

Creative Self-Efficacy and Product Innovation: Uncovering the Role of Creativity and Entrepreneurial Passion

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This article investigates the relationship between creative self-efficacy (CSE), and product innovation under the mediation of creativity, and the moderation of entrepreneurial passion. The said relationships were tested under the componential theory of creativity to gain a practical understanding of the psychological, and workplace-related creative mechanisms between the dyad of the boss, and the subordinate. The data was collected from 408 sets of the boss-subordinate dyad across the research and development (R&D) section of reputed information technology firms in Pakistan. The analyses were completed through the partial least squares structural equation modelling (PLS-SEM) technique by using Smart PLS. The results revealed the positive impact of CSE on product innovation, and the partial mediation of creativity was established between the relationship of CSE, and production innovation. Moreover, entrepreneurial passion was proven as a moderator to strengthen the relationship between creativity, and product innovation. The findings, and implications addressed the information technology (IT) sector in particular, and other sectors in general.

Key words: *Creativity, Product innovation, Creative self-efficacy, Entrepreneurial passion.*

Introduction

Innovation is an inevitable phenomenon in today's market economies (Kato-Nitta & Maeda, 2016). The diverse customer demands, and technological advancements have challenged

businesses to innovate. The advancements, global competition, and complexities in the workplace (Khan, Lee, & Bae, 2019) have urged management researchers to consider human resource importance, as well as improvements in creative performance to overcome the challenges of business (Kato-Nitta & Maeda, 2016). Organisations are continuously pressurised to come up with the latest versions of their products, and services, and are forced to innovate (Zhai, Ding & Wang, 2018). Innovation is inevitable in the current climate (Skerlavaj, Song & Lee, 2010). Innovation can be a new product or service, a new production technology, a new operation procedure or a new management strategy to an enterprise (Damanpour, 1991; West & Altink, 1996). It is an intentional change in the product, process or business method, which is targeted towards the achievement of the best creative processes followed by its implementation, and commercialisation.

Therefore, creativity is considered as a preceding activity of innovation. It serves as a critical driver for creative individuals. It leads to the commercialisation of innovative products. The requirement of creativity in the product development process is also crucial (Valgeirsdottir, Onarheim & Gabrielsen, 2015). Philosophers in creativity research believe that creativity is a key constituent of all innovation, and thus, is essential for innovative products, and services (Lora, Bellmunt & Morales, 2015). The generation of all creative ideas is an important aspect of all product development processes, and it is a requirement for innovation (Eling, Langerak & Griffin, 2015). Such creative ideas seek a motivational state to pursue product innovation, and one such state is self-efficacy. According to self-efficacy theory (Bandura, 1977), self-efficacy brings intrinsic motivation, which leads to the attainment of better product innovation.

The concept of self-efficacy for creativity is being modified as creative self-efficacy (CSE), derived from the self-efficacy concept of Bandura (1977). Self-efficacy (SE) is the internal feeling of an individual motivation that determines behaviour in a certain way (Bandura, 2007). It is the positive psychological state of an individual for creativity, and is extensively being studied in creativity research (Alotaibi, 2016). Tierney and Farmer (2002) were first to modify the concept of self-efficacy to creative self-efficacy. Employees with higher creative self-efficacy have a higher potential to carry out creative outputs, and it acts as an essential predictor of innovation (Hu & Zhao, 2016).

The psychological aspects of a creative individual have been nominated as the essentials of creativity, such as motivation, satisfaction, and ability (Kato-Nitta & Maeda, 2016). Past studies have found that CSE significantly determines creative performance, and innovation (Jaiswal & Dhar, 2016). Creative self-efficacy comes into play to incline an individual's psyche towards creative idea generation. It has also been enthusiastically included in creativity studies as a psychological construct (Collins & Amabile, 1999; Hennessey & Amabile, 1998; Runco & McGarva, 2013). Both CSE, and creative behaviour also have a



joint relationship, and CSE has a significant role in determining creativity (Lemons, 2010; Wang, Tsai & Tsai, 2014).

Although creativity and innovation are counterparts, they are also moderating constructs which add value for better outcomes. Such constructs could be the positive emotional states of the creative individuals, such as the passion to invent. The passion to innovate with creativity has been disclosed as having an entrepreneurial spirit and is termed as 'entrepreneurial passion' (Moses et al., 2016). The individual's level of entrepreneurial passion has proven to be significant for new ventures (Cardon, Post & Forster, 2017). It is the intense psychological state of a person that is involved in creating something entrepreneurial or novel. The presence of entrepreneurial passion logically brings new ventures, and inventions (Nasiru, Keat & Bhatti, 2015). Entrepreneurial passion is also pertinent in the context of research and development (R&D) in information technology (IT) where inventions are in rapidity, and an individual's creativity is the main input in customised innovative product development.

Consequently, this study contributes to analyse the creative self-efficacy, as an antecedent of product innovation in the R&D section of IT firms across the major cities of Pakistan. Karadal and Saygin (2011) recommended the research gap is addressed under this study for better product innovation across IT firms, as the said relationship is analysed under the mediating role of creativity. Moreover, as per the Stenholm (2019) argument, the moderating aspect of entrepreneurial passion is investigated between creativity, and product innovation. The prerequisite position of CSE, as a psychological mechanism towards creativity, and innovation, is addressed under the componential theory of creativity (Amabile, 1983, 2012). It advocates the prevalent nature of creativity as a product of individual minds, which is driven through an enhanced workplace environment to innovate.

The analyses of investigating the interrelationships among the studied variables under the componential theory of creativity intended to provide fruitful recommendations for the IT sector to stimulate product innovation under the dyadic interaction of the boss-subordinate. The optimistic view to consider entrepreneurial passion unfolds innovative solutions to the problems faced in the IT sector, and under uncertain conditions. This will also stimulate the R&D activities of the IT sector.

Literature Review

Creative Self-Efficacy and Product Innovation

Human psychological factors have been of distinct fascination to management science scientists. The different psychological mechanisms go about as crossing over job on

creativity. Among these psychological factors is CSE. Tierney and Farmer (2002) were first to adjust the idea of self-efficacy to creative self-efficacy. Creative self-efficacy is the abstract confidence of somebody on his or her capability to execute creative errands (Haase, Hoff, Hanel & Innes-Ker, 2018). Additionally, researchers have conceptualised CSE in two different ways. One, is as an independent single construct, and the other, is a specific measurement or a piece of a greater all-encompassing idea of self-efficacy (Alotaibi, 2016).

Creative self-efficacy has been affected by the flexibility of the person who engages themselves with innovative processes. Flexibility is portrayed by dynamic critical thinking, and product innovation (Hallak, Assaker, O'Connor & Lee, 2018). Likewise, there are numerous predecessors of innovative execution, including individual attributes, contextual factors, thinking, and the psychosocial environment (Chong & Ma, 2010; Mathisen & Bronnick, 2009). The impact of the social environment, and culture has also become evident in innovation studies, in addition to the individual's own attributes (Hondze & Gulliksen, 2015). One of these individual properties can be CSE. Creative self-efficacy impacts singular dimension advancement, and execution (Hallak et al., 2018). The individuals with higher creative self-efficacy can possibly realise imaginative yields. Therefore, based on the above arguments, the following hypothesis is analysed in this study:

H1: Creative self-efficacy positively affects production innovation.

Creative Self-Efficacy and Creativity

Creative individuals depict several special attributes, such as flexibility, and adaptability to new work situations (Hondze & Gulliksen, 2015). The research into creativity, and CSE has been ongoing since the most recent decade. The dominant components of these studies discovered the positive relationship. This makes it worth to consider in creativity related examination as an individual asset of an employee towards creative outcomes (Haase, Hoff, Hanel & Innes-Ker, 2018). The studies found certain organisational aspects that decide CSE, including leadership, job nature, autonomy, culture, job condition, job tenure, and association with partners.

Past studies have recommended that CSE determines creative performance (Jaiswal & Dhar, 2016). It is derived from personal features, as well as from their social contexts (Tierney & Farmer, 2011), and has the position of a psychological mechanism of an individual undergoing creativity (Mathisen, 2011). In this study, CSE serves as the essential element of the individual potential of creativity. An individual considers oneself capable of contributing to the product innovation of IT products. This process takes up creativity, as the intervening mechanism to translate CSE, as a capability to produce new products, and services, and add novelty in them.

H2: Creative self-efficacy positively affects creativity.

Creativity and Product Innovation

Creativity is a valuable resource of any organisation that acts as an impetus to initiate innovation (Runco, Paek & Jaegar, 2015). Obvious innovation exists when creativity serves as the prerequisite for all innovation (Del-Corte Lora, Bellmunt & Morales, 2015). It is the foremost content that fuels the whole process of innovation, and designing products (Travis & Lagrosen, 2014). The requirement of creativity in the product development process is also well understood (Valgeirsdottir, Onarheima & Gabrielsen, 2014). Major theorists in creativity research (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Woodman, Sawyer, & Griffin, 1993) believe that creativity is a major constituent of all innovation, as well as for innovative products, and services. Creative ideas are crucial for the product innovation process, and it links creativity with strategically innovative objectives of the business. The long-term ability of the firm to be competitive is widely dependent upon how the firm incorporates its creative ideas into the required product. Creativity is being taught in new disciplines, such as humanitarian logistics (Khan et al., 2020), for improved product innovation. Furthermore, creativity is recommended to serve as the antecedent of innovation in many studies (Travis & Lagrosen, 2014), however, its specific link with product innovation, and particularly in the R&D context, is yet to be explored. Hence, the following relationship of creativity, and product innovation is anticipated in the following hypothesis:

H3: Creativity positively affects product innovation.

Creative Self-Efficacy, Creativity and Product Innovation

Creativity is a valuable resource of any organisation, which fuels innovation (Runco, Paek & Jaegar, 2015). Noticeable innovation is evident when creativity provides the prerequisite for innovation (Del-Corte Lora, Bellmunt & Morales, 2015). It is the leading constructs that fuel the whole process of innovation, and designing products (Travis & Lagrosen, 2014). Thus, the requirement of creativity in the product innovation process is well understood (Valgeirsdottir, Onarheima & Gabrielsen, 2014). Similarly, CSE, as a psychological mechanism, enables an individual to produce innovative products. It can serve as the critical help, and inspirational driver of innovativeness (Tierney & Farmer, 2002). Many studies have accepted this construct as a mental instrument, and an intervening element between the relevant components, just as results, such as innovativeness (Liu, Chen & Yao, 2010). Hence it is proposed that creativity can play role as a positive mediation between CSE, and product innovation:

H4: Creativity mediates the relationship between creative self-efficacy, and product innovation.

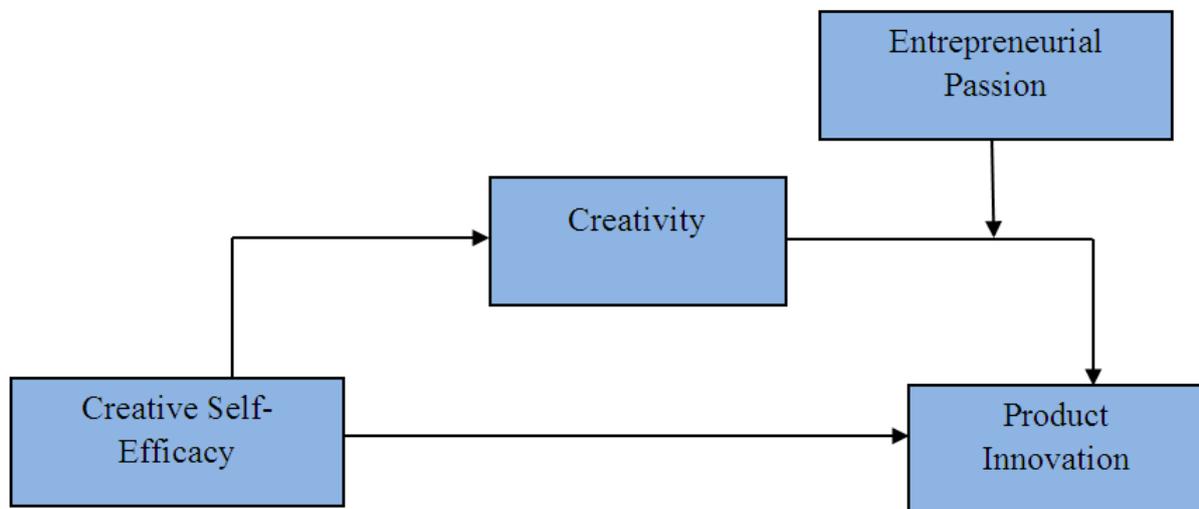
Moderation of Entrepreneurial Passion

The psychological aspects of an entrepreneur, such as risk-taking ability to see opportunities, heuristic approach, and problem solving, are essential (Klada, 2018). Entrepreneurial passion is one of the emergent psychological features of modern entrepreneurs. Although Entrepreneurial passion research is on the nascent stage of inquiry and investigation of the dynamic of its existence with other variables, recently it has been studied as an antecedent, as well as moderator of other concepts. Entrepreneurial passion has also been proven to be a good moderator in the many relationships of the constructs, which are related to entrepreneurship.

Davis, Hmieleski, Webb and Coombs (2017) studied the moderating effects of entrepreneurial passion between the perceived product creativity, and the positive reaction of funder for enterprise. They realised that the perceived creativity of the product, and the entrepreneurial passion of the entrepreneur combines to predict the approval of funds for a specific enterprise. Entrepreneurial passion has also been identified as a moderator between entrepreneurial cognitive training, and opportunity recognition by the entrepreneur (Costa, Santos, Wach & Caetano, 2018). In the R&D of the IT sector, new product development is always highly paced. The innovation in IT based products, and services is the key to their business success. Thus, this study investigates the moderating effect of entrepreneurial passion between creativity, and product innovation.

H5: Entrepreneurial passion moderates the relationship between creativity, and product innovation to the effect that the higher the entrepreneurial passion, the more it strengthens the relationship.

Figure 1. Research Model



Methodology

Sample and Data Collection

This study constitutes the dyadic association of a boss-subordinate relationship to assess the constructs in the R&D section of IT firms across Pakistan. The relevant firms were contacted on the basis of their registration with the Pakistan Software Export Board (PSEB). All the firms accessed for this study were situated in the software technology parks of Islamabad, Rawalpindi, Lahore, Karachi, and Peshawar. The managers of the respective companies were briefed about the objective of the study, and consent for participation in the study was attained. A total of 640 surveys, with a boss-subordinate proportion ratio of one to four (1:4), were distributed. Out of which, 408 surveys, with the same ratio, were completed in all features and at a response rate of 64 per cent. The dyadic approach of the boss-subordinate has been adopted to a time lag study of a one-month gap between ‘time one’, and ‘time two’, as recommended by Carmeli, Reiter-Palmon and Ziv (2010), to measure the variables. The time one data was collected from subordinates, and was related to their creative self-efficacy, and entrepreneurial passion. The time two data, which was collected after a gap period of one month, comprised the bosses of the respective employees responding on the creativity of the subordinate/s, and the product innovation pursued within the R&D section of the telecom company. To ensure the boss-subordinate relevance, a name code system using the first letter of both the employees’ first names, and surnames, was employed.

The demographics reveal that the IT industry within Pakistan comparatively constitutes more male employees than female employees. The respondents were comprised of males at 84 per cent, and females at 16 per cent. The age of the respondents included 61 per cent between 21–30 years, 36 per cent between 31–40 years, and seven per cent between 41–50 years. In

relation to their years of working experience, 66 per cent of employees had 1–5 years, 20 per cent had 6–10 years, 11 per cent had 11–15 years, and three per cent had 16 years or more of experience. Moreover, 11 per cent of the respondents had obtained a M. Phil and above degree qualification, 26 per cent held a master's degree, 49 per cent held a bachelor's degree, and 13 per cent had obtained a higher secondary education.

The scholars identified that the demographic characteristics of the respondents most often become controlling factors. To gauge the effect of the demographic factors, such as age, gender, qualification, and experience, which are used in this study, they were tested for their controlling effect. The control variable tests were conducted on both boss, and subordinate samples, as sample one, and sample two, respectively. A one-way ANOVA test was performed for all criterion variables, with reference to the demographics of sample one, as well as sample two. The results of the one-way ANOVA test depicted that creative self-efficacy, and creativity; and product innovation, and entrepreneurial passion were insignificantly different on the basis of gender, age, qualification, and experience. Therefore, they did not prove to be control variables for this study.

Survey Instruments

The study used survey design research, and all constructs were measured by using a five-point Likert-type scale ranging from '1' or 'strongly disagree' to '5' or 'strongly agree'. The relevant details are as under:

Creativity: was measured with an individual creativity scale introduced by Zhou and George (2001). It consists of 13 items rated by the boss, for the respective subordinate. The sample item includes: *"He suggests new ways to achieve goals or objectives"*.

Creative self-efficacy: was measured with three items developed by Tierney and Farmer (2002). This scale measures the employees' belief in their ability to be creative at work and has been used in many studies (Chong & Ma, 2010). The sample item was: *"I have confidence in my abilities to solve problems creatively"*.

Entrepreneurial passion: was measured with the entrepreneurial passion scale proposed by Cardon et al. (2013). It contained 13 statements for the relevant inventing passion. The sample item was: *"I would feel a loss if I were forced to give up searching for new solutions to business problems"*.

Product innovation: was measured with nine items developed by Skerlavaj, Song, and Lee (2010). A sample item was: “*Our new products and services are often perceived as very novel by customers*”.

Analyses and Results

The analyses were completed by using Smart PLS 3.2 to test the relationships among the variables. The PLS-SEM was used to estimate the constructs (Hair, Ringle & Sarstedt, 2011). The Smart PLS estimates the inner model or the association between the latent constructs, and the outer model or the estimations of the measurement items. A confirmatory factor analysis (CFA) was performed to analyse the scales’ reliabilities, and validities. Hence, a factor analysis was undertaken to analyse the scale’s validity measures, as recommended by Escring-Tena and Bou-Llusar (2005). In addition to factor analysis, the PLS Path analysis was also completed to examine the connections between the constructs. The bootstrapping method (Hair et al., 2014) was also employed to attain the significance level of the relationships. Furthermore, descriptive statistics, and correlations were used to assess the study variables.

Table 1: Descriptive Statistics

Variables	Mean	SD	Min	Max
Creative Self-Efficacy	3.998	0.717	1.000	5.000
Creativity	3.661	0.905	1.000	5.000
Product Innovation	3.70	0.603	1.000	5.000
Entrepreneurial Passion	3.91	0.722	1.000	5.000

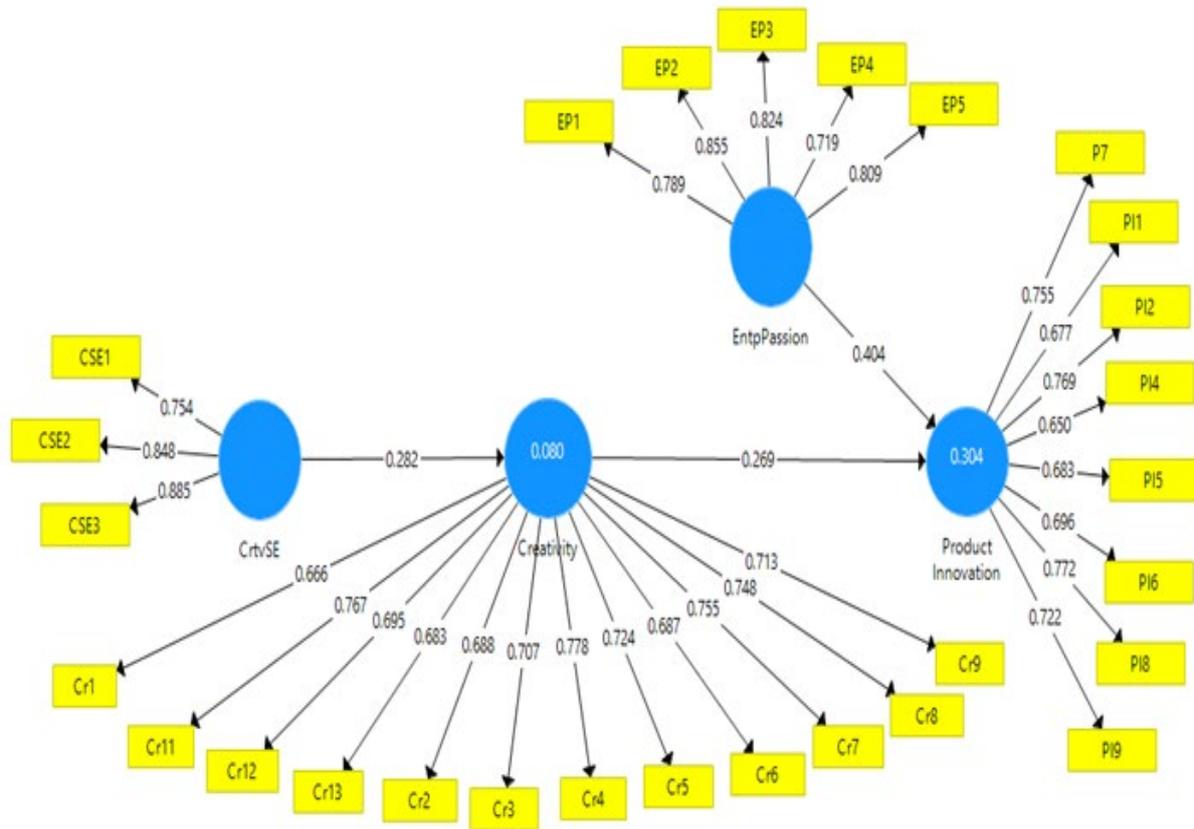
Testing the Measurement Model Using the PLS Method

A confirmatory factor analysis was utilised to estimate the measurement model. The determinants of the estimations included factor loadings, average variance extracted (AVE), convergent validity, construct reliability, and discriminant validity of the items. The AVE depicts the sufficiency of the enough convergent validity of each construct. The acceptable value of AVE should be >0.50 , as recommended by Fornell and Larcker (1981). The lesser value of AVE, from 0.50, is still adequate to measure a construct if the composite reliability (CR) becomes greater than 0.60 (Fornell & Larcker, 1981). The construct reliability is measured with Cronbach’s Alpha, and the acceptable range is >0.60 .

Confirmatory Factor Analysis (CFA)

The confirmatory factor analysis has a diagrammatic presentation form Smart PLS Path diagram.

Figure 2. Depicts CFA of all variables as a path model



The Figure 2 depicts the factor loadings on the respective latent variables. The first indicator is factor loading in CFA. Ideally, a factor loading must be greater than 0.70. However, some scholars suggested that the acceptance criteria of factor loadings can also be >0.60 (Aljanabi, 2017; Chin, Gopal & Salisbury, 1997; Hair et al., 2006). In this study, the factor loadings of the two items were less than 0.6, due to which the AVE of the latent variables was also outside of the acceptance range. These items were Cr10, and PI3, and were excluded from further analysis. The values on the arrow heads show the beta weights, and the values in the blue circles (on the variables) show the R^2 . The factor loading of each item, and the convergent validity is given in the below Table 2.

Table 2: Factor Loadings and Convergent Validity

Construct	Items	Convergent Validity			
		Factor Loadings	Cronbach's Alpha α	Composite Reliability	AVE
Creative Self-Efficacy	CrSE1	0.754			
	CrSE2	0.848			
	CrSE3	0.885	0.777	0.869	0.690
Creativity	Cr1	0.666			
	Cr2	0.688			
	Cr3	0.707			
	Cr4	0.778			
	Cr5	0.724			
	Cr6	0.687			
	Cr7	0.755			
	Cr8	0.748			
	Cr9	0.713			
	Cr11	0.767			
	Cr12	0.695			
	Cr13	0.683	0.915	0.927	0.515
	Product Innovation	PI1	0.677		
PI2		0.769			
PI4		0.650			
PI5		0.683			
PI6		0.696			
PI7		0.755			
PI8		0.772			
PI9		0.722	0.864	0.894	0.514
Entrepreneurial Passion		EP1	0.789		
	EP2	0.855			
	EP3	0.824			
	EP4	0.719			
	EP5	0.809	0.860	0.899	0.641

The values of alpha reliability were 0.777 for CSE, 0.915 for creativity, 0.864 for product innovation, and 0.860 for entrepreneurial passion. All values have fallen in the acceptable standard, which shows a good reliability of the items for each latent construct.

Table 3: Discriminant Validity and Correlations

Items	1	2	3	4
1. Creative Self-Efficacy	0.831			
2. Creativity	0.456**	0.719		
3. Product Innovation	0.364**	0.680**	0.717	
4. Entrepreneurial Passion	0.697**	0.505**	0.420**	0.801

Diagonal values depict discriminant validity of the items

*** Shows significant correlations at 0.01 significant levels*

The discriminant validity determines the differentiation among the constructs. It measures that a construct has distinct items when compared to other concepts. The acceptable range of discriminant validity is that its value must exceed the AVE value for that construct. As a rule of thumb, if the values on diagonal if exceed all the values lie in the table, then the discriminant validity is said to be in acceptable range (Aljanabi, 2017). In Table 3, the values at the diagonal exceed, which determines that the discriminant validity values are acceptable.

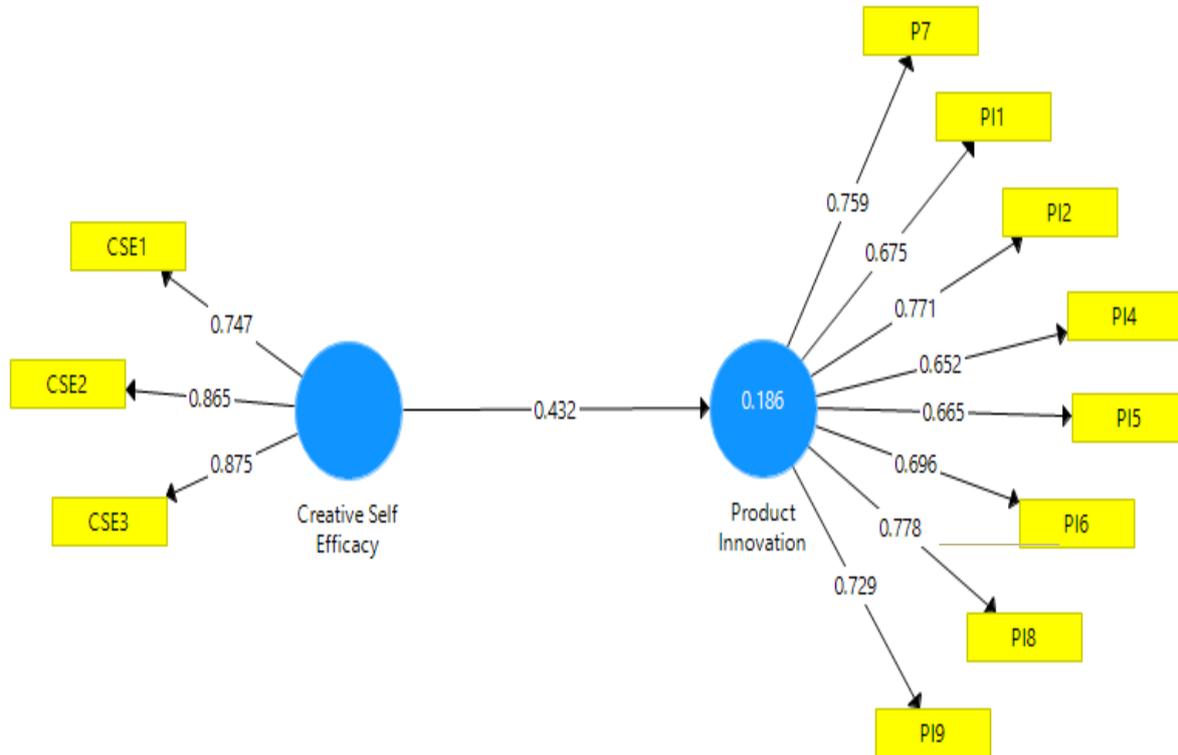
Direct Effect of CSE on Product Innovation

The direct effect of CSE on the product innovation has been depicted by a path diagram. The beta coefficient was 0.432, with $P=0.000$. The effect of CSE on the product innovation was significant, and positive. The R square value of each model is 0.186, which met the vital criteria of the goodness of model fit. Both Table 4, and Figure 3 showed the direct effect of CSE on the product innovation.

Table 4: Path Coefficients

	Product Innovation	
Creative Self-Efficacy	0.432 ($p = <0.05$)	
	R Square	R Square Adjusted
Product Innovation	0.186	0.184

Figure 3. Direct effects



Mediation Analysis of Creativity

The Figure 4, and Table 5 show the results of the mediation analysis. Moreover, creativity predicts production innovation ($\beta=0.287$, $P<0.05$). Creativity also acts as a mediator between CSE, and the product innovation. Creative self-efficacy positively impacts on the product innovation in the presence of creativity ($\beta=0.348$, $P<0.05$). In the direct relationship of CSE and the product, the innovation beta weight was 0.432, and during mediation, the beta weight was reduced to 0.348, but remained significant. Therefore, a partial mediation of creativity exists between CSE, and the product innovation.

Figure 4. Indirect effects

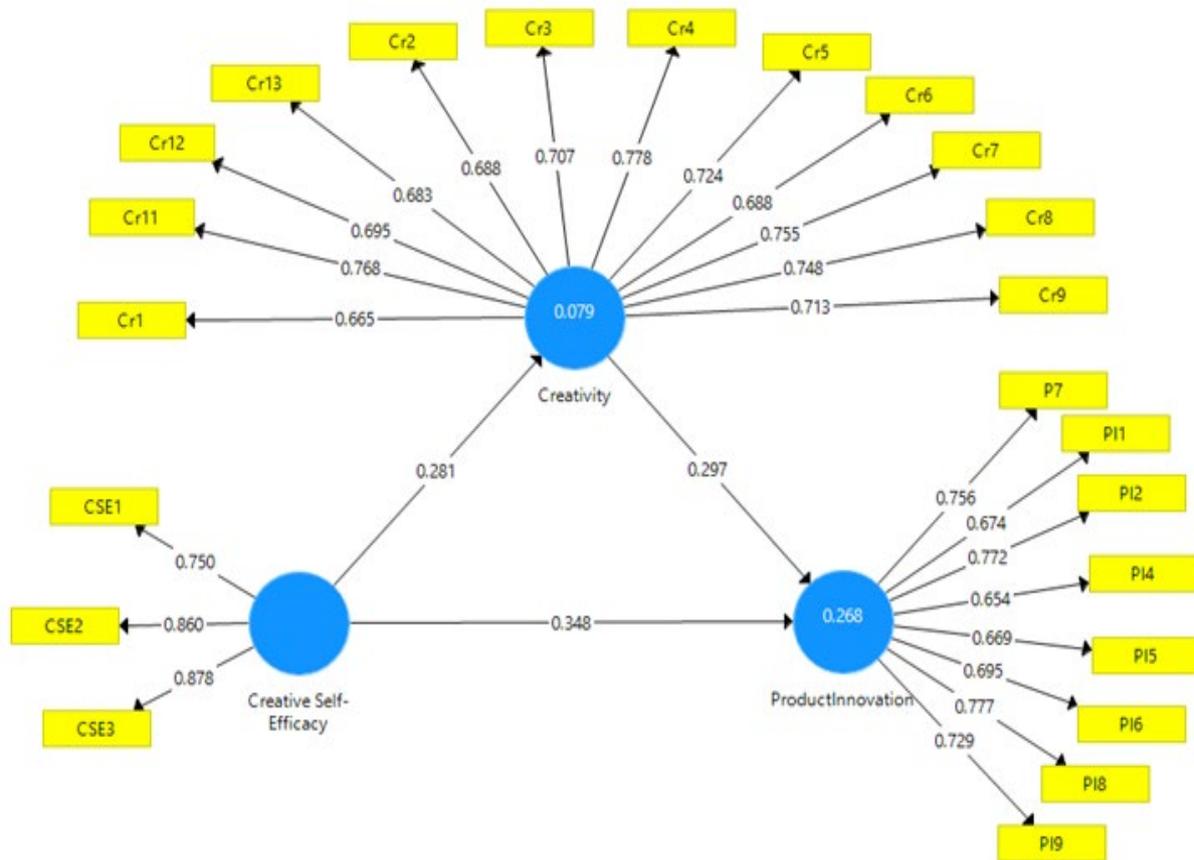


Table 5: Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation	T Statistics (O/STDEV)	P Values
Creative Self-Efficacy -> Creativity	0.281	0.283	0.062	4.565	0.000
Creative Self-Efficacy -> Product Innovation	0.348	0.349	0.048	7.259	0.000
Creativity -> Product Innovation	0.297	0.302	0.047	6.331	0.000

Moderation of Entrepreneurial Passion

Figure 4 shows the moderation results generated by the path diagram of the Smart PLS. Moreover, entrepreneurial passion serves as the moderator of creativity, and product innovation. The results showed that creativity has a significant impact on product innovation

(coefficient = 0.426, $p < 0.05$), and entrepreneurial passion also has a significant impact on product innovation (coefficient = 0.369 $p < 0.05$). Whereas, the moderating effect has a significant impact on the product innovation (coefficient = 0.168, $p < 0.05$). The beta coefficient shows that the moderating variable of entrepreneurial passion has a significant impact on the dependent variable. The moderating effect also has a significant impact on the dependent variable, and the independent variable in the presence of the moderating variable.

Figure 5. Moderation effects

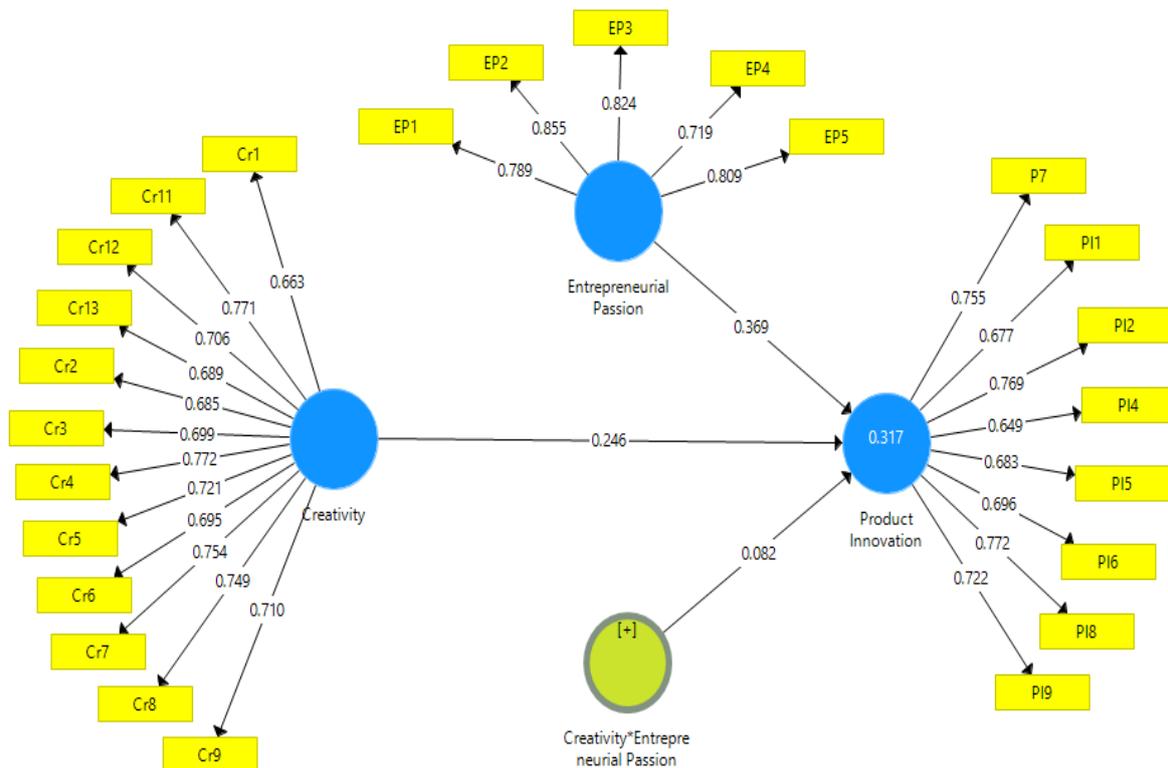


Table 6: Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Creativity -> Product Innovation	0.246	0.252	0.042	5.884	0.000
Entrepreneurial Passion -> Product Innovation	0.369	0.371	0.052	7.136	0.000
Moderation Interaction -> Product Innovation	0.082	0.079	0.032	2.535	0.012

Discussion

Creative self-efficacy is the poise of individuals to execute creative outputs. It is a critical, helpful, and inspirational driver of innovativeness (Tierney & Farmer, 2002). Hypothesis one proposed to anticipate the positive impact of CSE on the product innovation. In this study, this hypothesis was proven true. This is because an individual's cognition is vital in determining anticipated behaviour, and CSE lies in the cognitive processes, as an internal belief (Hou, & Fan, 2011). Creative self-efficacy also serves as the abstract confidence of an individual towards executing creative, and innovative outputs (Haase, Hoff, Hanel & Innes-Ker, 2018). The employee who possess creative-self efficacy are inquisitive, critical thinkers, and take risks. These attributes further enable and motivate them to undergo innovation (Gong, Huang, & Farh, 2009). The application of CSE to product innovation strengthens the transparency in performance systems across dyads (Khan et al., 2019). The hypothesis is also supported by previous studies, wherein this construct is accepted as a mental instrument resultant to innovativeness (Liu, Chen & Yao, 2010), and employee innovation (Hu & Zhao, 2016). Therefore, this study found a positive, and significant impact of CSE on the product innovation for improved performance, specifically in the context of the boss-subordinate dyad in IT firms.

The hypothesis two depicted that creative self-efficacy positively effects creativity. In the results, this was proven to be significantly true. Creative self-efficacy serves as a psychological mechanism involved in creativity. It serves as a mental asset, and enables a feeling of control in the individual (Schwarzer, 2014). As creative self-efficacy is the certainty to experience innovativeness, it acts from inside the individual, and fills the need, like an inborn inspiration. Additionally, creative self-efficacy is an interior tendency, and intention (Jaiswal & Dhar, 2016) that guarantees inventiveness. Thus, this finding extended the research of Mathisen and Bronnick (2009), and Schwarzer (2014). The results of hypothesis two affirms the discoveries of Tierney and Farmer (2011), Mathisen (2011), Chong and Ma (2010), and Lemons (2010), that creativity is a function of creative self-efficacy, leading to strengthening its worth across the registered IT firms, accordingly.

The hypothesis three was also accepted, which stated that “creativity positively affects product innovation”. The creativity of individual employees provides opportunities to translate their ideas into commercial forms as product innovation. Creativity is the input of all innovation (Amabile et al., 1996; Woodman et al., 1993), as well as product innovation (Del-Corte-Lora, Vallet-Bellmunt & Molina-Morales, 2015; Travis & Lagrosen, 2014). The result extends the research by Setiawan et al. (2020), that creativity is the first stage of product innovation across creative industrial workers. Therefore, the engagement of employees by employers to carry out creative tasks can be instrumental for innovation across Pakistani IT firms.

Hypothesis four stated that “creativity mediates between CSE, and product innovation”, and which was proven true through this study. The prerequisite position of CSE, as a psychological mechanism towards creativity and innovation, has deep roots in the componential theory of creativity (Amabile, 1983). It advocates the prevalent nature of creativity as a product of individual minds, which is driven through the motivation or drive to do so. In this study, CSE serves as an essential of the individual potential of creativity. An individual considers oneself capable of contributing to the product innovation of IT products. This process utilises creativity, as the intervening mechanism to translate CSE, as a capability to produce new products and services, and add novelty in them. The support for creativity under the dyadic interaction of the boss-subordinate fosters product innovation, as it has been enhanced by the creative self-efficacy of employees.

This study confirmed the moderating role of entrepreneurial passion under hypothesis five. Entrepreneurial passion serves as a moderator in studies, where an expression in the skills or mind is done to attain some result, as used in study of Costa, Santos, Wach, and Caetano (2018). As an individual becomes creative, and generates ideas, those ideas may diminish if the person does not have the passion to generate from that idea. The nature of entrepreneurial passion has also been proven to strengthen the relationship between creativity, and product innovation. These findings strengthen the research outcomes of Davis et al. (2017), and Costa et al. (2018), wherein emphasis was made on investigating the moderating role of entrepreneurial passion for improved innovation. The findings strengthen the entrepreneurial passion of the workforce in a unique context of the R&D section of IT firms, in comparison to its use at incubation centres.

Conclusion

The study holds confidence in the dyadic relationship of the boss-subordinate involved in the R&D of IT firms in Pakistan. The outcome of this study depicts creative self-efficacy’s impact on the product innovation under the established partial mediation of creativity. The role of entrepreneurial passion, as a moderator, has been proven true between creativity, and product innovation. These findings sustained the view of componential theory of creativity (Amabile, 1983), in the unique context of an underdeveloped country, which advocates the motivational mechanisms involved in creative tasks. Creative self-efficacy facilitates in the performance outcomes, and acts as the psychological mechanism to bridge between the social environment, and creativity. Thus, the employees of the IT firms involved in product innovation, and idea generation activities depend upon their CSE, which further determines their creativity.



Theoretical and Practical Implications

The finding of this study was a realised understanding of creativity, and the product innovation of the IT sector of Pakistan. In addition to creativity, and the social contextual background leading to deepening the understanding of the theoretical aspects of dyads. The findings are consistent with the investment theory of creativity (Sternberg & Lubart, 1991), which emphasises the importance of the outcome from creativity. The creativity to product innovation effect under the moderation of entrepreneurial passion added distinct theoretical knowledge. Entrepreneurial passion serves the role of ignition between creativity, and product innovation. The results provide practical reasoning to reconsider human resources functions for training and developing employees to foster better product innovation under the antecedent of CSE.

Limitations and Future Research

Despite the realisation of valuable results, certain limitations have been associated with this study, which need to be highlighted. First, the data gathered for this study was comprised of a limited sample size. Future research can utilise diverse cultures to further investigate the variables, in accordance with Singelis and Brown's (1995) recommendation. Second, this model was particularly tested in IT firms, so it can also be tested in other sectors to attain a greater generalisation ability. Further, this study used CSE as the psychological mechanism of creativity; future research may explore other psychological factors, which may act as antecedents of creativity.

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