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journal homepage: www.elsevier.com/locate/apmr

Knowledge creating ba as a determinant of work performance of employees: An empirical analysis among pump manufacturing firms in South India

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ARTICLE INFO

Article history:

Received 26 March 2015

Accepted 23 January 2017

Available online xxx

Keywords:

Knowledge creation

Ba

Manufacturing

Work performance

ABSTRACT

Knowledge Management is gaining momentum and organizations look towards knowledge management for improving the individual capacity of employees. Knowledge creation is a continual process and effective management and creation of new knowledge is an integral part of any organization. Organizations should provide an environment to nurture and create new knowledge. This paper explores the knowledge creation practices and how does it influence the work performance of employees. Research model has been developed to determine the impact of knowledge creation on work performance of employees and to understand which of four knowledge creating 'ba's has a greater impact on work performance. The research revealed that of the four 'ba's, dialoguing ba showed significant impact on work performance, thus illustrating that most of new knowledge created is mainly through dialogues and interaction among employees. The study further discusses how the organizations can develop the enabling context and conditions for creation new knowledge.

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1. Introduction

Knowledge has had its presence in the philosophical discussion even before the Socratic era (Prusak, 1997; Takeuchi, 2001). The importance of knowledge has grown considerably over the years. Knowledge as a resource that needs to be managed in an organizational context is what has gained renewed interest. For many years, organizational knowledge has been stored in several ways, including human minds, documents, policies and procedures and shared among individuals through such means as conversations, training, apprenticeship programs and reports. Managing the dynamics of knowledge assets in organizations are crucial for their competitive advantage (Tsai, Li, & Lin, 2012). Organizations have to be able to transform their knowledge domains into profitable products and services as well as they have to dynamically renew their capabilities (Schiuma, 2012). Organizations look towards Knowledge Management for improving their performance than their competitors (Marques & Simon, 2006). They have to continuously and actively identify, acquire, organize, share, apply and

assess their knowledge resources (Schiuma, 2012) because knowledge contributes to performance by better quality and lower cost through product and process innovation (Chang & Ahn, 2005).

Individual learning contributes to organizational learning (Simon, 1991) and gets embedded in organizational memory (Argyris & Schon, 1978). Individual learning process results in improved work performance and work satisfaction when knowledge is created and applied in work practices (Mikkelsen & Gronhaug, 1999). Employee work performance is always a research interest all over the world. Organizations continuously try to understand the antecedents that influence individual work performance. Visweswaran and Ones (2000) define Work Performance as scalable actions behavior and outcomes that employees engage in or bring about that are linked with and contribute to organizational goals.

The pump manufacturing industry is on upward swing and continuously undergoing structural changes. The pump manufacturing firms in India are located as clusters in and around major cities like Ahmedabad, Kolkata, Hyderabad, Coimbatore etc. The indigenous pump and motor industry in Coimbatore started way back in early 1900's and the first pump was developed in 1928 in Coimbatore. Less attention is paid so far by the firms to actively create, capture and manage the tacit knowledge of the employees. Also lack of proper documentation and codification of knowledge

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Peer review under responsibility of College of Management, National Cheng Kung University.

and best practices, transfer of individual knowledge held by key personnel into organizational knowledge are the main challenges faced by these firms. The manpower of this industry has to be equipped with the necessary skill sets and knowledge to improve their work performance so as to produce innovative and quality products to enhance productivity, quality and service to customers.

Given the importance of knowledge management, work performance of employees in pump manufacturing firms, and the lack of literature showcasing the relationship, it is necessary to analyze the connection between knowledge creation and work performance. This study is undertaken to understand the relationship between knowledge creation practices and work performance and more particularly how the four 'ba's of knowledge creation individually affect the work performance by developing an empirical model. The structure of the paper is as follows. Section 2 reviews the existing literature on Knowledge Management and Knowledge Creation. Section 3 explains the research methodology, justifies the sample chosen and respondents. This section also explains the development of questionnaire followed by data analysis. Then the paper presents the results of the study, discussions and implications. The last section has conclusion and future research directions.

2. Literature review and hypothesis development

The knowledge management literature suggests that since mid 1970s, economies and society have become more information and knowledge-intensive (Neef, 1999). In the post industrial society, theoretical knowledge has become more important type of knowledge. Theoretical knowledge represents abstract knowledge and principles which can be codified or atleast embedded in systems of rules and frameworks for action. Thus managing both tacit and explicit knowledge came into practice. With the advent of latest technologies in IT, the design and development of appropriate processes for managing organizational knowledge has improved.

Knowledge Management (KM) is defined as a systematic and organized attempt to use knowledge within an organization to transform its ability to store and use knowledge to improve performance (Robinson, Carrillo, Anumba, & Al-Ghassani, 2001). Hlupic, Pouloudi, and Rzevski (2002) suggest that Knowledge Management would give organizations the operational ability to identify their strengths and weakness, bring out the hidden potential of the employees, understand and respond as perceived by the end consumers. Knowledge management focuses on organizing and making available important knowledge, wherever and whenever it is needed. The traditional emphasis in Knowledge Management has been on knowledge that is recognized and already articulated in some form, but increasingly, KM has also incorporated managing important tacit knowledge.

2.1. Knowledge creation

The creation of new organizational knowledge is increasingly becoming a managerial priority (Spraggon & Bodolica, 2008). Knowledge creation capability plays a vital role for betterment of individual performance (Huang, Liu, & Warden, 2005). Organizations strive to create new knowledge to remain competitive. Henderson and Clark (1990) suggest that firms need to develop and renew their knowledge continually to prevent knowledge from becoming obsolete. Knowledge creation is the process of producing new knowledge by assimilating and integrating the existing knowledge. Mitchell and Boyle (2010) stress that knowledge

creation is the generation, development, implementation and exploitation of new ideas. Knowledge creation and knowledge transfer are antecedents of knowledge exploitation and exploration (Hornig, Tswei, & Chen, 2009). Styhre, Roth, and Ingelgard (2002) defines Knowledge Creation as the method through which new ideas are generated, incorporating activities, interactions and other organizational mechanisms. Knowledge is created in work practices. Experiencing and then reflecting on the experiences are the key processes in knowledge creation.

Knowledge creation relates to knowledge addition and/or correction of existing knowledge (Shin, Holden, & Schmidt, 2001). Two types of knowledge, tacit and explicit co-exist in an organization. Polanyi (1962) states that tacit knowledge is non-verbalized, intuitive, more unarticulated and resides within individuals. Explicit knowledge is more structured and available in codified form in the organization (Koulopoulos & Frappaolo, 1999). The two types of knowledge are contemporary and they are crucial for knowledge creation (Nonaka, 1990). Nonaka and Takeuchi (1995) developed a spiral process model called Socialization-Externalization-Combination-Internalization (SECI) for knowledge creation where tacit and explicit knowledge are converted from one form to another by involving the four processes.

2.2. Knowledge creation: the role of 'ba'

Followed by SECI model, Nonaka and Takeuchi (1995) identified a concept called 'ba' and defines 'ba' in knowledge creation as a platform where knowledge is created, shared and exploited. Knowledge is created not just by an individual but through interactions among individuals in an environment. Nonaka and Toyama (2002) state that 'ba' is a place where information is given meaning through interpretation to become knowledge and new knowledge is created out of existing knowledge through the change of meanings and contexts. There are four types of ba: originating, dialoguing, systematizing and exercising. Each type supports a particular mode of knowledge conversion between tacit and explicit. The characteristics of each type of 'ba' as given by Nonaka and Nishiguchi (2001) are,

- Originating ba is the place where individuals share feelings, emotions, experiences and mental models. Physical face-to-face experiences are the key in converting tacit knowledge into tacit knowledge. Originating ba is necessary during the socialization phase.
- Dialoguing ba is a situation, where by means of dialogue, individuals share their experience and abilities. Externalization phase requires dialoguing ba.
- Systematizing ba is a place of interaction in a virtual world instead of sharing of space and time in reality. Systematizing ba supports combination phase.
- Exercising ba supports focused training with mentors and colleagues through continued exercising. Learning by continuous self-refinement through on-the-job training or peripheral and active participation is stressed in this ba. Exercising ba is linked to internalization phase.

The knowledge generated in each ba is eventually shared and forms the knowledge base for organizations.

2.3. Knowledge creation: enabling conditions

In addition to the enabling context 'ba', the recent literature addresses the 'enabling conditions' for knowledge creation. For

Balestrin, Vargas, and Fayard (2008), firms working as a network have better possibilities for knowledge creation. Social interaction provided by network configuration has a positive influence on the dynamics of knowledge creation. The existence of formal and informal situations enables organizations to share abilities, experiences, emotions and know-how by means of face-to-face communication and contribute towards creating an environment for knowledge creation. Jakubik (2008) focused on micro-level interactions and collaborative learning approach to knowledge creation. More number of interactions among the participants increases the knowledge creation process. Diversity of the members in a community also has an impact on knowledge creation process. Time spent together, trust and familiarity with learning approach increases the number of interactions.

Lindblom and Tikkanen (2010) studied the knowledge creation and management in franchising and how franchisors can convert the tacit knowledge held by the franchises to create new explicit knowledge. They propose that the concept of ba has much to offer in considering knowledge management in a business format franchise system. Lindblom and Tikkanen (2010) and Nonaka, Toyama, and Konno (2000) propose that selecting individuals with the right mix of specific knowledge and capabilities is the key to managing knowledge creation. A cross functional team, including participants with the right mix of specific knowledge catalyzes the process (Lou, 2008). This helps employees to open up dialogues and promotes interaction. Lou (2008) analysed how organizational conditions, technology adoption, supplier relationship management and customer relationship management affect knowledge creation in supply chain in Taiwan through socialization, externalization, combination, internalization (SECI) modes and various bas, as proposed by Nonaka and Konno (1998). Lou (2008) found that great cultural understanding of relational partners will increase communication and interactions and lead to rapid assimilation of tacit knowledge. An organization with a high technology adoption capability will enhance the knowledge creation process.

Sraggon and Bodolica (2008) highlight that although ideas are formed in the minds of individuals, interaction between individuals, groups and organizations play a significant role in development of new ideas. Continuous communication, exchange and interaction are key to knowledge creation. Interaction promoting knowledge creation takes place through formal meetings, informal communities, cross functional teams and IT tools. Knowledge can also be created by individual or group action. "Action" refers to the implementation and execution of existing knowledge aiming to create new knowledge. "Learning by doing" is central to knowledge creation.

2.4. Work performance

There is a consensus among knowledge management researchers that knowledge management is a source of improved performance for the organization. As knowledge management is gaining importance, it significantly impacts the performance of the organizations. Deliberate knowledge management initiatives leads to knowledge management processes which provides knowledge management outcomes that deliver value to an organization (Grover & Davenport, 2001). Organizational Performance is used as a measure of outcome of knowledge management practices and several studies are conducted to understand the relationship between knowledge management and organizational performance (Starns & Odom, 2006; Ho, 2008; Zack, McKeen, & Singh, 2009; Akroush & Al-Mohammad, 2010; Kruger & Johnson, 2011; Mills & Smith, 2010). Innovative performance as an outcome of knowledge management is also researched in various studies. In an organizational context, providing enabling spaces is a key ingredient for

creating new knowledge which leads to innovation (Peschl & Fundneider, 2012). Zhang, Shu, Jiang, and Malter (2010) focused on innovative performance and found that firms engaged in strategic alliance confirm that knowledge creation strengthen the effect of innovative performance. Zhang et al. (2010) highlights that knowledge utilization is an important predictor for developing highly and moderately innovative products. Tacit knowledge acquisition and sharing is critical for task completion and group performance (Yang & Farn, 2010). Janz and Prasarnphanich (2003) found that creating a knowledge centered culture will lead to enhanced knowledge-related activities like co-operation and learning which inturn yields improvements in work satisfaction and performance. Bennett (2001) used salesforce effectiveness as an outcome of knowledge creation practices in selling function, while product creation performance, manufacturing creation performance and management creation performance as outcome of knowledge creation mode is studied by Kao, Wu, and Su (2011). These observations underlines that knowledge management practices have a major role in enhancing the performance of organizations and employees. Consequently for this study, personal evaluation of work performance of employees in their job is used as an outcome of knowledge creation practices because it would be appropriate to measure the knowledge created in an organization when it is embedded in their work practices and improves their efficiency, effectiveness and timeliness of doing a job. Efficiency and effectiveness of work indicates maximizing work output with less resource as input and meeting the goals and objectives of the organization respectively. Timeliness indicates the employees' completion of required work on time meeting the schedules and deadlines. Hence based on the above theoretical foundation, the hypothesis is proposed as,

H1: The level of knowledge creation practices positively influences the work performance of the employees.

The conceptual model for the study is given in Fig. 1. The independent variable Knowledge Creation is described by four 'ba's: originating ba, dialoguing ba, exercising ba, and cyber ba, while the dependent variable is by efficiency, effectiveness and timeliness. The research also includes studying which knowledge creating 'ba' has stronger impact on work performance.

3. Objectives of the study

The given literature review identifies the importance of knowledge creation and the role of 'ba's and the necessity to improve the work performance of the employees in pump manufacturing firms in India. The study presented here is mainly done to

- Understand the knowledge creation practices among pump manufacturing firms
- Empirically understand the relationship between knowledge creation practices and work performance
- Investigate how the four 'ba's of knowledge creation influences the work performance of employees.

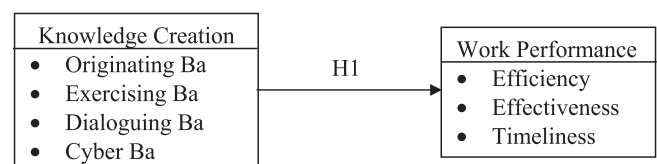


Fig. 1. Proposed research model.

4. Research methodology

4.1. Measures

A structured questionnaire was designed based on the extensive literature review. The primary focus of the study was to understand knowledge creation practices based on four 'ba's and more specifically the role of the 'ba's on individual work performance. Hence the questionnaire items were designed to capture extent of practice of four 'ba's in organizations and its impact on performance of employees. The questionnaire was constructed using a five point likert scale where 1 represented 'Strongly disagree' and while 5 for 'Strongly agree'. The questionnaire had three sections, the first part to capture the demographic information about the respondents like gender, age, education, work experience and position in the organization. The second part with 16 items to capture the practice of four 'ba's with four questionnaire items for each type of 'ba'. The third part to measure work performance of employees had nine item instrument developed by Henderson and Lee (1992). The work performance was scored in terms of efficiency, effectiveness and timeliness with three questionnaire items for each dimension.

4.2. Respondents

This descriptive research is conducted among the pump manufacturing firms in the city of Coimbatore in India. The sampling frame was decided as those pump manufacturing companies who were members of South India Engineering Manufacturers Association (SIEMA). There were about 103 pump companies listed in the website of SIEMA. Before the questionnaire was sent out to target respondents, a pilot test was conducted by sending the questionnaire to few experts in manufacturing sector to evaluate the validity and relevance of the items. Based on their suggestions minor refinements like deletion of overlapping questionnaire items were made. A total of 284 questionnaires were sent to the pump manufacturing organizations. Middle level managers and employees were the respondents for the study. The responses were obtained personally and through electronic mails. After regular follow-ups, a total of 195 replies were received, giving a response rate of 68.6%. The year of establishment of the company and the demographic data of the respondents like age, education, work experience and position in the organization are given in Table 1.

Most of the companies surveyed were established in less than 25 years. It was also found that most respondents were in the age

group of 30–40 years (60.5 percent). Also the respondents had undergone graduation (78.5 percent). In addition, the work experience of the employees was largely 11–15 years (48.7 percent). Finally the statistics indicated that 45.1 percent of respondents belonged to production department, 23.1 percent of respondents in quality control and 31.8 percent of respondents in administration, thus providing a wide spread of various positions in organizations.

4.3. Analysis criteria

The study included two models. The first research model to validate the impact of knowledge creation practices comprising of the four 'ba's on the work performance. Further to explore the first research model and understand the relationship of the four ba's on the work performance, a second model is constituted. The data analysis was done in two parts. A confirmatory factor analysis is used to derive whether the items relating to each of the four ba sub-constructs loaded into the anticipated factors, as well as their reliability and validity confirmation. Cronbach's alpha was used for confirming the consistency of internal reliability. An alpha value greater than 0.7 is taken as acceptable value (Cuieford, 1965; Nunnally, 1978). Second, the data were analysed using Visual PLS, a software package based on Latent Variables Path Analysis with Partial Least Squares. PLS path modeling provides a very flexible environment for the study of multi-block structure of observed variables by means of structural relationships between Latent Variables (Vinzi, Trinchera, Squillacciotti, & Tenenhaus, 2008). The PLS path modeling approach was used to assess the proposed models. The PLS technique allows us to use multiple indicators to measure constructs.

5. Results

5.1. Reliability and factor analysis

To measure internal consistency reliability, Cronbach's alpha was used for the four sets of questionnaire items relating to the four 'ba's of knowledge creation practices and work performance of questionnaire items. The alpha value for the originating ba is 0.866, exercising ba is 0.842 and interactive ba is 0.829 suggesting sound reliability criteria of more than 0.8. The work performance also generated high alpha value of 0.902 but the result of cyber ba is not so impressive with a value of 0.647 but which can also be accepted according to Cuieford (1965). The composite reliability of the research model and AVE (Average Variance Extracted) are shown in Table 2. The AVE values for all the composites were above 0.50. Also the squares of the correlations among composites were less than AVE values showing validity of the questionnaire items.

The sixteen items of the four 'ba's were factor analysed to establish dimensions of the ba responses. The confirmatory factor analysis showed that the items relating to each of the ba categories loaded onto the anticipated factors. The Table 3 shows the factor loadings,

Table 2
Reliability and AVE values.

Construct	Composite reliability	AVE	Cronbach alpha
Originating ba	0.906	0.709	0.866
Dialoguing ba	0.886	0.661	0.892
Exercising ba	0.895	0.681	0.841
Cyber ba	0.785	0.601	0.637
Work performance	0.922	0.571	0.902

Table 1
Descriptive statistics of respondents.

Items	Scale	Frequency	%
Company establishment	1 to 25 Years	102	52.3
	25 to 50 Years	85	43.6
	>50 Years	8	4.1
Age	20 to 30 Years	38	19.5
	30 to 40 Years	118	60.5
	40 to 50 Years	27	13.8
	>50 Years	12	6.2
Education	Graduation	153	78.5
	Post Graduation	42	21.5
Work experience	1 to 5 Years	22	11.3
	6 to 10 Years	36	18.5
	11 to 15 Years	95	48.7
	16 to 20 Years	25	12.8
	21 to 25 Years	12	6.2
Position in the organization	>25 Years	5	2.6
	Production	88	45.1
	Quality Control	45	23.1
	Administration	62	31.8

Table 3
Factor loadings.

Type of ba	Factor loadings
Originating ba	
Formal Meetings and Discussions	0.889
Informal Interactions and discussions in the work place	0.874
Informal Mechanisms to gather and mobilize knowledge	0.786
Face-to-face interactions for employees to share feelings, emotions or mental models	0.848
Dialoguing ba	
Employee participation in meeting and brainstorm about work-practices	0.807
Dialogues among employees open up into new ideas	0.819
Employees take part in collective decision making	0.866
Right mix of people with knowledge and capabilities for cross-functional team	0.839
Exercising ba	
Practicing new concepts and ideas	0.827
Employees internalize new work-practices	0.784
Employees learn by continuous self-refinement	0.831
Form teams and conduct experiments	0.840
Cyber ba	
Facilitation of IT for virtual space	0.846
Electronic document management	0.850
Central Knowledge repository	0.743
E-mails for sharing of files	0.784

5.2. Research findings

The first objective of the study was to understand the impact of knowledge creation practices on the work performance of the employees. To test this objective, a model was developed and regression analysis was used to indicate the relationships between the dependent and independent variable. It can be seen from Fig. 2, the relationship between knowledge creation practices and work performance of the employees is significant (regression coefficient = 0.655 and $t = 8.676$).

The result strongly supports the hypothesis H1, indicating that knowledge creation has a significant impact and related to work performance of the employees. The r^2 value is 0.438, which shows that 43.8% of the work performance is impacted (is explained) by knowledge creation practices. Hence it is reasonable to conclude that knowledge creation practices in terms of originating ba, exercising ba, interactive ba and cyber ba positively influences the work performance (effectiveness, efficiency and timeliness) of the employees.

Further to the above model, yet another path analysis model was developed to examine 'ba' as a determinant of work performance of employees.

The parameters of the path from dialoguing 'ba' to work performance showed significance ($t = 2.724$) where as originating ba and cyber ba to work performance showed positive but insignificance ($t = 1.479$ and 0.924 respectively). Exercising ba also did not present a significant impact on work performance ($t = 0.716$) showing the least impact. These results support that 'ba' has a positive impact on work performance indicating that dialoguing ba was significantly related to work performance than the other three 'ba's.

Regression analysis was used for further examination of relationships between each of the four 'ba's and work performance. It was found from the test results that originating ba ($\beta = 0.187$) does not present a significant impact on work performance. Second, exercising ba showed least impact ($\beta = 0.073$) on work performance. But dialoguing ba was significantly related and shows a strong influence ($\beta = 0.372$) on work performance. Finally cyber 'ba' had a positive but not significant impact ($\beta = 0.101$) on work performance. Discussions and managerial implications are given below.

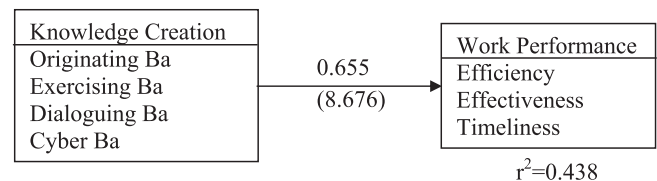


Fig. 2. Path diagram of Model.

6. Discussions

The survey conducted for these firms further brings out the fact that Knowledge Management is not only for large-scale and medium scale organizations (Singh, Shankar, Narain, & Kumar, 2006) but also for small manufacturing organizations in India. This finding further supports Pillania (2005) that importance of new knowledge creation is acknowledged among manufacturing firms.

The study found that the knowledge creation practices comprising of four 'ba's is a significant variable affecting the work performance of the employees. This finding is consistent with the previous results (Bennett, 2001; Janz & Prasarnphanich, 2003; Peltokorpi, Nonaka, & Kodama, 2007). This implies that firms in pump manufacturing industry should give importance to knowledge creation for improved work performance of employees because the need for knowledge creation and renewal is particularly acute for small organizations (Martin, Martin, & Mabbett, 2002). But further analysis shows that the four types of 'ba' have varied impacts on three areas of work performance like efficiency, effectiveness and timeliness. Results in Fig. 3 indicate that dialoguing ba presumably improves the work performance to a significant extent. Dialoguing ba exists in manufacturing firms through interaction and dialogues among employees. More the space or platform for dialogues among individuals, better the knowledge creation, leading to efficiency in work performance. Knowledge is created when information is put into context, ie, when individuals gather and share dialogues to solve a problem (Jakubik, 2008), they are providing a shared context to create new knowledge (Baqir & Kathawala, 2004). Dialoguing ba also provides context for forming cross functional teams with right mix of people with bundle of experiences that accelerates the knowledge creation

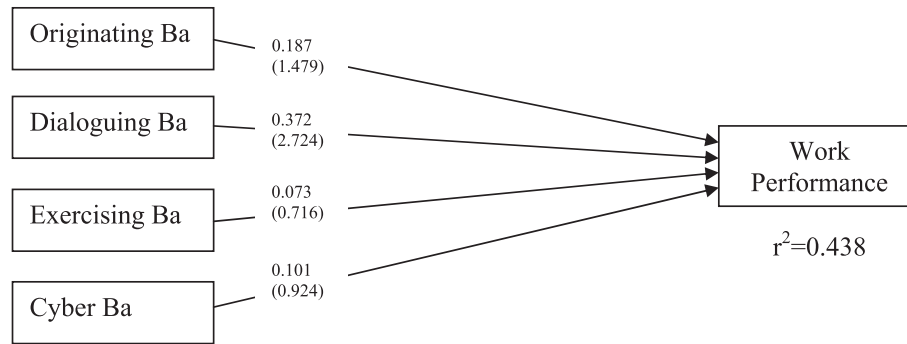


Fig. 3. Path diagram of four 'ba's on work performance.

process and work performance (Nonaka et al., 2000; Jakubik, 2008; Lou, 2008; Spraggon & Bodolica, 2008). Dialoguing 'ba' allows employees to brainstorm about the work practices to make collective decisions and share among them. The results of the study indicate that dialoguing ba will be advantageous for pump manufacturing firms because it accelerates the work performance of the employees. Therefore manufacturing firms that would like to enhance the efficiency, effectiveness and timeliness of work performance should form an environment that nurtures more dialogues, interaction and brainstorming sessions in which continuous knowledge creation is encouraged. This is consistent with the results that ba is not only a physical space but an " ... existential place where participants share their contexts and create new meaning through interactions" (Nonaka & Toyama, 2002).

Second, from Fig. 3, it can be seen that originating 'ba' positively impacts work performance but does not have a significant impact. Originating ba is a platform where individuals share feelings, emotions and mental models. Individuals talk about internal and external best practices; lessons learned and perhaps come to believe that their knowledge and expertise are valued by other people (Bennett, 2001). Formal and informal meetings among employees provide an enabling environment for knowledge creation (Balestrin et al., 2008). Surprisingly, the study indicates that in manufacturing firms, individuals do not engage in adequate physical face-to-face interactions which are the key in converting tacit knowledge to tacit knowledge. There exists a wider (or larger) scope for pump manufacturing firms to provide a shared context or space to stimulate interactions that provide a platform for individuals to discuss and reveal their best practices and know-how's to others. The formal meetings and discussion held periodically in the organizations provide a forum for collective thinking and knowledge creation. Nonaka (1998) indicates that a stress on open organizational designs provide strong ecological stimuli through direct encounter between individuals. Our suggestion is that the manufacturing firms should not highly limit the space for formal or informal interactions because doing so may curb the knowledge creation in manufacturing industry.

Subsequent to originating ba, cyber ba has a positive but not significant impact on work performance of individuals. Usage of Information Technology provides Cyber ba which is a place of interaction in a virtual world instead of real space and time. Cyber space is not much utilized for interaction and knowledge creation and the existing IT infrastructure is a major obstacle for introducing new ideas and technologies in manufacturing industry (Singh et al., 2006). Hence there exists a huge gap in utilization of information technology tools and systems for knowledge creation purpose in manufacturing industry. Cyber ba presumably improves the utilization of technology, disseminates knowledge quickly and

precisely, and promotes the generation of fresh ideas capable of elevating the firm to higher levels of efficiency (Bennett, 2001). Virtual ba can be introduced by combining the concept of Ba with the virtual context (Baqir & Kathawala, 2004). Singh et al. (2006) suggest that IT can play various roles like providing collaboration for those searching for knowledge or information, becoming an integrator of communication technology, helping to convert tacit knowledge into an explicit form, providing static repositories of best practices. Chawla and Joshi (2010) highlights that IT is another dimension which helps organization in leveraging knowledge. There is no doubt that information systems are needed but creating one without understanding what users need often results in a knowledge junkyard. Extensive use of IT tools that are integrated and configured for Knowledge Management will work as a major catalyst and our suggestion is that the manufacturing sector will benefit by using Cyber ba for Knowledge Creation purpose.

Finally, it is found from the figure that exercising ba does not significantly influence the work performance of employees. Exercising ba supports learning by continuous self-refinement through on-the-job training or peripheral and active participation (Nonaka, 1998). The results of the study shows that the employees of the manufacturing firms do not get adequate opportunity to practice new concepts and ideas and also there is very little scope for employees to learn by continuous self-refinement. This implies that in manufacturing industry exercising 'ba' does not have a significant existence and hence there exists ample opportunity for these firms to leverage the knowledge internalized by the employees by allowing them to continuously self refine and simulate applications. The firms can also provide focused training for employees by mentors. Nonaka (1994) argues that this personal contact between employees is essential in creating new knowledge because this kind of interaction in the exercising ba will allow for sharing of time and space enhancing knowledge creation. Mentoring relationships also provide a means for firms to share knowledge, encourage learning and build intellectual capital (Allen, Eby, Poteet, Lentz, & Lima, 2004; Eddy, Tannenbaum, Lorenzet, & Smith-Jentsch, 2005; Hezlett & Gibson, 2005; Lankau & Scandura, 2002; Mullen & Noe, 1999; Swap, Leonard, Shields, & Abrams, 2001). Mentoring programs are benefit to organizations, as mentors share their tacit knowledge and demonstrate their skills and behaviours to others (Handzic & Hasan, 2003). A mentor-mentee relationship supports professional growth and development and empowers the mentee (Luna & Cullen, 1995) to create new knowledge. Our suggestion therefore is that manufacturing firms have to create an environment for employees to learn continuously through on-the-job training methods and also mentoring by senior colleagues to improve work performance.

7. Implications

The findings of the study contributes to Knowledge Management research by understanding how the four 'ba's of knowledge creation affects work performance of employees. The study also contributes to the practitioners in manufacturing sector by providing a better understanding about the presence of four 'ba's and how it facilitates the work performance. Knowledge creating 'ba' offers a platform or space for the manufacturing firms for improving employee performance. Based on the research findings the following suggestion could be considered by the pump manufacturing firms wishing to implement knowledge creation practices. The study strongly indicates that the extent of knowledge creation influences the work performance of the employees. The establishment of an enabling context 'ba' as suggested by Nonaka and Konno (1998) in their various studies, will enhance the performance of work. First the study shows that knowledge creation through dialoguing ba positively and significantly impacts the work performance. This shows that mainly through sharing of dialogues and work experiences, knowledge is created. This implies that the manufacturing firms should not highly limit the space for dialogues and interaction among the employees, because by doing so will hamper the knowledge creation and hence the work performance.

Equally as important, the data analysis shows that originating ba has impact on work performance but not significant. The extent of originating ba within an enterprise depends on formal and informal meetings and social gatherings to exchange their insights and intuitions. This implies that the manufacturing firms need to provide opportunity for the employees to socialize and deliberately organize informal events which encourage face-to-face exchange of knowledge among them.

The research presented also shows that exercising ba has the least impact and insignificant on work performance. This implies that the employees in these firms need to be given freedom to discuss and internalize new work practices to deepen their understanding and ability to apply the knowledge. Also senior employees can be made as mentors to provide help and support to other employees.

The findings of the study also implies that manufacturing firms do not extensively use IT based systems and tools to store and disseminate company policies, procedures and manuals. Employees work performance can be improved by using computerized systems which enable them to communicate virtually and easily locate the required knowledge to promote generation of fresh ideas.

8. Conclusion

This paper highlights the context and importance of knowledge creating 'ba's and the role that these 'ba's play in improving employee performance. Manufacturing sector was particularly chosen for the study because there exist a dire need for these firms to continuously perform to meet the market requirements. As suggested by Singh et al. (2006) there exists a lot of scope for manufacturing firms to leverage the benefits of Knowledge Management practices for their performance. The research findings statistically confirmed the impact of knowledge creation on employee work performance and also the impact of four 'ba's originating ba, dialoguing ba, exercising ba and cyber ba on work performance. The study also shows that manufacturing firms can further explore the possibilities of having better enabling context for 'ba' by allowing the employees to interact and collaborate. Also less use of cyber ba is noticed among the companies. Arguably these companies need to enhance their IT adaptability and configure it for Knowledge Creation.

If organizations have to compete effectively in the knowledge economy, it is essential to develop the conditions and the necessary 'ba's in which knowledge creation occurs and enhances work performance. The current research finding is quite remarkable because early studies were to focus on knowledge creation as a whole without placing emphasis on the type of 'ba' on work performance. This study also contributed to the growing Knowledge Management literature because it is first of its kind to explore the impact of 'ba' on work performance of manufacturing firms. Further research is needed to study about the prevalence of 'ba' in knowledge intensive industries like biotechnology, pharmaceutical and others, where the influence of knowledge creation is expected to be considerable.

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