

# Confirmatory Model of the Workplace Creativity in Higher Education

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**Abstract:** *This study has identified the key factors of workplace creativity in the higher educational institution. Previous studies have provided evidence of the positive correlation between the performance level of students and employees. Researchers in past studies have also discussed the close association between favorable cultural conditions and workforce performance. One of such conditions is the culture of creativity and innovation. Many institutions are unable to perform due to lack of motivation among employees to exercise creativity in their work. Current study has identified twelve key visible practices among employees in the higher educational institutions from the past literature. These indicators were then employed to factor out four latent constructs including: presence of challenge in job, motivation to take up the challenging tasks, freedom and flexibility in doing job, and availability of enough resources to experiment. Data was collected from 191 employees in eight institutions of higher education in UAE by using creativity scale questionnaire. Exploratory factor analysis was initially employed to verify the structure of the proposed path model, and then relationships between indicators and underlying constructs were tested in the confirmatory factor analysis. Findings show that leadership role is an important element for the development of creative practices among employees which provoke innovative approach in jobs. This will motivate employees to face the challenges and find creative solutions. The study provides valuable information to the leaders in higher educational institutions and policymakers about the importance of the cultural factors which could be used as an indicator identifying presence or absence of workplace creativity and innovation.*

**Keywords:** Creativity, Innovation, Experimentation, Workplace challenges

## I. INTRODUCTION

The sustainability in growth depends on innovative capabilities of the people, which creates a competitive advantage for them (Muller et al. 2005; Polits 2005). It requires workplace environment that encourages idea-generation and creative thinking (Amabile 1998; Polits 2005; Carroll 2014). In UAE, universities are dealing an extreme diverse population of students by employing the staff with different background, culture and communal groups.

Educational models which are based on excessive standardization cannot work. Flexible adaptable learning and teaching strategies is a natural form that supports cultural diversity. Diversity has advantage, as it brings diverse workplace experiences in the organization. If university leadership can identify and manage such pool of successful experiences, will create competitive advantage for the institution.

## II. CREATIVITY AND INNOVATION

According to Amabile et al. (1996), creativity and innovations are two interrelated terms, where creativity is the production of novel and useful ideas in any domain, and innovation is the successful implementation of such creative ideas in the organizational context. Creativity in this sense is a deliberate process of reaching out the successful ideas to solve organizational problems. The creative outcome depends on the external as well as internal factors (Leavy, 2005). These factors derive the human efforts towards creativity and innovation. Innovation depends on the ideas and primary source of ideas is talented individuals (Leavy 2005). Innovation emerges from the initial creative idea to the experimentation and sharing of ideas with others (DeBowski 2006; Amabile 1998).

All human are creative, but every human is unable to engage creativity in the problem-solving. Past knowledge and experience of employees can impede creativity. De Bono (1995) said that our brain is used to of making quick judgments, but these instant judgments are enemy of creativity. People who are naïve in anything or they are new to any situation like children, are creative because they are unable to make a judgment about what they are experiencing new to them. In order to be creative, we must delay or suspend the judgment process in our brain (De Bono 1995).

Cognitive practices among employees to solve problem include both convergent and divergent thinking (Duck 1981). Convergent thinking is targeting on the one right answer to the problem (Kneller, 1971), whereas, divergent thinking as better approach over the convergent thinking, aims at multiple possible solutions to answer the question. According to Leavy (2005), leaders should be able to recognize that creativity and intelligence are not the same and that there are many intelligent people who are unable to provoke their creativity beyond a moderate level. On the other hand, the creative people are marked by the capacity for divergent thinking as they are characterized by originality, fluency of ideas, the flexibility of ideas, ability to elaborate, ability to refine. When employees provoke creativity to engage in the problem-solving application, it becomes active creativity, and they start innovating in their work.

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Sternberg(2003), in his book *Wisdom, Intelligence, and Creativity Synthesized*, mentioned various strategies to foster creative practices among children, which can equally be applied in the organizational context. In relation to this research, some of the characteristics are:keep challenges in jobs, risk-taking, out of the box thinking, freedom to problem solving,right use of knowledge,sufficient time for creativity, guidance for creativity, encouragement for creativity, allow to do mistakes, and encourage creative collaboration.

The KEYS model (Amabile 1996) is considered a widely accepted model to assess the work environment for creativity. According to this model, all innovations begins with creative ideasand theirsuccessful implementations. KEYS model relates creative work with three components; creative thinking, motivation, and expertise.The creative thinking skills will enable employees to deal challenging situation. If such employees are also motivated to confront these challenges, they will take the idea beyond the initial state and experiment. KEYS model ismeasuring employees' perception of creative culture in the organization with the help of two different scales called 'Stimulant scales' and 'Obstacle scales". Stimulant scales are positively related to the creativity, and obstacle scales are negatively related to the creativity. The conditions prevailing in the organization supporting creativity include; supervisory and workgroup support, autonomy or freedom, availability of resources, and work pressures like challenging work or workload. The conditions unfavorable to creativity include; culturalfactors like politics among workers, and unrealistic work pressure.

Muller et al. (2005) gave the framework of innovation, which explained the perspective for a suite of metrics that help assess and develop the organizational capacity for innovation. The fundamental assumption of this model was that innovation is not a onetime or a random act in any organization, rather it should be considered as a permanent feature prevailing in the organizational culture which looks at the innovative practices and processes as habits of employees and leadership. According to this model, the sustained innovation in the organization needs appropriate metrics to measure the degree of innovativeness, in order to take the informed decision. This model describes input, process, and output in three innovative contexts. First is the resource view, which addresses the allocation of resources to generate a return on investment by deploying strategic innovative processes. Capability view assesses the cultural conditions allowing innovative practices. The conducive culture acts as an input and it accommodates processes such as research and experimentation for producing unique products. The leadership view assesses the degree to which organizational leadership extends support for innovation. Policies and rules encouraging innovation are inputs combined in the processes where leaders are involved in motivating and allowing for creative ideas in practices so that they can produce an output which will give them a competitive advantage. Managers need to measure both input and output to determine the degree on which organizational culture is allowing for innovation in work processes.

Bukowitz(2013), in his case study of the Fidelity Investments, has emphasized that for the success of

innovation there should be bold and risk-taking efforts in the presence of stringent compliance requirements, use the culture to your advantage, let the innovators pick the tools they want to use, create a home for innovation that focuses and leverages impact, and be ready to change your own ideas about what you should be doing. Fidelity's Innovation Framework is based on four layers which develop the culture of innovation in the organization. These layers include; business layer, tools layer, human layer, and cultural layer. The business layer is the first layer which carries strategy and resources for innovation, where resources include both time and funding. Business layer will provide support to the tools layer which explains the management processes. The human layer includes right people, who are motivated and appropriately empowered to contribute. The final layer of culture represents permanent nature of practices which are hard to be influenced directly. According to this framework, the leadership initiative through strategic measures and resources to empower motivated and right people in the processes will develop the culture of innovation.

Ikedda and Marshal (2016) provided a list of visible practices in the most successful innovation organizations grouped into three sets: organization, culture, and processes. The organization covers practices including the creation of impact from resources for innovation, open collaboration among employees for innovation and idea generation, establishing dedicated innovation teams. Culture includes the placement of innovation at the core of the organization, building a climate of innovation by making innovation a philosophy, and prioritize agility as a critical capability. Processes include creating idea generation platforms, idea evaluation processes, securing an innovation funding stream, and use quantitative metrics to evaluate innovation. The outperforming innovators generate new ideas from a wide range of sources, they fund innovation and measure innovation outcomes.

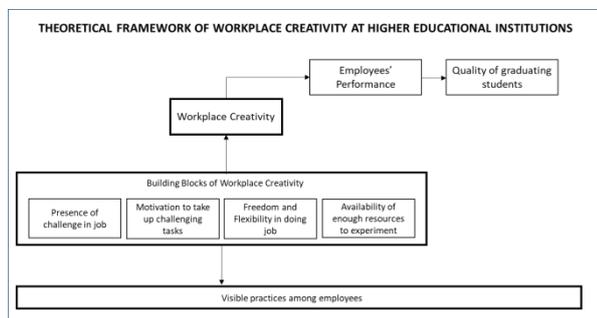
There are few other reliable instruments assessing the work environment for creativity, for example, the Organizational Assessment Instrument (Van de Ven and Ferry 1980), Work Environment Scale (Insel and Moos 1975), Sport of Innovation Scale (Siegel and Kaemmerer 1978), and Creative Climate Questionnaire (Ekval, Arvonen, &Waldenstrom 1983).

With the help of above discussion, the culture of creativity in the organization explains how far set of internal organizational conditions and management practices are enabling employees to exercise creativity in their work. It explains the degree to which organizational environment can provoke creativity and enabling them to adopt creative and innovative ways in their jobs for improved performance and competitiveness. Employees will be creative when they find their work challenging, they have a shared commitment to face the challenge, when they have enough freedom or autonomy in their work, and when enoughresources are available to them to exercise creative ideas.



### III. THEORETICAL MODEL

The literature review has helped us to identify following key conditions among employees that can be considered as factors determining the level of creativity and innovation in the workplace. They can be considered as the building blocks of the culture of creativity at the workplace as shown in the following figure.



**Figure 1: Theoretical framework of the workplace creativity and innovation**

The figure-1 provides the theoretical framework of the workplace creativity. With the help of past literature, a direct relationship between employees' performance and quality of graduating students was established by many researchers (Ramsden 1991; Singh 2000; Parket 2000; Kuncel et al. 2004; Berk 2005; Stronge et al. 2007; Sadikoglu&Zehir 2010). On the other hand, literature review has also provided evidence that employees' performance is depending on the cultural conditions supporting creativity in the workplace (Ostroff et al. 2003; Noe et al. 2006; Senge 2006). From the literature review, following four factors (or building blocks) were identified, which defines the behavior of the employees and can be seen through visible practices among them:

1. Presence of challenge in the jobs. (Lynch 2017, Sternberg 2003, Amabile et al. 1996)
2. Motivation to take up the challenging task. (Lynch 2017; Sternberg 2003, Amabile et al. 1996)
3. Freedom to experiment in jobs to exercise creative ideas. (Sternberg 2003, Amabile et al. 1996)
4. Availability of enough resources to support creative practices in the job. (Muller et al. 2005, Sternberg 2003, Amabile et al. 1996)

### IV. PRESENCE OF CHALLENGE IN JOB

Every organization must meet certain goals in short and the long run (Dubrin 2007). There are challenges in the way to achieve such goals. Challenge should not be understood as a difficult or unachievable task, rather it is something which needs out of the box thinking. Easy to go work life will not encourage employee to exercise its creative practices (Sternberg 2003). It requires the work challenge, risk-taking and experimenting (Goh& Richard 1997). When a person is faced with a challenging problem, he or she will often increase the probability of finding a creative solution (Dubrin 2007). For example, work pressure or work stress causes challenge (Cady & Valentine 1999; Amabile 1996) as mentioned in the Goal Theory (Lockey 1968), that too little

challenge leads to boredom, and too high challenge make it impossible to attract employee towards the challenging work. Meeting the academic quality standards in teaching and learning also possess challenge on teachers and students respectively (Calman 2007). Likewise, challenges may arise due to the interaction between social and technical factors (Cooper& Foster 1971). When colleagues interact, they compete. If this competition is healthy it will help in the improvement of their performance. Think win-win (Covey et al. 2014) is one of such characteristics among employees that can help in building the effective culture. Other forms of challenges include; ambiguity, politics (Hass 2006), and information gathering (De Bono 1995). Therefore, the visible practices showing presence of challenge in work include:

- Performing within quality specification standards (challenge of outcome).
- Students' set goals for their next achievements (the challenge of performance).
- Healthy competition among employees (the challenge of competition).

**Hypothesis 1:** There is a positive effect of the presence of challenge in the job and the workplace creativity and innovation.

H1a: All employees are required to meet quality standards in their work.

H1b: All students set their own goals of achievement.

H1c: There is healthy competition among employees.

### V. MOTIVATION TO TAKE UP CHALLENGING TASKS

Organizational culture can make creative people more creative (Amabile 1998, Gardner 1994), by creating readiness among staff to deal with new challenging organizational goals (Lynch & Smith 2016). When employees are not motivated, there will be no growth, no productivity gain, and technological development (Senge 2006). Those employees who are motivated to face the challenge are encouraged to be risk-takers. Risk is the outcome of those actions which are taken in the state of uncertainty (Antunes& Gonzalez 2015), and positive association was found between risk and return (Sharpe 1964). Moderate risk-taking can have probability of failure, that must be allowed to employee, instead of being punished (Sternberg 2003). This will help them to reach to the novel ideas of solving problem. The institutions where managers think that best ideas and decision-making abilities only exist among higher-ups are reducing the organizational ability to create (Adams 2005). They need sense of ownership and encouragement (Polits 2005). This requires inculcating in people at the psychological level the tolerance towards non-habitual and to unexpected criticism along with free flow of opinion and respect for alternative views (Petrosyan 2016). Leaders extend help in solving problems instead of trying to solve the problems themselves (Hanzager& Alexandra, 1991).

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Organizational encouragement will increase the favorable relationship between employees and organization (Rhoades & Eisenberger 2002; Amabile 1996) and encourages them towards better performance (Fiedler 1997), for example reward is a motivator, and exerts energy into the creative process (Sternberg 2003, Kachelmeier et al. 2008). Similarly, the supervisory encouragement for experimentation will also help in provoking creativity among employees (Sternberg 2003). Focus on incentives, team formation, staffing, and existing innovation processes act as inputs to the leadership support for innovative practices (Muller et al. 2005). Ineffective organization, there is a culture of cooperation among employees in order to deal with challenges. It means that the whole group is engaged working on a creative idea, as joint ownership (Sternberg 2003). As a result, members in the group or colleagues go out of the way to help each other during the challenging situation. Peer support ease out the decision-making during difficulties, which enhances employees' creativity (Amabile et al. 1996; Polits 2005). In the study by Lynch & Smith (2016) highlighted the importance of teacher's readiness and its impact on the institutional improvement. In the similar study (Lynch et al. 2017) developed a proposition that teacher's readiness is linked to overall improvement through improved students' learning. Therefore, the practices among staff showing motivation and readiness to take up the challenging task include:

- Employees are taking moderate risk in the job (Risk-taking behavior)
- Supervisor encouragement to deal with challenge (Supervisory support)
- Workgroup support during challenging situation (Peer support)

**Hypothesis 2:** There is a positive effect of staff motivation to take challenging work on the workplace creativity and innovation.

H2a: All employees are taking a moderate risk in their jobs.

H2b: All employees are encouraged to face the challenge by their managers.

H2c: All employees support each other during the challenging situation.

### VI. FREEDOM AND FLEXIBILITY IN DOING JOB

Freedom and Flexibility in doing Job means that employees are enjoying enough freedom in their jobs to adopt alternative ways of doing work, and they have flexibility in taking different decisions regarding their work. They have freedom in planning, way to do the work, and innovate. It provides a sense of ownership, and control over their work (Garavelli & Gorgoglione 2006). Freedom of planning has its roots with the encouragement of creative ideas in the organization (Amabile, et al. 1996; Gardner 1994; Adams 2005; Johansson 2004). For developing creativity, employees must be given chance to come up with their own solutions to the problem in planning as well as during the work itself, especially for those who really have passion in that areas or field, as it fosters the creative process (Sternberg 2003). Management needs to purposefully analyze all sources of new opportunities (Durcker 1999) and must support experimentation in work in order to convert

the problem into opportunity (Goh & Richard 1997). This can be done through right kind of authority and empowerment. Autonomy provides highly integrated internal motivation (Choi 2007). When an employee is empowered (Potterfield 1999), they can help themselves (Adams 2005), and it results in the better performance (Ken et al. 1996). Management practices which allow freedom or autonomy in the work, are visible practices in the environment fostering creativity and innovation (Amabile 1996). Therefore, the visible practices of autonomy and freedom in the organization include:

- Freedom of planning.
- Freedom in the way the work is to be done.
- Freedom to innovate.

**Hypothesis 3:** There is a positive effect of freedom and flexibility in work on the workplace creativity and innovation.

H3a: All employees have the freedom to make their own work plans in their jobs.

H3b: All employees have the freedom to do work the way they want to do.

H3c: All employees have the freedom to innovate in their work.

### VII. AVAILABILITY OF ENOUGH RESOURCES TO EXPERIMENT

Companies must create balance between tactical investment in existing business and strategic investment in new businesses (Muller et al. 2005). Resources can alter this balance. They include all financial and non-financial resources available to the work desk or in the easily accessible range of staff. Staff requires equipment, stationery, furniture, and enough space to execute their responsibilities. When leaders equip their staff with enough resources to experiment, they are helping their organization to solve challenging problems of the welfare of students, teachers, parents, and the institution's community (McNamara et al. 1999). Time is one of the important factors for creativity (Amabile et al. 1996). Creative idea and underlying process has time lags involved, and it comes in bits and pieces (Sternberg 2003). Time in the context of creativity means duration that allows cultivating and growing the creative idea in the mind. It is like the cooking of idea to the level that can be materialized in concrete manner (Dubrin 2007). Effective organizations allocate enough time to teachers to balance increasing curricular demands (David & Terry, 2004). Perceived work environment does make a difference, and when employees feel that working on creative approach will negatively affect their performance, they will never innovate, and continue with traditional practices (Amabile et al. 1996). Authors have observed that in poor quality academic organizations, planning documents claim the allocation of ample resources to the staff, but when it comes to reality, there are serious direct or indirect bottlenecks to access the resources on time, which discourages creative approach in such institutions. Existing tacit and explicit knowledge in organization is also an important resource for creativity.



If employees lack enough knowledge in their domains, they will not be creative (McAuliffe 2016; Mataruna-Dos-Santos 2011; Polits 2005). The presence of the expert opinion among staff also helps employees to take right actions in various problem-solving situations (Sternberg 2003). Therefore, visible practices showing availability of enough resources to employees include:

- The budget adequacy.
- Non-financial resources are in the access of employees.
- The expert advisory system is in place to help employees with innovation.

**Hypothesis 4:** There is a positive relationship between the availability of enough resources and the culture of creativity and innovation.

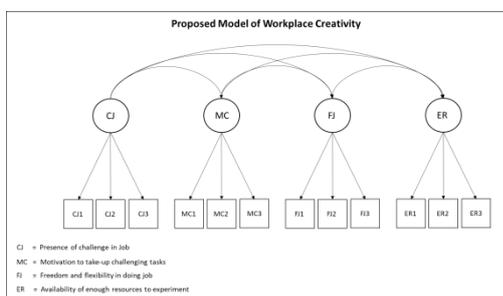
H4a: There is enough budget for innovative practices in the organization.

H4b: There are enough non-financial resources available to employees.

H4c: The Expert advisory system is in place to help employees for innovation.

**VIII. RESEARCH METHODOLOGY**

In this study the past literature was explored to obtain key determinants or factors of the workplace creativity and what are those indicators or visible practices among employees that can be considered as manifest variables explained by these factors. The theoretical framework in figure-1 above has explained the relationship between these variables and underlying constructs. The proposed model of workplace creativity is shown in the figure-2, which is a path diagram connecting the four latent factors and twelve manifest variables.



**Figure 2: Proposed model of workplace creativity**

The model specifications and fitness of the latent construct were examined through the confirmatory factor analysis (CFA), which is a useful technique to test model based on the prior research and given theoretical foundation (Harrington 2009). Research scale was borrowed from our own previous research (Azeem et al. 2018) and modified according to the current research context without compromising on the composition and placement of the scale items. The scale reliability test showing value of Cronbach Alpha of 0.59, which is in reasonable range, and can be improved with the increase in the sample size. Following table shows the operation definitions and corresponding scale items. Each item is measuring the

evidence of visible practice among employee in the organization.

**Table-1: Workplace Creativity Scale**

WORKPLACE CREATIVITY SCALE		
MV	Operational definition	Items
Presence of challenge in job (CI)	Degree to which employees are facing challenge of output in their jobs.	(q1_CJ1) It is not a very serious matter in my job if my students are not showing any progress. (r)
	Degree to which employees are facing challenge of performance in their jobs.	(q2_CJ2) It matters a lot if I am unable to perform according to prescribed performance standards of my job.
	Degree to which employees are facing the challenge of competition in their jobs.	(q3_CJ3) In this university, there is healthy competition among all employees to do better in their jobs.
Motivation to take up challenging tasks (MC)	Degree to which employees are carrying risk-taking behavior	(q4_MC1) I take moderate risk in my job.
	Degree to which employees have supervisory support in their jobs during the challenging situation.	(q5_MC2) During the challenging situation in my job, my supervisor goes out of the way to support me.
	Degree to which employees are getting peer support to deal with the challenge.	(q6_MC3) Only those who are close to me provide help during the difficult situation in my job (r)
Freedom and flexibility in doing job (FJ)	Degree to which employees have freedom of planning.	(q7_FJ1) My boss gives me free hand to make my own work plans.
	Degree to which employees have freedom in the way, the work is to be done.	(q8_FJ2) My boss does not allow me to do work the way I like to do. (r)
	Degree to which employees have freedom to innovate.	(q9_FJ3) I have freedom to experiment in my job.
Availability of enough resources to experiment (ER)	Degree to which employees find that the budget is adequate for their jobs.	(q10_ER1) The budget allocated to my work is not adequate. (r)
	Degree to which employees find that there are enough non-financial resources available in their jobs.	(q11_ER2) I have enough resources available for my work. e.g. stationary, photocopy, furniture, etc.)

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	Degree to which employees have the facility of expert advisory system in their jobs.	(q12_ER3) There is someone in my university, who helps me with the expert advice, whenever I want to implement new idea in my job.
(r) indicates reverse order or negative statement of the item.		

### SAMPLE

Target population was universities and institutions of higher education in UAE. Due to the convenience of data

collection only three states of UAE were chosen, and data

was collected at random in eight universities from the employees by using questionnaire during fall semester 2018-19. Five universities in the private sector were chosen from Dubai; two from Sharjah; and one from Ajman. Out of 215 responses 191 were passed initial examination and included for analysis. Unengaged responses and missing values were removed from the data frame. The following section shows the demographic distribution of the responded of the study:

**Table-2: Demographic of the Respondents**

	Frequency	Percentage	Valid (%)	Cumulative (%)
<b>Gender</b>				
Female	71	37	37	37
Male	120	63	63	100
	<b>191</b>			
<b>Position of Respondents</b>				
Staff	113	59	59	59
	78	41	41	100
	<b>191</b>		0	
<b>Institution Type</b>				
Private	191	100	100	100
Public	0	0	0	100
	<b>191</b>		0	
<b>Age of Respondents</b>				
31-35	19	10	10	10
36-40	54	28	28	38
41-45	71	37	37	75
46-50	37	19	19	95
51-55	9	5	5	99
Above 55	1	1	1	100
	<b>191</b>		0	
<b>Education Level of Respondents</b>				
Diploma	5	3	3	3
Undergraduate	57	30	30	32
Master's degree	51	27	27	59
Doctorate/PhD.	78	41	41	100
	<b>191</b>		0	

## IX. DATA ANALYSIS & RESULTS

The data was loaded on IBM SPSS and AMOS to run CFA on 12 items. The goodness of fit indices were examined for model. CFA confirms the loadings of all scale items on the four factors as they were hypothesized. The proposed model was built on the experience and information found in the past literature. It was essential to load the data and ensure whether linear relationship exist between the manifest variables and latent constructs. Explorative factor analysis (EFA) is a popular statistical tool in multivariate analysis to develop basic explanatory theories and identifying the underlying latent variables structure (Harrington 2009), and it is an essential first step in the complex investigation. EFA is a data-driven approach based on the common factor model, where each observed variable is a linear function of one or more common factors, and one unique factor (Harrington 2009). Total variance in manifest

variable is equal to the common variance, which is due to the factor and the unique variance which is due to measurement error and item specific variance. The proposed model can be shown with the help of following linear equations:

$$y_i = \lambda_{ik} \zeta_k + \delta_i$$

Where,  $y_1, y_2, \dots, y_i$  are manifest variables in the model. The subscript ( $i$ ) with  $y$ ,  $\lambda$ , and  $\delta$  shows the number of manifest variables. There are 12 such variables in the model. The ' $\lambda$ ' is a coefficient that explains the proportion of variance in  $y$  due to the latent variable ( $\zeta$ ). Small subscript ( $k$ ) of  $\zeta$  shows number of latent factors where  $k$  varies from 1 to 4., and ( $\zeta$ ) represent the latent variables.  $\delta_i$  represent error terms which explain variance other than the latent variable in the manifest variable.

Sample size of 191 university staff is enough to run the EFA and CFA and qualifying the assumptions of multivariate analysis. Maximum likelihood (ML) method with promax rotation for factor extraction was used. It is non-orthogonal oblique rotation technique assuming that factors are correlated. Decision about number of factors was taken based on the eigenvalues greater than 1 and reconfirmed through scree plot. By default, SPSS uses the KMO criterion of retaining factors with eigenvalues greater than 1 (Field 2013). KMO measures of sampling adequacy is 0.78., communality is above 0.50 which also provides evidence for convergent validity. Factor correlations are also low which is evidence supporting discriminant validity. Some tendency of high correlations was observed which indicates the presence of some casual relationships between two factors. For example, between ‘CJ’ and ‘MC’ the correlation is 0.48, and between ‘MC’ and ‘FJ’ it is 0.45. On the other hand, the pattern matrix and factor correlation matrix also provides the is evidence of convergent and discriminant validity respectively. We can also use factor correlation matrix for studying the discriminant validity. According to this matrix, correlation between factors should not be greater than 0.70, which is the indication of shared variance. By calculating R<sup>2</sup> the percentage of the share can be found. Pattern matrix can also help in determining the face validity, though it is subjective, but variables loading on one viable can be explained for some common theme. CFA is applied to examine the construct validity, which tests the relationship between manifest and latent variables in the proposed model. Path diagram in figure-3 shows the AMOS output of the CFA.

**Table-3: KMO and Bartlette’s Test**

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.780
Bartlett's Test of Sphericity	Approx. Chi-Square	639.184
	df	66
	Sig.	.000

**Table-4: Pattern Matrix**

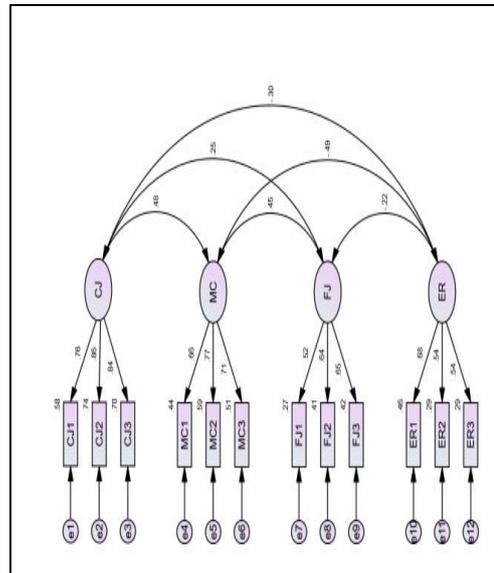
	Pattern Matrix <sup>a</sup>			
	Factor			
	1	2	3	4
CJ1	.714			
CJ2	.896			
CJ3	.835			
MC1		.736		
MC2		.793		
MC3		.575		
FJ1			.464	
FJ2			.687	
FJ3			.655	
ER1				.638
ER2				.533
ER3				.607
Extraction Method: Maximum Likelihood.				
Rotation Method: Promax with Kaiser Normalization. <sup>a</sup>				
a. Rotation converged in 6 iterations.				

**Table-5: Factor Correlation Matrix**

Factor Correlation Matrix				
Factor	1	2	3	4
1	1.000	.448	.248	-.308
2	.448	1.000	.447	-.457
3	.248	.447	1.000	-.219
4	-.308	-.457	-.219	1.000

Extraction Method: Maximum Likelihood.  
Rotation Method: Promax with Kaiser Normalization.

According to Figure-3, four latent variables CJ, MC, FJ, and ER are latent variables. Each latent variable explains the variance in the corresponding set of manifest variables. For example, arrows going out of the CJ show the explanatory power of CJ on CJ1, CJ2, and CJ3 respectively. For absolute fit, the value of Chi-square is 42.93 with p-value 0.6. In the Comparative fit, Normed fit index (NFI) and Tucker-Lewis index (TLI) are greater than 0.95, and Root mean square error of approximation is below 0.03. These values provides evidence of good fit between the model and observed data.



**Figure 3: Path diagram of the proposed model (CFA)**

Table 6 in the next section shows the standardized and unstandardized coefficients for CFA. Two estimates Standardized and Unstandardized are reported in this table.

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**Table-6: Estimates of the Model**

Observed Variables	Latent constructs	B (unstandardized)	$\beta$ (standardized)	R <sup>2</sup>	SE	Sig
CJ1	CJ	1.00	0.76	0.58		
CJ2	CJ	1.11	0.86	0.74	0.097	***
CJ3	CJ	1.04	0.84	0.70	0.092	***
MC1	MC	1.00	0.66	0.44		
MC2	MC	1.26	0.77	0.59	0.164	***
MC3	MC	1.15	0.71	0.51	0.153	***
FJ1	FJ	1.00	0.52	0.27		
FJ2	FJ	1.27	0.64	0.41	0.270	***
FJ3	FJ	1.30	0.65	0.42	0.275	***
ER1	ER	1.00	0.68	0.46		
ER2	ER	0.78	0.54	0.29	0.168	***
ER3	ER	0.80	0.54	0.29	0.172	***

## X. MODEL HYPOTHESES TESTING

In the following section shows that enough evidence has been obtained through data analysis so that proposed hypothesis are tested, and conclusion can be drawn about the framework.

**Table-7: Hypothesis Testing**

	Hypotheses	Results
<b>H1</b>	<b>There is a positive effect of the presence of challenge in the job and the workplace creativity and innovation.</b>	Accepted
1a	All employees are required to meet quality standards in their work.	Accepted
1b	All students set their own goals of achievement.	Accepted
1c	There is healthy competition among employees.	Accepted
<b>H2</b>	<b>There is a positive effect of staff motivation to take challenging work on the workplace creativity and innovation.</b>	Accepted
2a	All employees are taking a moderate risk in their jobs.	Accepted
2b	All employees are encouraged to face the challenge by their managers.	Accepted
2c	All employees support each other during the challenging situation.	Accepted
<b>H3</b>	<b>There is a positive effect of freedom and flexibility in work on the workplace creativity and innovation.</b>	Accepted
3a	All employees have the freedom to make their own work plans in their jobs.	Accepted
3b	All employees have the freedom to do work the way they want to do.	Accepted
3c	All employees have the freedom to innovate in their work.	Accepted
<b>H4</b>	<b>There is a positive relationship between the availability of enough resources and the culture of creativity and innovation.</b>	Accepted
4a	There is enough budget for innovative practices in the organization.	Accepted

4b	There are enough non-financial resources available to employees.	Accepted
4c	The Expert advisory system is in place to help employees for innovation.	Accepted

Above table verifies that all model hypotheses were accepted and pass the statistical evidence test.

## XI. MANAGERIAL IMPLICATIONS

The current study has explored literature to unearth those key factors supporting workforce creativity and innovation. The control on these four factors will enable educators and leaders to manage financial and non-financial resources along with leadership commitment, to achieve competitive advantage. It highlights the importance of challenge in the job. Easy to perform routine jobs cannot provoke creative insights. Leaders in higher education must bring a challenge for their team and exhibit their commitment to overcome such challenges. The policy framework should be such that it allows individual to take moderate risks in their work and undertake experiments reaching out the alternate solutions to the workplace challenges. Further work is required in this direction to validate current relationships among the variables of the proposed model. The current study also guides us towards following key considerations:

1. There should be flexibility in the workplace in all respects.
2. Over-standardization during the process may hamper creativity and innovative initiatives.
3. Allocation of financial and non-financial resources for experimentation is essential.
4. Leadership must encourage employees to take a moderate risk in problem-solving.
5. Imitating the best practices of other institutions could be harmful if they were not understood and related to institutions own objectives.
6. Creative people need recognition for gaining further energy for greater challenges. Therefore, acknowledging one's ideas and work is a key and it gives a positive message to all members to produce their work with any fear of being stolen.



## XII. LIMITATIONS

Current study was conducted subject to following limitation:

1. Interviews data can contribute valuable information, which were not included in this research due to time constraint.
2. The data was gathered only from the employees in private sector, which can skew the research findings. It is important that comparative analysis should be developed between employees working in private sector and public sector universities.
3. Only 191 responses were included in the analysis, which should be increased for more reliable generalization.
4. The model was presented without mediation and moderation effects, which may have serious effect on the conclusions. Therefore, effects of gender, nationality, location etc should also be studied.
5. It is important to include the interrelationship among latent variables in the structured model, which was not included in the current research.

## XIII. CONCLUSION

This paper presents a conceptual framework of workforce creativity and innovation, which depends on four factors, which are ‘employees have a certain degree of challenge in their jobs’, ‘they are motivated to face such workplace challenges’, ‘freedom, and flexibility in their work’, and ‘availability of enough resources for experimentation’. The culture of creativity and innovation is modern day requirement to run educational organizations. The heterogeneous classrooms, diverse population of employees, numerous educational technology tools, and state's quality standards are such challenges which cannot be ignored. The organizational culture which empowers its employees to proactively deal with such challenges by provoking their creative ideas and innovative practices in day-to-day work can increase the capacity of the organization to move forward successfully. The variables included in the proposed model of workforce creativity and innovation were derived from the literature review. The model testing was done on the private university employees with the assumption that the findings from the public sector universities would not be very different. It is essential to replicate the similar study for the data on the public sector universities. Although, the current study has drawn a basic framework which can be enhanced for larger perspective. The empirical investigation is further required on the larger sample to verify the predictability of the proposed model.

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