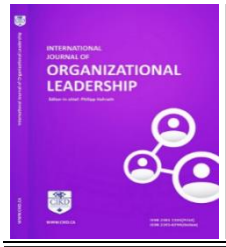

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Is Training and Development a Leading Catalyst to Foster Creativity for Sustainability and Survival of Software Houses?

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ABSTRACT

This research explores Training and Development (T&D) effects on employee creativity and employee performance with the mediating influence of Intrinsic Motivation (IM) among professional employees of different software houses situated in the Federal Capital Territory (FCT) Islamabad and the Rawalpindi district of Punjab, Pakistan. Software houses were focused on data collection using self-administered questionnaires to obtain responses from professional software engineers. The proposed research model was tested by analyzing data from 424 respondents through AMOS while applying structural equation modeling. The research results show that T&D has a direct positive effect on both employee performance and creativity. Similarly, T&D initiatives lead to enhanced performance and creativity of employees, but IM partially mediates these relationships. The present research emphasizes how T&D techniques perform better when combined with IM for generating employee creativity and performance improvements. This research establishes theoretical and practical benefits to different organizations, but particularly software companies. Moreover, it demonstrates how motivation and skill development act together based on the self-determination theory to define organizational success. The success of employee creativity and performance depends upon both growth opportunities and employee empowerment systems. In addition to this, the study extends the self-determination theory in the context of T&D, employee creativity, and IM by providing several practical implications for the enhancement of organizational performance. Furthermore, it was a cross-sectional study and limited to FCT Islamabad and Rawalpindi territory, including twin metropolitan cities.

The software industry has rapidly grown worldwide, earning global recognition for its technological expertise. As the sector continues to evolve, fostering innovation and creativity has become a critical need for software firms. Amid intense competition, these organizations must nurture environments that enhance employee creativity to stay ahead in technological advancements and adapt to dynamic market trends (Shafique et al., 2020; Wang et al., 2024). Employee creativity is vital for innovation, organizational performance, and long-term success, making it a key area of focus in achieving competitive advantages (Ellitan, 2021). However, these programs alone are insufficient. Intrinsic Motivation (IM) is essential for employees to engage with tasks, apply learned skills, and produce innovative solutions (Aldabbas et al., 2023). Effective Training and Development (T&D) strategies provide skills to employees that they require, but they also boost their confidence and motivation. Consequently, this directly affects both individual and group performance. Training programs that support organizational goals can improve productivity, creativity, and flexibility in response to changing conditions. It has been discovered that organizations that place a greater emphasis on encouraging employees' creativity are more competitive than others (Karimi et al., 2022). It appears that researchers are currently more interested in figuring out how to implement high-job performance methods than they are in figuring out how to increase people's creativity at work. Process innovation enables the business to identify its offering from that of its competitors and change its organizational design to exceed it (Chahar et al., 2019).

In the fast-evolving software industry, creativity is essential for competitive advantage, making T&D critical tools for fostering innovation. However, their success depends on more than just skill acquisition (Fishbach & Woolley, 2022). IM, shaped by fulfilling psychological needs like autonomy, competence, and relatedness, plays a pivotal role in enhancing creativity (Vallerand, 2000). Training programs receive limited research attention regarding their ability to boost IM, especially in software houses (Yesuf et al., 2023). This research concentrates on software houses located in Rawalpindi because their employees confront intense innovation demands. The absence of proper psychological assistance allows work stress to turn into burnout (Sahibzada Jawad et al., 2020). Creative performance involves generating novel and actionable ideas, requiring employees to take risks, challenge norms, and employ problem-solving skills (Mutonyi et al., 2020). T&D programs are essential for employees to enhance the skills and knowledge needed to encourage creativity and uncover solutions for problems (Laing, 2009). Employee training is a learning experience designed to help employees modify their conduct in a way that will increase their creativity and productivity (Judith & Ramos, 2022).

Effective training also boosts employee competence and engagement, which improves overall performance. Businesses that invest in such initiatives gain competitive advantages by increasing organizational capability and creativity (Fauziah et al., 2024). The global market is evolving, and innovative practices are vital to distinguish solutions and maintain advancement. Researchers are increasingly acknowledging the importance of creativity for organizational survival and creativity, especially in sectors that emphasize diversity and evolution (Morris et al., 2023). The analysis evaluates IM as a variable that links training to employee creativity with implications for performance outcomes. The study examines a fundamental blind spot that distinguishes the variations between fundamental skills training and technical training on creativity based on specific industrial settings (Yesuf et al., 2023). The study applies Self-

Determination Theory (SDT) to demonstrate that meeting psychological needs results in heightened IM, which drives creativity and performance according to (Ghosh, 2015). The research study examines the software sector in Rawalpindi by providing localized insights that can help similar settings to develop creative strategies for handling specific industry challenges. The research solves an essential knowledge gap that merges practical and theoretical models to boost the software industry's creativity and productivity. The study provides operative guidelines that help software organizations create training systems to boost relatedness and competence alongside autonomy to achieve greater creativity and organizational performance. Managers should utilize these discoveries for training program alignment to reach organizational objectives thus securing long-term growth.

Literature Review and Hypotheses Development

Theoretical Background

Self-Determination Theory (SDT) addresses human motivation and personality through its foundation built in the 1980s by Edward Deci and Richard Ryan through the concepts of autonomy and competence, and relatedness. The satisfaction of these necessities constitutes an essential foundation for health and mental growth, together with peak operational results. The ability to decide freely is known as autonomy, while competence relates to effective and well-executed ability, and connectedness expresses deep relationships with others. People achieve IM and pursue activities for their fulfillment (Gil-Arias et al., 2021). According to SDT, when employees perceive competence, autonomy, and relatedness, they become intrinsically motivated (Muzafary et al., 2021). Programs for training that correspond to these psychological needs can greatly increase IM, which in turn promotes creativity. Employees who are intrinsically motivated are more likely to approach tasks with zeal and consider creative solutions (Zhang & Bartol, 2010). SDT provides organizations with a method to motivate creativity development through training processes. IM is increased by programs that are related (teamwork), competent (tasks that match skills), and autonomous (self-directed learning paths). Driven by personal passion and fulfillment, intrinsically motivated employees proactively address challenges and creative thinking (Zhang & Bartol, 2010). SDT also emphasizes how IM mediates the link between creativity and training. Particularly in fast-paced fields like software development, training that meets psychological demands increases IM and improves creativity (Fauziah et al., 2024). Additionally, as dedication and engagement result in increased creativity and efficiency, genuinely motivated employees typically perform better. Therefore, SDT provides insightful information for creating training programs that have an impact and improve performance and creativity (Jeong et al., 2017).

Training and Development and Employee Creativity

Organizational training programs are vital for encouraging employees' creativity and innovation (Hidayat & Muh. Abdul Aziz, 2022). Employees can solve contemporary issues and come up with novel ideas that benefit their companies by learning novel techniques (Maulana & Wijanarko, 2023). Employees who receive training, including technical, interpersonal, and experiential learning, are better equipped to complete jobs efficiently and effectively. Poor performance is frequently the result of inadequate training, highlighting the significance of ongoing training for skill development (Nawaz et al., 2014). According to (Jerez Gómez et al.,

2004), training is an essential human resource management strategy that contributes significantly to organizational transformation and skill development at the person, group, and organizational levels. Although the implications of training on creativity have not received enough attention, combining research from a variety of disciplines, including human relations, creativity psychology, and innovation management, shows that training can foster radical innovation on a psychological, social, and personal level (Chahar et al., 2019). Employees are encouraged to create and actively participate in idea development, problem-solving, and idea commercialization by effective training programs that promote IM (Stevenson et al., 2014). Programs that foster creativity, including those built around the Creative Problem Solving (CPS) paradigm, encourage brain functions that are critical to creativity, such as problem identification, information retrieval, and solution development (Puccio et al., 2020). Organizations can promote collaboration, creativity, and synergy by emphasizing the development of both technical and interpersonal skills (Shalley & Gilson, 2017). Thus, ongoing learning and carefully thought-out training initiatives foster innovation, creativity, and a competitive edge. Therefore, based on the above literature, the following hypothesis was proposed:

H1: T&D has a significant positive relationship with employee creativity.

Training and Development and Employee Performance

Enhancing staff performance and organizational effectiveness requires T&D. Successful training improves abilities, increases motivation, and acquaints employees with new technology (Asfaw et al., 2015). Clear performance standards must be established by managers in order to encourage ongoing development. According to research, personnel who have received training outperform those who have not, which helps the organization succeed (Noe & Schmitt, 1986). Businesses that treat their people as important human capital see increased productivity and a competitive edge as a result of their investments in their development (Kanapathipillai & Azam, 2020). Gaining new skills and feeling appreciated by their employers through evident support for professional development is essential for employees' adaptability and efficacy in their employment (Bhakuni & Saxena, 2023). T&D programs, as organized HRM activities, offer workers the skills and abilities they need to work efficiently (Noe & Schmitt, 1986). Productivity is positively impacted by both on- and off-the-job training, with off-the-job training frequently producing higher results because of focused learning. Training improves organizational effectiveness by enhancing the relationship between job satisfaction, commitment, performance, and training. Insufficient training, however, might result in conflict, dissatisfaction and decreased output (Ugbomhe et al., 2016). Training that emphasizes decision-making, teamwork, and problem-solving abilities increases employee productivity on an individual basis and successfully aligns workers with organizational goals (Jeni et al., 2021). Training is, therefore, an essential tool for both organizational and individual development. So, based on the above literature, the following hypothesis was proposed:

H2: T&D has a significant positive relationship with employee performance.

Training and Development and Intrinsic Motivation

Training effectiveness is significantly impacted by the relationships among IM, motivation to learn, and motivation to transfer (Chung et al., 2022). With situational aspects like management support becoming more and more important, modern training places an emphasis on learner control, enabling employees to match skill development with individual objectives (Venketsamy & Lew, 2024). According to Chahar et al. (2019) and Maulana and Wijanarko (2023), intrinsically motivated employees are more self-driven, acquire expertise, and make good use of training to improve their and their teammates' performance. Perceived training possibilities and high IM boost performance and creativity, but they can reduce employee satisfaction due to the lack of training chances (Kuvaas et al., 2017). Comprehensive training focusing on developing one's skills and personality greatly increases IM, which in turn improves performance and job satisfaction (Oh et al., 2023). Training that is in line with employees' goals and interests promotes meaningful work and meets their demand for control and expertise (Loon & Casimir, 2008). Addressing psychological demands for relatedness, feedback, and acknowledgement during training sessions increases IM (Park & Kang, 2016). Performance and IM are further enhanced by e-learning technologies that are modified to each learner's preferences and pace of training (Barboza, 2023). Training programs that are well structured are essential for increasing employee engagement, improving organizational performance, and cultivating IM (Aljumah, 2023). Consequently, based on the above literature following hypothesis was proposed:

H3: T&D has a significant positive relationship with IM.

Intrinsic Motivation and Employee Creativity

Studies highlight the strong relationship between creativity and IM. Putra et al. (2017) emphasized the impact of social and environmental elements on employees' creativity and characterized IM as originating from the intrinsic advantages of tasks. This perspective is broadened by the SDT (Vallerand, 2000), which defines IM as the result of doing work that is both joyful and meaningful. According to SDT, relatedness, competence, and autonomy are basic psychological demands that foster creativity when met (Di Domenico & Ryan, 2017). Curiosity, cognitive flexibility, and openness to nontraditional decision-making are traits of intrinsically motivated people that are essential for creativity (Muzafary et al., 2021). Additionally, they are more likely to exhibit optimistic attitudes, solve problems methodically, and accomplish professional goals. When workers are engaged in their work, they are more creative. However, to maximize IM and creativity, all three psychological requirements must be satisfied (Nili & Tasavori, 2022). Recent research has confirmed the direct and mediating roles of intrinsic drive in creative performance. For instance, it promotes resilience, learning, and problem-solving skills (Chung et al., 2022). By encouraging IM through possibilities for personal development, autonomy, and leadership, organizations can foster creativity (Hirst et al., 2018). These initiatives foster conditions that encourage creativity and participation. Therefore, based on the above literature, the following hypothesis was proposed:

H4: IM has a significant positive relationship with employee creativity.

Intrinsic Motivation and Employee Performance

Employee performance is greatly influenced by IM, which is described as a drive arising from internal desires connected to learning goals (Riyanto et al., 2021). It emerges organically and is determined by individual choices rather than outside influences (Medina Halako Twalib, 2020). Studies demonstrate a significant positive relationship between IM and performance because intrinsically driven employees are more engaged, creative, and efficient (Van den Broeck et al., 2021). On the contrary, poor IM results in decreased productivity and delays in completing projects (Triswanto & Lidia Yunita, 2021). Employees are motivated to take responsibility for their jobs when their aims coincide with those of the company (Andika & Darmanto, 2020). It improves performance and creativity by fostering a sense of competence and autonomy (Di Domenico & Ryan, 2017). Although awards that suggest outstanding performance can encourage competence, performance-contingent benefits might decrease IM if they are viewed as restricting (Lee & Hidayat, 2018). Autonomy, meaningful job environments, and supportive leadership are ways that organizations might improve IM (Fahriana & Sopiah, 2022). Intrinsically satisfied workers are more inclined to go above and beyond the call of duty and take initiative (Kuvaas et al., 2020). This research shows that developing internal interest among employees creates better workplace engagement and enterprise results. Thus, based on the above literature, the following hypothesis was proposed:

H5: IM has a significant positive relationship with employee performance.

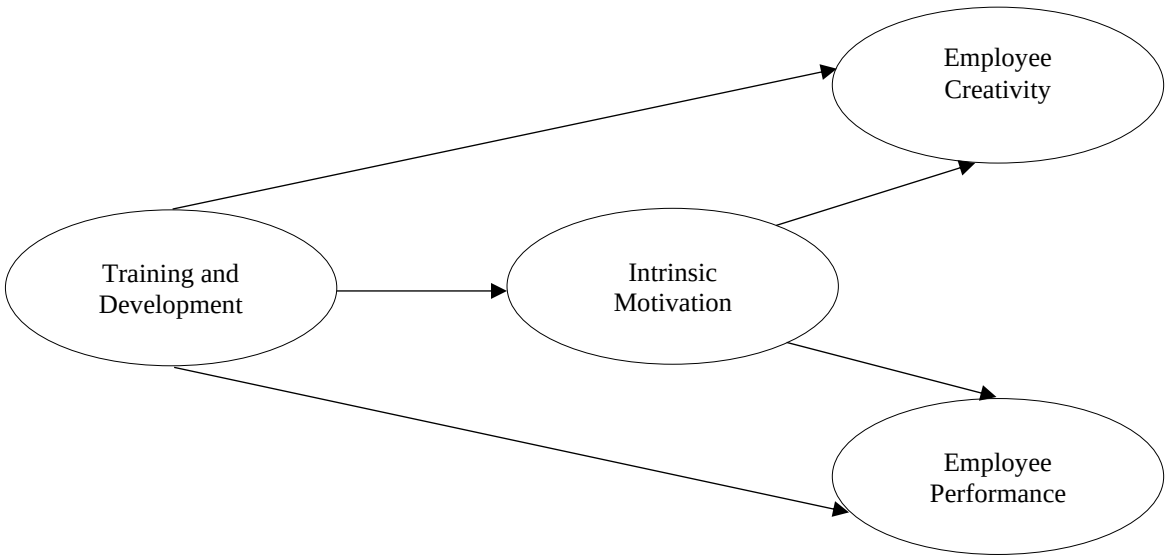
Intrinsic Motivation as a Mediator

The effectiveness of T&D programs improves significantly through IM because it enhances employee creativity alongside performance outcomes (Raza et al., 2023). Employees who demonstrate IM show better dedication and creativity, combined with enhanced competence, when taking advantage of training opportunities to enhance both individual and team performance (Zaheer et al., 2023; Karimi et al., 2022). T&D practices that support individual development and occupational growth enhance employee's internal drive while boosting their professional satisfaction (Di Domenico & Ryan, 2017). Research proves that IM functions as a mediator between T&D and creativity because it simplifies knowledge application to creative outcomes (Zhou & Zhang, 2024). Research indicates that development programs about workforce interests produce higher IM, leading to improved job satisfaction, combined with better skills acquisition and innovative outputs (Hosseini et al., 2022). Studies confirm self-determination theory because autonomy and competence, together with relatedness, control motivational patterns (Ryan & Deci, 2020). IM leads workers to display high creative self-efficacy and work engagement, which generates superior performance outcomes (Udahemuka et al., 2024). The relationship between creativity and training is mediated by IM, which pushes workers to use newly acquired abilities in creative ways (Vallerand, 2000). Empirical research has shown that IM strengthens the relationship between T&D activities and performance and creativity metrics (Lin, 2023) and thus ought to be included in all training curricula. Organizations should focus on T&D program designs that stimulate employee IM if they want to achieve optimal performance and innovation results (Deshpande & Srivastava, 2023). Hence, based on the above literature following hypothesis was proposed:

H6: IM mediates the relationship of T&D with employee creativity.
H7: IM mediates the relationship of T&D with employee performance.

The relationship of various variables is shown in Figure 1.

Figure 1
Research Model



Method

The study was quantitative in nature, and a cross-sectional research design was adopted with a deductive approach. Data was collected through a self-administered questionnaire from software engineers working in software houses located in Federal Capital Territory (FCT) Islamabad and Rawalpindi, Pakistan, through convenient sampling. A sample size of 424 was used for analysis. A five-point Likert scale was used in this study. Four important variables were included in the questionnaire, and each has been evaluated using validated scales from earlier studies. Nine items that were modified from (Boon et al., 2011) were used to evaluate T&D. The sample items that focus on the relationship between perceived T&D and employee retention through work attitudes are "I receive the coaching that supports my development" and "I receive the opportunity to do another job within this organization." Six items from (Dysvik & Kuvaas, 2011) were used to measure IM. The sample items, which highlight the mediating role of IM between job autonomy and employee performance, are "My job is so interesting that it is a motivation in itself" and "The tasks that I do at work are themselves representing that it is motivation in itself." Thirteen items from (Zhou & George, 2001) were used to assess employee creativity. Two sample items are "I come up with new and practical ideas to improve performance" and "Creativity suggests new ways to achieve goals or objectives". Finally, Employee Performance was assessed using 18 items from (Koopmans et al., 2014) and the sample items were ‘I started new tasks myself, when my old ones were finished’ and ‘I worked at keeping my job knowledge up-to-date’, providing a comprehensive measure of individual work performance construct validity. Details of demographic characteristics are presented in Table 1.

Table 1

Demographic Characteristics

Characteristics	Frequency	%
Gender		
Male	238	56.10
Female	186	43.90
Age		
25 years or under	144	34.00
26-35 years	169	39.90
36-45 years	80	18.90
More than 45 years	31	7.30
Qualification		
Graduate/ postgraduate	246	58.00
Undergraduate	178	42.00
Experience		
Less than 5 years	177	41.70
6 to 10 years	146	34.40
11 to 15 years	85	20.00
Above 15 years	16	3.80

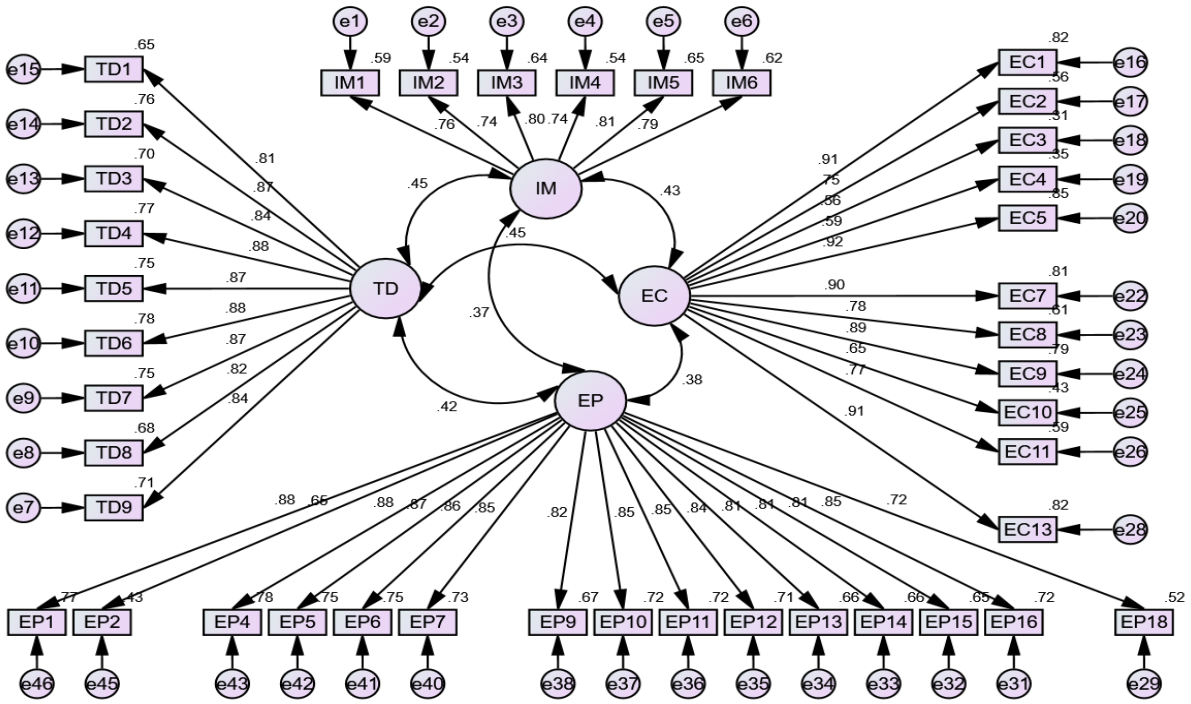
Results

Measurement and Validity

Structural Equation Modeling (SEM) serves as a standard approach to explain variable relations. The analysis involved Confirmatory Factor Analysis (CFA) to verify the measurement model's validity and reliability with factor loadings of items. According to Cua et al. (2001), validity threshold of 0.50 factor loadings served as the basis for item evaluation. Construct validity is considered strong when (Fornell & Larcker, 1981) established that AVE values exceed .50. The factor loadings of EP3, EP8, EP17, EC6 and EC12 were < .50; therefore, these items were excluded from further analysis and deducted from the model displayed in the path diagram in Figure 2.

Figure 2

Path Diagram



Descriptive Statistics, Reliability, and Correlation Analysis

Table 2 presents descriptive data, such as each variable's mean, standard deviation, and correlation. The Standard Deviation (*SD*) represents a range in the data, while the Mean (*M*) numbers show the average responses. In accordance with the findings, employee performance (*M* = 3.72, *SD* = .97), intrinsic motivation (*M* = 3.47, *SD* = .91), and employee creativity (*M* = 3.47, *SD* = .78) were the next highest mean scores, followed by T&D (*M* = 3.63, *SD* = 1.00). The Cronbach's alpha (α) values, which are given in parentheses, were used to evaluate the constructions' reliability. Every construct exhibited great internal consistency (TD = .96, IM = .89, EC = .94, EP = .97) and high dependability, above the suggested criterion of .70 (Holmbeck & Devine, 2009). The results are deemed credible since these coefficients are within the suggested range of .70 to .90 (Hair et al., 2017). At the $p < .001$ level, Pearson correlation analysis showed significant positive connections between all variables. Employee performance ($r = .40$, $p < .001$), employee creativity ($r = .45$, $p < .001$), and intrinsic motivation ($r = .42$, $p < .001$) were all significantly correlated with T&D. Likewise, there was a positive correlation between intrinsic motivation and employee performance ($r = .35$, $p < .001$) and creativity ($r = .41$, $p < .001$). Additionally, there was a substantial correlation between employee performance and creativity ($r = .39$, $p < .001$).

Table 2

Descriptive Statistics, Reliability, and Pearson Correlation Analysis

Variable	*M*	*SD*	TD	IM	EC	EP
TD	3.63	1	(0.96)			
IM	3.47	.91	.42**	(.89)		
EC	3.47	.78	.45**	.41**	(.94)	
EP	3.72	.96	.40**	.35**	.39**	(.97)

Note. n = 424, TD = Training and Development, IM =Intrinsic Motivation, EC = Employee Creativity, and EP = Employee Performance.
**p< .001. Correlation is significant at the .001 level.

Structural Equation Modeling

The model and the efficacy of the proposed relationships between employee performance, IM, T&D, and employee creativity were evaluated using structural equation modeling. The viability of model fitness was assessed using a number of statistical indices, as suggested by Steenkamp & Baumgartner (2000). The Chi-Square to Degrees of Freedom (CMIN/DF) ratio, as indicated in Table 3, was 2.65 for direct effects and 2.42 for indirect effects. These values lie within the acceptable range of 3.0 to 5.0, as recommended by (Bentler & Bonett, 1980) and (Hu & Bentler, 1999). This suggests a model fit that is passably excellent. An effective model fit was demonstrated by the Root Mean Square Error of Approximation (RMSEA), which was .06 for direct effects and .05 for indirect effects. Both values are below the acceptable threshold of .8 (Doll et al., 1994). In terms of GFI and AGFI, the values were .83 and .81 for direct effects and .82 and .80 for indirect effects, respectively. Since AGFI and GFI values above .80 indicate a reasonable fit (Doll et al., 1994), the model meets this criterion. Additionally, the CFI and TLI were .93 and .93 for direct effects and .93 and .92 for indirect effects, respectively.

Table 3

Model Fit Indexes

Indexes of Fit Factor	Direct Effects	Indirect Effects
Chi-square/df	2.651	2.424
AGFI	.816	.805
TLI	.932	.928
RMSEA	.062	.058
GFI	.837	.825
CFI	.937	.932
NFI	.902	.900

Direct Effects

The direct impacts of T&D on employee creativity and employee performance were investigated in this study using structural equation modeling (SEM), taking into account the mediating function of IM. T&D had substantial effects on employee creativity (β = .45, p < .001) and employee performance (β = .42, p < .001), according to the results shown in Figure 3 and Table 4. These results support the validity of H1 and H2, showing that employee performance and creativity are significantly influenced by T&D. The results are consistent with earlier studies that highlight the beneficial effects of training on employee performance and creativity. Workers are more likely to improve their overall productivity and creative talents when they have access to structured T&D opportunities (Noe & Schmitt, 1986). The importance of these relationships is further supported by the Critical Ratio (CR) values of 9.49 for TD → EC and 8.16 for TD → EP, since CR values greater than 1.96 signify strong statistical significance (Hikmah, 2024). Additionally, the Variance Inflation Factor (VIF) values of 1.21 and multi-collinearity tolerance values of .82 presented in Table 4 attest to the model's robustness by confirming the lack of multi-collinearity issues (Tabri & Elliott, 2012).

Figure 3

Direct Effects without Mediator

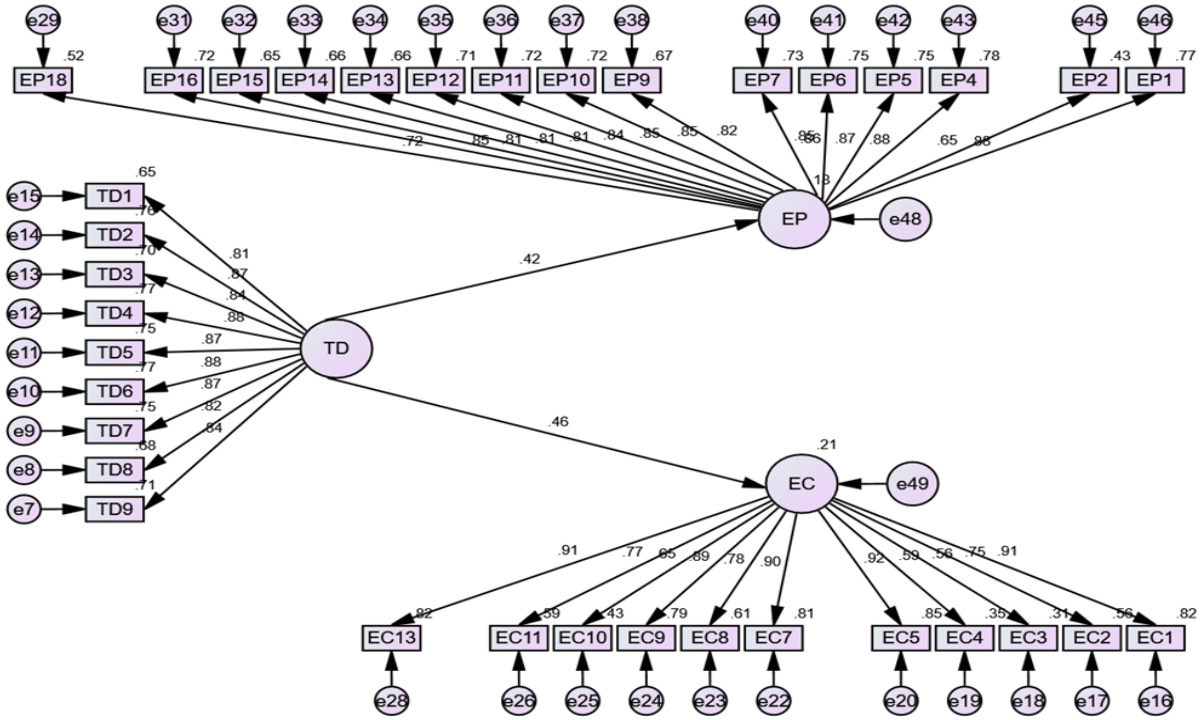


Table 4

Direct Effects

Relationship	β	SE	CR	p	Hypothesis support	Multi-collinearity tolerance	Diagnostic VIF
TD → EC	.45	.04	9.49	.000	H1supported	.82	1.21
TD → EP	.42	.04	8.16	.000	H2 supported	.82	1.21

Note. TD = Training and Development, IM = Intrinsic Motivation, EC = Employee Creativity and EP = Employee Performance

Indirect Effects

Furthermore, as seen in Figure 4 and Table 5, T&D significantly impact IM (β = .44, p < .001), validating H3. According to additional studies, structured training programs enhance employees' IM, which in turn enhances their performance and creativity (Abd-El-Salam et al., 2013). Furthermore, the positive impacts of IM on employee performance (β = .23, p < .001) and creativity (β = .28, p < .001) validate H4 and H5. These findings support studies that demonstrate that highly motivated employees are more likely to be creative and productive (Reddy et al., 2013). If employees find their work to be intrinsically rewarding, they are more likely to address challenges creatively and successfully contribute to the company's success. The significance of those relationships is supported by the Critical Ratio (CR) values of 8.51, 5.41, and 4.24, since values higher than 1.96 demonstrate statistical significance (Hair Jr. et al., 2017) Additionally, the Variance Inflation Factor (VIF) of 1.21 and multi-collinearity tolerance of .82, which both attest to the lack of multi-collinearity issues, verifies the robustness of the model (Tabri & Elliott, 2012).

Figure 4

Indirect Effect with a Mediator (Intrinsic Motivation)

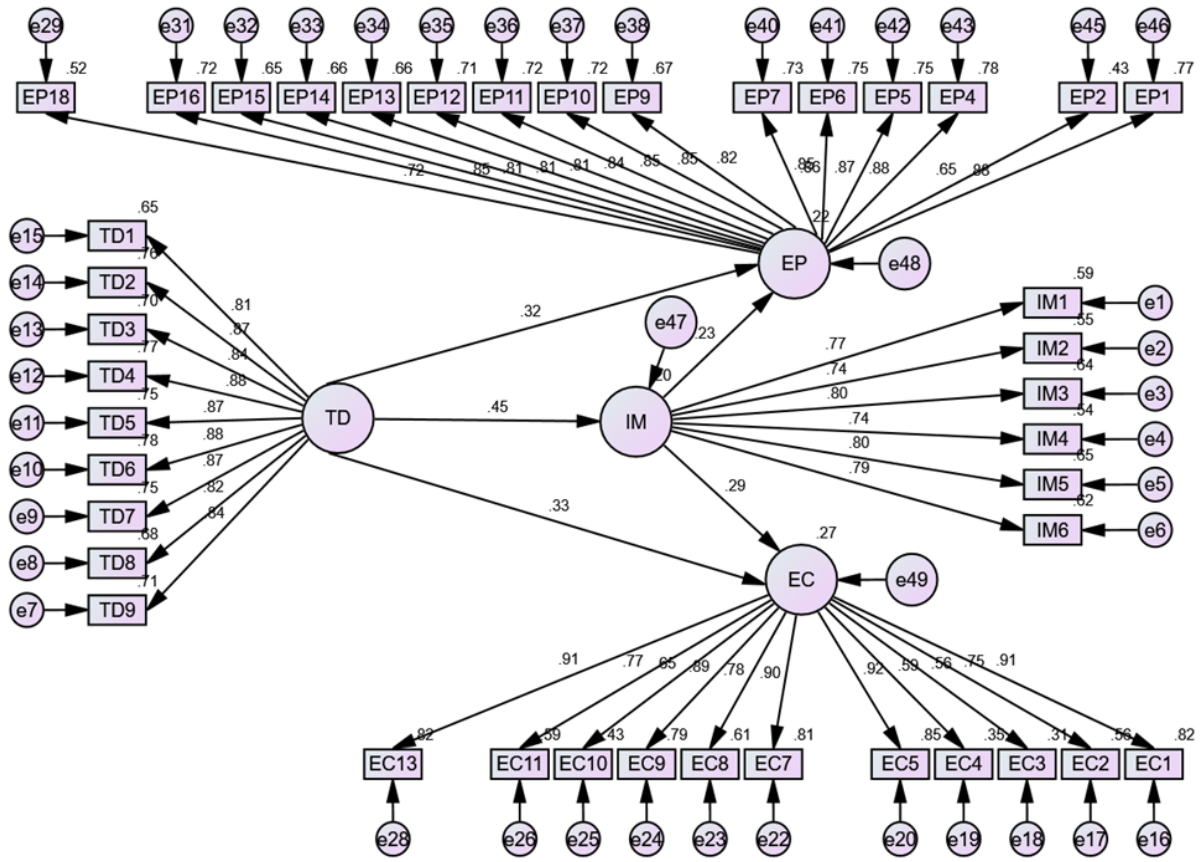


Table 5

Indirect Effects

Relationship	β	SE	CR	p	Hypothesis supported	Multi-collinearity tolerance	Diagnostic VIF
TD → IM	.44	.04	8.51	.000	H3 supported	.82	1.21
IM → EC	.28	.05	5.41	.000	H4 supported	.82	1.21
IM → EP	.23	.05	4.24	.000	H5 supported	.82	1.21

Note. TD = Training and Development, IM = Intrinsic Motivation, EC = Employee Creativity and EP = Employee Performance

Comparison of Direct and Indirect Effects

The study additionally demonstrates that IM acts as a partial mediating factor between T&D and employee performance (EP) as well as TD and employee creativity (EC). Table 6 illustrates that the direct effects of T&D on employee creativity (β = .45, $p < .001$) and employee performance (β = .42, $p < .001$) decreased when IM was incorporated into the model. As a result, there were indirect effects of β = .33 and β = .32, respectively ($p < .001$). This verifies the support of H6 and H7 by showing that IM is essential for enhancing the impact of T&D on employees' creativity and performance. These results align with earlier studies showing that IM has a mediating role in enhancing task performance (Tuuli & Rowlinson, 2009). According to Ryan and Deci (2020), workers who participate in organized training programs not only gain new abilities but also feel more intrinsically motivated, which enhances their level of productivity. Additionally, IM encourages inclusion, creativity, and problem-solving skills, all of which improve worker performance and innovation in the long run (Nili & Tasavori, 2022).

Table 6

Comparison of Direct and Indirect Effects

Relationship	Direct Estimate (β)	P	Indirect Estimate (β)	P Value	Hypothesis Support
TD → EC	.45	.000	.33	.000	H6 supported
TD → EP	.42	.000	.32	.000	H7 supported

Note. TD = Training and Development, IM = Intrinsic Motivation, EC = Employee Creativity and EP = Employee Performance

Discussion

To enhance employee performance and creativity, which are facilitated by IM and contribute to organizational success, T&D is vital (Ryan & Deci, 2020). The results of this study indicate that T&D plays an essential role in improving employee performance and creativity, with IM contributing as a partially mediating variable. Based on SDT, which highlights relatedness, competence, and autonomy as important psychological factors that influence motivation, the findings show that companies that invest in organized T&D programs perceive increases in performance, creativity, and innovation (Ryan & Deci, 2020). The first hypothesis revealed that T&D is a strong predictor of employee creativity. Employees who engage in continuous skill development programs demonstrate higher levels of innovative thinking and problem-solving abilities, aligning with research suggesting that a well-structured learning environment enhances creative performance (Watson, 2022). A high-performance learning system working alongside interactive knowledge-sharing practices helps organizations build creative environments that drive ongoing improvement (Zaheer, 2025; Chahar et al., 2019). Employer leadership, combined with organizational backing, serves as the key force for implementing skills effectively after employees learn them, thus producing innovative results (Shalley & Gilson, 2017; Zaheer et al., 2023a).

T&D programs lead to significant impacts on employee performance based on the second hypothesis. The provision of ongoing learning programs to staff enhances their production rates and their ability to adapt while increasing their work dedication, according to studies by Asfaw et al. (2015). Organizations that use complete performance management frameworks, which unite feedback programs with guidance services alongside leadership backing, experience superior operational effectiveness combined with employee contentment (Jeni et al., 2021). Employee engagement and workplace performance levels remain high when T&D programs are implemented because these programs play a critical dual role in both skill acquisition and sustained workplace performance (Bhakuni & Saxena, 2023). The analysis of T&D activities and IM displayed an intense positive relationship, according to research findings. The belief that training leads to professional development triggers elevated IM in employees since SDT maintains that individuals thrive in places that let them exercise autonomy and reach competency goals (Ryan & Deci, 2020). Research shows that employee IM increases when they practice self-directed learning and take part in mentorship programs under participatory training decision-making structures (Han & Abdrahim, 2023). Organizations that design training programs that focus on employee aspirations build professional commitment and motivation throughout the workplace (Hosseini et al., 2022).

The fourth hypothesis confirmed that internal motivation stands as an essential factor that drives workplace creativity. Workers who experience IM demonstrate better creativity through their thinking abilities and idea generation and their actions toward innovative solutions (Udahemuka et al., 2024). The results support studies that demonstrate that work environments offering autonomy allow team members to take risks while conducting experiments and cooperating, thus generating heightened creative involvement (Zaheer et al., 2024: Zhou & Zhang, 2024). Policies at organizations that establish intrinsic reward structures, including recognition programs and purpose-focused work and psychological empowerment, lead to elevated creative outputs from their staff members (Nili & Tasavori, 2022). Employee performance increases notably when IM comes into play, as established by the fifth hypothesis. High IM in employees leads to better efficiency alongside enhanced problem-solving abilities and persistence because it results in increased work output and organizational commitment (Van den Broeck et al., 2021). According to Lee and Hidayat (2018), studies indicate that organizations should implement performance-driven training models that incorporate growth opportunities together with autonomy and purpose-driven tasks to develop long-term engagement and productivity.

Leadership backing, combined with constructive feedback systems alongside team-oriented work environments, creates pathways that enhance staff motivation and lead to better employee results (Ryan & Deci, 2020). Research investigated IM as it acts as a linking factor between training development and employee creativity performance through hypotheses 6 and 7. The research findings confirmed that IM plays an intermediary role in these associations while demonstrating that employee results depend on internal dedication to implement training knowledge (Reddy et al., 2013). Research by Reddy et al. (2013) supports the requirement of training programs to implement psychological empowerment along with self-efficacy and intrinsic rewards for maximizing creativity levels and performance outcomes. Training programs, together with development methods, act as essential factors that create motivated teams, which in turn increase workplace productivity while advancing innovation (Nili &

Tasavori, 2022). This study builds upon SDT by showing the combined importance of training and motivation for employee innovative outcomes and performance (Di Domenico & Ryan, 2017). Practically, organizations should design training programs that not only develop technical skills but also foster IM through autonomy-supportive leadership, personalized learning, and employee empowerment (Lin et al., 2022).

Theoretical Implications

The research adds theoretical value to SDT in the context of T&D, employee creativity and performance studies by linking IM as a mediating mechanism because autonomy and competence with relatedness strengthen IM to enhance creativity and boost operational effectiveness. According to Van den Broeck et al. (2021), an investigation revealed how T&D initiatives satisfy employees' psychological needs because they improve self-efficacy and autonomy, leading to IM. Study findings enrich SDT by showing how regulated learning encounters enable workers to control their career progression, thus enhancing their confidence besides mastery (Di Domenico & Ryan, 2017). The integration of IM as an intermediary component with T&D strengthens theoretical research on employee creativity and performance.

Secondly, According to SDT, Vallerand (2000) confirms that IM rises from achieving relatedness and competence and gaining autonomy, which results in better performance and creativity. The study extends beyond the principles of SDT because it proves how T&D programs satisfy employee psychological needs and develop self-efficacy and autonomy to drive IM (Vallerand, 2000). This, in turn, results in higher performance and creativity. This study extends SDT by revealing how structured learning opportunities give staff members the ability to direct their professional development, thus strengthening their sense of competence and mastery (Di Domenico & Ryan, 2017).

Practical Implications

T&D programs, together with IM and employee creativity, create knowledge that leads to increased organizational performance. Organizations need to identify personal intrinsic drives to make the most effective T&D investments and increase job-related results. The training design for organizations must create structured programs that correspond to personnel career goals while encouraging client-directed education through mentor relationships and expert-level tests. Managers who want to achieve the best effect through T&D systems need to embed autonomy and accountability along with purposeful work responsibilities into their job design. Employees within enriched job roles gain IM and psychological empowerment through training across departments and by taking part in important organizational decisions.

Secondly, employees learn from peer interactions when they work together in brainstorming sessions as well as creativity workshops and team projects, which enable them to solve problems and practice their skills. Technical funds for digital teaching resources as well as self-directed training content enable organizations to serve students with multiple learning methods, which improves their commitment to education. Employee achievements always deserve attention, while well-designed feedback creates motivation for their professional growth.

Finally, employing the described practices enables organizations to establish a workplace environment that prioritizes both competency improvement and internal drive. Organizations that use this method train their employees to be competent professionals who demonstrate both

high motivation levels and creative performance abilities. Upcoming workforce strategies need to unify methodology-based competency development with motivational elements as a way to maintain long-term employee engagement and overall productivity.

Conclusion and Future Recommendations

Performance quality with creativity reaches high levels when employees receive motivation and receive T&D in sectors that operate at high speeds. The research shows that centralized T&D programs enhance employees' internal drive, which enables better performance through creativity. The investigation among engineers of software companies was limited to FCT Islamabad and Rawalpindi, Punjab, Pakistan, which concluded that T&D enables employees to fulfill their full potential for achieving standard results, thereby enabling contentedly motivated workers to effectively execute their tasks. Secondly, the design of this research was cross-sectional. Research shows that employees who receive training as a path for career progression, together with skill development, become more internally driven workers, delivering higher productivity and original ideas. Organizations should improve their training programs by adding features of professional development, together with significant work tasks and self-managed assignments to boost employee motivation and increase participation. Employee creativity strengthens when organizations organize innovative learning spaces that combine knowledge-sharing websites with innovation workshops. Future research should explore how, with/without digital learning resources, together with organizational support and leadership philosophies, generate IM. This research is beneficial for all kinds of organizations because it allows evaluation of prolonged T&D program outcomes to achieve a deeper understanding of sustaining employee performance, together with innovation.

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References

Abd-El-Salam, E. M., Shawky, A. Y., & El-Nahas, T. (2013). The impact of corporate image and reputation on service quality, customer satisfaction and customer loyalty: Testing the mediating role. Case analysis in an international service company. *Journal of Business and Retail Management Research*, *8*(1).

Aldabbas, H., Pinnington, A. H., & Lahrech, A. (2023). Encouraging more creativity in organizations: the importance of employees' intrinsic motivation and work engagement. *International Journal of Organizational Analysis*, *31*(6), 2337–2358. https://doi.org/10.1108/IJOA-11-2021-3038

Aljumah, A. (2023). The impact of extrinsic and intrinsic motivation on job satisfaction: The mediating role of transactional leadership. *Cogent Business and Management*, *10*(3). https://doi.org/10.1080/23311975.2023.2270813

Andika, R., & Darmanto, S. (2020). The effect of employee empowerment and intrinsic motivation on organizational commitment and employee performance. *Jurnal Aplikasi Manajemen*, *18*(2), 241–251. https://doi.org/10.21776/ub.jam.2020.018.02.04

Asfaw, A. M., Argaw, M. D., & Bayissa, L. (2015). The impact of training and development on employee performance and effectiveness: A case study of district five administration office, Bole Sub-City, Addis Ababa, Ethiopia. *Journal of Human Resource and Sustainability Studies*, *03*(04). https://doi.org/10.4236/jhrss.2015.34025

Barboza, D. (2023). *Fostering intrinsic motivation within secondary special education with attention towards teacher presence and positive behavior support* [Master's thesis, Dominican University of California]. https://doi.org/10.33015/dominican.edu/2023.EDU.05

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3). https://doi.org/10.1037/0033-2909.88.3.588

Bhakuni, S., & Saxena, S. (2023). Exploring the link between training and development, employee engagement and employee retention. *Journal of Business and Management Studies*, *5*(1), 173–180. https://doi.org/10.32996/jbms.2023.5.1.17

Boon, C., den Hartog, D. N., Boselie, P., & Paauwe, J. (2011). The relationship between perceptions of HR practices and employee outcomes: Examining the role of person-organisation and person-job fit. *International Journal of Human Resource Management*, *22*(1). https://doi.org/10.1080/09585192.2011.538978

Chahar, B., Hatwal, V., & Sen, S. (2019). Employees training and its impact on learning and creativity: Moderating effect of organizational climate. *Problems and Perspectives in Management*, *17*(2), 430–439. https://doi.org/10.21511/ppm.17(2).2019.33

Chung, S., Zhan, Y., Noe, R. A., & Jiang, K. (2022). Is it time to update and expand training motivation theory? A meta-analytic review of training motivation research in the 21st century. *Journal of Applied Psychology*, *107*(7). https://doi.org/10.1037/apl0000901

Cua, K. O., McKone, K. E., & Schroeder, R. G. (2001). Relationships between implementation of TQM, JIT, and TPM and manufacturing performance. *Journal of Operations Management*, *19*(6). https://doi.org/10.1016/S0272-6963(01)00066-3

Deshpande, P., & Srivastava, A. P. (2023). A study to explore the linkage between green training and sustainable organizational performance through emotional intelligence and green work life balance. *European Journal of Training and Development*, *47*(5–6). https://doi.org/10.1108/EJTD-11-2021-0182

Di Domenico, S. I., & Ryan, R. M. (2017). The emerging neuroscience of intrinsic motivation: A new frontier in self-determination research. In *Frontiers in Human Neuroscience* (Vol. 11). https://doi.org/10.3389/fnhum.2017.00145

Doll, W. J., Xia, W., & Torkzadeh, G. (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS Quarterly: Management Information Systems*, *18*(4). https://doi.org/10.2307/249524

Dysvik, A., & Kuvaas, B. (2011). Intrinsic motivation as a moderator on the relationship between perceived job autonomy and work performance. *European Journal of Work and Organizational Psychology*, *20*(3), 367–387. https://doi.org/10.1080/13594321003590630

Ellitan, L. (2021). The importance of entrepreneurship and information technology for SMEs strategic planning. In *International Journal of Trend in Scientific Research and Development (IJTSRD)*, *5*(4).

Fahriana, C., & Sopiah. (2022). The influence of work motivation on employee performance. *Asian Journal of Economics and Business Management*, *1*(3), 229–233. https://doi.org/10.53402/ajebm.v1i3.237

Fauziah, N. H., Choenraad, D. P., Jatmika, L., & Arby, R. R. (2024). The influence of motivation and work discipline on employee performance (Study of one of the pharmaceutical health equipment companies in Bandung City). *Majalah Bisnis & IPTEK*, *17*(1), 48–56.

Fishbach, A., & Woolley, K. (2022). The structure of intrinsic motivation. In *Annual Review of Organizational Psychology and Organizational Behavior* (Vol. 9). https://doi.org/10.1146/annurev-orgpsych-012420-091122

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1). https://doi.org/10.2307/3151312

Ghosh, K. (2015). Developing organizational creativity and innovation: Toward a model of self-leadership,employee creativity,creativity climate and workplace innovative orientation. *Management Research Review*, *38*(11). https://doi.org/10.1108/MRR-01-2014-0017

Gil-Arias, A., Harvey, S., García-Herreros, F., González-Víllora, S., Práxedes, A., & Moreno, A. (2021). Effect of a hybrid teaching games for understanding/sport education unit on elementary students' self-determined motivation in physical education. *European Physical Education Review*, *27*(2). https://doi.org/10.1177/1356336X20950174

Hair Jr., J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, *1*(2). https://doi.org/10.1504/ijmda.2017.10008574

Han, W., & Abdrahim, N. A. (2023). The role of teachers' creativity in higher education: A systematic literature review and guidance for future research. *Thinking Skills and Creativity*, *48*. https://doi.org/10.1016/j.tsc.2023.101302

Hidayat, A., & Muh. Abdul Aziz. (2022). The role of job training in improving employee performance. *Adpebi International Journal of Multidisciplinary Sciences*, *1*(1). https://doi.org/10.54099/aijms.v1i1.186

Hikmah, N. (2024). The role of social media use, knowledge sharing, and intrinsic motivation on student creativity. *AMCA Journal of Education and Behavioral Change*, *2*(1), 1–15.

Hirst, G., van Knippenberg, D., Zhou, Q., Zhu, C. J., & Tsai, P. C. F. (2018). Exploitation and exploration climates' influence on performance and creativity: Diminishing returns as function of self-efficacy. *Journal of Management*, *44*(3). https://doi.org/10.1177/0149206315596814

Holmbeck, G. N., & Devine, K. A. (2009). Editorial: An author's checklist for measure development and validation manuscripts. In *Journal of Pediatric Psychology*, *34*(7). https://doi.org/10.1093/jpepsy/jsp046

Hosseini, L. J., Rafiemanesh, H., & Bahrami, S. (2022). Levels of motivation and basic psychological need satisfaction in nursing students: In perspective of self-determination theory. *Nurse Education Today*, *119*. https://doi.org/10.1016/j.nedt.2022.105538

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1). https://doi.org/10.1080/10705519909540118

Jeni, F. A., Momotaj, ., & Al-Amin, M. (2021). The impact of training and development on employee performance and productivity: an empirical study on Private Bank of Noakhali Region in Bangladesh. *South Asian Journal of Social Studies and Economics*. https://doi.org/10.9734/sajsse/2021/v9i230234

Jeong, S., McLean, G. N., McLean, L. D., Yoo, S., & Bartlett, K. (2017). The moderating role of non-controlling supervision and organizational learning culture on employee creativity: The influences of domain expertise and creative personality. *European Journal of Training and Development*, *41*(7). https://doi.org/10.1108/EJTD-03-2017-0025

Jerez Gómez, P., Céspedes Lorente, J. J., & Valle Cabrera, R. (2004). Training practices and organisational learning capability: Relationship and implications. *Journal of European Industrial Training*, *28*. https://doi.org/10.1108/03090590410527636

Judith, N., & Ramos, S. (2022). Stress and job satisfaction in Peruvian public officials: engagement as a mediating factor 2. *Literature Review and Theoretical Background*, 100–112.

Kanapathipillai, K., & Azam, S. M. F. (2020). The impact of employee training programs on job performance and job satisfaction in the telecommunication companies in Malaysia. *European Journal of Human Resource Management Studies*, *4*(3), 1–17. https://doi.org/10.46827/ejhrms.v4i3.857

Karimi, S., Ahmadi Malek, F., & Yaghoubi Farani, A. (2022). The relationship between proactive personality and employees' creativity: the mediating role of intrinsic motivation and creative self-efficacy. *Economic Research-Ekonomska Istrazivanja* , *35*(1), 4500–4519. https://doi.org/10.1080/1331677X.2021.2013913

Koopmans, L., Bernaards, C. M., Hildebrandt, V. H., De Vet, H. C. W., & Van Der Beek, A. J. (2014). Construct validity of the individual work performance questionnaire. *Journal of Occupational and Environmental Medicine*, *56*(3), 331–337. https://doi.org/10.1097/JOM.0000000000000113

Kuvaas, B., Buch, R., & Dysvik, A. (2020). Individual variable pay for performance, controlling effects, and intrinsic motivation. *Motivation and Emotion*, *44*(4). https://doi.org/10.1007/s11031-020-09828-4

Kuvaas, B., Buch, R., Weibel, A., Dysvik, A., & Nerstad, C. G. L. (2017). Do intrinsic and extrinsic motivation relate differently to employee outcomes? *Journal of Economic Psychology*, *61*. https://doi.org/10.1016/j.joep.2017.05.004

Laing, I. F. (2009). the impact of training and development on worker performance and productivity in public sector organizations: a case study of Ghana Ports and Harbours Authority. *Institute of Distance Learning-KNUST*.

Lee, C.-W., & Hidayat, N. (2018). The influence of transformational leadership and intrinsic motivation to employee performance. *Advances in Management & Applied Economics*, *8*(2), 1–12.

Lin, C., Shipton, H., Teng, W., Kitt, A., Do, H., & Chadwick, C. (2022). Sparking creativity using extrinsic rewards: A self-determination theory perspective. *Human Resource Management*, *61*(6), 723–735. https://doi.org/10.1002/hrm.22128

Lin, Y. H. (2023). Determinants of green purchase intention: The roles of green enjoyment, green intrinsic motivation, and green brand love. *Sustainability (Switzerland)*, *15*(1). https://doi.org/10.3390/su15010132

Loon, M., & Casimir, G. (2008). Job-demand for learning and job-related learning the moderating effect of need for achievement. *Journal of Managerial Psychology*, *23*(1). https://doi.org/10.1108/02683940810849684

Maulana, R., & Wijanarko, A. A. (2023). The influence of employee training, compensation and employee creativity on innovative behavior. *Jurnal Ilmiah Manajemen, Ekonomi, & Akuntansi (MEA)*, *7*(3). https://doi.org/10.31955/mea.v7i3.3545

Medina Halako Twalib, M. M. K. (2020). Influence of motivation on employee performance at Telkom Kenya Limited. *International Journal of Business, Social Sciences & Education*, *2*(Xi).

Morris, S., Carlos, C., Kistruck, G. M., Lount, R. B., & Thomas, T. E. (2023). The impact of growth mindset training on entrepreneurial action among necessity entrepreneurs: Evidence from a randomized control trial. *Strategic Entrepreneurship Journal*, *17*(3), 671–692. https://doi.org/10.1002/sej.1472

Mutonyi, B. R., Slåtten, T., & Lien, G. (2020). Organizational climate and creative performance in the public sector. *European Business Review*, *32*(4). https://doi.org/10.1108/EBR-02-2019-0021

Muzafary, S. S., Wahdat, M. N., Hussain, M., Mdletshe, B., Tilwani, S. A., & Khattak, R. (2021). Intrinsic rewards for creativity and employee creativity to the mediation role of knowledge sharing and intrinsic motivation. *Education Research International*, *2021*. https://doi.org/10.1155/2021/6464124

Nawaz, M. S., Hassan, M., Hassan, S., Shaukat, S., & Asadullah, M. A. (2014). Impact of employee training and empowerment on employee creativity through employee engagement: Empirical evidence from the manufacturing sector of Pakistan. *Middle - East Journal of Scientific Research*, *19*(4), 593–601. https://doi.org/10.5829/idosi.mejsr.2014.19.4.13618

Nili, F., & Tasavori, M. (2022). Linking an autonomy-supportive climate and employee creativity: the influence of intrinsic motivation and company support for creativity. *European Business Review*, *34*(5). https://doi.org/10.1108/EBR-06-2021-0146

Noe, R. A., & Schmitt, N. (1986). the influence of trainee attitudes on training effectiveness: Test of a model. *Personnel Psychology*, *39*(3), 497–523. https://doi.org/10.1111/j.1744-6570.1986.tb00950.x

Oh, S. H., Hur, W. M., & Kim, H. (2023). Employee creativity in socially responsible companies: Moderating effects of intrinsic and prosocial motivation. *Current Psychology*, *42*(21), 18178–18196. https://doi.org/10.1007/s12144-022-02852-2

Park, S., & Kang, J. (2016). Knowledge contributors' intrinsic and extrinsic motivation on social connectedness and satisfaction. *The Journal of Information Systems*, *25*(3). https://doi.org/10.5859/kais.2016.25.3.91

Puccio, G. J., Burnett, C., Acar, S., Yudess, J. A., Holinger, M., & Cabra, J. F. (2020). Creative problem solving in small groups: The effects of creativity training on idea generation, solution creativity, and leadership effectiveness. *Journal of Creative Behavior*, *54*(2). https://doi.org/10.1002/jocb.381

Putra, E. D., Cho, S., & Liu, J. (2017). Extrinsic and intrinsic motivation on work engagement in the hospitality industry: Test of motivation crowding theory. *Tourism and Hospitality Research*, *17*(2). https://doi.org/10.1177/1467358415613393

Reddy, M. M., Vivekanandhan, S., Misra, M., Bhatia, S. K., & Mohanty, A. K. (2013). Biobased plastics and bionanocomposites: Current status and future opportunities. In *Progress in Polymer Science*, *38*(10–11). https://doi.org/10.1016/j.progpolymsci.2013.05.006

Riyanto, S., Endri, E., & Herlisha, N. (2021). Effect of work motivation and job satisfaction on employee performance: Mediating role of employee engagement. In *Problems and Perspectives in Management*, *19*(3). https://doi.org/10.21511/ppm.19(3).2021.14

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*. https://doi.org/10.1016/j.cedpsych.2020.101860

Sahibzada Jawad, S. U. R., Naushad, S., Yousaf, S., & Yousaf, Z. (2020). Exploring performance of software houses: Market orientation and mediating role of firm innovativeness. *World Journal of Entrepreneurship, Management and Sustainable Development*, *16*(1), 1–11. https://doi.org/10.1108/WJEMSD-05-2019-0033

Shafique, I., Ahmad, B., & Kalyar, M. N. (2020). How ethical leadership influences creativity and organizational innovation: Examining the underlying mechanisms. *European Journal of Innovation Management*, *23*(1). https://doi.org/10.1108/EJIM-12-2018-0269

Shalley, C. E., & Gilson, L. L. (2017). Creativity and the management of technology: balancing creativity and standardization. *Production and Operations Management*, *26*(4). https://doi.org/10.1111/poms.12639

Steenkamp, J. B. E. M., & Baumgartner, H. (2000). On the use of structural equation models for marketing modeling. *International Journal of Research in Marketing*, *17*(2–3). https://doi.org/10.1016/s0167-8116(00)00016-1

Stevenson, C. E., Kleibeuker, S. W., de Dreu, C. K. W., & Crone, E. A. (2014). Training creative cognition: Adolescence as a flexible period for improving creativity. *Frontiers in Human Neuroscience*, *8*(October). https://doi.org/10.3389/fnhum.2014.00827

Tabri, N., & Elliott, C. M. (2012). Principles and practice of structural equation modeling. *Canadian Graduate Journal of Sociology and Criminology*, *1*(1). https://doi.org/10.15353/cgjsc.v1i1.3787

Triswanto, H., & Lidia Yunita. (2021). The influence of intrinsic motivation and extrinsic motivation on employee performance productivity of PT. Weigh Deli Indonesia. *Journal of Economics and Business (JECOMBI)*, *2*(2). https://doi.org/10.58471/jecombi.v2i2.22

Tuuli, M. M., & Rowlinson, S. (2009). Empowerment in project teams: A multilevel examination of the job performance implications. *Construction Management and Economics*, *27*(5), 473–498. https://doi.org/10.1080/01446190902729713

Udahemuka, F. F., Walumbwa, F. O., & Ngoye, B. (2024). Enhancing meaningful work: the roles of spiritual leadership, intrinsic motivation, and employees' gender. *International Journal of Business and Society*, *25*(2), 713–735. https://doi.org/10.33736/ijbs.7624.2024

Ugbomhe, U. O., Nasakhare, O. G., & Egwu, E. U. (2016). Impact of training and development on employee performance in selected banks in Edo North Senatorial District, Nigeria. *International Journal of Enhanced Research in Management*, *7*(3).

Vallerand, R. J. (2000). Deci and Ryan's self-determination theory: A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychological Inquiry*, *11*(4), 312–318.

Van den Broeck, A., Howard, J. L., Van Vaerenbergh, Y., Leroy, H., & Gagné, M. (2021). Beyond intrinsic and extrinsic motivation: A meta-analysis on self-determination theory's multidimensional conceptualization of work motivation. *Organizational Psychology Review*, *11*(3). https://doi.org/10.1177/20413866211006173

Venketsamy, A., & Lew, C. (2024). Intrinsic and extrinsic reward synergies for innovative work behavior among South African knowledge workers. *Personnel Review*, *53*(1), 1–17. https://doi.org/10.1108/PR-02-2021-0108

Wang, G., Niu, Y., Mansor, Z. D., Leong, Y. C., & Yan, Z. (2024). Unlocking digital potential: Exploring the drivers of employee dynamic capability on employee digital performance in Chinese SMEs-moderation effect of competitive climate. *Heliyon*, *10*(4). https://doi.org/10.1016/j.heliyon.2024.e25583

Watson, S. (2022). Noe, R. (2017). Employee training and development . New York, NY: McGraw Hill Education. ISBN: 978-0078112850 . *Human Resource Development Quarterly*, *33*(2). https://doi.org/10.1002/hrdq.21333

Yesuf, Y. M., Getahun, D. A., & Debas, A. T. (2023). Factors affecting "employees' creativity": the mediating role of intrinsic motivation. *Journal of Innovation and Entrepreneurship*, *12*(1). https://doi.org/10.1186/s13731-023-00299-8

Zhang, X., & Bartol, K. M. (2010). Linking empowering leadership and employee creativity: the influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal*, *53*(1), 107–128. https://doi.org/10.5465/amj.2010.48037118

Zhou, J., & George, J. M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management journal*, *44*(4), 682–696.

Zhou, Z., & Zhang, Y. (2024). Intrinsic and extrinsic motivation in distance education: A self-determination perspective. *American Journal of Distance Education*, *38*(1). https://doi.org/10.1080/08923647.2023.2177032