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Enhancing the Innovation Capability in Dairy Farms through Knowledge Sharing

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Abstract

The purpose of this paper is to develop and evaluate the framework for enhancing the innovation capability in dairy farms through knowledge sharing. It was hypothesized that trust, motivation, training and development are positively associated with knowledge sharing and that knowledge sharing between employees and managers impact positively on the innovation capability of the firms. The questionnaire based survey was used to collect the date from 254 randomly selected dairy farms that are located in the Punjab region of Pakistan. For data analysis SMART PLS-SEM 3.00 was used. The results of this paper confirmed all hypothesized relationships except the impact of trust on knowledge sharing which may be due to the unique contextual setting of Pakistan. This paper concludes that employees feel delighted in sharing knowledge for enhancing the innovation capability when they feel motivated and are provided with proper trainings.

Keywords: dairy farms, innovation capability, motivation, Punjab, Pakistan, trust, training and development.

1. Introduction

This papers stems from an interest in understanding the dynamics of innovation capability in the context of dairy business in Pakistan. In recent years, the economy of Pakistan is facing numerous challenges which include instability, high inflation, increasing poverty and declining growth and development. There may be several reasons for this state of economy as Pakistan is facing a lot of challenges and obstacles during the last couple of decades. However, one of the major reasons is the lack of innovation capability by the business sector in Pakistan. Innovation capability is a potential source for the firms to

sustain and grow. In addition to this, innovation capability is about the conversion of new ideas into opportunities which can be used for the growth of the firm (Tidd, 1997, Saunila et al. 2014, Sivalogathasan and Wu, 2015). Innovation capability in the current era can be considered as the main apparatus for sustainable growth of the business (Kurt et al., 2013) as well as sustainable development of the economy.

Pakistan is an agro based country and its major source of income come from the agriculture sector. The agriculture sector is the 2nd largest contributor in the GDP of Pakistan (Burki et al., 2004, Yaseen, 2015). The agriculture sector is mainly relying on the dairy sector. In this context, dairy farms are the main vehicle for the economy of Pakistan (Burki et al., 2004, ACO, 2009, ACO, 2010, Burki and Khan, 2011, Shah and Mahmood,2013, Murphy, 2014, MOF, 2015). Therefore, in this paper, our focus is on the evaluation of the factors that can enhance the innovation capability of the dairy sector. Understanding of these factors will help in enhancing the role of the dairy sector in the GDP and sustainable development of Pakistan.

The success of a firm in every industry depends on its ability to innovate. Many researchers noted that that the innovation capability empowers an institution and organization to preserve and gain the competitive advantages (Lin, 2007, Kurt et al., 2013). Consequently, innovation capability has become a center of attention for organizations throughout the world. Innovation capability has been deliberated as the key factor for supporting the firms and converting the new ideas and opportunities in the business environment. Innovation capability is an instrument through which firms develop new systems and products (Dougherty and Hardy, 1996, Darroch, 2003, Yang, 2012). Despite of the relative importance of the dairy farms in the agrarian based economies (like Pakistan), there is no conceptual model that can explain the factors effecting the innovation capability of the dairy farms. This study aims to fill this gap and is an attempt to investigate the relationships, between innovation capability and other variables, which are hypothesized in the next section.

Innovation capability is an intangible factor that provides several benefits to the firms. The enhancement in the innovation capability also results in the growth of the developing countries (Ates and Bititci, 2011, Camelo-Ordaz et al., 2011, Yu, 2013, Tang et al., 2015, Tang et al., 2015). Innovative countries had a great level of income and productivity than less innovative countries (Fagerberg, 2004). Many researchers are convinced that the innovation capability is the only single way for the business survival and success. Various intangible factors have been identified in the literature that affects the innovation capability. For example innovation capability of firms can be enhanced through effective human resource practices. The effective training and development enables employees to generate and share new ideas (Shindina et al., 2015). Moreover, motivation also has a forceful effect on the innovation capability. Several studies have shown intangible source associated to innovation capability (Paalanen and Hyypiä, 2008, Skarzynski and Gibson, 2008) but greatly in theoretical perception. A lot of previous studies only focused on intellectual capital as an intangible source of innovation capability (Kalkan et al., 2014).

The current study aims to contribute to the exiting literature on the intangible factors affecting the innovation capability by exploring the proposed relationship in the context of dairy business in Pakistan. The major objectives of the current research are to explain the effects of motivation, trust and training & development on knowledge sharing for enhancing the innovation capability in dairy farms of Pakistan.

2. Literature review and hypotheses

2.1 Trust, Motivation, Training, and Development as Tools of Knowledge Sharing

Knowledge sharing is an important factor for the innovation capability of firms (Nonaka and Takeuchi, 1995, Shih et al., 2006, Chang, 2012). In order for the firms to innovate, its employees must share their expertise, knowledge related to job, skills, and abilities (Lin, 2007, Camelo-Ordaz et al., 2011). Despite of the recognition of the fact that knowledge sharing enhances the innovation capability, there is little understanding of the factors affecting knowledge sharing, especially in the context of developing countries like Pakistan (Abass et al., 2011).

Trust is one factor that enhances the likelihood of knowledge sharing activities as confirmed by many researchers (see e.g., Dakhli and De Clercq, 2004, Schaufeli et al., 2006, Hsu et al., 2007, Holste and Fields, 2010). Trust on the employee is fundamental for increased communication level and approachability which enhances the potential for knowledge sharing (Willem et al., 2006, Akhavan and Mahdi Hosseini, 2016). Trust can reduce the level of uncertainty and cultivate an opportunistic environment which can be used to enhance the willingness of an employee towards knowledge sharing (Lin, 2007). Trust in that sense facilitates and supports knowledge sharing (Hau et al., 2013). As per Akhavan and Mahdi Hosseini (2016), various researchers believe that when managers trust employees, people and employees are more active to offer useful knowledge. In the business environment where trust exists, employees are well prepared and motivated to accept and listen to each other knowledge (Andrews and Delahaye, 2000, Schaufeli et al., 2006). So, we hypothesize that

H_1: Trust on employee positively impact on knowledge sharing

Motivation is another factor that has been recognized, in the prior literature, as most effective and valuable in supporting employees towards knowledge sharing (Wasko and Faraj, 2005, Hung et al., 2011). Motivation can be used to build strong relationships between employees and firms that ultimately enhances the knowledge sharing practices (Hau et al., 2013). Through knowledge sharing, motivation may also leads to a more innovation capability (Collins and Smith, 2006). A growing literature provides the evidence that motivation plays a significant role in knowledge sharing activities (Hau et al., 2013). Stenmark (2001) argued that knowledge sharing is scarcely developed without the intrinsic motivation of an employee. Moreover, motivation is the most important factor directing employees to share their expertise and knowledge (Lin, 2007, Hau et al., 2013). On the basis of this, we formulate the 2nd hypothesis as follows.

H_2: Motivation from manager positively impact on knowledge sharing.

Training is known as well-established organizational practice for guiding employees towards new skills and knowledge (Noe, 2010). Training plays an important role in facilitating knowledge sharing (Psarras, 2006, Psarras, 2007). Training and development are basically an opportunity given by an organization to their employee for improving their skills and expertise towards knowledge sharing (Ipe, 2003). In the previous research, training and development were the taken as the most influencing factors on knowledge sharing (Low et al., 2005). On the basis of these arguments, the 3rd hypothesis of this study is as follows;

H_3: Training and development has significant relationship with knowledge sharing.

2.2 Knowledge Sharing and Innovation Capability

Innovation capability is an intangible factor that contributes to the better performance and overall success of an organization (Lawson and Samson, 2001). In this era of competition, innovation capability cannot be ignored as it is the ultimate way to survive and succeed (Neely et al., 2001). Innovation capability exists in conjunction with the ability to share, manage, create and maintain the knowledge (Smith, 2005, Subramaniam and Youndt, 2005, Lin, 2007). However, there are several factors that impacts the innovation processes and knowledge creation (Nonaka et al., 1996, Ipe, 2003). Innovation and knowledge sharing should be implied as a method through which the knowledge detained by individuals is internalized and expanded by a part of firm's knowledge (Nonaka et al., 1996). The central idea is that knowledge held by an the individual should be transmitted to the levels of the organization and group as a whole, so that it can be implemented to raise the innovation (Ipe, 2003). To put it in another way, individual knowledge supports the firm with necessary raw materials enhancing the innovation and knowledge creation (Brachos et al., 2007).

The prior literature demonstrates knowledge sharing as the process of placing individual knowledge at the temperament of the others within the firm, in a way that it can be utilized and absorbed by them. Knowledge sharing refers to both knowledge receiving and knowledge giving. It enhances both the absorption and transmission of knowledge. It grants the individual to develop and maintain new knowledge and experience based on the knowledge possessed by others (Van den Hooff and de Leeuw van Weenen, 2004). Hence, knowledge sharing allows connecting prior isolated views, ideas, information, and facts, which develop the footing for new knowledge and for innovation (Brachos et al., 2007, Camelo-Ordaz et al., 2011).

The relevance of knowledge sharing for the innovation capability has been theoretically and empirically examined in many studies. The studies of Cohen and Levinthal (1990) and Levin et al., (2002) reveals that the communication among individuals who have various knowledge and experiences improves the ability and knowledge of the organization to innovate. Furthermore, Lin (2007) debated that innovation capability of the firm is the outcome of the individuals who have various types of knowledge, information, and experiences. Similarly, other authors specified that knowledge sharing among employees paves the way for the new knowledge creation that has consequences to effective innovation capability (Akhavan and Mahdi Hosseini, 2016).

In the extant literature, knowledge sharing and innovation capability also have a significant relationship. Firms that promote knowledge sharing activities are more effective in the innovation capability (Seidler-de Alwis and Hartmann, 2008). According to Lin (2007), who studied the factors that influence innovation capability in the manufacturing, banking, transportation, real estate and health industry, there was a positive and significant association between knowledge sharing and innovation capability developments. Many researchers are of the view that innovation capability of the firms can be improved when the essential factors for inspiring the individuals to transfer and share knowledge exists (see e.g., Brachos et al., 2007, Rahab, 2011, Ojeda-López et al., 2015). The above mentioned literature leads us towards the following hypothesis.

H4*:* Knowledge sharing between employee and managers impact positively on the innovation capability of the firms.

3. Research framework

The research framework for this study which is presented in Fig. 1 is drawn from the previous literature, on trust, motivation, training and development and innovation capability, as discussed in the previous section.

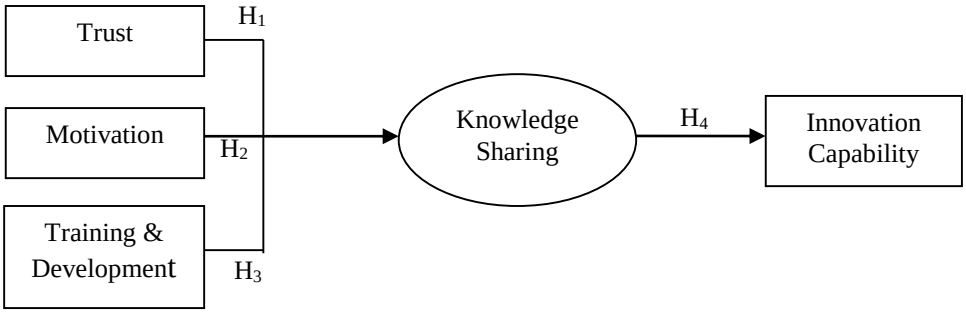


Figure 1: Framework of the Study

Trust is the important factor for enhancing the innovation capability of firms. In addition, motivation as well as training and development also has a crucial role in enhancing the innovation capability (Hau et al., 2013). Employees working in the organizations are from the different background and expertise. A deeper understanding is needed on trust for the exchange of the expertise and knowledge (Fleig-Palmer and Schoorman, 2011). Overall the above framework suggests that trust as well as motivation, training and development are important determinants of knowledge sharing and knowledge sharing is valuable for the innovation capability (Seo et al., 2016).

4. Research Methodology

4.1Measurement

The present study used the questionnaire based survey for testing the research model. The questionnaire was developed after going through the literature and used instrument was adapted by already existing scales that are more suitable for the dairy farms. Items of innovation capability were adapted and developed from the study of Calantone et al. (2002). Items of knowledge sharing were adapted from the study of Bock et al. (2005). Additionally, the items for motivation were based on the studies of Siemsen et al. (2008). Further, the items for individual trust were adapted from the Adali et al. (2010). Items concerning training and development were adapted from Jayakumar and Sulthan (2014). All developed items for this study were scored using the five-point likert style. Before the survey, the developed instruments for this study were inspected by two experts to inquire about the problems with format, question ambiguity and wording and then items were revised based on the expert comments and feedback.

4.2 Data Collection Procedures

For the current study, survey method was applied to collect the primary data for the analysis. The researchers selected dairy farms for research that are located in the Punjab region. Punjab has the highest numbers of dairy farms because of the strong agrarian base in the region. The sample for this study was drawn from dairy farm's owner and manager

in Punjab region. A total of 410 dairy farms from Multan, Vehari, Sialkot, Mianwali, Lodhran, DG Khan, Sahiwal and Faislaabad constituted the population. Punjab cities Some of the questionnaires were given and received as duly filled in person while others were sent through courier services. A cover letter was also attached with the objectives of the study mentioned in it. Return envelop was also enclosed with the cover letter. Reminder letters were also posted about four weeks after the first courier. The survey was conducted for this research from January 01, 2016 to March 30, 2016. A total of 254 usable responses were received with a 62% usable response rate.

5. Results

The research model for this study is investigated using partial least square structural equation modeling (PLS-SEM) version 3.00. The researcher executed normality and validity of the sample distribution through PLS-SEM 3.00 and the results highlighted that the sample distributions of collected data do not follow the normal distribution. PLS-SEM is convenient in analyzing such a data to determine non-normality because it sites essential limitations on the sample distribution in order to resample through bootstrapping (Hair et al., 2012).

5.1 Measurement Model

The researcher in this study considered the internal reliability of items through the Cronbach's alpha. The least value of Cronbach's alpha in the current research was 0.723, showing the satisfactory levels of reliability. After this, confirmatory factor analysis was performed to check the measurement model. The convergent and discriminant validity of the construct items were also performed. First, the convergent validity of each item loading is 0.60 or greater than it is acceptable (Sarstedt et al., 2014). The least loading in this research was 0.60, which fulfilling the convergent validity condition. Secondly, to test the reliability of the latent variables (LV), average variance extracted (AVE) and composite reliability (CR) are determined through the procedure adopted by Fornell and Larcker (1981). The reliability for AVE and CR is accepted if AVE of the model is greater than 0.50 and CR are greater than 0.70. The calculated results represented in Table 3 that AVE and CR values of the construct in this research are greater than the accepted point. Thirdly, the discriminant validity (DV), the AVE value of the construct must be higher from the variance of the construct by research model (Chen and Wang, 1997). The results of Table 2 represented the DV; the results show that correlation of all variables is less than the square root of AVE of every construct which is highlighted in diagonal. Innovation capability and knowledge sharing of dairy farms have high inter-correlations, an indication of their high and strong associations, but the square root of AVE greater than inter-construct correlations, gratifying the DV condition.

5.2 Structural Model

In this paper, the bootstrap method was performed for the analysis in order to establish the significance of the path coefficients and test the relationship between established hypotheses. The SEM results are represented in Fig. 2. Moreover, it reveals that knowledge sharing of the dairy farm has a significant impact on innovation capability. According to the results of knowledge sharing with innovation capability, as established, the result recommended that knowledge sharing has the significant impact on innovation capability ($\beta = 0.225; t = 3.028; p < 0.01$). In addition, the result shows that motivation has the strongly significant impact on knowledge sharing ($\beta = 0.262; t = 3.505; p <$

0.01). Furthermore, the result of training and development shows that it has the strongly significant impact on knowledge sharing ($\beta = 0.272; t = 4.548; p < 0.01$). Finally, the result about trust indicates that trust does not have significant impact on knowledge sharing ($\beta = 0.018; t = 0.265; p < 0.10$). Thus, all developed hypotheses, except trust with knowledge sharing, were supported. A summary of the hypotheses testing results is mentioned in Table 4.

Table 1: Factor Loading

Variables	IC	KS	MO	TD	TR
IC1	**0.712**	0.333	0.232	0.191	0.053
IC2	**0.827**	0.300	0.225	0.204	0.204
IC3	**0.686**	0.147	0.148	0.185	0.138
IC4	**0.658**	0.236	0.108	0.348	0.187
IC5	**0.796**	0.323	0.176	0.235	0.159
IC6	**0.715**	0.138	0.213	0.195	0.231
KS1	0.217	**0.745**	0.196	0.086	0.130
KS2	0.324	**0.786**	0.246	0.263	0.058
KS3	0.272	**0.822**	0.168	0.236	0.115
KS5	0.206	**0.657**	0.166	0.176	0.155
MO1	0.221	0.189	**0.879**	-0.003	0.355
MO2	0.234	0.305	**0.875**	-0.005	0.285
MO3	0.199	0.166	**0.894**	-0.079	0.353
TD2	0.119	0.102	-0.035	**0.567**	0.067
TD3	0.224	0.152	-0.063	**0.723**	0.074
TD4	0.273	0.100	-0.133	**0.793**	0.042
TD5	0.266	0.336	0.083	**0.823**	0.101
TR1	0.189	0.116	0.280	0.067	**0.793**
TR2	0.190	0.143	0.370	0.048	**0.867**
TR3	0.153	0.080	0.236	0.148	**0.780**

Note: IC= "Innovation Capability", KS= "Knowledge Sharing", MO= "Motivation", TD= "Training & Development" and TR= "Trust".

Table 2: Discriminant Validity

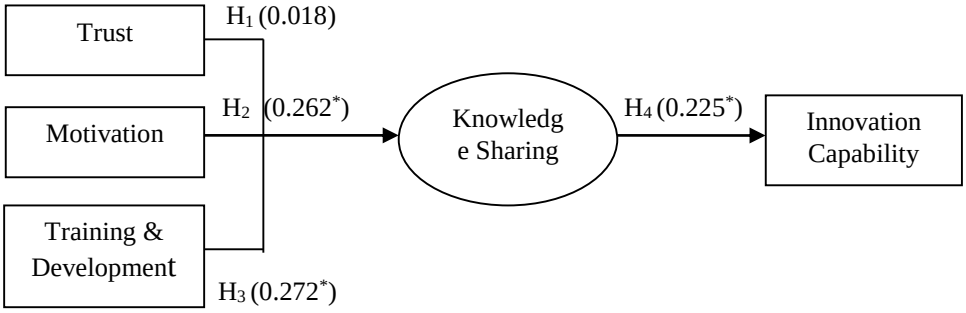
Variables	IC	KS	MO	TD	TR
IC	**0.735**				
KS	0.347	**0.755**			
MO	0.25	0.261	**0.883**		
TD	0.314	0.266	-0.028	**0.733**	
TR	0.22	0.142	0.369	0.62	**0.814**

Note: IC= "Innovation Capability", KS= "Knowledge Sharing", MO= "Motivation", TD= "Training & Development" and TR= "Trust".

Table 3: Convergent Validity

Construct	Item	Loading	Cronbach's Alpha	CR	AVE
Innovation Capability	IC1	0.712	0.829	0.875	0.540
	IC2	0.827			
	IC3	0.686			
	IC4	0.658			
	IC5	0.796			
	IC6	0.715			
Knowledge Sharing	KS1	0.745	0.750	0.840	0.570
	KS2	0.786			
	KS3	0.822			
	KS5	0.657			
Motivation	MO1	0.879	0.862	0.914	0.780
	MO2	0.875			
	MO3	0.894			
Training and Development	TD2	0.567	0.723	0.820	0.538
	TD3	0.723			
	TD4	0.793			
	TD5	0.823			
Trust	TR1	0.793	0.747	0.855	0.662
	TR2	0.867			
	TR3	0.780			

Note: IC= "Innovation Capability", KS= "Knowledge Sharing", MO= "Motivation", TD= "Training & Development" and TR= "Trust".



Notes: *p<0.01, **p<0.05. Without * value indicate insignificant path.

Figure 2: Results of PLS Analysis

Table 4: The Results of the Hypothesis Testing

Hypotheses	Path	Path co-efficient	t-statistic	P-Value	Decision
H_1	TR -> KS	0.018	0.265	0.396	Not Supported
H_2	MO -> KS	0.262	3.505	0.000	**Supported**
H_3	TD -> KS	0.272	4.548	0.000	**Supported**
H_4	KS -> IC	0.225	3.028	0.001	**Supported**

Note: IC= "Innovation Capability", KS= "Knowledge Sharing", MO= "Motivation", TD= "Training & Development" and TR= "Trust".

5.3 Predictive Relevance of the Model

This research further used the blindfolding method to test the predictive capacity of the research model. The study of Hair et al., (2014) indicates that the value of Q^2 is calculated through blindfolding to obtain the parameter estimates and obtained how values are close to the model. The results were obtained from PLS-SEM 3.00. The result of Q^2 test indicates the predictive relevance of 0.067 for the KS (Knowledge Sharing) which indicates that this model has predictive relevance. As per Hair et al., (2010) recommendation if the Q^2 value is more than zero the model has predictive relevance.

Table 5: Result of Predictive Relevance of the Model

Q2 Test (Stone Geisser Test)			
Total	**SSO**	**SSE**	**1-SSE/SSO**
KS	1016	948.41	0.067

Note: KS= "Knowledge Sharing"

6. Discussion and Conclusions

The purpose of this paper was to develop and evaluate the framework for the factors effecting knowledge sharing and innovation capability. The framework developed suggests that trust as well as motivation, training and development are important determinants of knowledge sharing and knowledge sharing is valuable for the innovation capability (Seo et al., 2016). The results of this study confirm the strong positive impact of motivation as well

as training and development on knowledge sharing. The results related to motivation correspond with the study of Cadwallader et al. (2010) in which there was strong evidence of a positive link between motivation and knowledge sharing. These results imply that motivation is a very important factor which can help employees to overcome the challenges related to knowledge sharing. Motivation can boost the confidence and reduce fears for sharing knowledge. These finding are of practical importance. Since motivation significantly affected on knowledge sharing, managers and owners need to enhance the motivation level for enhancing the innovation capability. Managers and owners fascinated in sustaining and developing knowledge sharing must focus on establishing the atmosphere for employees, which appreciate the knowledge sharing behavior.

The result of this research about training and development endorse the study of Enders (2010). The result implies that those employees participate in knowledge sharing activities, which are provided with training and development. Therefore, managers and owners should focus on training and development of the employees in order to improve their skills which boost the knowledge sharing activities. The results of current research further provide a way to enhancing the innovation through the training and development. So, the managers and owners should focus on the training and development for development and growth of the organization.

The results related to the impact of trust on knowledge sharing are bit surprising as it suggest that trust has no significant impact on knowledge sharing. This finding demands further investigation as extant literature shows a significant positive impact of trust on knowledge sharing (see e.g., Dakhli and De Clercq, 2004, Schaufeli et al., 2006, Hsu et al., 2007, Holste and Fields, 2010). The different findings of our paper may be because of the unique context of Pakistan as the socio-cultural realities of Pakistan are different from other countries that have been studied in extant literature. Pakistan is a country where there is high-power distance. For a significant impact of trust on knowledge sharing, increased communication between employees and managers is necessary. Despite of the trust by the managers, Pakistani employees may still feel reluctant because of the high power-distance. Thus, this research suggests that the impact of trust on knowledge sharing shall be investigated further in various cultural settings.

Lastly, the results of this research showed that knowledge sharing has strong impact on innovation capability. The results of this research endorse the previous study result in which knowledge sharing has a significant positive impact on innovation capability (Collins and Smith, 2006, Lin, 2007). The findings of this study suggested that knowledge sharing play a significant role in enhancing the innovation capability for the growth of firms. As Wang et al. (2008) mentioned, knowledge sharing is the fundamental role which employee can perform for enhancing the innovation capability and for the success of the firms. Furthermore, prior research showed that knowledge sharing and innovation capability is the combination for cost reduction, new product development and new ideas generation (Hansen, 2002, Lin, 2007, Wang and Noe, 2010). To conclude, we can say that employees who feel motivated and are provided with proper trainings feels delighted in knowledge sharing activities for enhancing the innovation capability.

Our research is subject to certain limitations. The sample for this research constitutes 254 managers and owners in dairy farms of Pakistan. The research model of this study should be examined further using large sample size in the same country or samples from the other countries for comparative analysis. This research was performed in the context of Pakistan,

further research may be considered in other cultural settings. The cultural differences may affect the relationships investigated in the model. The research focused knowledge sharing that occurs between managers and employees, but it may occur between employees at the same level. Knowledge sharing between employees involved in same level of job is another area which is worthy of attention. In this research knowledge sharing mediated the relationship between trust, motivation, training and development and innovation capability. The future research may examine other mediating factors like organizational characteristics and personal traits. Notwithstanding the above-mentioned limitations, the researchers believe that this research is of practical significance and contributes to the literature. Also this research is a fertile area for further research. We encourage further research on other sectors (like telecommunication, banking and sports sector for innovation capability) and other countries.

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