



Organizational culture and innovation performance in Pakistan's software industry



Fakhar Shahzad*, GuoYi Xiu, Muhammad Shahbaz

Harbin University of Science and Technology, China

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ABSTRACT

Rapid transformation in technological innovation requires organizations to develop a culture that fosters innovation performance for sustainable development amidst global competition. The core aim of this empirical investigation is to explore the role of organizational culture, particularly an inclusive culture, in the innovation performance of the software industry in Pakistan. To achieve the objective of this study, research was conducted to collect the required information by using a structured questionnaire from software firms in Pakistan via an online data collection system using Google Forms. The sample size is ($n = 215$) therefore, descriptive statistics, correlation and multiple regression models are used to determine the association between explanatory factors of organizational culture and innovation performance. The results propose that organizational innovation performance is backed and affected by organizational culture. Flexibility/support to change and organizational climate are the comparatively significant factors for creativity and innovation performance. This study focuses on the cultural influence of innovation performance in a specific industry where measurable performance is critical for competitive survival: the software industry. It is critical to understand this relationship, particularly in the context of a developing economy, because of the status of the software industry in the rapid technological innovation and economic progress of the country.

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1. Introduction

Innovation has become the core pillar of achievement for every organization in the current business world. Fast-evolving technology, shorter product life cycles and a higher rate of product development possibly boost the speed of innovation, which triggers changes in the nature of economic development. Innovation is now a core part of organizational strategies to achieve and sustain a competitive advantage in the market. It will be more complex due to rapid changes in customer wants and technology [7]. An organization, small or large, whose core objective is to produce software, is known as a software house. It requires that the personnel be highly technical in the aspect of developing software. HP, Microsoft, Oracle, and Apple are world leading software developers. Let us take-a-look at the IT industry of Pakistan, which is flourishing and has achieved its goals in recent years. Currently, more than 2500 IT firms are registered with highly skilled and educated professionals in Pakistan. The sales of the IT industry is over \$ 2.8

billion, out of which \$ 1.6 billion belongs to the export of software and IT services [49]. As per the report, 25 tech-incubators, co-working spaces, and accelerators are in possession of the Pakistani IT industry. Three OSCAR awards are received by Pakistani software engineer "Mir Zafar Ali" due to tremendous contribution to Life of Pi, The Golden Compass, and Frozen. Technically skilled and Microsoft certified professionals are adding value to the IT industry and economic development of the country [49]. (see Fig. 1)

This small, however, a significant industry has its own culture, and the performance of the organization is affected by its culture. A firm's culture required to the employees to do things efficiently. The study by Ref. [43]; investigated that the organizational culture is highly significant and plays a vital role in organizational success, and is highly correlated with an employee's satisfaction and performance. For example, software engineers require an open and relaxed environment to cultivate their innovative ideas into a software and introduce innovation in technology to the world. This type of creative environment could be developed by paying more focus on the organizational culture [4]. A Strong culture will motivate employees to take a dynamic part in decision making to express their innovative ideas with the management to improve organizational performance [45]. This study investigated the fact

* Corresponding author.

E-mail addresses: fshahzad51@yahoo.com (F. Shahzad), xiugy@126.com (G. Xiu), shahbaz755@yahoo.com (M. Shahbaz).

that a firm can maintain a sustainable innovation performance, which in turn leads the organization to get a competitive advantage if the management involves their employees in decision-making and maintains a flexible organization culture. This study is based on the software industry of Pakistan, which has the dynamic features associated with the high-tech innovation process, extended knowledge sharing, short product life cycle, and high global competition.

2. Theoretical background and hypothesis

Innovation is defined by Ref. [2] as an efficient execution of creative thoughts within an organization. Practical implementation of creativity is a preliminary point for innovation, which could not stop creative ideas considered as an essential theme for innovation and its implementation. As investigated by Ref. [16]; innovation is the most efficient way to attaining a competitive advantage, sustainable performance, and development of business in the market. It is true to say that innovative firms are more flexible with higher capacity to adapt changes in the market as well as in technology. Market innovation refers to the adoption of a new marketing program with existing products or finding and entering in new potential markets for new and existing products. Numerous studies suggest a substantial relationship between culture and innovation i.e. [10,23,32,35,37]. Wang & Ahmed, [52] described innovations in the process as well, which refers to introducing contemporary production and management methods, adoption of innovative technology, and improvement in product management systems. Organizations also established a culture that encourages their employees to come up with innovative ideas, take part in management decisions and innovation strategies. The environment enables creativity, informal and relaxed environment leads to the creativity and innovation in the organization. The study by Ref. [23]; has shown that organizational innovation and learning are affected by the organizational values, beliefs, work environment, knowledge sharing, and all the cultural doings in the organization.

Corporate culture has a determinant role in the working environment. As per the KBV theory of organizational culture, personal ideas are considered as an intangible asset, which plays a vital role in corporate development. Organizational culture referred to an employee's values, and beliefs shared at all levels and displayed organizational traits [42]. Creativeness belongs to individuals or a team, but change happens in the organization. Organizational culture is necessary to boost the knowledge sharing and creative minds which are considerable for organizational success [11].

Another would assume such a culture to discard activities and practices that obstruct innovation such as control, stiffness, predictability, and stability in the organization [25]. Furthermore, it represents the vibrant character of employees; language, behaviors, relationship, feelings, artifacts, physical settings, and symbolism are communicated and reinforced [52]. investigated that innovations become possible only when an innovative culture is developed in groups. For the efficacy of this procedure, new resolutions are highly required to increase creativity in an organization. Innovation in product and services are highly interrelated as per the needs of the potential customer and market demand at the accurate time. Organizational culture is a significant driver of risky outcomes such as productivity, innovation, and financial performance of an organization. The spirit of organizational culture is that the employees are highly motivated to find solutions to problems and coordinate through knowledge sharing and cultural values [46]. Strong organizational culture can significantly stimulate creativity and innovative behavior among the employees; it can be helpful to arise with creative ideas and consider innovation as a core worth of the organization [21]. Due to the nature of innovation, formal rules and regulations could be kept at a minimum level and provide an open climate to allow creative ideas to flourish [21].

2.1. External orientation

[33] defined that market orientation culturally linked with external orientation representing customers, competitors, and market cooperation [54]. described the impact of culture on entrepreneurship in family-based organizations in four dimensions, internal and external orientation is one of them. They explained that the culture of family firms tends to be determined by force of personality, comfortable environment for managers and staff of the project, autonomously. External orientation significantly emerges a strong culture within the organization to motivate an employee for knowledge sharing and improving abilities to determine the opportunities for the organization. External orientation based on market direction and firm's adaptability with the extreme situation and adjacent connection with customers and versatility via familiarity to market is also necessary for sustainable innovation performance [31]. Market orientation is the key factor to increase the innovative organizational performance [41] [29]. described the external orientation as fulfilling current and future requirements of potential customers as well as measuring the change in customer's expectations, evaluating the activities of potential competitors and sharing concerned information within the organization. That is why a firm needs to maintain contact with the

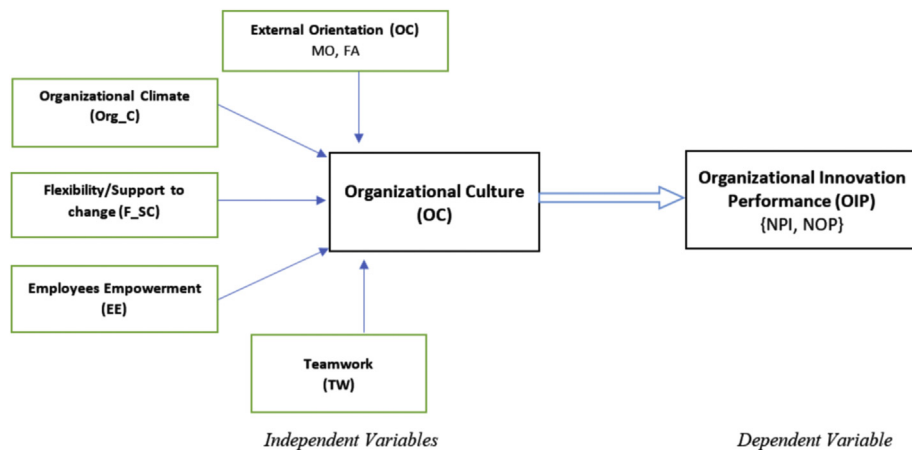


Fig. 1. Research framework.

external environment and analyze change.

Therefore, we hypothesized:

H1. External orientation does influence organizational innovation performance

2.2. Organizational climate

In line with the studies of Gupta, Tesluk, & Taylor [20], & [39]; an employee's self-perception regarding attributes of the organization is called as organizational climate, which plays a pivotal role in the creation of innovative attitude within the organization. The organizational climate describes to interpreting apparent practices, situations, and procedures; shared and followed by members of the organization [1,13]. Studies argued that an organization's climate has long been associated with the long-term survival rate and profit of the organization by promoting innovative ideas. According to the study of [18] organizations that stopped learning will lose the ability to innovate in highly uncertain circumstances within it [2]. Suggested that a consistently supportive climate is required to stimulate innovation activities, innovation capacity, and organizational performance. A flexible and positive environment is needed to deal with any fluctuations in customers' expectations, and it boosts the creativeness and employee's empowerment as well as is helpful in knowledge sharing [28]. A study of [8] described that companies having an advanced level of knowledge and open climate of knowledge sharing could foster the enterprise actions and affect positively to recombining internal and external resources, that cannot attain in closed climate culture. Augmentation in psychosocial work, positive and comfortable environment can mitigate employees' stress and make it easier for them to bring new ideas into work [3]. According to the study of [9] organizations should be more focused to the perceptions of employees toward organizational ethical climate which can play a vital role towards financial and innovation performance. An innovative and active organizational atmosphere provides a suitable climate to employees for theoretical and technological innovation, which affects the innovation performance of the organization. Organizational climate is measured as a vital tool to enhance an employee's innovative behavior and innovation activities [26]. Employees are more likely to aspire for innovation if they found perceive low innovative organizational climate.

Therefore, we hypothesized:

H2. Organizational climate does influence organizational innovation performance

2.3. Flexibility, support to change

Organizational change is considered as an interesting topic in the global environment, and it could say that "Only the change is constant." Organizations must be flexible to support the change to survive in a highly competitive market and to face global challenges. Organizational change might be of excessive advantage for corporate survival and innovation performance, if it takes place in response to a theatrical reform of market conditions, established routines and competencies [22,50]. Flexibility to changing global market situations and rapid decision making are key factors for getting innovation performance at an optimal level [28]. Organizations with appropriate flexible, innovative culture and provision of employee training can make internal or external adjustments and grasp market dynamics to become a market leader [55]. Organizational encouragement like as cheer innovation, rewards, defining creative activities, development of creative ideas and

positive attitude towards employees represent flexibility or support to change that brings confidence in employees and improve their creativity [9].

Therefore, we hypothesized:

H3. Flexibility/support to change does influence organizational innovation performance

2.4. Teamwork

Members of the team should interact and evaluate information at the right time to get the most suitable decision for improving innovation performance. Making decisions as a team is highly significant in business management. Team theory described that organizational decision-making determines the organizational growth. Knowledgeable workers are the core components to get sustainable innovation performance and decision making in the fast-changing global markets. Collaboration with employees in decision making will enhance the quality of a team's decision making and predictability of the firm, that leads to improving the ultimate innovation performance [36]. According to [27]; teamwork and the role of employees in decision making are incredibly substantial for innovation and organizational performance. Teamwork is a process of interrelated activities, based on the information circulated in the market including collecting, interpreting, and exchange of this information for achieving mutual organizational goals [48].

Therefore, we hypothesized:

H4. Teamwork does influence organizational innovation performance

2.5. Employee empowerment

Increase in intrinsic task innovation due to competencies and self-determination of employees is considered as an employee's empowerment [51]. According to [28] employees' participation in decision making encourages employees to feel more responsible for and important to the organization. It allows exploiting the knowledge and competencies of employees towards innovation [34]. Studied the software industry of Ireland and concluded that top management is controlling the culture of a software firm. Providing an opportunity to be the part of decision-making and sharing ideas with confidence can improve the innovation efficiency. Employee's empowerment and participation are essential in all type of organizational setup to improve employee's efficiency and innovation performance. Empowerment is described as a management style that values sovereignty, an employee's responsibility, creativity, and decentralization of managerial powers. It gives the opportunity and freedom to employees to achieve their tasks with full responsibility. Freedom of choice and self-determination in daily activities leads to the employees being more efficient and effective and vice versa [24].

Therefore, we hypothesized;

H5. Employees empowerment does influence organizational innovation performance

2.6. Innovation performance

[53] defined innovation performance as the accomplishment of innovation through organizational activities per desired targets that can be measured by various financial, technical, and non-technical methods. The study of [15]; recommended that language and culture vary according to organizational factors within a

national system, which plays a vital role to the fluctuating innovation performance of an organization. He further explained that innovation performance depends on the innovative abilities of an organization and the employees' internal and external interaction [44], argues that two crucial factors can measure innovation performance regarding product innovation and process innovation which are also known as product technology and production techniques respectively. Product technology or product innovation refers to the degree of invention in new products and services delivery while production techniques or process innovation represents invention and shifting of the manufacturing process by the adoption of the latest technology for provision of the products and services [40]. In the OSLO manual [38], innovation performance can gauge the output of innovation which includes new product innovation and new organizational practices. It increases the quality of products as well as existing organizational system which enhances productivity and profitability [12]. Our study is focusing on product and process innovation as the key factors to measure the organizational innovation performance. As per the study of [19], innovation strategies are the primary driver that should be developed and executed to enhance the innovation performance which boosts the operational as well as financial performance of the organization.

3. Methodology

This study was conducted to measure the influencing factors of organizational culture to the innovation performance of the software industry of Pakistan. The composition of data was based on a structured questionnaire using Google Forms sent to the employees of software houses around the country. A five-point Likert scale was used from strongly agreed to strongly disagree in this survey, which was employed in several studies to measure the relationship between culture and innovation performance i.e. [17,29,47,54]. Two-hundred twenty-seven employees from 29 software firms responded to the questionnaire. Top-ranked software firms like as; Net Sol Technologies, TRG Tech, Ovex Technologies, System Pvt. Ltd, Elixir Tech Ilds, Descon, and Kalsoft, are highly focused for data collection. After sorting the data, the 215 responses were found to be complete and were used as a sample for this study. The instrument used was reviewed and discussed with experts and went through testing before its distribution. The collected data was put into SPSS version 20 for analysis.

Age, gender, qualification, and experience were considered as control variables in this study. Cronbach's alpha technique is applied to find the reliability of the instrument. The values of Cronbach's alpha are; EO = 0.74, Org_c = 0.67, F_SC = 0.70, TW = 0.65, EE = 0.73 and OC = 0.78, which described that data is highly reliable and can be used for further analysis. Descriptive statistics applied on the control variables to measure the outcomes. Correlation and linear regression models are implemented to test the hypothesis of the study are already followed by a different researcher in studies i.e. [28,54] and [17].

The core intention of this research is to answer the question whether organizational culture has an impact on the innovation performance of the software industry of Pakistan. However, organizational culture and innovation performance measured by various dimensions based on prior studies. The framework of the survey is as follows:

4. Results and discussions

This section of the present study is an interpretation of the collected data from the software firms in Pakistan. The dataset has been analyzed by SPSS version 20 to use various statistical tools.

4.1. Demographic analysis

Table 1 shows the profile of the respondents, and it found that 56.7% of respondents belong to the young age group 20 to 29 and the remaining ones belong to 30 to 39. 58.6% of respondents are highly educated and attained a higher education level. Most respondents belong to experience group 6–10 which is 35.3 and 1–3 are 34%. 90.7% of respondents are male.

Based on these findings we can conclude that males are dominant in this industry in Pakistan. Young and educated personnel are engaged in software development. As shown in Table 1, the personnel in the software industry are highly experienced, 34% of the respondents have 1–3 years of experience, which describes the high rate of participation of new and skilled personnel towards the software industry that assists to invent new ideas and become the part of the innovation process.

4.2. Descriptive statistics

Descriptive analysis of explanatory variables illustrated in

Table 1
Demographic variables.

		Frequency	Percent	Valid Percent	Cumulative Percent
Age	Valid				
	20 to 29	122	56.7	56.7	56.7
	30 to 39	93	43.3	43.3	100.0
	Total	215	100.0	100.0	
Level of Education	Valid				
	Graduate	80	37.2	37.2	37.2
	Post-Graduate	126	58.6	58.6	95.8
	Diploma/Professional certificate	9	4.2	4.2	100.0
	Total	215	100.0	100.0	
Experience	Valid				
	Less than 1 year	13	6.0	6.0	6.0
	1 to 3	73	34.0	34.0	40.0
	3 to 6	53	24.7	24.7	64.7
	6 to 10	76	35.3	35.3	100.0
	Total	215	100.0	100.0	
Gender	Valid				
	Male	195	90.7	90.7	90.7
	Female	20	9.3	9.3	100.0
	Total	215	100.0	100.0	

Table 2
Descriptive statistics.

	N	Mean	Std. Deviation
EO	215	3.8500	0.82441
Org_C	215	3.9523	0.91891
F_SC	215	3.6726	0.79340
EE	215	3.9291	0.62645
TW	215	3.5814	0.70928
Valid N (listwise)	215		

Table 2. The Mean value of the variables described the fact that respondent's beliefs these variables are highly significant for organizational innovation performance. Organizational climate (org_c) and Employees Empowerment (EE) contain the higher values 3.95 and 3.92 respectively. It describes the fact that organizational climate and employee's empowerment in the organization plays a significant role in the innovation performance of the software industry in Pakistan.

4.3. Correlation analysis

To analyze the fact of the association between organizational culture and innovation performance Pearson Correlation matrix has applied. In this study, organizational culture is determined by various indicators. Results of all indicators are separately discussed to understand the overall impact of the culture of the organization about innovation performance, which is measured by using NPI, NOP and combined the effect of these indicators.

The correlation matrix in **Table 3** describes the values of the coefficient of correlation among dependent and selected independent variables. The value of correlation coefficient between external orientation (EO) and the dependent variable is 0.576 with the significant value at 0.000 which described the significant positive relationship between variables and the value describe the moderate strength of EO on OIP. Another indicator employees' empowerment also has a significant moderate impact on OIP with the value of 0.410. Organizational climate (Org_C) and flexibility/support to change (F_SC) have a strong positive correlation between OIP with the values of 0.764 and 0.806 respectively with a significant value of 0.000. The value of the coefficient of correlation between teamwork (TW) and OIP is 0.601, which describes the significant positive correlation. It is shown in **Table 3** that selected indicators of organizational culture significantly correlated with organizational innovation performance.

Table 3
Correlations.

		EO	Org_C	F_SC	EE	TW	OIP
EO	Pearson Correlation	1					
	Sig. (2-tailed)						
Org_C	Pearson Correlation	0.420 ^a	1				
	Sig. (2-tailed)	0.000					
F_SC	Pearson Correlation	0.622 ^a	0.810 ^a	1			
	Sig. (2-tailed)	0.000	0.000				
EE	Pearson Correlation	0.212 ^a	0.275 ^a	0.349 ^a	1		
	Sig. (2-tailed)	0.002	0.000	0.000			
TW	Pearson Correlation	0.319 ^a	0.554 ^a	0.569 ^a	0.325 ^a	1	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
OIP	Pearson Correlation	0.576 ^a	0.764 ^a	0.806 ^a	0.410 ^a	0.601 ^a	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	215	215	215	215	215	215

^a Correlation is significant at the 0.01 level (2-tailed).

4.4. Regression analysis

The Linear regression model has been developed as under to prove the influence of various aspects of organizational culture on organizational innovation performance.

$$OIP = a + b EO + c Org_C + d F_SC + e EE + f TW$$

Whereas, OIP represents organization innovation performance used as a dependent variable. EO is external orientation; Org_C is organizational climate; F_SC is flexibility/support to change; EE is employee empowerment; & TW is teamwork; "a" intercepted displays explanatory variables do not influence OIP and b, c, d, e, & f are the coefficients of explanatory variables respectively that represent the influence of these variables on organizational innovation performance. **Table 4** shows the results of regression analysis describe the significant value of regression coefficients.

Table 4 represents the regression outcomes of this study, and the value of Adjusted R square is 0.731, which displays that explanatory variables of organizational culture explicated 73% variation in organizational innovation performance and defined the appropriate fitness of applied model. The values of the regression coefficient of explanatory variables are also significant and positive which described the positive relationship among the variables. The prominent level of degree of freedom and significance values of regression analysis describe the fact that organizational culture has a significant positive impact on organizational innovation performance. Previous studies supported the importance of culture in innovation performance but this study empirically investigated this importance in the software industry which was previously not proved. Thus, H1, H2, H3, H4 & H5 are supported based on these empirical findings.

5. Conclusion

The focus of this study was to confirm that organizational culture has a relationship with innovation performance of the software industry in Pakistan. The strength of this relationship has been investigated by using a structured questionnaire and the data which were collected from all over the Pakistan. To achieve the key objectives of this study, organizational culture is measured in five possible dimensions which were briefly discussed in the literature. The value of the coefficient of correlations of selected critical dimensions are also significant with 0.000 significance level, and

Table 4
Regression analysis.

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	0.859 ^a	0.738	0.731	0.33445		
ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.743	5	13.149	117.545	0.000 ^c
	Residual	23.379	209	0.112		
	Total	89.121	214			
Coefficients ^d						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.201	0.200		1.005	0.316
	EO	0.183	0.048	0.176	3.816	0.000
	Org_C	0.231	0.044	0.328	5.238	0.000
	F_SC	0.278	0.068	0.301	4.064	0.000
	EE	0.133	0.040	0.129	3.367	0.001
	TW	0.165	0.049	0.150	3.362	0.001

^a Predictors: (Constant), TW, EO, EE, Org_C, F_SC.

^b Dependent Variable: OIP.

^c Predictors: (Constant), TW, EO, EE, Org_C, F_SC.

^d Dependent Variable: OIP.

regression coefficient is also showing the significant positive results in Table 4. The results of descriptive statistics in Table 2 also represent that selected cultural dimensions are equally important to measure the innovation performance. Organizational climate

and flexibility/support to change are extremely substantial to increase the innovation performance of the software firms in Pakistan. These empirical results proved a strong positive relationship between organizational culture and innovation performance in the software industry of Pakistan.

The overall results proved a significant positive relationship among the selected dimensions of organizational culture and organizational innovation performance. The obtained results are also verified and related to the previous studies of [4,28]; and [37]. According to results in Table 1, the participation of females is meager in the software industry as compared to the males. It is because of the high technical skills required in this industry or females are not desired to be the part of this industry. This issue can be further studied.

The Strong and flexible culture climate within organization motivates the employees to participate in decision-making with their innovative concepts which help to increase the organizational innovation performance. Management should have an emphasis on strategies regarding the development of human resource and provide an open climate to enhance research and development strategies which lead to improve the innovation performance of the organization and to get a competitive advantage worldwide. Innovative and flexible climate are also key factors to influence the innovation performance in collaboration with organization culture that is highly recommended for the future researchers to be investigated.

Appendix A. Measured items

Constructs	Items	Sources
External Orientation (EO)	Market Orientation:	
	MO1	This firm tracks changes in its markets on a regular basis.
	MO2	This firm is preferably working with the key customers and learning from them.
	MO3	The firm values are learning from the activities of its competitors.
	MO4	This firm pays attention to building relationships with external stakeholders.
	MO5	The firm values are working with an external agent.
	Firm's Adaptability:	
	FA1	This firm is flexible and adaptive in how it deals with difficulties.
	FA2	The firm approaches problems with a positive mindset.
	FA3	The firm knows it has the power to solve major problems.
Organizational Climate (Org_C)	Org_C	We regularly talk about things that concern us.
	Org_C	We take the time to listen to each other.
	Org_C	We are frank with each other.
	Org_C	We have social gatherings where everyone in the firm comes together.
Flexibility/Support to change (F_SC)	F_SC1	Informs employees regarding technological changes on a regular basis.
	F_SC2	This firm is aggressively pursuing emerging business opportunities.
	F_SC3	Managers ask employees if there was a better way to do things.
	F_SC4	This firm is committed to providing training to employees.
	F_SC5	This firm is devoted for utilization of innovative technology.
Teamwork (TW)	TW1	There is a lot of group spirit in this organization.
	TW2	Members of this firm are always able to help each other when the need arises.
	TW3	This firm when faced with difficulties it efficiently works together.
	TW4	Management is friendly and approachable.
	TW5	Management considers employee's options in making key decisions.
	TW6	Creating and preserving clear and explicit practices are important to us.
Employee Empowerment (EE)	EE1	The authority to decide is delegated to the person who is responsible.
	EE2	Decisions usually made at the level where the best information is available.
	EE3	The required information is widely shared with the employees as when they needed.
	EE4	Every employee in our organization is the part of both short and long-term planning processes.
Organizational Innovation Performance (OIP)	New Product Introduction	
	NPI1	How many products have launched in the past three years that are new to the software industry?
	NPI2	Paying attention to product specification during product development is essential.
	NPI3	Our customers provide specifications for new products.
	NPI4	The firm's growth rate of sales has increased because of introducing new product/service.
	New Organizational Practice	
	NOP1	Implementation of new business concepts and practices will enhance employee's innovation skills.
	NOP2	Changing organizational structure is significant to promote organizational innovation.
	NOP3	Introduce technology innovation programs to employees will boost the organizational innovation.

Appendix B. List of important acronyms

Sr	Acronyms	Details
1	KBV theory	Knowledge-based view theory
2	EO	External orientation
3	MO	Market orientation
4	FA	Firm's adaptivity
5	NPI	New product innovation
6	NOP	New organizational procedures
7	OIP	Organizational innovation performance
8	Org_C	Organizational climate
9	F_SC	Flexibility/support to change
10	EE	Employees Empowerment
11	TW	Teamwork

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