

## **Effect of Knowledge Management Practices on Business Performance in Bangladesh Pharmaceutical Industry**

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### **Abstract**

*During the past decade, the area Knowledge Management (KM) has drawn considerable attention from researchers. This is due to the fact that firms' performances are increasingly hinge upon managing knowledge of their employees rather than managing only physical facilities and resources. The present study intends to investigate the effect of KM practices on business performance in Bangladesh Pharmaceutical industry. Factor analysis has identified three factors of KM, namely organization culture, IT infrastructure and performance measurement. Structural Equation Modelling application has found that IT infrastructure and performance measurement have positive impact on business performance, while no significant relationship was observed between organization culture and business performance. Managerial implications of the findings are put forward.*

**Keywords:** Knowledge management (KM), business performance, Bangladesh

### **1. INTRODUCTION**

In today's market place, firms are required to synchronize their diverse activities to generate superior performance in their businesses (Germain and Iyer, 2006). In attaining so, synchronization, however, calls for an effective transmittal of knowledge amongst the individuals within the firm. Empirical evidence from prior research corroborates the fact that deployment of an effective transfer of knowledge derived from within and outside the business environment is critical to firms' competitiveness and business performance.

Due to its technological nature, the pharmaceutical industry is intimately involved in the adoption, generation and preservation of knowledge, with investments in research and development leveraging its core competencies. Bangladesh pharmaceuticals is one of the fastest growing sector with an annual two digit growth rate, and is now poised for self-sufficiency in meeting the local demand. The industry is the second highest contributor to the national exchequer and is the largest white collar intensive employment sector of the country. Bangladesh pharmaceuticals industry is mainly dominated by domestic manufacturers. Of the total pharmaceuticals market in Bangladesh, the local companies generate a market share of around 87% and the multinational companies (MNCs) account for around 12% with the rest being imported (Chowdhury, 2010). Pharmaceutical firms in Bangladesh export approximately \$27.54 million in products to more than 60 countries in the world.

Bangladesh, as a least developed country, currently enjoys some benefits in drug manufacturing as it is exempted by the Doha declaration from complying with patent protection

until 2016 (Chowdhury, 2010). As this flexibility under the agreement on trade-related aspects of intellectual property rights (TRIPS) will come to an end in a couple of years, the pharmaceutical industry is in utmost need of developing indigenous resources to combat the challenges of evolving market scenario of post 2016. With the pharmaceutical industry for a developing country like Bangladesh playing a significant role in meeting the local demands of pharmaceutical products as well as in exporting their products to overseas markets, it is of paramount significance that the factors influencing the various dimensions of knowledge management (KM) practices are looked into. This is particularly so as there exists a distinct dearth of studies conducted in this regard, particularly from the perspective of a developing country. This research is thus aimed at examining these influencing factors of KM practices and their impact on the business performance (BP) of drug manufacturers in the pharmaceutical industry of Bangladesh. Specifically, this research seeks to find out the influencing factors of KM practices as being observed and examine empirically the relationships of these dimensions on business performance of drug manufacturers in the pharmaceutical industry of Bangladesh.

## **2. LITERATURE REVIEW**

There is no uniformity or common conformity on the part of the scholars as to the definition and nature of knowledge – an intrinsically ambiguous or equivocal term. Thus, numerous approaches and taxonomies, such as ‘belief’, ‘understanding’, ‘information’, ‘experience’, ‘power’, etc. are offered by them in different times and studies to convey the meaning of knowledge from a variety of perspectives as found in the literature.

According to Allee (1997), knowledge is experience that can be communicated and shared; though, by experience, he emphasizes more on information. This is echoed by others, who believe such information is tacit in nature, and its creation and restructuring engenders new knowledge (Bhagat *et al.* 2002).

Notwithstanding a plethora of articles in the extant literature focusing on various dimensions of KM, according to Earl and Scott (1999), there exists a general lack of uniformity vis-à-vis the definition of KM. Knowledge management is rather an emerging area of discipline that began to surface in the early 1990s. While this has resulted into a surfeit of meaning and attributes of KM dimensions, it has also given rise to a somewhat divergent picture of this domain (Kakabadse *et al.*, 2003). A summarized version of prior definitions by various authors of knowledge management as offered by Hung *et al.* (2005, p. 165) is provided below:

“a managerial activity that develops, transfers, transmits, stores and applies knowledge, as well as provides the members of the organization with real information to react and make the right decisions, in order to attain the organization’s goals in an ever-changing competitive environment”.

### **2.1 Dimensions of Knowledge Management practices**

In general, the literature highlights the dimensions of knowledge management practices from two perspectives – one, the hard aspects, i.e., technical and the other, the soft issues, i.e., social (Mason and Pauleen, 2003). The ‘hard’ aspect holds the view that the deployment and usage of various information technologies would be the key to performing knowledge management activities in an organization (Mason and Pauleen, 2003). It is anchored on the premise that large amounts of knowledge processed through manifold information technologies, such as data mining, data warehousing, groupware, etc., will propel KM initiatives in the organization (Malhotra, 2000).

Contrary to this 'hard' view, the 'soft' approach of KM practices conveys the prevalence of social relationships in an organization such that employees would nurture a feeling towards each other through knowledge sharing and sustain the knowledge management drives (Gupta and Govindarajan, 2000). These social dimensions, according to Lee and Choi (2003), comprise those such as, the culture, the structure and the people working in the organization that are found to be instrumental in its performance. With time, as these values and resources are ingrained in the organizational work-setting, as the organization learns and garners business excellence, these social dimensions become difficult for others to imitate.

In this study, three dimensions relating to both hard and soft aspects of KM practices, namely, organizational culture, IT infrastructure and performance measurement with their hypothesized relationships on firm's business performance are described below.

### **2.2 Organizational culture on business performance**

According to Hofstede (2001), organizations function in a social milieu, and hence the importance of a particular cultural context or norm it is driven by. This cultural aspect sets the tone in an organization as to how knowledge is valued and organized in its attempt to create a competitive advantage. Deemed therefore as a form of organizational capital, the prevalence of a knowledge culture is instrumental in instituting knowledge management practices in an organization and ultimately making it a success. This is so as, according to them, it conveys an obligation on the part of the leadership toward exchange of knowledge, particularly the tacit in nature, contributing to informed decision-making. The argument that it is likely to hold greater influence than any other factor in implementing or inhibiting the knowledge management practices finds traction in the study conducted by Chase (1998); about 80 percent of the participants consider the primacy of culture as the key to nurturing a knowledge-based organization.

The relationship between organizational culture and the role it plays on its performance is highlighted in various studies. As suggested by Robinson *et al.* (2005), a culture conducive to learning and knowledge management practices is a conduit to innovation of new products and processes and helps it gain improved business performance. This is shared by Hooijberg and Petrock (1993) who state that it leverages superior performance and generates team-spirit among the members in an organization. Thus it can be stated as:

*H1: Organizational culture has a positive impact on business performance.*

### **2.3 IT Infrastructure on business performance**

According to Hung *et al.* (2005), for an effective KM system to develop in an organization, it has to be equipped with a strong IT infrastructure. This is in line with the empirical study by Ma *et al.* (2009), where IT capability is found to be a key enabler for KM effectiveness; the authors, therefore, advocate the need of paying adequate attention and inquiry vis-à-vis the impact of IT competence on organizational KM capability. The extant literature highlights various key aspects of IT competence such as, employee IT skills, IT infrastructure, IT investment, strategic fit of IS-business interface etc. (Bharadwaj, 2000; Sambamurthy *et al.*, 2003). It can, therefore, be hypothesized as:

*H2: IT infrastructure has a positive impact on business performance.*

### **2.4 Performance measurement on business performance**

Organizations that recognize their employees for what they know as well as for exchange of that knowledge nurture a climate that contributes to knowledge management efforts. However, since the role of a knowledge worker may occupy a new role within an organization, the flowering of a

desired knowledge culture for exchange and utilization of knowledge requires some time. In order for such a culture fostering a knowledge sharing behavior to take firm root in an organization, it is critical that exchange of knowledge and ideas within and across teams is rewarded, and not the individual performance, which might give way to knowledge hoarding. This is in agreement with what O'Reilly and Pfeffer (2000) suggest that the teams that harbor a knowledge community approach in resolving problems deserved to be rewarded and recognized throughout the organization; this would lead to improved firm performance. It can thus be hypothesized as:

*H3: Performance measurement has a positive impact on business performance.*

The hypothesized research model employed in this study is illustrated as follows in Figure 1.

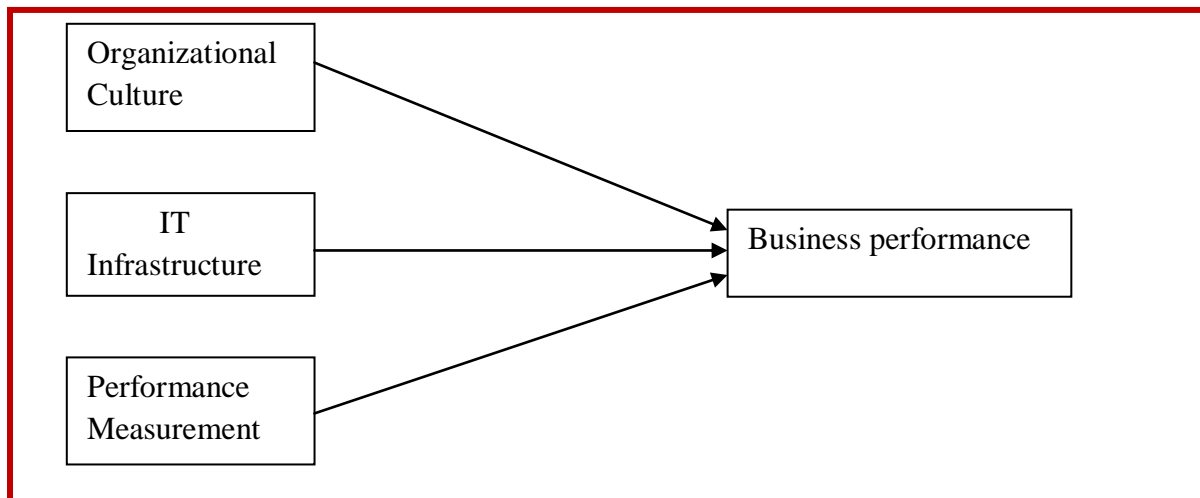


Figure 1: Hypothesized Research Model

### 3. METHODOLOGY

A questionnaire was first designed using prior literature reviews and then subjected to academic and expert reviews for content validity resulting into some minor modifications in the phrasing of the questionnaire items. The questionnaire thus developed comprises a few general questions regarding the company's competitive environment and demographic information of the respondents. Besides, there are questionnaire items regarding the dimensions of KM practices and business performance. A 5-point Likert scale that asks respondents to provide a relative assessment of various statements in the questionnaire on a continuum ranging from 'strongly agree' to 'strongly disagree' is used. As can be observed, there are 15 items regarding various dimensions of knowledge management practices; the studies covered for these dimensions of KM practices include Hung *et al.* (2005), Zack *et al.* (2009), Lee and Choi (2003), Robinson *et al.* (2005). For business performance, there are 7 items included for this study; the studies reviewed for this construct include Tseng (2010), Singh and Power (2009), Tracey and Tan (2001).

#### **3.1 Data collection and data analysis**

In order to understand the influencing dimensions of KM practices in the pharmaceutical industry, questionnaires were sent to those people and working in those companies that have

met certain criteria. The sampling frame contains the names of the drug manufacturers obtained from the Bangladesh Association of Pharmaceutical Industries (BAPI). The companies employ a minimum of 300 employees in order to ensure a minimum operating structure of each company. The respondents who take part in this study comprise full-time professionals, such as, product development managers, marketing and purchasing managers, executives in these departments as well as in engineering, quality assurance, project development and all those familiar with the product development activities for more than a year.

After having screened out the responses not fulfilling the above criteria as well as being incomplete, it is found that a total of 160 respondents with a response rate of about 56% participated in this study.

The data analysis is carried out by SPSS version 16.0 highlighting the demographic profile of the respondents and the companies. The reliability of the variables is measured by Cronbach alpha. The hypotheses of the study are tested by structural equation modeling using AMOS version 16.0. The adequacy of the structural model is measured by a number of indices, such as, Normed Chi-square, RMSEA and CFI, with their minimum threshold values taken as being less than 5, 0.08 and greater than 0.90, respectively (Hair *et al.*, 2010).

#### **4. STUDY FINDINGS**

##### **4.1 Reliability analysis**

Table 1 presents the reliability tests performed for the items of the relevant variables. Cronbach alpha is obtained in order to measure the reliability of measurement items. Ranging from 0 to 1, a Cronbach alpha value of 0.7 or above is considered adequate in measuring the internal consistency of an instrument. As all the Cronbach alpha values are found to be above the threshold value of 0.7, reliabilities of the measurement instruments are deemed adequate. In order to determine the convergent validity, item-to-item correlation with a threshold value of 0.4 is measured. None of the items show any value below 0.4, thus showing sufficient convergent validity of the measurement items.

Table 1: Reliability of the Variables

<i>Reliability</i>	<i>Items</i>	<i>Cronbach Alpha</i>
Organizational Culture	7	0.8569
IT Infrastructure	4	0.8899
Performance Measurement	4	0.8857
Business Performance	7	0.8512

##### **4.2 Factor analysis**

Factor analysis for KM practices is performed in order to obtain the pertinent constituent items comprising the four dimensions, i.e., organizational culture, IT infrastructure, benchmarking and performance measurement. This is done after checking the suitability of the data for this purpose; to this end, two measures are checked: Bartlett test of sphericity (to be significant at  $p < 0.05$ ) and Kaiser-Meyer-Olin (KMO), the value of which is to be 0.6 or above. Factor extraction is carried out through principal component analysis (PCA) and varimax rotation. As regards to deciding the number of factors to retain, latent root (or eigen values greater than 1) is considered. Variables are sorted by their loadings (0.50) on each factor and with communalities

greater than 0.50; those that cross-load on two factors (with loading above 0.4) in the rotated component matrix are deleted.

A KMO value of 0.899 and Barlett's test of sphericity ( $p < 0.001$ ) indicate, therefore, the appropriateness of such analysis in this study. The three factors with eigen values above 1.0 cumulatively account for 72.49% of the total variance explained. The items loaded comprise three factors, namely organizational culture (3 items: KM2, KM3, KM1), IT infrastructure (4 items: KM9, KM10, KM8, KM10), and performance measurement (5 items: KM12, KM13, KM14, KM15 and KM7) with no cross-loading detected at the rotated component matrix shown in Table 2.

Table 2: Rotated Component matrix (a)

	Component		
	1	2	3
KM13*	<b>.803</b>	.269	.191
KM14	<b>.772</b>	.270	.212
KM15	<b>.771</b>	.269	.278
KM12	<b>.763</b>	.210	.232
KM7	<b>.641</b>	.165	.112
KM9	.163	<b>.877</b>	.205
KM10	.249	<b>.828</b>	.183
KM8	.321	<b>.764</b>	.174
KM11	.315	<b>.760</b>	.159
KM2	.202	.147	<b>.869</b>
KM3	.171	.233	<b>.794</b>
KM1	.384	.209	<b>.774</b>

\* Details of the items are omitted due to space limitation.

### 4.3 Structural Equation Modelling

Once the three dimensions of KM practices with their constituent items are obtained through factor analysis, structural equation modelling is applied to test the proposed hypotheses of the study. Maximum likelihood estimation (MLE) is employed as the estimation technique. Figure 2 illustrates the structural model highlighting the influence of the three antecedents (organizational culture, IT infrastructure and performance measurement) on the business performance of the drug manufacturers in the pharmaceutical industry of Bangladesh.

The model is obtained after having revised the initial one that does not show adequate fit as evidenced by the values of one of the fit indices, i.e., RMSEA (Table 3). An inquiry into the modification indices reveals large inter correlations among various items, such as error bp1 and bp2 as well as error bp3 and bp4. After connecting these error terms with the earrings, the revised model in Figure 2 displays sufficient fit with the sample data as manifested by all the improved values of the fit indices in the Table 3. Besides, all the items representing the constructs possess minimum threshold values of above 0.50, thereby exhibiting adequate construct validity (Hair *et al.* 2010). The model highlights the fact that the three antecedents together account for 57% of the variance in business performance.

Table 3: Results of the Structural Model

<i>Goodness-of-fit statistics</i>	<i>Initial model</i>	<i>Revised model</i>	<i>Minimum threshold of the fit indices</i>
Normed-Chi square	2.143	1.854	< 5.0
RMSEA	0.085	0.073	< 0.08
CFI	0.903	0.928	> 0.9

Table 4: Regression Weights: (Group number 1 – Default model)

			Estimate	S.E.	C.R.	P
Bus Perf	<---	Org Cult	.008	.056	.138	.890
Bus Perf	<---	Perf Msrmnt	.246	.074	3.332	***
Bus Perf	<---	IT Infra	.204	.058	3.502	***

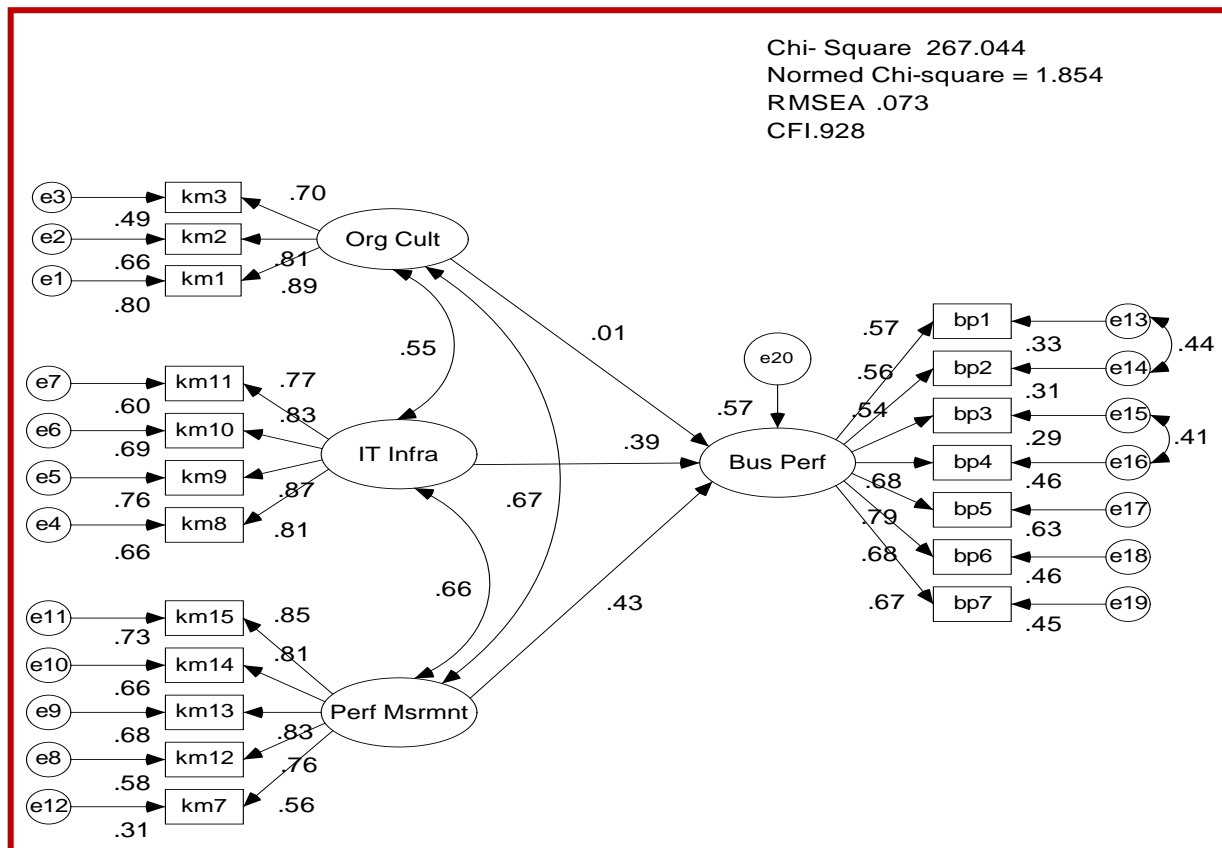


Figure 2: Full-fledged Structural Model

From Figure 2 and Table 4, it is seen that two path co-efficients prove to be statistically significant at  $p < 0.001$ . Thus it is suggested that in this study, while the hypotheses H2 (IT Infra

→ Bus Per) and H3 (Perf Msrmt → Bus Per) are supported, the model does not support the other hypothesis, namely, H1 (Org Cult → Bus Perf), indicating their influence on business performance. Apart from these, the correlations amongst the exogenous variables are quite high (Org Cult → IT Infra: 0.55; Org Cult → Perf Msrmt: 0.67; IT Infra → Perf Msrmt: 0.66) as evidenced from the model.

## **5. DISCUSSIONS AND MANAGERIAL IMPLICATIONS**

### **5.1 Role of organizational culture**

The study finds that knowledge management practices as being observed by the pharmaceutical companies is contingent upon an open and trusting company culture. However, as the model suggests, when it comes to exerting its influence on business performance, it does not show any evidence in this regard. This calls for urgent attention to be paid by the managers of the pharmaceutical companies. As it is a knowledge-driven industry, the importance of knowledge to be deemed as a resource cannot be overstated; this is, however, conspicuous by its absence to be loaded as one of the constituent items of organizational culture impacting KM practices. This is in harmony with the lack of adequate innovation of new drugs affecting the industry competitiveness vis-à-vis developed or strong regional economies. As stated earlier, Bangladesh pharmaceutical industry would be hard-pressed in navigating the post-2016 competitive landscape as the compliance to the TRIPS agreement regarding patent protection will come into force exposing the industry to stiff competition by such power players like Vietnam, India and China. Managers are, therefore, required to focus on nurturing an atmosphere, where, knowledge is to be viewed as a key resource that would foster learning and innovation among the employees.

### **5.2 Role of IT Infrastructure**

As the study indicates, IT resources deployed by the companies in the pharmaceuticals industry contribute significantly to employee productivity and sharing of knowledge – both vertically and horizontally. The finding is in agreement with Aguiar (2009), where it is indicated that KM facilitates in harmonizing knowledge within firms, though not with its external interfaces. Hence, the perceived advantages of knowledge management are derived from internal exchange of knowledge and information among the employees of the pharmaceutical companies.

While IT infrastructure surfaces as an important ingredient in gaining superior business performance, managers ought to address the issue of IT usage both within and outside the companies. Today's competition is no longer confined within the companies; rather, it is fought along the supply chains. For KM practices to bear fruit, instantaneous transmittal of knowledge to the appropriate employees along the various entities in the pharmaceutical supply chains is an imperative. This would ensure that no stock-outs of medicines take place with the demand and inventory of the medical supplies being constantly monitored by the concerned chain entities. The efficacy of the current IT usage notwithstanding, managers need to take a holistic approach so that the prevailing IT infrastructure be broadened to incorporate various supply chain linkages both on the upstream and downstream sides.

### **5.3 Role of performance measurement**

The study finds sufficient evidence to the application of performance evaluation system in the pharmaceutical companies in Bangladesh. This is not in congruence with the study of Hung *et al.* (2005) that does not extract performance evaluation system as one of the contributing factors in adopting knowledge management system. However, this is in line with the current industry practice of Bangladesh pharmaceutical industry, where the leading national manufacturers and



some MNCs have their performance evaluation system in place. In her study on GlaxoSmithKline Bangladesh Ltd., a subsidiary of the renowned pharmaceutical manufacturer GlaxoSmithKline plc, Zaman (2011) informs that the company uses a standard performance appraisal form known as 'Performance and Development Plan (PDP)' that asks the directors and managers to track their efforts against their yearly targets that conforms to SMART criteria (that is, S: specific; M: measurable; A: action-oriented; R: realistic; T: time-based).

In case of sales force personnel, it is measured by a few yardsticks such as, attainment of target, managing customer relations, knowledge of product and market competition, selling expertise, etc. In many companies, they set the KPIs (key performance indicators) on a yearly basis subject to some standards vis-à-vis the particular job positions/descriptions. Such performance appraisal process, however, varies from company to company, and impacts the performance of the companies. While the current practice of performance evaluation is much more pronounced in areas of sales and marketing, managers need to attach due importance to its application to all the other departments as well.

## **6. CONCLUSIONS**

Knowledge management practices play a pivotal role in gaining superior business performance in the pharmaceutical industry. This calls for figuring out, in the first place, the dimensions influencing these practices. The factor analysis done in this regard indicates that there are three dimensions, namely, organizational culture, IT infrastructure and performance measurement that comprise KM practices in the pharmaceutical industry of Bangladesh. As the structural equation modelling performed in the study shows that out of three hypotheses, two are supported: performance measurement exerts the highest impact of 0.43, followed very closely by IT infrastructure with 0.39 (at  $p < 0.001$ ) on business performance; the other dimension, namely organizational culture does not exhibit any significant influence on business performance. Overall, a variance of 57% in business performance is accounted for by the antecedents in this study.

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