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## Impact of Knowledge Management on Employee Innovation Capabilities: An Empirical Study of the Pharmaceuticals Industry in Bangladesh

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### ABSTRACT

The potential impact of knowledge management practices on enhancing the innovative abilities of employees has yet to be fully explored in the dynamic context of the Bangladesh pharmaceutical industry. In an effort to bridge this gap, this empirical study delves into the relationship between knowledge management and employees' innovative capabilities. Through a comprehensive survey of 238 knowledgeable employees from 10 pharmaceutical companies, this research employs the PLS-SEM method to rigorously examine the reliability, validity, and research hypotheses. The results of this study reveal that knowledge acquisition, dissemination, and application all play a significant role in shaping employees' innovative capabilities. By establishing a clear connection between knowledge management and innovation, this study adds valuable insights to the existing literature.

### INTRODUCTION

According to Faisal (2019), knowledge management has become one of the most dominant business issues since 1995, and after the fourth industrial revolution (Industry 4.0) in 2011, it became a well-established discipline in academia and business. On the bookshelf, among the business articles and journals, articles related to knowledge management started to grow exponentially and were supposed to be doubled yearly (Ahmad & Karim, 2019). The intensive breed of knowledge management is now crowding out in the mandatory reading lists that are considered the most popular extension of cognitive science that underpins much of the intellectual motive or ambition for this twenty-first century (Ishak & Mansor, 2020). Knowledge is considered the organization's most useful metaphor in terms of self-corrective measures of the workforce, organizational learning, and information processing systems, so knowledge management practices must be implemented within the organization properly (Akram *et al.*, 2019).

Knowledge management is intuitively important because the modern organization's productivity and growth lie in the employees' and systems' intellectual and innovative capabilities rather than its hard assets (Al Ahabbi *et al.*, 2019). Again, knowledge management is considered the core of the transformation of the global economy, the success of the organization, motivation to capitalism by the private enterprises, new modes of work, and a total shift from info-war to knowledge warfare to gain competitive advantage by the firms (Ali *et al.*, 2020). Purposefully, it is considered that competitive advantage lies in learning organizations, brain-based organizations, intellectual capital-intensive firms, and economies of

ideas. Hence, knowledge is considered central to causing changes in the forms of organizations in the post-information revolution (Al-Jabri, 2020).

In the pharmaceutical industry, as a knowledge-intensive industry, success depends mostly on the specialized knowledge of the employees and that is why pharma companies are intensively turning towards knowledge management (Ramy *et al.*, 2020). Knowledge management helps pharma companies improve productivity and innovation in the R&D department by sharing knowledge and expertise from different parts of the company and the partnering companies like acquisition, merger, partnership, and other types of collaboration (Supermane, 2019). The pharmaceutical industry has had a long-term phenomenon towards innovation over the last 200 years, and companies in this industry have regular research intensity (Mohamed, 2016). According to the OECD (Organization for Economic Cooperation Development), the pharmaceutical industry is considered in the top five high-tech sectors based on R&D development and application (Sahibzada *et al.*, 2020).

The pharmaceutical industry of Bangladesh currently accounts for a market size of 3 billion USD, and it contributes to Bangladesh's GDP by around 1.83%, and it has almost 150 factories to meet around 98% of local demands, among which 90% of factories are local-based. It contributes to Bangladesh's GDP by around 1.83%, and it has almost 150 factories to meet around 98% of local demands among which 90% of factories are local-based. The remaining 10% is under multinationals (Hossan, 2023). The major players in this industry are Beximco, Square, Incepta, and ACI. Bangladesh has a patent exemption in exporting its pharma products till 2033

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under the TRIPs agreement (Faisal, 2019). The industry has high growth potential in exporting with a revenue of 5 billion USD annually by the next 5 years as well and there is potential to promote the country as a middle-income country from an LDC by 2026 (Hossan, 2023). For that reason, the industry must be blooming, and a major initiative can be to boost employees' innovative capabilities as early as possible.

In the industry, when companies are more competitive, they are more innovative, searching for the means of getting a competitive edge over competitors (Abbas, 2020). Innovative capabilities of the employees can give the base of sustained competitive advantage because human capabilities are more difficult to imitate by competitors than non-human capabilities and systems (Ahmed *et al.*, 2020). Knowledge management practices can help to achieve these innovative capabilities of the employees.

In this research, we contend that knowledge management allows firms to extract more external resources that can increase their capabilities for innovation. Notwithstanding the significance of knowledge management, past research has not yet looked at the underlying connections between knowledge management and the innovation capability of the employees. The current study fills this gap by examining the connection between KM and employee innovation capabilities. Also, the selected context of this research, the pharmaceutical industry of Bangladesh, reveals that no such primary study has been conducted so far in this perspective. Considering the significance of this issue, this study aimed to measure the impact of knowledge management on employees' innovative capabilities.

**RQ**

How do knowledge management practices impact on innovation capabilities of employees?

**METHODOLOGY**

Quantitative research methodology was carried out to address the research question formulated in Section 1. A close-ended questionnaire was designed based on the findings of the literature review to collect primary data. The questionnaire consisted of 2 main segments, including the demographics of the respondents in the first part and, subsequently, the knowledge management

activities and their impact on employee innovation capabilities in the 2nd part. A 5-point Likert scale was used where 1 indicates 'strongly disagree' and 5 indicates 'strongly agree'. There were 38 questions in the 2nd part where 31 questions were for knowledge management and 7 questions for employee innovative capabilities. Among the 31 questions in knowledge management, 11 questions were for knowledge acquisition, 10 questions were for knowledge dissemination, and another 10 questions were for knowledge application to capture in-depth knowledge management practices. Then, the questionnaire was formulated in Google document form and distributed through online social media platforms for the convenience of both the researcher and participants. As the quantitative analysis was proposed as SEM (Structural Equation Modelling) analysis, the ideal sample size could be calculated as 5 to 10 times of total indicators used for this survey (Eden & Nielsen, 2020). In this research, the authors used 38 indicators to reflect the latent variables. So, the ideal sample size for this survey could be between (38\*5) 190 to (38\*10) 380 participants. To ease the data collection and analysis process, a sample size of 250 knowledge workers was used in this study inspired by previous research conducted in this field (Al Ahababi *et al.*, 2019; Alyoubi *et al.*, 2018; Jilani *et al.*, 2020). Here, knowledge workers can be defined as high-level workers who can apply theoretical and analytical knowledge, acquired through formal learning, training, and experience, to develop products and services (Ahmed *et al.*, 2020).

To collect 250 responses, clustered simple random sampling was used in this study. 257 licensed manufacturing companies operate in Bangladesh's pharmaceutical industry (Natasha & Akter, 2023). For this sampling technique, the ideal number of clusters that can be used for a survey is a minimum of 10 (Saunders, *et al.*, 2009). For that reason, 10 pharmaceutical companies were selected at random where 5 are private limited companies and another 5 are public limited companies. However, 238 responses were received during the online survey phase which shows a response rate of [238/250] \*100] or 95.2%. The rest of the targeted responses (12) could not be collected due to the non-reachability of the respondents. The distribution of 238 responses based on targeted companies is given below-

**Table 1:** Break-down of Sample Size based on Targeted Companies

No.	Company Name	Ownership Orientation	Number of Responses	Percentage (%) of Responses
01	Eskayef Pharma Ltd.	Private	25	10.5%
02	General Pharma Ltd.	Private	25	10.5%
03	Orion Pharma Ltd.	Private	25	10.5%
04	Transcom Ltd.	Private	25	10.5%
05	Bio-Pharma	Private	25	10.5%
06	Delta Pharma Ltd.	Public	25	10.5%
07	Advanced Chemicals	Public	25	10.5%
08	Popular Pharma Ltd.	Public	25	10.5%

09	Silco Pharma	Public	25	10.5%
10	ACI Ltd.	Public	13	5.5%
	<b>Total</b>		<b>238</b>	<b>100%</b>

After the data collection phase, descriptive statistics were used to analyze the demographic data of the respondents through MS Excel. Then, the Partial Least Squares (PLS) method based on Structural Equation Modeling (SEM) was used to analyze the model fitness based on construct validity and reliability measures as well as to test the hypotheses of the research to draw a generalizable conclusion accurately (Dash & Paul, 2021). This analysis was done using SmartPLS software (Version 4.0.0).

## LITERATURE REVIEW

### Distinctive Views of Knowledge

According to Abbas (2020), knowledge is considered the most important strategic resource for an organization to achieve competitive advantage by adding value to business data, information, processes, and systems. Ahmed *et al.* (2020) stated that when firms seek to achieve a competitive edge, they use mainly two types of knowledge including explicit knowledge and tacit knowledge. Ahmad & Karim (2019) argued that firms use explicit knowledge to define the market demands and requirements as well as the industry trends to capture the practices of competing firms and this knowledge can be identified in the company records, routines, and systems. On the other hand, Akram *et al.* (2019) added that tacit knowledge is used by firms to respond to the changes in market regulations and structures by any action of the competitors. So, according to Al Ahbabi *et al.* (2019), tacit knowledge is utilized by firms in terms of strategies to achieve a competitive advantage that reflects the intellectual, intangible, and dynamic capabilities of the knowledge employees. Such type of knowledge creation, acquisition, sharing, and utilization requires firms to follow the knowledge-based view (Ali *et al.*, 2020).

### Knowledge-Based View of the Firm

Knowledge-based view (KBV) reflects the capabilities of the firm to develop strategies to achieve competitive advantage through the organizational learning process to involve employees to develop the operation and transformational objectives of the firm (Al-Jabri, 2020). Alshammari (2020) posits that this can be achieved by the continuous acquisition, sharing, and transfer of knowledge within the firms to adapt to the ever-changing competitive framework of the market or industry. Alyoubi *et al.* (2018) also added that KBV helps to achieve a sustainable knowledge-based competitive advantage in terms of difficulties in transmission, imitation, and rareness faced by the competitors because the firms employ a heterogeneous base of knowledge in their organizational structure. Bhatti *et al.* (2021) agreed that KVM ensures knowledge bears strategic significance in terms of its appreciated value compared to the traditional

factors of production that depreciate over time. Again, Di Vaio *et al.* (2021) stated that the management of the KBV firms coordinates within the firm to develop specialized knowledge that helps to hold the existence of the firm.

### Employee Innovation Capabilities

According to Kordab *et al.* (2020), employee innovation capability can be defined by three qualitative constructs including personality traits like risk-taking capability, specific behaviors like communication and interpersonal relationships, teamwork, and group behaviors like championing. In this research, personality traits are excluded and specific behaviors focus on that can result in broader behavior like championing. Six factors are found to design employee innovation capability that can result in innovation outputs.

Linda *et al.* (2020) stated that employee innovation can be defined first and foremost by individual creativity. Idea generation is considered the creative behavior of the employees. Again, Lukes & Stephan (2017) argued that besides generating ideas, employees' impetus to search for new ideas is also an expression of creative behavior in the workplace. According to Ode & Ayavoo (2020), successful innovation reflects the act of implementation that requires communicating or sharing the idea with superiors and subordinates to receive active feedback from them. Papa *et al.* (2020) stated that in the phase of idea implementation, a key person takes responsibility for implementation and he or she is called the champion. Then, posits that the innovation champion starts implementing the idea with proper planning of funds and resources. After that, Putra *et al.* (2020) agreed that the innovation champion involves others in the implantation process which increases the confidence of the champion because the success now depends on a collective innovative effort. Saffar & Obeidat (2020) stated that they collectively work and collaboratively impede all the obstacles or barriers in the path of implementation. Finally, Sahibzada *et al.* (2020) argued that it results in innovation output in terms of changes in products and services, changes in processes and systems, etc.

### Knowledge Management and Employee Innovation Capabilities

According to Sahibzada *et al.* (2022), knowledge management strategies are developed to create or acquire appropriate employees and collective knowledge for the organization to achieve a competitive advantage. Son *et al.* (2020) stated that knowledge management (KM) is the process of acquiring, storing, sharing, and using organizational knowledge to get more innovative performance from employees. Sun *et al.* (2020) argued that the KM process in organizations helps employees to

belong in a knowledge-intensive atmosphere to establish a shared understanding and obtain value from knowledge. Wahjudewanti *et al.* (2021) added that knowledge is directly linked with innovation in the sense that when organizations acquire knowledgeable employees, their knowledge becomes shared with the other existing employees and can be stored as a cognitive stock and can finally be applied to the critical problems of the organization.

### Knowledge Acquisition

According to (Zia, 2020), knowledge acquisition implies the activities of identification, location, creation, discovery, or generation of knowledge that are required for the firm to solve any concurrent problem. Bhatti *et al.* (2021) stated that knowledge can be acquired from several sources and it is acquired mainly in terms of individual skills and experiences that they have gathered from previous or existing job platforms. Then, Papa *et al.* (2020) agreed that knowledge can be acquired in terms of industry information, the competitor's data, internet and published information, etc. It is believed that external sources of data and information can open more opportunities for the internal employees of the organization to use them as readily such as research findings from external research institutions, universities, etc. Also, according to Alshammari (2020), organizations can benefit by using the already developed innovations in the same or new way rather than establishing themselves because in the case of technology, the market is more volatile, and developing a new technology internally can be time-consuming and the innovations may be obsolete then. Kordab *et al.* (2020) posit that some organizations encourage employees to have conversations with their colleagues or superiors in both formal and informal ways so that they can share and acknowledge innovative ideas of each other. Such conversation can be regarding the recent innovations related to the firm and industry and these can be continued with the employees of competitors so that they can track each other's move in terms of innovation. Based on this discussion, the following hypothesis has been formulated.

#### H1

Knowledge acquisition has a significant impact on employee innovation capabilities.

### Knowledge Dissemination

Jilani *et al.* (2020) stated that knowledge dissemination reflects the activities of sharing and storing knowledge. Kordab *et al.* (2020) agreed that knowledge sharing, communicating, and distributing to the organizational structure of the firm is a fundamental step of knowledge management that indicates a relevant knowledge is accessible by everyone to use at the time needed. Linda *et al.* (2020) also added that knowledge here can be stored in terms of explicit and tacit knowledge where explicit knowledge can be shared through an information

database and tacit knowledge can be shared through group collaboration and mentoring by the knowledge holder. Similarly, Saffar & Obeidat (2020) posit that knowledge can be disseminated better when employees are engaged in informal and formal meetings and conversations, and it can be with colleagues and seniors of the same organization or from competitors' organizations. Again Bhatti *et al.* (2021) added that when the knowledge holder arranges seminars and presentations within the organizations, their knowledge base can be shared with whom having weaknesses in that particular field as well and the knowledge base can be improved the knowledge holder by more insights and innovative ideas from other employees through brainstorming. Jilani *et al.* (2020) posit that only sharing is not enough to make the employees innovative because the human mind cannot memorize everything and by the possess of time, they remove memories and for that reason, there is a need for storing the important knowledge that is shared earlier before all employees and the storage must be accessible to the employees at their need.

In the case of tacit knowledge, Ahmad & Karim (2019) agreed that employees must know whom to report to get the required knowledge they need in their tasks. Then Lukes & Stephan (2017) agreed that it also helps to improve the innovative capabilities of the employees because the knowledge has been stored which ensures the path of continuous access for the employees who need it and can improve their ideas. Ode & Ayavoo (2020) stated that in the implementation phase, they get the collaboration and sharing of knowledge they need to complete or solve a critical problem. Based on this discussion, the following hypothesis has been formulated.

#### H2

Knowledge dissemination has a significant impact on employee innovation capabilities.

### Knowledge Application

According to Putra *et al.* (2020), knowledge application implies the ability of firms to respond to market changes with unique ideas and strategies to achieve competitive advantage. Saffar & Obeidat (2020) found that many firms have knowledge repositories they gathered or acquired earlier but they fail at the competition because they cannot apply the knowledge repositories and cannot transform them into information resources. Sahibzada *et al.* (2020) agreed that knowledge application is very important for knowledge-based firms to generate new ideas to beat the competition and boost business growth. The application of knowledge can be revealed when the company can respond to the competitors' initiatives make competitive decisions and respond to the industrial shifts due to macro-economic factors like technology or others. Sun *et al.* (2020) stated that when companies are capable of developing new products and processes with innovations, inventions, modifications, changes, adding product lines, or removing product lines, these are their application of

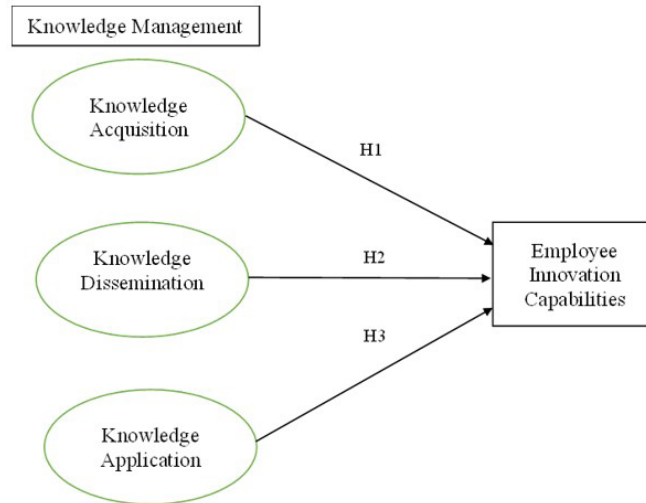
knowledge that the employees were acquiring and sharing throughout the organization that helps them to act innovatively and take decisions competitively. Alshammari (2020) posited that many successful companies can succeed although the industry or economy is in crisis due to the ability of crisis management of their employees to think critically and solve problems innovatively. agreed that such application of knowledge can be revealed by the cost-effectiveness or achievement of economies of scale of the company. Sahibzada *et al.* (2022) stated that it helps to improve the innovation capabilities of the employees

because they can apply the knowledge to overcome the obstacles in the path of implementation of new changes wisely and properly. Zia (2020) also added that employees can design solutions for critical potential problems. The discussion has come up with the following hypothesis.

**H3**

Knowledge application has a significant impact on employee innovation capabilities.

**Conceptual Framework**



**Figure 1:** Conceptual Framework

Figure 1 shows the theoretical framework of this research that indicates a hypothetical relation between knowledge management and employee innovative capabilities. It reflects that knowledge management practices like knowledge acquisition, knowledge dissemination, and knowledge application can directly impact the innovative capabilities of the employees.

**Theoretical Construct**

Table 2 shows the theoretical construct for the research where the determinants of each of the constructs are observed from previous kinds of literature in this field and some minor adjustments are made to the determinants according to this research context.

**Table 2:** Theoretical Construct

	<b>Constructs</b>	<b>Determinants</b>	<b>References</b>
Independent Variables	Knowledge Acquisition	Recruiting creative people, gathering industry information through informal communication, tracking best practices, tracking competitors' initiatives, internet source of ideas, preference to use ideas of other organizations rather than spending on R&D, knowledge acquisition through external research, employee retention, gathering ideas through publications and traveling overseas, etc.	Papa <i>et al.</i> (2020); Abbas (2020); Akram <i>et al.</i> (2019); Al Ahababi <i>et al.</i> (2019); Alshammari (2020); Alyoubi <i>et al.</i> (2018); Di Vaio <i>et al.</i> (2021); Kordab <i>et al.</i> (2020); Sahibzada <i>et al.</i> (2020); Sahibzada <i>et al.</i> (2022)
	Knowledge Dissemination	Formal meetings, seminars and presentations, information database, metaphorical description, brainstorming, informal discussions, use of intranets, knowing well who to ask for information, etc.	Ahmad & Karim (2019); Ahmed <i>et al.</i> (2020); Al-Jabri (2020); Bhatti <i>et al.</i> (2021); Jilani <i>et al.</i> (2020); Saffar & Obeidat (2020); Son <i>et al.</i> (2020)

	Knowledge Application	Response to competitors' initiatives, response to industrial shifts, product or process development, response to employee issues, response to the financial condition, deletion of products or processes, changes in products or processes, cost-effectiveness, crisis management, etc.	Ode & Ayavoo (2020); Saffar & Obeidat (2020); Sun <i>et al.</i> (2020); Alshammari (2020); Alyoubi <i>et al.</i> (2018); Di Vaio <i>et al.</i> (2021); Kordab <i>et al.</i> (2020);
Dependent Variable	Employee Innovation capabilities	Idea generation, idea search, idea sharing, starting implementation, involving others, problem-solving, experiencing innovation output	Zia (2020); Ali <i>et al.</i> (2020); Linda <i>et al.</i> (2020); Lukes & Stephan (2017); Papa <i>et al.</i> (2020); Saffar & Obeidat (2020); Sun <i>et al.</i> (2020)

**RESULTS AND DISCUSSIONS**

**Demographic Profile of Respondents**

Table 3 shows the demographic profile of the respondents based on 3 descriptors including gender, age, and their working experience with the company. According to the

table, almost 70.2% of the respondents, or a majority of them are male and the rest 29.8% of them are female, almost 38.2%, or a majority of them are between the age of 31 to 40 years, and almost 34% or the majority of them have the working experience of 6 to 15 years

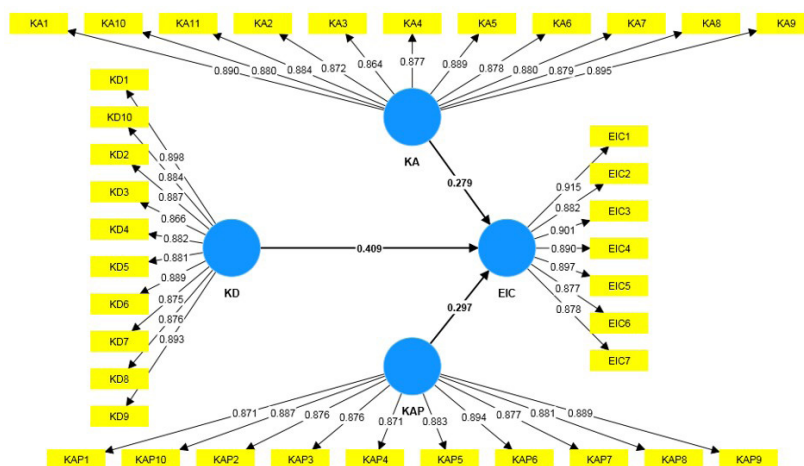
**Table 3:** Demographics of Respondents

Descriptors	Items	Frequency	Percentage	Mean	Standard Deviation
Gender	Male	167	70.2%	1.30	0.03
	Female	71	29.8%		
Age	Less than or equal to 30 years	48	20.2%	2.34	0.06
	31 to 40 years	91	38.2%		
	41 to 50 years	68	28.6%		
	More than 50 years	31	13%		
Working Experience	Less than or equal to 5 years	54	22.7%	2.45	0.07
	6 years to 15 years	81	34%		
	16 years to 30 years	44	18.5%		
	More than 35 years	59	24.8%		

**Measurement Model**

Figure 2 shows the PLS-SEM (Partial Least Squares-Structural Equation Model) in terms of confirmatory composite analysis (CCA) in a reflective form that shows how properly and accurately the items can reflect the constructs of this research or simply it can be said how accurately the observed variables can reflect the latent variables. In this

model, observed variables are shown in yellow square shapes latent variables are shown in blue circles as well and a direct path is shown between the independent latent variables like knowledge acquisition (KA), knowledge dissemination (KD), and knowledge application (KAP) and dependent latent variable employee innovative capabilities (EIC) and there are 38 items in this model.



**Figure 2:** PLS-SEM measurement model

**Construct Reliability and Validity**

Table 4 represents the measurement model fitness based on reliability and validity measures. At first, the outer loadings of the observed items for each latent variable have values more than 0.70 and it can be said that these items can reflect the latent variables well (Bell *et al.*, 2022). After that, the reliability of this model has been measured

through Cronbach's alpha and CR which reflects the values are more than 0.70 and it can be said that the measurement model is reliable. Lastly, the convergent validity has been measured by AVE (Average Variance Extracted) and here, the values for each construct are more than 0.50 and it seems the measurement model is valid as well (Totawar & Prasad, 2016).

**Table 4:** Construct Reliability and Validity

Constructs	Items	Loadings	Cronbach's alpha	Composite reliability (rho_c)	AVE
Employee Innovative Capabilities (EIC)	EIC1	0.915	0.957	0.964	0.795
	EIC2	0.882			
	EIC3	0.901			
	EIC4	0.89			
	EIC5	0.897			
	EIC6	0.877			
	EIC7	0.878			
Knowledge Acquisition (KA)	KA1	0.89	0.971	0.974	0.776
	KA10	0.88			
	KA11	0.884			
	KA2	0.872			
	KA3	0.864			
	KA4	0.877			
	KA5	0.889			
	KA6	0.878			
	KA7	0.88			
	KA8	0.879			
KA9	0.895				
Knowledge Dissemination (KD)	KD1	0.898	0.969	0.973	0.78
	KD10	0.884			
	KD2	0.887			
	KD3	0.866			
	KD4	0.882			
	KD5	0.881			
	KD6	0.889			
	KD7	0.875			
	KD8	0.876			
KD9	0.893				
Knowledge Application (KAP)	KAP1	0.871	0.968	0.972	0.775
	KAP10	0.887			
	KAP2	0.876			
	KAP3	0.876			
	KAP4	0.871			
	KAP5	0.883			
	KAP6	0.894			
	KAP7	0.877			
	KAP8	0.881			
KAP9	0.889				

\*\*\* (Sig. Level 0.05 or 5%)

### Hypotheses Testing

The test of hypotheses has been conducted at the 5% level of significance and based on the two-tailed test to show whether the independent variables like knowledge acquisition, knowledge dissemination, and knowledge application can significantly impact the dependent variable (employee innovative capabilities) positively or

negatively. The path coefficients of the PLS-SEM model reflect that there is a significant positive relation between the independent and dependent variables. Because the T-statistics show values more than 1.96 that represent the P-values are less than the significance level or 0.05 (Totawar & Prasad, 2016). Hence, all the 3 hypotheses are supported in this study.

**Table 5:** Test of Hypotheses

Hypotheses	Path	Original sample (O)	Sample mean (M)	STDEV	T statistics ( O/STDEV )	P values	Comment
H1	KA -> EIC	0.279	0.279	0.092	3.034	0.002	Supported
H2	KD -> EIC	0.409	0.409	0.121	3.366	0.001	Supported
H3	KAP -> EIC	0.297	0.295	0.119	2.485	0.013	Supported

\*\*\* (Sig. Level 0.05 or 5%, T-statistics > 1.96, P-values < 0.05)

### DISCUSSION ON FINDINGS

The main objective of this study was to critically measure the impact of knowledge management on employee innovative capabilities. The process model of knowledge management helps to develop a hypothetical relation between knowledge management as input in terms of three core activities including knowledge acquisition, knowledge dissemination, and knowledge application, and employee innovative capabilities as output. The expected outcome was that the three core activities of knowledge management can direct employee innovative capabilities to shine and flourish and the notion of the study implies that knowledge management practices help employees to think critically, develop the knowledge base, share the knowledge, and implement it to produce more innovative results.

According to the data analysis and findings, all the hypotheses were supported. H1 reflects that knowledge acquisition has a significantly positive impact on employee innovative capabilities. Companies in the pharmaceutical industry can acquire or create knowledge by recruiting creative and talented employees, gathering industry information through various publications, and traveling overseas to gather international or global firm information (Belkhir & Masaud, 2024). Organizations can also track the steps taken by the competitors, adopt the industry best practices, and gather knowledge and information through internet sources, external research works, and the knowledge already established by other companies rather than internal development of such knowledge (Akram *et al.*, 2019). Such practices help the knowledge employees to search for and generate new ideas, share those ideas with fellow employees and employers, and implement the ideas through collaboration and involvement of all the employees to solve critical problems in the path of innovation and can result in an innovative output that contributes to the organizational innovation and competitive advantage (Kornelius *et al.*, 2024).

H2 reflects that knowledge dissemination has a significantly positive impact on employee innovative capabilities. After acquiring knowledge, the task is to

disseminate or communicate the knowledge with all the employees properly and they must be given easy access to knowledge so that they can use it whenever they need it (Ahmad & Karim, 2019). This knowledge sharing can be done through informal meetings, seminars, presentations, database storage, formal meetings, use of the internet, and accessing the knowledgeable person easily and on a real-time basis (Bhatti *et al.*, 2021). This also helps the employees to know the source of knowledge, access there, and search for or create new ideas to share them with others and implement them for further innovative outputs for the success of the overall organization (Zia, 2020).

Besides, H3 reflects knowledge application has a significantly positive impact on employee innovative capabilities. After knowledge acquisition and dissemination, employees must possess knowledge application to achieve a competitive advantage (Ode & Ayavoo, 2020). For this, knowledge applications can take the forms of responding to competitors' initiatives, responding to industrial changes and shifts, changing, modifying, and developing their products and services, solving employee issues, organization crises, improving financial position through cost effectiveness, etc. (Saffar & Obeidat, 2020). Such activities of the knowledge employees can assure them to generate and apply new ideas to produce more innovative outputs (Saffar & Obeidat, 2020). It can be contemplated that through knowledge management activities, companies can ensure a sustained competitive advantage to ensure long-term success in the competitive pharmaceutical industry at large.

### Limitations and Suggestions for Further Research

The sample size used in the study was not representative of the industry entirely and tended to over-represent businesses with equal to or more than 200 employees. The impact of business size or industry on knowledge management is uncertain, though. For instance, it may turn out that larger companies in the industry that depend heavily on information and knowledge like

pharmaceuticals, need to manage knowledge more skillfully due to greater number of employees, divisions, locations, or abundance of sophisticated knowledge. Furthermore, larger companies may find it more difficult to engage in diffusion and responsiveness efforts. In addition to potential sample biases, it is also important to keep in mind that Bangladeshi companies are often tiny by international standards and it is needed to be replicated in different contexts.

According to this study, companies that manage information well, exhibited a higher levels of innovation and performance. It also pointed that responsiveness to knowledge positively benefitted knowledge management and performance of employees that affect innovation positively. The ability to extract high-quality ideas and resources from other sources through effective knowledge management and use them innovatively by the employees is the main theme of the study. Future studies are needed to more comprehensively investigate the supporting role of knowledge management to find out the relation between employee innovation and firm performance. Finally, given the significance of knowledge management to knowledge-based societies, it is hoped that future confirmation on the findings of the research will be established through future stream of researches to identify additional effects and antecedents of effective knowledge management.

## CONCLUSION

This is one of the first studies to look into how knowledge management affects innovation capabilities of employees in the Bangladeshi pharmaceutical firms. As a result, the findings of the study suggested that knowledge management would improve the ability of knowledge-intensive firms, like the pharmaceutical industry, to innovate. This study concludes that knowledge management predicted the innovation capability of employees based on these findings. Second, knowledge management as a result of knowledge acquisition, dissemination, and application fosters innovation capacity of the employees in knowledge-based firms. This has demonstrated that knowledge, an intangible resource, can improve innovation capability in the pharmaceuticals industry, particularly when it comes to key business areas like product innovation and development. The findings of this study confirm the importance of knowledge management for organizational performance, competitiveness, capacity of resilience, dynamism, and sustainability. However, it was found that none of the prior studies cited in this research contradicted the results of this study but resulting another research gap that will be filled by subsequent studies. The implications of the outcomes found in this research is that the directors and managers of pharmaceutical firms should promote knowledge management practices at work because they have been shown to enhance employees' capabilities for product, marketing, and process innovation.

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