]. The negative effects of high JS at the administrative level can lead to increased injuries, cost overruns, and a negative impact on the organization's reputation. On the other hand, low levels of JS can also result in accidents, cost overruns, and a negative impact on the organization's reputation, all of which are caused by work-related pressures [42,43].

According to Wong and Lam [44], employees who have been subjected to excessive work stress are more likely to make errors and be involved in more injuries than others. Arshad et al. [45] primarily focused on the impact of JS on different levels of managers and their subordinates, as well as the well-being of team members working under their supervision. The findings revealed that the primary cause of manager exhaustion is the JS experienced by their team members, which has a negative impact on the managers' and their teams' productivity [46]. Modern theories consider the central role of psychological processes when understanding certain types of stress. Various theories of work-related stress are discussed below.

The person–environment fit theory is a model that reveals the interaction of variables to better understand work-related stress, and it is one of the primary theories that have led to research on JS [47]. The person–environment fit model refers to the degree of match between an individual's characteristics (such as biological needs, psychological needs, future goals, capabilities, or personality) and an environment's characteristics (such as job control, cultural norms, qualities of other individuals in the environment, or intrinsic/extrinsic rewards) [48]. The job demand-control (JDC) model is based on the job demand–control–support model, which has been a driving force in occupational stress research for the past two decades [49]. According to the JDC model, job strain is caused by the interaction between two work environment variables, namely, job control and psychological job demands [50]. The effort–reward imbalance model proposes that work effort is exchanged as part of a social contract based on the norm of reciprocity [51].

According to Cox and Mackay [52], stress is a result of changing interactions between the environment and the individual. However, unlike other stress models, this one focuses on the individual's cognitive evaluation of the perceived demands placed on them and their perceived capacity, resources, and skills to meet those demands. Stress occurs when perceived demands exceed the employee's perceived capacity, and individual perceptions shape what they consider stressful, which can vary depending on the individual, the situation, and the time [53]. The transactional model is the last major JS theory that emphasizes the underlying psychological and physical processes that play out in the process, building on the assertions of interactions between individuals and their environments in the P–E fit model [54].

2.4. Research Model and Hypotheses Development

The model presented in Figure 1 is based on the theories of JS and PC perception analyzed by academics [55–57]. Based on the developed model, the following hypotheses were formulated. Each of the hypotheses was designated a unique label:

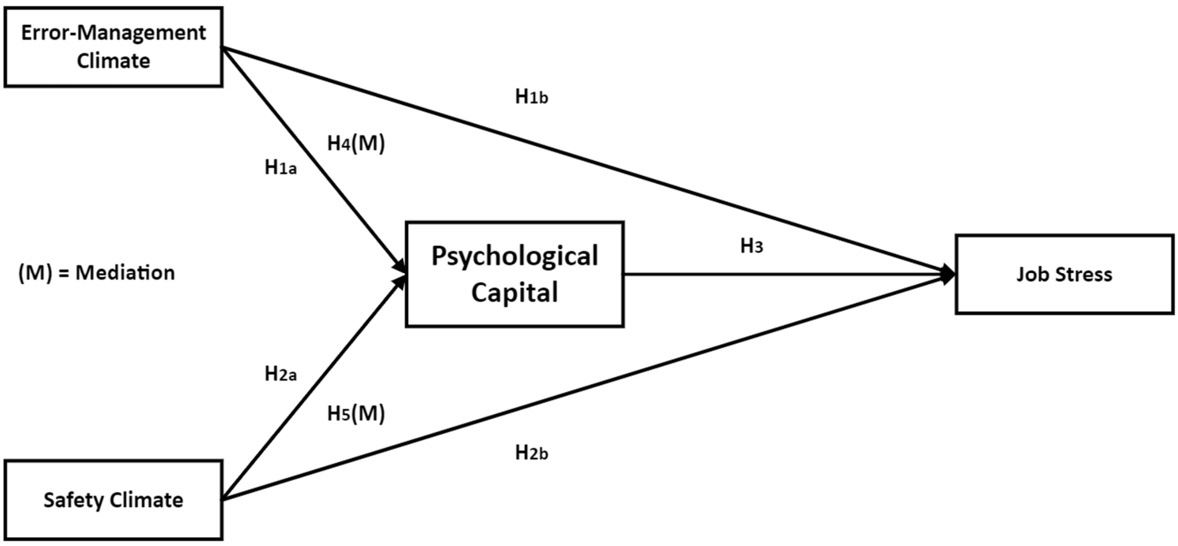

Figure 1. Conceptual framework.

According to Krause et al. [58], dealing with errors on construction sites is difficult due to job hazards and risks. Since errors are predictable, the main concern is how to deal with them constructively. To overcome these obstacles, it is critical to implement clear and workable techniques that reduce employee anxiety which can lead to under-reporting and non-reporting of accidents and mishaps. Implementing EMC can shift a company's existing error-prevention mindset to one that supports learning mindfulness to provide a procedure for resolving action errors [59]. Job safety is a significant concern worldwide, particularly on construction sites, as the nature of the work poses significant challenges. As a result, ensuring a healthy work environment requires comprehensive strategies beyond standard enforcement [46]. Therefore, awareness and other factors that affect laborers' risky conduct/behavior on the construction site must be improved.

Keeping this in view, it is hypothesized that:

H1a. *EMC has a positive association with construction workers' PC.*

H1b. *EMC has a negative association with construction workers' JS.*

Firms use the SC to create a picture of their organization in employees' minds [10]. Flores et al. [60] put forth a theoretical model that integrates employee-safety behavior, the organization's SC, and the mediating effect of individual safety expectations. Consequently, the authors established a comprehensive framework that facilitates a thorough comprehension of worker-safety behavior within an organization. For instance, a positive and effective supervisory interaction could positively influence the SC and the well-being of employees [31,46].

Keeping this in view, it is hypothesized that:

H2a. *SC is positively associated with construction workers' PC.*

H2b. *SC is negatively associated with construction workers' JS.*

PC refers to a positive state of mind that is associated with an individual's growth and development, often demonstrated through his or her sense of self-efficacy, trust, optimism, and resilience [61]. Srivastava and Maurya [62] found that PC can improve workers' job satisfaction, health and safety, organizational commitment, and behavior towards organizational social responsibility. It can also lead to job success, reduce employee turnover, and mitigate negative behaviors, such as work pressure and fatigue [63]. During the early stages of development, leaders demonstrate a diverse range of behaviors and perform various tasks in order to achieve team goals. Additionally, leaders work to improve their employees' job-related abilities and cultivate desirable psychosomatic characteristics [64]. According to social learning theory, in order to influence and inspire staff and team members, leaders must demonstrate good PC and serve as role models for the entire team. This means that leaders must display positive behaviors and attitudes in order to set an example for their employees to follow [65].

Keeping this in view, it is hypothesized that:

H3. *PC negatively relates to construction workers' JS.*

Kwok et al. [66] argue that psychological, societal, and human capital are essential for a firm's effectiveness in providing certain benefits. Specifically, these three factors play a critical role in ensuring that a firm is capable of delivering value to its stakeholders. Alessandri et al. [67] found that analyzing methods for improving firm efficiency using positive PC is a perfect way to do so. Jung and Yoon [68] assert that positive PC is a strong path to examine methods of improving organizational performance. Hence, based on the study conducted by Hur et al. [69], PC can be used as an adequate mediator to test predictive values for the outcome.

Keeping this in view, it is hypothesized that:

H4(M). *Construction workers' PC mediates the effect of EMC on JS.*

H5(M). *Construction workers' PC mediates the effect of SC on JS.*

3. Research Methodology

3.1. Sampling and Data Collection Process

To determine the appropriate sample size for our study, we followed Cohen's [70] recommendation for sample size determination at a statistical power of 80%, which has also been suggested by Hair et al. [71] for determining sample size in partial-least-squares structural-equation modelling (PLS-SEM). This criterion states that, in order to detect 1% of variance in the endogenous constructs, a model containing three arrows pointing at any of the endogenous constructs requires 103 responses to determine the statistical significance of the relationships at a 95% significance level. Therefore, a total of 200 questionnaires were distributed among employees and the feedback was solicited on a five-point Likert scale ("1" = strongly disagree to "5"= strongly agree). The first section of the questionnaire asked respondents about their demographic characteristics. The results of this survey are presented in Table 1, which depicts respondents' age, education, designation, tenure of service at a specific department, experience in years, and employment status. The details of the factors can be seen in Appendix A.

Table 1. Respondents' demographics.

Demographics Category	Frequency	Percentage (%)
Age Profile (in years)		
20–25	62	43%
26–30	39	27%
31–35	27	19%
Above 35	16	11%
Education Profile		
Matriculation	4	3%
Intermediate/Diploma	49	34%
Bachelor	71	49%
Master	20	14%
Designation		
General Manager	36	25%
Project Engineer/Site Engineer	40	28%
Site Supervisor	33	23%
Foreman/DAE/Junior Engineer/Intern	35	24%
Tenure in the current department (in years)		
<5	124	86%
5–10	13	9%
11–15	4	3%
>15	3	2%
Experience (in years)		
<5	78	54%
5–10	46	32%
11–15	12	8%
>15	8	6%
Employment Status		
Permanent	43	30%
Contractual	85	59%
Temporary (daily wages)	16	11%

Of the 200 questionnaires, 144 responses were obtained, which was a response rate of 72%. The breakdown of respondents by job role was as follows: project engineer/site engineers (28%), general managers (25%), site supervisors (23%), and foreman/DAE/junior engineer/interns (24%). In terms of age, 43% of respondents were between 20–25 years old, 27% were between 26–30 years old, 19% were between 31–35 years old, and 11% were above 35 years old. Based on education level, 3% had completed matriculation, 34% had completed an intermediate/diploma, 49% had completed a bachelor's degree, and 14% had completed a master's degree. In terms of tenure, 86% of respondents had been in their current department for less than five years, while only 2% had spent more than 15 years in their current department. Regarding experience, 54% of respondents had less than five years of experience, 32% had 5–10 years of experience, and 6% had more than 15 years of experience. In terms of employment status, 59% were contractual employees, 30% were permanent employees, and 11% were temporary wage employees who responded to the questionnaire.

3.2. Data Analysis

For multivariate analysis, statistical techniques are typically classified on the basis of their suitability for either exploratory or confirmatory type of research [71]. Typically, multiple regression, logistic regression, confirmatory factor analysis, and analysis of variance are first generation statistical techniques that are primarily employed in confirmatory settings. However, owing to the limitations of first-generation techniques to handle complex models and to entertain the employability of latent constructs [71,72], second-generation statistical technique of structural equation modeling (SEM) garnered researchers' attention. The two types of SEM, covariance-based-SEM (CB-SEM) and partial-least-squares SEM (PLS-SEM) that were developed to meet the requirements of different types of research objectives are, therefore, applied in distinct settings. CB-SEM is primarily employed where the research's focus is toward theory testing as opposed to theory building [72]. PLS-SEM, on the other hand, is deemed most appropriate when the research aims to build theory [71]. Furthermore, CB-SEM that employs maximum-likelihood estimation assumes data to be normally distributed [71,72] as opposed to PLS-SEM that makes no such assumption and, therefore, is more robust to violations of multivariate normal distributions [71,73]. Therefore, for data analysis, this study uses the partial-least-squares structural-equation modeling (PLS-SEM) technique, with Smart PLS 3 being the software employed for this purpose. In addition to the explanation in the aforementioned lines, this approach was selected for two reasons. Firstly, it enables the examination of both latent and directly measurable variables. Secondly, PLS-SEM is well-suited for analyzing complex models with small sample sizes, making it an ideal choice for this study [74,75].

3.3. Measurement

Model Estimation

The study was able to generate an adequate composite reliability (CR) for all constructs, indicating that the measurement items were appropriate for their respective latent variables [76]. To test the convergent validity of the latent variables, the average variance extracted (AVE) was determined by comparing the variance retained by an independent variable from its measurement products to the variance retained by measurement errors [77]. The measurement requires that 50% of the variance is illustrated by its latent variables [78]. Table 2 presents the study's estimates of AVE, which display all the outcomes for the measurement model and indicate that AVEs are approximately 60% for all the latent variables in the model.

Table 2. Measurement Model Results for Convergent Validity and Reliability (Smart PLS Output).

	Items	Loadings [a]	AVE [b]	CR [c]	Rho_A
Error-Management Climate	LFE	0.788	0.607	0.861	0.785
	TAE	0.835			
	ECE	0.735			
	ECN	0.756			
Safety Climate	Safety Communication LVS	0.874	0.681	0.937	0.925
	Safety Training LVS	0.840			
	Supervisor Support LVS	0.830			
	Learning LVS	0.860			
	Management Commitment LVS	0.849			
	Anticipation LVS	0.767			
	Awareness LVS	0.756			
Psychological	Efficacy	0.819	0.600	0.857	0.807
Capital	Hope	0.837			
	Resilience	0.659			
	Optimism	0.739			
Job Stress	JS11	0.759	0.514	0.914	0.897
	JS12	0.701			
	JS13	0.775			
	JS14	0.700			
	JS15	0.692			
	JS2	0.725			
	JS3	0.680			
	JS5	0.694			
	JS7	0.748			
	JS8	0.689			

LFE = learning from errors; TAE = thinking about errors; ECE = error competence; ECN = error communication; AVE = average variance extracted; and CR = composite reliability.

To ensure data reliability, Cronbach's alpha (α) was measured using IBM SPSS v. 24 for the latent variables included in the questionnaire, namely, EMC, SC, PC, and JS. Table 3 presents the results of the α coefficients, which indicate that all of the α values are greater than 0.7, demonstrating that internal consistency exists [79].

Table 3. Cronbach's Alpha Analysis for Internal Consistency.

Reliability Statistics	
Scale	**Cronbach's Alpha**
Error-Management Climate	0.783
Job Stress	0.895
Psychological Capital	0.780
Safety Climate	0.921

Discriminant validity refers to the ability to distinguish a particular latent variable from the other latent variables in the model [80]. To assess this, the analysis test of cross-loadings and AVE was required [77]. Uniform scores for the measurement object and latent scores for all variables were computed using Smart PLS. The scores were then entered into SPSS to determine the Pearson's correlation coefficient value for each item tested against its independent variable ranking. The results of these correlations are presented in Table 4.

Table 4. Discriminant Validity Results—Cross-Loadings Analysis (Smart PLS Output).

	Error-Management Climate	Safety Climate	Psychological Capital	Job Stress
ECELVS	0.735	0.441	0.455	−0.286
ECNLVS	0.756	0.350	0.445	−0.248
LFELVS	0.788	0.428	0.506	−0.301
TAELVS	0.835	0.501	0.508	−0.175
Safety Communication LVS	0.499	0.874	0.511	−0.355
Safety Training LVS	0.458	0.840	0.433	−0.387
Supervisor Support LVS	0.368	0.830	0.480	−0.359
Learning LVS	0.473	0.860	0.361	−0.338
Management Commitment LVS	0.409	0.849	0.529	−0.386
Anticipation LVS	0.557	0.767	0.510	−0.428
Awareness LVS	0.420	0.750	0.388	−0.332
Optimism LVS	0.444	0.297	0.739	−0.300
Resilience LVS	0.396	0.361	0.695	−0.195
Efficacy LVS	0.475	0.498	0.819	−0.394
Hope LVS	0.570	0.543	0.837	−0.413
JS11	−0.311	−0.211	−0.373	0.759
JS12	−0.185	−0.189	−0.194	0.701
JS13	−0.185	−0.227	−0.300	0.775
JS14	−0.190	−0.340	−0.326	0.700
JS15	−0.168	−0.359	−0.263	0.692
JS2	−0.252	−0.357	−0.264	0.725
JS3	−0.246	−0.387	−0.259	0.680
JS5	−0.287	−0.439	−0.355	0.694
JS7	−0.276	−0.367	−0.447	0.748
JS8	−0.231	−0.282	−0.302	0.689

ECELVS = error competence latent variable score; ECNLVS = error communication latent variable score; LFELVS = learning from errors latent variable score; TAELVS = thinking about errors latent variable score; and JS = job stress.

The current study demonstrates this analysis of AVE in the correlation matrix of the latent variables in Table 5. According to Roldán et al. [81], successful discriminant validity is expressed when the diagonal values are greater than values found in the off-diagonal of the rows and columns. The diagonal values bolded in Table 5 illustrate the square root of the AVE.

Table 5. Comparison of correlations between latent variables and the square root of AVE.

	Error-Management Climate	Job Stress	Psychological Capital	Safety Climate
Error-Management Climate	0.779			
Job Stress	−0.326	0.717		
Psychological Capital	0.616	−0.435	0.775	
Safety Climate	0.554	−0.451	0.564	0.825

The study used the square roots of the average variance extracted (AVEs) to check for discriminant validity. Any two independent variables that have a correlation greater than or equal to the square roots of the AVEs of the same variable are considered to have no association. Based on the results of the discriminant validity check, there were no issues with the latent variables or their calculation variables [82]. The results of the entire measurement model indicate that individual item reliability, convergent validity, and discriminant validity were sufficient for the items and their measures [83]. The latent variables were within the appropriate error range. Hence, the measurement model demonstrates the satisfaction needed for measuring the relationship between all the model's variables.

4. Results

Structural Model Estimation

The measurement model is robust enough to further analyze the research's structural model [1]. Figures 2 and 3 illustrate the structural model of the current research and present the path coefficients (beta values) used to measure and verify the hypotheses [84]. Two variables are integrated to test the research's structural model, variance (R2), path coefficient strength (β), and significance (t values) [85]. The study of direct effects, including five hypotheses, is tested.

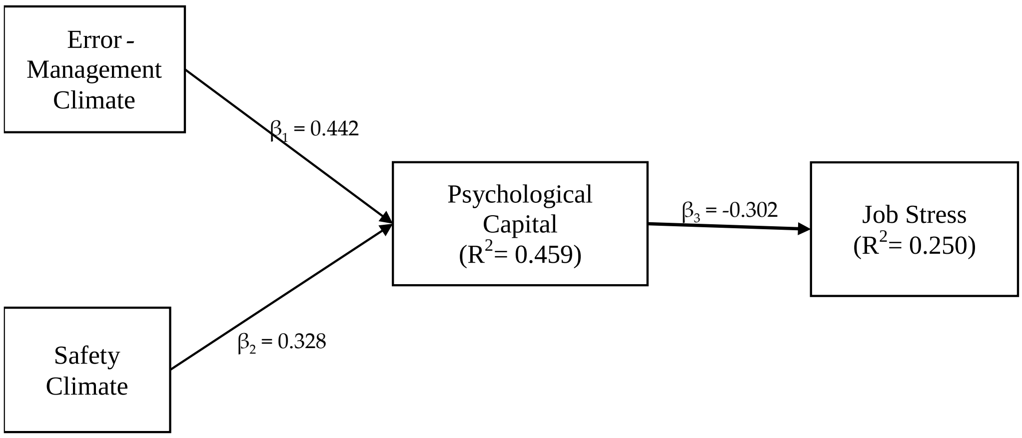

Figure 2. Structural model of the factors influencing job stress with psychological capital.

The results of the PLS bootstrapping presented in Table 6 show the status of the hypotheses as supported or unsupported based on the t statistic. Table 6 includes values for the direct effects of three latent variables on JS. Tehseen et al. [86] argued that t statistics greater than 1.96 are significant and support their hypotheses. The direct hypotheses consist of three hypotheses, with H1a, H2a, H2b, and H3 showing significance by producing t statistics greater than 1.96. Based on the results, it can be seen that safety climate has a significant influence on PsyCap and job stress, as hypothesized. In contrast, EMC is found to have a significant influence only on PayCap. Furthermore, PsyCap is found to have a significant negative influence on job stress, as hypothesized.

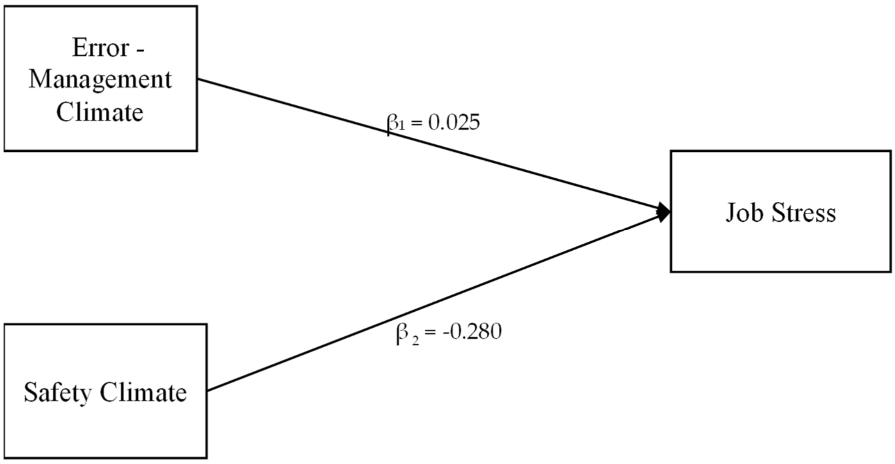

Figure 3. Structural model of the factors influencing job stress directly.

Table 6. Structural Model Hypothesis Testing for Direct Effects.

Hypothesis	Relationship	Std. Beta	Std. Error	t Value	Decision	97.5% CI LL	97.5% CI UL
H1a	Error-Management Climate → PsyCap	0.441	0.098	4.474	Supported	0.241	0.610
H1b	Error-Management Climate → Job Stress	0.011	0.099	0.077	Unsupported	−0.196	0.197
H2a	Safety Climate → PsyCap	0.321	0.099	3.262	Supported	0.138	0.520
H2b	Safety Climate → Job Stress	−0.309	0.109	2.777	Supported	−0.517	−0.098
H3	PsyCap → Job Stress	−0.272	0.115	2.334	Supported	−0.492	−0.054

Schilke et al. [87] define mediation as the existence of a third variable that transmits the impact of an independent variable to an outcome. In the present study, mediation occurs when the effect of EMC on JS is transmitted by PC, meaning that EMC's impact on PC, in turn, affects JS. A mediating effect involves a third variable that acts as an intermediary between the antecedent and outcome variables. Therefore, the current study's mediation hypotheses focus on how the independent variables of EMC and SC have an impact on the dependent variable of occupational job stress through the mediating variable of PC. Following Hair et al.'s [71] guideline on conducting mediation testing, direct and indirect paths involving the predictors of EMC and SC and the outcome variable of JS were examined. Hair et al. [71] note that partial mediation is inferred if both direct and indirect paths are significant. In contrast, in case only the indirect path is significant, it is suggestive of full mediation. Referring to Table 7 below, it can be seen that the indirect path between EMC and job stress is significant. However, from Table 6 above, it can be seen that the direct path from EMC to job stress is insignificant. Thus, the data find support for the full mediation of PC for the relationship between EMC and job stress. Hence, H4 found support from the data. Similarly, for the indirect effect of SC on JS, it can be seen from Table 7 that the indirect effect is insignificant, indicating no mediating role of PC for the relationship between SC and JS. Hence, H5 did not find support from the data.

Table 7. Indirect Effects on Hypothesis Testing.

Hypothesis	Relationship	Std. Beta	Std. Error	t Value	Decision	97.5% CI LL	97.5% CI UL
H4	Error-Management Climate -> Psychological Capital -> Job Stress	−0.119	0.057	2.052	Supported	−0.244	−0.020
H5	Safety Climate -> Psychological Capital -> Job Stress	−0.089	0.050	1.721	Not Supported	−0.200	−0.013

5. Discussion

The present study provides a novel contribution to the limited research on PC and the relationships among SC, EMC, PC, and JS within the construction industry [88–90]. The direct relationships analyzed in the current study through hypotheses H1a and H1b have revealed that EMC has a positive association with PC [91], which is supported as it produced a t statistic of 4.474, according to the findings of the structural model. It is important to note that the lack of a direct relationship between EMC and JS does not necessarily mean that EMC does not have an impact on JS at all. As the current study has shown, there is a partial mediation effect of PC in the relationship between EMC and JS. This suggests that, while EMC may not have a direct impact on JS, it can still indirectly influence it through the mediating variable of PC. Additionally, it is also possible that the construction industry context of the current study may have different dynamics compared to the hotel industry context of Berry [92] study, which could explain the differences in findings. Further research is needed to fully understand the relationship between EMC and JS in different industries and contexts. A study by Kim et al. [93] explored a similar premise to the current study and found that positive EMC did not reduce work environment stress. Instead, they discovered that negative error management increased employee stress. The rejection of hypothesis H1b in the current study suggests that another variable may be mediating the relationship between EMC and JS, in contrast to the direct relationship proposed by Berry [92].

When testing for SC, it was found that hypothesis H2a, which states that SC has a positive association with PC [94], was supported with a t statistic value of 3.262. The second hypothesis, H2b, explored the impact of SC on JS, and it was hypothesized that a greater SC would reduce JS, resulting in a negative association between the two variables. However, this hypothesis was not supported as it produced a t statistic of 2.777. These findings suggest that while SC may have a positive impact on PC, it does not necessarily have a negative impact on JS in the context of the construction industry. Similarly, Kim, Park, Lim, and Cho [59] observed that high occupational stress associated with the physical work environment, job demands, job insecurity, organizational systems, and workplace culture was observed in accident departments with lowered SC in safety-construction companies. The authors suggested a link between occupational stress and workplace accidents due to lowered SC. In contrast, the current study presents the relationship in reverse. It suggests that an active and present SC in the construction organization reduces the JS experienced or imposed on the employees of the construction company.

The third hypothesis H3 was supported by the results, with a t value of 2.334. The study found that construction companies that perceived greater organizational strategies for error management and safety management were more likely to report higher levels of PC [95]. Similarly, the findings of the current study also support the idea that construction workers with higher levels of PC are more likely to experience lower levels of JS.

Upon integrating both workplace climates and the P–E fit theory, it was hypothesized and confirmed that PC mediates the relationship between EMC and JS, as postulated in hypothesis H4(M). In other words, the current study found that a good work environment leads to lower levels of JS through the mediation of PC. The calculation of VAF produced a value of 55%, indicating partial mediation, as argued by Carrión et al. [96].

Consequently, the current study has found that employees in the construction industry who perceive positive EMC in their organization also experience higher levels of PC, leading to reduced JS. As H5(M) was not supported, it was unnecessary to determine the extent of mediation using VAF. Luthans et al. [97] emphasize the importance of PC in predicting employee outcomes. Their findings demonstrated the significance of a supportive climate and the relationship between employees' perceptions, PC, and performance. The current study also highlights the importance of enhancing the components of EMC and PC in construction workers to reduce JS.

6. Conclusions and Implications

The purpose of this study was to investigate the impact of EMC, SC, and PC on JS among construction workers, as well as the relationships between these variables. Data were collected from 144 participants via a questionnaire survey, and the research model's proposed relationships were analyzed using PLS-SEM. The results indicated that EMC has a direct positive correlation with PC, with a t statistic of 4.474. However, EMC was not found to have a negative relationship with JS, as evidenced by a t statistic of 0.077. SC was positively associated with PC, with a significant value of 3.262, but negatively related to JS, with a t statistic of 2.777. The study also found that PC mediates the impact of EMC on JS, with a t statistic of 2.652, and a partial mediation of 55% was observed through VAF.

The findings of this study offer practical recommendations for improving the safety climate in the construction industry, as well as contributing to the academic understanding of the relationship between safety climate, EMC, and job stress. Notably, this research has made a theoretical contribution by showing that EMC does not have a negative impact on JS, indicating the need for further investigation in this area. The study has also demonstrated that a lack of recommended EMC and SC can lead to increased stress among construction workers, which can lead to employee dissatisfaction and a loss of positive attitudes towards their employers.

Based on the study's results, practical steps can be taken to reduce stress and improve the safety climate on construction projects. Construction companies should create models and plans for communication and sharing of errors. Employees at all levels of a construction firm must be trained in critical skills to investigate and assess errors, thereby reducing the negative consequences that can result from them. Leaders and followers within the firm can foster positive perceptions of the company by creating a more positive work environment, which will, ultimately, lead to reduced job stress for all employees.

To further reduce job stress, construction companies must focus on creating a safe environment within their organizations. By consistently maintaining a positive and optimistic work environment, construction companies can encourage positive behaviors and attitudes among their employees, which will have a positive impact on the safety climate of the company.

Limitations of the Study and Future Directions for Research

This study has employed cross-sectional research design that could only provide empirical support to infer about the findings of the study primarily based on the correlations between variables of the study. It is this very reason that cross-sectional research design is termed as correlational research design as well. In contrast, longitudinal research designs as opposed to correlational research design could help establish causality between variables. Therefore, research design as employed in this study has limitations in relation to claim causality between variables. Future studies could contribute to the body of knowledge by employing longitudinal research design and establishing causality between variables. Furthermore, the study has employed convenience sampling that limits the generalization of results. Future studies could employ random or a stratified random-sampling approach to make the findings more robust and generalizable to wider contexts and to the respective populations. Although the study has contributed by exploring the mediating role of psychological capital for the relationship between predictors of error-management climate, safety climate, and the outcome variable of job stress, future studies could expand these findings by identifying positive and negative moderators for the relationship between predictors and outcome variables of this study. Also, future studies could immensely benefit the body of knowledge if research designs employ interventions to determine how increases in the levels of predictors ultimately influence mediators and outcome variables of this study.

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Appendix A

Item	Questions	Source
	Error-Management Climate	
	Learning From Errors	
1.	For us, errors are very useful for improving the work process.	
2.	An error provides important information for the continuation of the work.	
3.	Our errors point us at what we can improve.	
4.	When mastering a task, people can learn a lot from their mistakes.	
	Thinking About Errors	
5.	After an error, people think through how to correct it.	
6.	After an error has occurred, it is analyzed thoroughly.	
7.	If something went wrong, people take the time to think it through.	[98]
8.	After making a mistake, people try to analyze what caused it.	
9.	When working for this organization, people think a lot about how an error could have been avoided.	
	Error Competence	
10.	Although we make mistakes, we don't let go of the final goal.	
11.	When an error is made, it is corrected right away.	
12.	When an error has occurred, we usually know how to rectify it.	
	Error Communication	
13.	When people are unable to correct an error by themselves, they turn to their co-workers.	
14.	When people make an error, they can ask others for advice on how to continue.	
15.	If people are unable to continue their work after an error, they can rely on others.	
16.	When someone makes an error, he shares it with others so they don't make the same mistake.	
	Safety Climate	
	Management Commitment to Safety	
1.	Our management conducts frequent safety inspections.	
2.	Our management provides safety equipment.	
3.	Our management is strict about working safely when work falls behind schedule.	[99–101]
4.	Our management gives safety personnel the power they need to do their job.	
5.	After an accident, our management focuses on how to solve problems and improve safety rather than pinning blame on specific individuals.	
6.	Our management provides enough safety programs.	

Item	Questions	Source
	Supervisor Role for Safety	[102]
7.	My supervisor tries to make my job as safe as possible.	
8.	My supervisor shows personal concern about employee safety.	
9.	My supervisor places worker safety as a top priority.	
10.	My supervisor always tells management about unsafe situations.	
	Safety Communication	[11]
11.	I feel comfortable discussing safety issues with management.	
12.	I feel that my management openly accepts ideas for improving safety.	
13.	I feel that management encourages open communication about safety.	
14.	I discuss safety issues with my management.	
15.	I always discuss safety-related problems with my management.	
	Training	[103]
16.	Training includes effective skills practice for normal operations.	
17.	Training includes skill practice for emergency.	
18.	Potential risks and consequences are identified in training	
19.	Training is carried out by individuals with relevant operational experience.	
20.	Effective training is provided on skills specific to individual task and equipment.	
	Learning	[101,104]
21.	Workers' ideas and opinions on safety are solicited and used.	
22.	Timely feedback is provided when a safety hazard is reported.	
23.	Safety is discussed at regular meetings, not just after an accident.	
24.	Workers are informed about lessons learned from past events.	
	Anticipation	[105]
25.	I assess the potential safety impacts for each of my decision or behaviors.	
26.	I detect failures or errors in my job before they create problems.	
	Awareness	[104,106]
27.	People are aware of the safety hazards in their work area.	
28.	People are clear about their responsibilities for safety in my workplace.	
29.	People are careful to minimize and avoid safety hazards in my workplace.	
	Job Stress	[107]
1.	I have felt fidgety or nervous as a result of my job.	
2.	Working here makes it hard to spend enough time with my family.	
3.	My job gets to me more than it should.	
4.	I spend so much time at work, I can't see the forest for the trees.	
5.	There are lots of times when my job drives me right up the wall.	
6.	Working here leaves little time for other activities.	
7.	Sometimes when I think about my job, I get a tight feeling in my chest.	
8.	I frequently get the feeling I am married to the company.	
9.	I have too much work and too little time to do it in.	
10.	I feel relaxed when I take time off from job.	
11.	I sometimes dread the telephone ringing at home because the call might be job-related.	
12.	I feel like I never have a day off.	
13.	Too many people at my level in the company get burned out by job demands.	
14.	I don't have enough time to develop my people.	
15.	People find this place of work uncomfortable.	

References

1. Maqsoom, A.; Wazir, S.J.; Choudhry, R.M.; Thaheem, M.J.; Zahoor, H. Influence of Perceived Fairness on Contractors' Potential to Dispute: Moderating Effect of Engineering Ethics. *J. Constr. Eng. Manag.* **2020**, *146*, 1. [CrossRef]
2. Awan, A.G.; Sheeza, M. Causes of Trade Deficit and Its Impact on Pakistan's Economic Growth. *Glob. J. Manag. Soc. Sci. Humanit.* **2019**, *3*, 480–498.

3. Nawaz, M.; Ghulam, A.; Bindu, A.; Ghulam, A.B.; Saira, F. Understanding Employee Thriving: The Role of Workplace Context, Personality and Individual Resources. *Total Qual. Manag. Bus. Excell.* **2020**, *31*, 1345–1362. [CrossRef]
4. Azhar, N.; Rizwan, U.F.; Syed, M.A. Cost Overrun Factors in Construction Industry of Pakistan. Presented at the First International Conference on Construction in Developing Countries (ICCIDC–I), Advancing and Integrating Construction Education, Research & Practice, Karachi, Pakistan, 4–5 August 2008.
5. Turner, M.; Lingard, H. Examining the Interaction between bodily pain and mental health of construction workers. *Constr. Manag. Econ.* **2020**, *38*, 1009–1023. [CrossRef]
6. Goldenhar, L.M.; Williams, L.J.; Swanson, N.G. Mo-Delling Relation-Ships between Job Stressors and Injury and near-Miss Outcomes for Con-Struction Labourers. *Work Stress* **2003**, *17*, 218–240. [CrossRef]
7. A Campbell, M.; Gunning, J.G. Strategies to improve mental health and well-being within the UK construction industry. *Proc. Inst. Civ. Eng.-Manag. Procure. Law* **2020**, *173*, 64–74. [CrossRef]
8. Chen, Y.; McCabe, B.; Hyatt, D. Impact of individual resilience and safety climate on safety performance and psychological stress of construction workers: A case study of the Ontario construction industry. *J. Saf. Res.* **2017**, *61*, 167–176. [CrossRef]
9. Santos, E. *Introducing the Workplace Well-Being Program Implementation Model: A Model to Inform the Establishment of Organizational Well-Being Programs*; University of Pennsylvania: Philadelphia, PA, USA, 2019.
10. Cooper, M.D. The Safety Culture Construct: Theory and Practice. In *Safety Cultures, Safety Models*; Springer: Cham, Switzerland, 2018; pp. 47–61.
11. Cigularov, K.P.; Chen, P.Y.; Rosecrance, J. The effects of error management climate and safety communication on safety: A multi-level study. *Accid. Anal. Prev.* **2010**, *42*, 1498–1506. [CrossRef]
12. Ashraf, T.; Danish, A.S. The Impact of Employee Engagement on Employee Retention: The Role of Psychological Capital, Control at Work, General Well-Being, and Job Satisfaction. Control at Work, General Well-Being, and Job Satisfaction. *Hum. Resource Res.* **2020**, *4*, 67. [CrossRef]
13. Scharf, T.; Charlie, V.; Pamela, K.; Lisa, S.; Kathleen, K.; Bill, W.; Lynn, R.; Henry, C. Toward a Typology of Dynamic and Hazardous Work Environments. *Hum. Ecol. Risk Assess.* **2001**, *7*, 1827–1841. [CrossRef]
14. Cupido, G. The Role of Production and Teamwork Practices in Construction Safety: A Cognitive Model and an Empirical Case Study. *J. Saf. Res.* **2009**, *40*, 265–275.
15. He, C.; Jia, G.; McCabe, B.; Chen, Y.; Sun, J. Impact of psychological capital on construction worker safety behavior: Communication competence as a mediator. *J. Saf. Res.* **2019**, *71*, 231–241. [CrossRef]
16. Trinh, M.T.; Feng, Y. Improving Construction Safety Performance through Error Management: A Literature Review. In *Proceedings of the 21st International Symposium on Advancement of Construction Management and Real Estate*; Springer: Singapore, 2018.
17. Ernst Kossek, E.; Cynthia, O. Work–Family Conflict, Policies, and the Job–Life Satisfaction Relationship: A Review and Directions for Organizational Behavior–Human Resources Research. *J. Appl. Psychol.* **1998**, *83*, 139. [CrossRef]
18. Javed, B.; Jalees, T.; Herani, G.M.; Rolle, J.-A.; Kiet, K.P. M moderated mediation model linking error management culture to organizational performance. *J. Bus. Retail Manag. Res.* **2020**, *11*, 159–170. [CrossRef]
19. Pan, X.; Xianyou, P.; Malin, S.; Ranran, G. The Influence of Green Supply Chain Management on Manufacturing Enterprise Performance: Moderating Effect of Collaborative Communication. *Prod. Plan. Control* **2020**, *31*, 245–258. [CrossRef]
20. Ullah, F. Smart Tech 4.0 in the Built Environment: Applications of Disruptive Digital Technologies in Smart Cities, Construction, and Real Estate. *Buildings* **2022**, *12*, 1516. [CrossRef]
21. Anuka, B.E. *Pressure for Health Service Delivery and Employee Safety Behaviour among Ghanaian Health Workers*; University of Ghana: Accra, Ghana, 2016.
22. Goleman, D. *Leadership: The Power of Emotional Intelligence*; More Than Sound LLC: Washington, DC, USA, 2021.
23. Frese, M.; Keith, N. Action errors, error management, and learning in organizations. *Annu. Rev. Psychol.* **2015**, *66*, 661–687. [CrossRef]
24. Reason, J. *Managing the Risks of Organizational Accidents*; Routledge: Abingdon, UK, 2016.
25. Tariq, A.; Ali, B.; Ullah, F.; Alqahtani, F.K. Reducing Falls from Heights through BIM: A Dedicated System for Visualizing Safety Standards. *Buildings* **2023**, *13*, 671. [CrossRef]
26. Maqsoom, A.; Zahoor, I.; Ashraf, H.; Ullah, F.; Alsulami, B.T.; Salman, A.; Alqurashi, M. Nexus between Leader–Member Exchange, Paternalistic Leadership, and Creative Behavior in the Construction Industry. *Sustainability* **2022**, *14*, 7211. [CrossRef]
27. Jha, S. Team Psychological Safety and Team Performance. *Int. J. Organ. Anal.* **2019**, *27*, 903–924. [CrossRef]
28. Casey, T. Development and Evaluation of an Industry Safety Leadership Toolkit. Ph.D. Thesis, The University of Queensland, St Lucia, QLD, Australia, 2020.
29. Lingard, H.; Zhang, R.P.; Oswald, D. Effect of leadership and communication practices on the safety climate and behaviour of construction workgroups. *Eng. Constr. Arch. Manag.* **2019**, *26*, 886–906. [CrossRef]
30. Luthans, F.; Carolyn, M.Y.; Bruce, J.A. *Psychological Capital: Developing the Human Competitive Edge*; Oxford University Press: Oxford, UK, 2007.
31. Walumbwa, F.O.; Suzanne, J.P.; Bruce, J.A.; Chad, A.H. An Investigation of the Relationships among Leader and Follower Psychological Capital, Service Climate, and Job Performance. *Pers. Psychol.* **2010**, *63*, 937–963. [CrossRef]
32. Ren, H.; Wen, Z.; Chen, Q.; Ye, B. The Impact Mechanism of Work Team Leaders' Psychological Capital on Followers' Organizational Citizenship Behavior: A Multilevel Model. *Acta Psychol. Sin.* **2013**, *45*, 82–93. [CrossRef]

33. Avey, J.B.; Rebecca, J.R.; Fred, L.; Ketan, H.M. Meta-Analysis of the Impact of Positive Psychological Capital on Employee Attitudes, Behaviors, and Performance. *Hum. Resour. Dev. Q.* **2011**, *22*, 127–152. [CrossRef]
34. Bandura, A. Social Learning Theory Bandura Social Learning Theory. Learning Theories. 1977.
35. René, V.W. The manifestation of familiness resources and psychological capital as familiness capital: A conceptual analysis. *Int. Bus. Econ. Res. J.* **2013**, *12*, 1021–1040.
36. Balogun, T.V. An Intergrated Model of the Role of Authentic Leadership, Psychological Capital, Psychological Climate and Intention to Quit on Employee Work Engagement: A Comparative Analysis. Ph.D. Thesis, University of the Western Cape, Cape Town, South Africa, 2017.
37. Ganster, D.C. Measurement challenges for studying work-related stressors and strains. *Hum. Resour. Manag. Rev.* **2008**, *18*, 259–270. [CrossRef]
38. Branson, V. The Adolescent Distress-Eustress Scale: Designing, Evaluating, and Utilising a Holistic Measure of Adolescent Stress. Ph.D. Thesis, University of Adelaide, School of Psychology, Adelaide, Australia, 2019.
39. Bowen, P.; Edwards, P.; Lingard, H. Workplace stress among construction professionals in South Africa. *Eng. Constr. Arch. Manag.* **2013**, *20*, 620–635. [CrossRef]
40. Hanson, P. *The Influence of Percieved Organisational Learning, Employees' Creativity and the Moderating Role of Psychosocial Factors on Quality of Work Life of Employees in Selected Ghanaian Organisations*; University of Ghana: Accra, Ghana, 2014.
41. Gander, P.; Hartley, L.; Powell, D.; Cabon, P.; Hitchcock, E.; Mills, A.; Popkin, S. Fatigue risk management: Organizational factors at the regulatory and industry/company level. *Accid. Anal. Prev.* **2011**, *43*, 573–590. [CrossRef] [PubMed]
42. Zerguine, H.; Tamrin SB, M.; Jalaludin, J. Prevalence, Source and Severity of Work-Related Injuries among "Foreign" Construction Workers in a Large Malaysian Organisation: A Cross-Sectional Study. *Ind. Health* **2018**, *56*, 264–273. [CrossRef]
43. Khadim, N.; Thaheem, M.J.; Ullah, F.; Mahmood, M.N. Quantifying the cost of quality in construction projects: An insight into the base of the iceberg. *Qual. Quant.* **2023**, 1–27. [CrossRef]
44. Wong, I.L.K.; Lam, P.S. Work stress and problem gambling among Chinese casino employees in Macau. *Asian J. Gambl. Issues Public Health* **2013**, *3*, 7. [CrossRef]
45. Arshad, M.A.; Muhammad, T.M.; Ghazala, A. Effects of Performance Appraisal Politics on Job Satisfaction, Turnover Intention and Loyalty to Supervisor: Study with Reference to the Telecom Organizations of Pakistan. *Int. Rev. Manag. Bus. Res.* **2013**, *3*, 653.
46. Thorp, J.M. Employee Well-Being of Followers of Novice Leaders in the Financial Service Industry: A Phenomenological Study. Doctoral Dissertation, Northcentral University, Scottsdale, AZ, USA, 2020.
47. Edwards, J.R.; Caplan, R.D.; Van Harrison, R. Person-Environment Fit Theory. *Theor. Organ. Stress* **1998**, *98*, 67–94.
48. Vansteenkiste, M.; Christopher, P.N.; Bart, S. The Development of the Five Mini-Theories of Self-Determination Theory: An Historical Overview, Emerging Trends, and Future Directions. In *The Decade Ahead: Theoretical Perspectives on Motivation and Achievement*; Emerald Group Publishing Limited: Bingley, UK, 2010.
49. Lewig, K.A.; Dollard, M.F. Emotional dissonance, emotional exhaustion and job satisfaction in call centre workers. *Eur. J. Work. Organ. Psychol.* **2003**, *12*, 366–392. [CrossRef]
50. Häusser, J.A.; Mojzisch, A.; Schulz-Hardt, S. Endocrinological and psychological responses to job stressors: An experimental test of the Job Demand–Control Model. *Psychoneuroendocrinology* **2011**, *36*, 1021–1031. [CrossRef]
51. Maina, G.; Bovenzi, M.; Palmas, A.; Filon, F.L. Associations between two job stress models and measures of salivary cortisol. *Int. Arch. Occup. Environ. Health* **2009**, *82*, 1141–1150. [CrossRef]
52. Cox, T.; Mackay, C.J. A Psychological Model of Occupational Stress. *Relaz. Al Med. Counc.* **1976**.
53. Fisher, G.G.; Chacon, M.; Chaffee, D.S. Theories of Cognitive Aging and Work. In *Work across the Lifespan*; Elsevier: Amsterdam, The Netherlands, 2019; Volume 17–45.
54. Edwards, J.R.; Rothbard, N.P. Work and Family Stress and Well-Being: An Examination of Person-Environment Fit in the Work and Family Domains. *Organ. Behav. Hum. Decis. Process.* **1999**, *77*, 85–129. [CrossRef]
55. Byers, J.F.; Smyth, K.A. Application of a Transactional Model of Stress and Coping with Critically Ill Patients. *Dimens. Crit. Care Nurs. DCCN* **1997**, *16*, 292–300. [CrossRef]
56. Farrastama, D.N.; Thatok, A.; Hermanto, H. Effect of Emotional Intelligence on Counterproductive Work Behavior with Job Stress as an Intervening Variable: Study on Civil Servants in Mataram City. *Int. J. Soc. Sci. Humanit.* **2019**, *3*, 14–25.
57. Karimireddy, S.P.; Quentin, R.; Sebastian, S.; Martin, J. Error Feedback Fixes Signsgd and Other Gradient Compression Schemes. Presented at the International Conference on Machine Learning, New York, NY, USA, 18 September 2019.
58. Krause, N.; Richard, J.B.; Onyebuchi, A.A.; Jussi, K. Occupational Physical Activity and 20-Year Incidence of Acute Myocardial Infarction: Results from the Kuopio Ischemic Heart Disease Risk Factor Study. *Scand. J. Work. Environ. Health* **2015**, *41*, 124–139. [CrossRef] [PubMed]
59. Kim, K.W.; Park, S.J.; Lim, H.S.; Cho, H.H. Safety Climate and Occupational Stress According to Occupational Accidents Experience and Employment Type in Shipbuilding Industry of Korea. *Saf. Health Work.* **2017**, *8*, 290–295. [CrossRef]
60. Flores, W.R.; Egil, A.; Mathias, E. Information Security Knowledge Sharing in Organizations: Investigating the Effect of Behavioral Information Security Governance and National Culture. *Comput. Secur.* **2014**, *43*, 90–110. [CrossRef]
61. Chadwick, C.; Way, S.A.; Kerr, G.; Thacker, J.W. Boundary Conditions of the High-Investment Human Resource Systems-Small-Firm Labor Productivity Relationship. *Pers. Psychol.* **2012**, *66*, 311–343. [CrossRef]

62. Srivastava, U.R.; Maurya, V. Organizational and Individual Level Antecedents of Psychological Capital and its Associated Outcomes: Development of a Conceptual Framework. *Manag. Labour Stud.* **2017**, *42*, 205–236. [CrossRef]
63. Pillay, K.; Buitendach, J.H.; Kanengoni, H. Psychological capital, job demands and organisational commitment of employees in a call centre in Durban, South Africa. *SA J. Hum. Resour. Manag.* **2014**, *14*, 13. [CrossRef]
64. Haider, S.; Qasim, A.N.; Faizan, B.; Muhammaz, A. Dark Side of Leadership: Employees' Job Stress & Deviant Behaviors in Pharmaceutical Industry. *Int. J. Pharm. Res. Allied Sci.* **2018**, *7*, 2.
65. Wu, C.M.; Chen, T.C. Collective Psychological Capital: Linking Shared Leadership, Organizational Commitment, and Creativity. *Int. J. Hosp. Manag.* **2018**, *74*, 75–84. [CrossRef]
66. Kwok, S.Y.C.L.; Cheng, L.; Wong, D.F.K. Family Emotional Support, Positive Psychological Capital and Job Satisfaction among Chinese White-Collar Workers. *J. Happiness Stud.* **2014**, *16*, 561–582. [CrossRef]
67. Alessandri, G.; Chiara, C.; Fred, L.; Laura, B. Testing a Dynamic Model of the Impact of Psychological Capital on Work Engagement and Job Performance. *Career Dev. Int.* **2018**, *23*, 33–47. [CrossRef]
68. Jung, H.S.; Hye, H.Y. The Impact of Employees' Positive Psychological Capital on Job Satisfaction and Organizational Citizenship Behaviors in the Hotel. *Int. J. Contemp. Hosp. Manag.* **2015**, *27*, 1135–1156. [CrossRef]
69. Hur, W.-M.; Han, S.-J.; Yoo, J.-J.; Moon, T.W. The moderating role of perceived organizational support on the relationship between emotional labor and job-related outcomes. *Manag. Decis.* **2015**, *53*, 605–624. [CrossRef]
70. Cohen, J. A Power Primer. *Psychol. Bull.* **1992**, *112*, 155–159. [CrossRef]
71. Hair, J.F.; Tomas M Hult, G.; Christian, M.R.; Marko, S. *A Primer on Partial Least Squares Structural Equation Modeling (Pls-Sem)*, 2nd ed.; SAGE Publications, Inc.: Los Angeles, CA, USA, 2017.
72. Lowry, P.B.; Gaskin, J. Partial Least Squares (PLS) Structural Equation Modeling (SEM) for Building and Testing Behavioral Causal Theory: When to Choose It and How to Use It. *IEEE Trans. Dependable Secur. Comput.* **2014**, *57*, 123–146. [CrossRef]
73. Gefen, D.; Straub, D.; Boudreau, M.-C. Structural equation modeling and regression: Guidelines for research practice. *Commun. Assoc. Inf. Syst.* **2000**, *4*, 1–70. [CrossRef]
74. Urbach, N.; Frederik, A. Structural Equation Modeling in Information Systems Research Using Partial Least Squares. *J. Inf. Technol. Theory Appl.* **2010**, *11*, 5–40.
75. Daly, A.; Hess, S.; Patruni, B.; Potoglou, D.; Rohr, C. Using ordered attitudinal indicators in a latent variable choice model: A study of the impact of security on rail travel behaviour. *Transportation* **2011**, *39*, 267–297. [CrossRef]
76. MacKinnon, D.P.; Coxe, S.; Baraldi, A.N. Guidelines for the Investigation of Mediating Variables in Business Research. *J. Bus. Psychol.* **2011**, *27*, 1–14. [CrossRef]
77. Henseler, J.; Christian, M.R.; Marko, S. A New Criterion for Assessing Discriminant Validity in Variance-Based Structural Equation Modeling. *J. Acad. Mark. Sci.* **2015**, *43*, 115–135. [CrossRef]
78. Pecora, P.J.; David, C.; Emily, B. *Strategic Supervision: A Brief Guide for Managing Social Service Organizations*; Sage: Newcastle upon Tyne, UK, 2010.
79. Heo, M.; Namhee, K.; Myles, S.F. Statistical Power as a Function of Cronbach Alpha of Instrument Questionnaire Items. *BMC Med. Res. Methodol.* **2015**, *15*, 86. [CrossRef] [PubMed]
80. Temme, D.; Marcel, P.; Till, D. Incorporating Latent Variables into Discrete Choice Models—A Simultaneous Estimation Approach Using Sem Software. *Bus. Res.* **2008**, *1*, 220–237. [CrossRef]
81. Roldán, J.L.; Leal-Rodríguez, A.L.; Leal, A.G. The influence of organisational culture on the Total Quality Management programme performance. *Investig. Eur. De Dir. Y Econ. De La Empresa* **2012**, *18*, 183–189. [CrossRef]
82. Barati, M.; Taheri-Kharameh, Z.; Farghadani, Z.; Rásky, É. Validity and Reliability Evaluation of the Persian Version of the Heart Failure-Specific Health Literacy Scale. *Int. J. Community Based Nurs. Midwifery* **2019**, *7*, 222–230. [PubMed]
83. Teo, T.; Liang, T.T.; Chih-Chien, Y. Applying Structural Equation Modeling (Sem) in Educational Research: An Introduction. In *Application of Structural Equation Modeling in Educational Research and Practice*; Brill Sense: Paderborn, Germany, 2013; pp. 1–21.
84. Thirupathi, R.; Vinodh, S. Application of interpretive structural modelling and structural equation modelling for analysis of sustainable manufacturing factors in Indian automotive component sector. *Int. J. Prod. Res.* **2016**, *54*, 6661–6682. [CrossRef]
85. Chun-Che, H.; Wang, Y.; Wu, T.; Wang, P. An Empirical Analysis of the Antecedents and Performance Consequences of Using the Moodle Platform. *Int. J. Inf. Educ. Technol.* **2013**, *3*, 217.
86. Tehseen, S.; Farhad Uddin, A.; Zuhaib, H.Q.; Mohammad, J.U.; Ramayah, H. Entrepreneurial Competencies and Smes' Growth: The Mediating Role of Network Competence. *Asia-Pac. J. Bus. Adm.* **2019**, *11*, 1. [CrossRef]
87. Schilke, O.; Hu, S.; Helfat, C.E. Quo Vadis, Dynamic Capabilities? A Content-Analytic Review of the Current State of Knowledge and Recommendations for Future Research. *Acad. Manag. Ann.* **2018**, *12*, 390–439. [CrossRef]
88. Fong, V. *The Role of Organizational Culture and Commitment on Job Embeddedness and Stay Intention in Hong Kong*; London South Bank University: London, UK, 2017.
89. Iacobucci, D.; Saldanha, N.; Deng, X. A Meditation on Mediation: Evidence That Structural Equations Models Perform Better Than Regressions. *J. Consum. Psychol.* **2007**, *17*, 139–153. [CrossRef]
90. Hair, J.; Hollingsworth, C.L.; Randolph, A.B.; Chong, A.Y.L. An updated and expanded assessment of PLS-SEM in information systems research. *Ind. Manag. Data Syst.* **2017**, *117*, 442–458. [CrossRef]

91. Kim, M.; Kim, A.C.H.; Newman, J.I.; Ferris, G.R.; Perrewé, P.L. The antecedents and consequences of positive organizational behavior: The role of psychological capital for promoting employee well-being in sport organizations. *Sport Manag. Rev.* **2019**, *22*, 108–125. [CrossRef]
92. Berry, M.L. Predicting Turnover Intent: Examining the Effects of Employee Engagement, Compensation Fairness, Job Satisfaction, and Age. Ph.D. Dissertation, University of Tennessee, Knoxville, TN, USA, 2010.
93. Kim, H.J.; Hur, W.-M.; Moon, T.-W.; Jun, J.-K. Is all support equal? The moderating effects of supervisor, coworker, and organizational support on the link between emotional labor and job performance. *BRQ Bus. Res. Q.* **2017**, *20*, 124–136. [CrossRef]
94. Bergheim, K.; Eid, J.; Hystad, S.W.; Nielsen, M.B.; Mearns, K.; Larsson, G.; Luthans, B. The Role of Psychological Capital in Perception of Safety Climate among Air Traffic Controllers. *J. Leadersh. Organ. Stud.* **2013**, *20*, 232–241. [CrossRef]
95. Walumbwa, F.O.; Luthans, F.; Avey, J.B.; Oke, A. *Retracted*: Authentically leading groups: The mediating role of collective psychological capital and trust. *J. Organ. Behav.* **2009**, *32*, 4–24. [CrossRef]
96. Carrión, G.; Christian, N.; José, L.R. Mediation Analyses in Partial Least Squares Structural Equation Modeling: Guidelines and Empirical Examples. In *Partial Least Squares Path Modeling*; Springer: Cham, Switzerland, 2017; pp. 173–195.
97. Luthans, F.; Norman, S.M.; Avolio, B.J.; Avey, J.B. The mediating role of psychological capital in the supportive organizational climate—Employee performance relationship. *J. Organ. Behav.* **2008**, *29*, 219–238. [CrossRef]
98. Van Dyck, C.; Michael, F.; Markus, B.; Sabine, S. Organizational Error Management Culture and Its Impact on Performance: A Two-Study Replication. *J. Appl. Psychol.* **2005**, *90*, 1228. [CrossRef]
99. Hayes, B.E.; Perander, J.; Smecko, T.; Trask, J. Measuring Perceptions of Workplace Safety: Development and Validation of the Work Safety Scale. *J. Saf. Res.* **1998**, *29*, 145–161. [CrossRef]
100. Zohar, D.; Luria, G. A Multilevel Model of Safety Climate: Cross-Level Relationships between Organization and Group-Level Climates. *J. Appl. Psychol.* **2005**, *90*, 616–628. [CrossRef]
101. Carthey, J.; de Leval, M.R.; Reason, J.T. Institutional resilience in healthcare systems. *BMJ Qual. Saf.* **2001**, *10*, 29–32. [CrossRef]
102. Dedobbeleer, N.; Béland, F. A safety climate measure for construction sites. *J. Saf. Res.* **1991**, *22*, 97–103. [CrossRef]
103. Glendon, A.; Litherland, D. Safety climate factors, group differences and safety behaviour in road construction. *Saf. Sci.* **2001**, *39*, 157–188. [CrossRef]
104. Ostrom, L.; Wilhelmsen, C.; Kaplan, B. Assessing Safety Culture. *Nucl. Saf.* **1993**, *34*, 163–172.
105. Ferreira, P.P. Resilience in the Planning of Rail Engineering Work. Ph.D. Dissertation, University of Nottingham, Nottingham, UK, 2011.
106. Cox, S.; Cheyne, A. Assessing safety culture in offshore environments. *Saf. Sci.* **2000**, *34*, 111–129. [CrossRef]
107. Parker, D.F.; Thomas, A.D. Organizational Determinants of Job Stress. *Organ. Behav. Hum. Perform.* **1983**, *32*, 160–177. [CrossRef]