





“Information technology integration for accelerated knowledge sharing practices: challenges and prospects for small and medium enterprises”

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INFORMATION TECHNOLOGY INTEGRATION FOR ACCELERATED KNOWLEDGE SHARING PRACTICES: CHALLENGES AND PROSPECTS FOR SMALL AND MEDIUM ENTERPRISES

Abstract

This paper argues that business enterprises in this competitive global market cannot compete and remain sustainable without effective knowledge sharing to improve business intelligence processes. The central argument hinges on the deployment and use of information technology (IT) as strategic tools to promote business decision making through quick business data analysis and dissemination of business ideas across business units and locations. The study reiterated the critical role IT plays in facilitating a culture of organizational learning and knowledge sharing practices. The study utilized surveys and questionnaires that were distributed to 230 small and medium enterprises (SMEs), and both descriptive and inferential statistics were used to present the results. Findings showed that firms are still using one-on-one meeting to share knowledge, while knowledge sharing activities are controlled through a rigid and inflexible process at the top management level, thereby hindering knowledge flow that is crucial for real-time decision making. The advances in IT have not been used advantageously to improve knowledge sharing and to advance business management. The paper concludes that without strong positive correlation between IT infrastructure integration, and communication strategies and knowledge sharing, the SMEs may not be able to compete in a highly competitive knowledge economy. Consequently, they may lose leverage to another competitor with more robust and mature IT infrastructure alignment for sharing business analytics and intelligence efficiently. A technologically driven, open, and informal approach to knowledge sharing for productive and innovative engagement is recommended. Furthermore, the use of IT that can promote agile and real-time knowledge sharing is recommended.

Keywords

business intelligence information, information
technology, business information systems, knowledge
sharing, KM, SMEs

JEL Classification

D80, D83

INTRODUCTION

In this modern business environment, organizations must learn the craft of adapting, using, and integrating technology to connect their employees and operations sites in various locations, or coordinate business processes through robust information management and efficient knowledge sharing. Reports have documented the integral role IT plays in knowledge sharing, information sensing and packaging, as well as disseminating business intelligence (Majchrzak, Rice, King, Malhotra, & Ba, 2014; Ajibade, 2016). It is time-consuming to share business ideas and knowledge on product innovations without the integration of IT (Park & Lee, 2014); social networks and other computing technologies help for improving knowledge sharing are being adopted by users (Bilgihan, Barreda, Okumus, & Nusair, 2015). It is

undoubtedly clear that SMEs must rely on the knowledge-intensive business information dissemination to remain competitive in this global economic arena. However, the utilization and integration of IT infrastructure with the core process and operations of any enterprise will determine the return an organization derives from IT investment regarding its capabilities of sharing business intelligence. However, poorly configured and deployed IT infrastructure would prevent the organization from sharing business knowledge most efficiently and effectively to promote business agility. This paper examined the knowledge sharing trajectory of small and medium-sized enterprises in Nigeria and South Africa as the two leading economies on the continent. The essence is to determine if there is IT infrastructure to promote knowledge sharing and business intelligence and whether the IT is aligned with the core functions of these enterprises to effortlessly facilitate the process of sharing business intelligence across various geographical locations.

1. LITERATURE REVIEW

The literature review covers the problem statement and the rationale for the study, the debate in the literature, and the theoretical underpinning of the study.

1.1. Problem statement

Companies that fail to prioritize their knowledge management strategies and efficiently protect and share their business intelligence and knowledge within their business operations will be unable to thrive. In fact, the competitive nature of the global economy entails and dictates the ability to respond swiftly and to compete for market shares forces firms to protect and securely share business intelligence. Sharing business intelligence is crucial as often witnessed in financial market trading platforms across major stock markets around the world. To be precise, the need for accurate and agile business knowledge sharing has led to companies investing billions of dollars in knowledge sharing platforms and software to enable efficient business data processing and sharing for investment decision making. Therefore, SMEs, like any other organization, need the ability to use information technology infrastructure to dissect information trends, and to process and disseminate information. It was debated that organizations must be able to sense sources of useful information, and to process and disseminate it for effective operations (Kang'ethe & Ajibade, 2016). However, a number of SMEs appears to be lacking the ability to deploy, use, and integrate the information technology infrastructure that is needed for sharing business intelligence in an efficient manner. Nevertheless, the SMEs need the skills to articulate their business intelligence and knowledge sharing through the use and integration of business information systems (BIS). This

integration of BIS is important for SMEs to collaborate in order to share tacit knowledge (Kucharska & Kowalczyk, 2016; Huber, 2015), especially when an organization has many satellite branches. It was indicated that sharing experiences are social ways employees and workers connect as a fundamental process of human interaction to enhance collaboration (Gallego, Bueno, & Noyes, 2016). Although a report by Fagerström and Gustavsson (2014) indicated that certain employees find it difficult to share knowledge and experiences, Ajibade (2016) reiterated that SMEs improve productivity when their business intelligence and knowledge are shared within the organization. Therefore, it is imperative that the information technology is used as computer-assisted tools to the advantages of the companies to help those employees who cannot socialize or interacts to adapt feature on the companies information systems (IS) or other social networking and knowledge sharing platforms to disseminate information and business intelligence as companies thrive and consume processed data for business decision making and business governance. Yet, many SMEs have not been able to integrate some of the IT capabilities to share knowledge and enhance collaboration. Findings reported that knowledge sharing challenges relating to technology challenges are least reported despite array of technologies that support knowledge sharing (Zahedi, Shahin, & Babar, 2016).

1.2. Theoretical underpinnings

1.2.1. *Technology alignment model (TEAM) lifecycle*

In order to make IT more effective in SMEs, it was necessary to develop that will enhance their knowledge sharing practices. Hence, this paper utilizes

the TEAM model, which is a framework that enables SMEs to capture manage business processes and utilize the functionalities of IT to create, use, store, and share (vital operational knowledge) known as business intelligence (Ajibade, 2018). The TEAM model advocates the efficient ways firms can integrate and use IT in their business lifecycle to promote effective business process management (BPM) and knowledge sharing within the business lifecycle. The framework, enable firms to capture vital business insight due to integration of business and IT architecture, while the integrated system enables the firms to share knowledge within their operational ecosystem. The TEAM model was developed as part of the conceptual model for a PhD thesis in information science to enable researchers, business executives, and operational managers increase the potential of integrated IT capabilities with their business process to improve use and return on IT functions. Business and IT architecture must be examined to determine if it is integrated, and if it is robust enough to promote efficient business process management that is needed to achieve the company's strategic plans. This includes examining if the IT plans is robust enough to accomplish this strategic alignment. This must be determined through joint review of IT contributions to the BPM, and review of organization business and policies vis-à-vis what is expected from the employees to ensure compliance, and finally the evaluation of their performances to determine the efficiency and productivity level of the organization.

However, if the expected outcome was not achieved, the company must re-examine and evaluate the business and IT architecture and realign it with the core BPM of the firm and whatever insights is generated from each of these stages during the BPM, this knowledge would be transmitted within the organization. The IT alignment lifecycle must be re-examined again by following the same trajectory. Therefore, to assist each business units in carrying out their functions as the system store business intelligence (BI) and it is able to track provenances of BI, classify and aggregate BI, in order to enhances efficient sharing of this information. Furthermore, within the BIS, it is also possible to archive BPM vital information worthy of permanent preservation for future use or dissemination. The optimization of BIS and its analytical capabil-

ity to facilitate improved knowledge sharing based on the ability to execute task timeously and track knowledge sharing in a real time will improve efficiency within firms. This is because of its ability to share business ideas quickly and in the most cost-saving manner, which is critical for accomplishing the strategic plans of the firm. In so doing, it enhances efficient knowledge sharing, maximizes performance, and reduces the cost of business knowledge sharing. The model may be used so that business and IT architecture must be aligned to facilitate business knowledge management processes. The alignment of this architecture will lead to the achievement of the strategic plan of the companies, provided the IT plans are set up to support strategic goal of the firm through timeous information, knowledge sharing and performance scorecards.

For the purpose of this study, a technology alignment model was used within the context of IT depicting a system lifecycle or continuum. In this case, the use of the term 'lifecycle' should not be taken to imply that there is an end to the system architecture, particularly in the process of migrating from one platform to another. But the lifecycle concept is equally well elucidated regarding either a lifecycle or a continuum. The notion of an alignment lifecycle, or continuum, was advanced by Coertze and Von Solms (2014), to enable key players to be recognized and to connect the various different elements which are necessary to ensure the optimal business-IT alignment. The intent behind the model was to resolve any discrepancies, which may be inherent in the practical application of the concept of alignment and its theoretical foundations.

Although previous studies have provided visual representations of frameworks for IT alignment, in the form of four boxes with lines connecting them (Maes, Rijsenbrij, Truijens, & Goedvolk, 2000), in a practical business environment, it is not quite so simple if the intention is to obtain an accurate understanding of the various processes within the context of an actual business. Nevertheless, by this framework, the IT system will be used to collect, process, classify, store, and share knowledge at every unit in the entire business lifecycle by promoting the strategic objectives of the firm and using an aligned IT infrastructure to improve organizational learning.

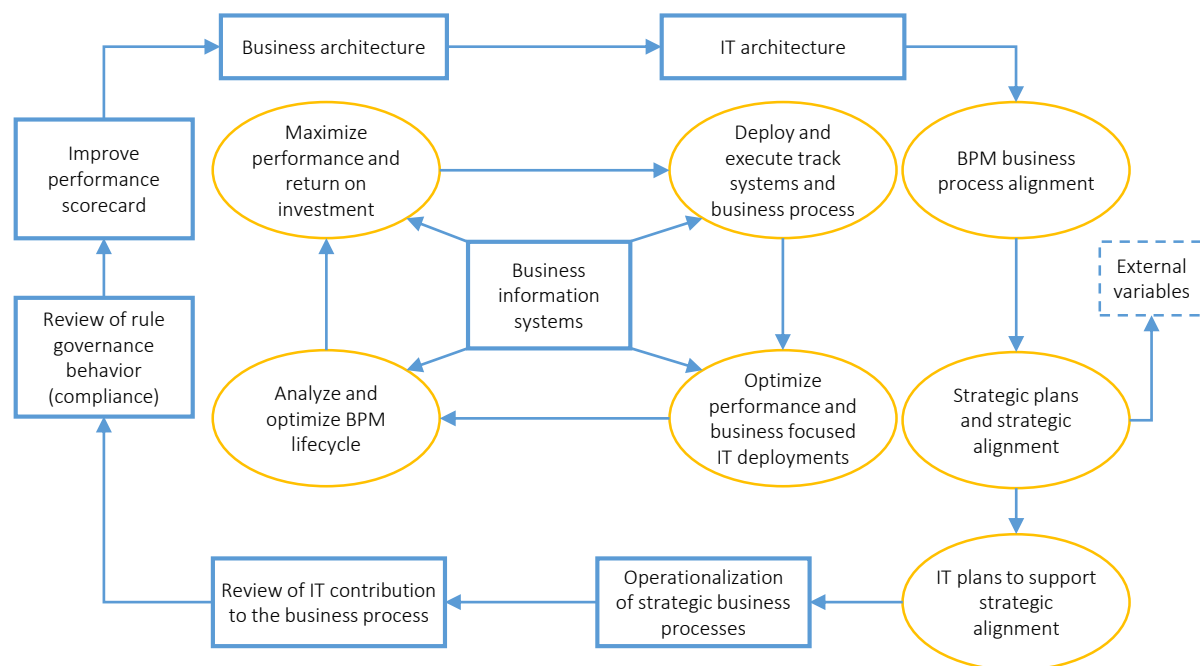


Figure 1. IT alignment lifecycle

Previous studies by Chan and Reich (2007), Coertze (2014), Coltman, Tallon, Sharma, and Queiroz (2015), De Haes and Van Grembergen (2009, 2015), Luftman (2015) have tended to overlook the value of periodic reviews of the contributions of IT to business processes, as the functioning of SMEs is dynamic in its nature. As business environments, IT infrastructure and business architecture require a proactive, rather than a static, approach to be adopted, periodic assessments are of crucial importance. Consequently, the ability of the alignment framework to respond seamlessly and adjust to the changing business climate serves to develop alignment maturity. Previous studies also tended to neglect the need for rules-based behavior concerning governance among employees (Luftman & Kempaiah, 2007). As the success of the alignment process depends upon the staff at all levels of a business, the term 'human and IT alignment' is advanced for the purposes of this study, in the belief that doing so could deepen the understanding of the alignment process and generate further discourse in future studies. It is also suggested that the incorporation of the concept into existing dialogue about alignment could make a significant contribution to the achievement of alignment and alignment maturity in businesses. Adherence to rules-based governance,

regarding both the policies of firms and the duties and responsibilities of individual employees, which need to be included in their performance appraisals, has the potential to improve the ability to meet IT compliance standards and, in turn, to increase the potential for achieving successful alignment. Finally, the performance scorecards of all business units should be examined in relation to business process alignment strategies.

1.3. Methodology

The paper used quantitative methods to collect and analyze the data by distributing questionnaires to SMEs at Buffalo City and Ibadan Metropolis. The paper used stratified purposive sampling techniques based on the industries in which the SMEs operate in such as manufacturing, agriculture, retail, hospitality and tourism, automotive and service sectors. There are three ways SMEs can be defined: by size, annual turnover and market capitalization. However, for this paper, the definition of SMEs by size was adopted and it was defined as firms with more than five (5) but not above two hundred and fifty-five (255) paid employees. To maintain high level of ethical standard, ethical clearance application was made to the higher degree of the Institution and an eth-

ical certificate was issued having met all the prescribed requirements. Part of the results were presented using descriptive and inferential statistics. Survey data were collected from 230 respondents, and both descriptive statistics and inferential statistical data were collected from SMEs at Buffalo City and Ibadan Metropolitan Municipality. The tools used for the analysis includes SPSS version 22.0, the Statistical Analysis Software (SAS) and the R statistical computing platform. The descriptive data were presented as tables and percentage and frequencies of the distributions were presented, and the reliability score of the variables were presented (see Table 1). The Pearson R correlation were used based on this formula:

$$r = r_{xy} = \frac{\sum x_i y_i - n\bar{x} \cdot \bar{y}}{\sqrt{\sum x_i^2 - n\bar{x}^2} \sqrt{\sum y_i^2 - n\bar{y}^2}}. \quad (1)$$

The formula is thus simplified and expressed as:

$$r = r_{xy} = \frac{1}{n-1} \sum_{i=1}^n \left(\frac{x_i - \bar{x}}{\delta_x} \right) \left(\frac{y_i - \bar{y}}{\delta_y} \right). \quad (2)$$

where n – number of pair scores, $\sum xy$ – sum of the paired x and y , $\sum x$ – sum of x scores, $\sum y$ – sum of y score, $\sum x^2$ – sum of squared x scores, $\sum y^2$ – sum of squared y scores.

The next section presents the questions, which were used to elicit responses from forty-three respondents.

1.4. Research question

What is the role of information technology in promoting small and medium-sized enterprises knowledge sharing?

Based on the primary research question, to ensure that the responses were measurable, the following objectives were used to gain insights from the respondents into the SMEs' knowledge sharing practices. The specifics objectives were to know the following:

1. Methods used by SMEs to promote organizational learning and knowledge sharing?
2. The culture of knowledge sharing that existed within the SMEs.

3. The promotion of organizational learning and knowledge sharing in SMEs.
4. The relationship between information technology (IT) and knowledge sharing in SMEs.
5. Frequently used IT platforms and channels used to share knowledge.

2. FINDINGS AND DISCUSSIONS

This section presents the findings about the business organizations knowledge sharing and management of business intelligence as a prerequisite for company to be or remain competitive. It has become increasingly difficult to monitor knowledge or manage its flow, but with the use and integration of IT, organizations can use IT tools to manage knowledge and share knowledge in an efficient manner, (Peng, Quan, Zhang, & Dubinsky, 2016), provided the companies have the skill to integrate their IT infrastructure to enable them use business intelligence. IT should play an important role in managing knowledge through quick classification of information that improves the process of knowledge sharing in a faster way (Peng et al., 2016), just as social media can accelerate information and knowledge sharing and large companies rely on social media platforms for sharing knowledge (Ellison, Gibbs, & Weber, 2015). In order to determine the effectiveness of IT usage in SMEs, their IT alignment maturity level in promoting knowledge sharing was divided into 5 levels, ranging from 1 preliminary or ad hoc to 5 advanced or matured. The data in Table 1 show that 21 (9.1%) respondents indicated that their firm uses peer-sharing and meeting for sharing knowledge which was categorized as level 1, while level 2 deals with the use of email, telephone and training for sharing knowledge, level 3 uses collaborative process from top management, level 4 involved formal and institutionalized processes in all level of management to promote sharing of experiences and critical success factor. The variable on method of knowledge sharing indicated that 32 (13.9%) which was classified as level 1 believe their companies knowledge sharing methods are rigid, while level 2 was classified as moderately informal but with directive from the top, and level 3 indicated formal and inflexible bi-directional from top down and from the bottom-up, level 4 showed moderately

Table 1. The levels of SME's IT integration to promote knowledge sharing practices

Firm communication governance and partnership	Frequency, %	Level 1	Level 2	Level 3	Level 4	Level 5	I don't know	Not applicable	Mean	SD	Cronbach Alpha
Q-1(N = 168)	Freq., %	21 9.1	41 17.8	64 27.8	37 16.1	5 2.2	–	–	2.79	1.022	–
Q-2(N = 181)	Freq., %	32 13.9	44 19.1	54 23.5	40 17.4	11 4.8	–	–	2.75	1.165	–
Q-3(N = 219)	Freq., %	71 30.9	57 24.8	53 23.0	33 14.3	5 2.2	–	–	2.29	1.139	
Q-4(N = 216)	Freq., %	57 24.8	55 23.9	60 26.1	34 14.8	10 4.3	–	–	2.47	1.173	0.703
Q-5(N = 225)	Freq., %	76 33.0	53 23.0	38 16.5	45 19.6	13 5.7	–	–	2.40	1.292	
Constructs	Q-1. Methods used by the SMEs to promoting organizational learning. Q-2. The extent to which IT and business employees' communication styles ease the exchanging ideas. Q-3. The degree to which cultures in which the value of sharing knowledge is appreciated have been established in the SMEs. Q-4. The role of IT in knowledge sharing practices. Q-5. The effectiveness of cooperation between IT units and business departments in the SMEs.										

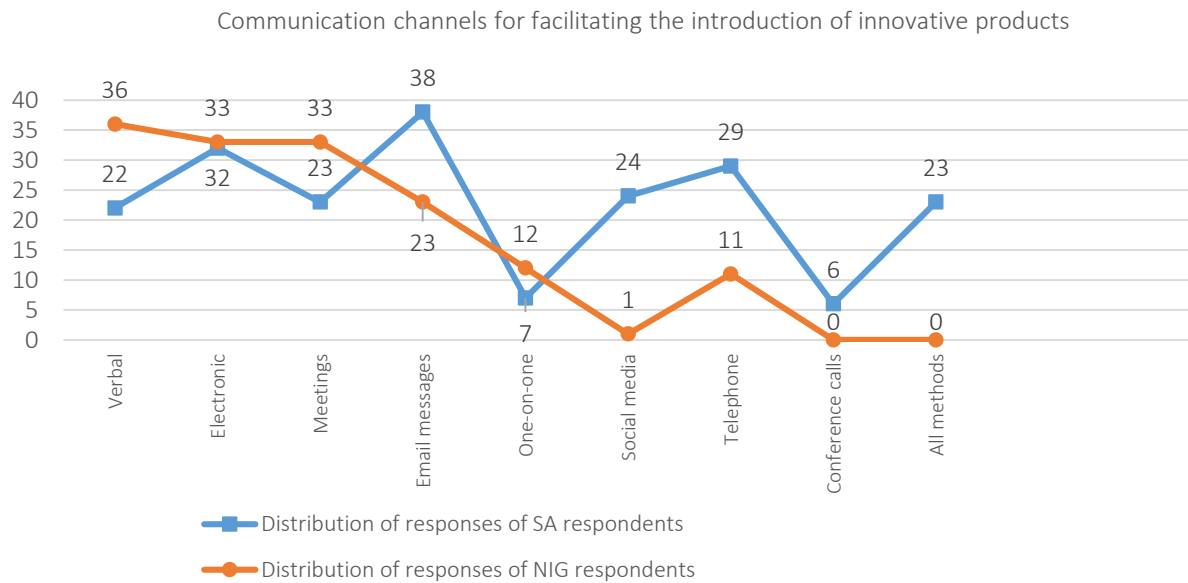
informal and flexible methods of knowledge sharing while level 5 showed a casual and flexible methods of sharing knowledge within the organization as indicated in Table 1.

Furthermore, to know about the extent of the SMEs' knowledge sharing culture, the respondents were asked their opinion about the role IT plays in their company's knowledge sharing practices, and the respondent's perceptions options were as follows: no significant role, minor role, moderate role, important role, and vital role. The findings indicated that 24.8% believed that IT plays no significant role in their knowledge sharing methods. This corresponds to the results in Table 1, which indicated that 9.1% and 17.8% respondents stated that their companies use one-on-one and meetings to promote organizational learning and sharing of experiences.

The implication of these findings for the efficient knowledge sharing and online real-time business intelligence sharing would be reflected upon the quality of decision making, and delays in BPM since the capabilities of IT are not embedded in the decision making and knowledge sharing processes, because the quality of decision making is dependent on the amount of business intelligence shared and how quick the methods of sharing within the firms. Although previous findings have indicated that individuals tend to hoard knowledge (Peng, Quan, Zhang, & Dubinsky, 2016; Ajibade, 2016), in an enterprise with a desire to promote open innovation

and efficient services, open-access knowledge management culture must be developed and expanded for sharing business knowledge. Hence, individual practices of hoarding critical business intelligence must be eliminated, especially in a business setting that intends to encourage agile business operations.

The methods, styles, means, and techniques which SMEs use to communicate play a vital role in ensuring the effectiveness of knowledge sharing, efficient business processes, and the attaining of their strategic objectives. Hence, we wanted to know what IT platform or channels were frequently used by the SMEs to share knowledge (research question 5). As effective communication concerning the introduction of innovative products is facilitated by the successful integration of IT infrastructures into BPM, the business units of SMEs need to be acutely aware of the strategies of their organizations pertaining to the introduction of innovative products and the leaders of units need to ensure that optimal use is made of the channels and modes of communication which are available to them, in order to ensure that all units have up-to-date information and the public is made aware of new products. From the responses of the respondents, it was found that their preferred styles and modes of communication were represented by verbal communication (58%), electronic communication (65%), e-mail messages (61%), meetings (56%), social media (25%), and telephone communication (40%). The distributions of responses are depicted in Figure 2. As the respondents were permitted to select



Note: As multiple selections were permitted; percentages could exceed 100%.

Figure 2. Communication channels for facilitating the introduction of innovative products

more than one option, the sum of the percentages of the descriptive statistics exceeds 100%. Although the telephone tended to be preferred to meetings by the South African SMEs, the opposite trend was found among the Nigerian SMEs.

It is important to reiterate that our argument is central to how information technology is deployed and integrated to manage business information. This view provides a clear nexus between knowledge and information as “knowledge sharing may range from exchanges of information between individuals to ongoing problem solving and coordination in formal project teams on a large scale within organization” (Ellison, Gibbs, & Weber, 2015, p. 104). The analysis which was performed, using the Statistical Analysis Software (SAS), of the perceptions of the respondents regarding the contribution IT made to achieving the strategic goals of their organizations, indicated that there was a positive correlation between this variable and the role of IT in knowledge sharing practices (cf. Q-4). The analysis had been formulated in order to assess the role of IT in the knowledge sharing practices of the SMEs, with a Pearson correlation coefficient of 0.43555 and a p -value of < 0.0001 , from a total of 104 responses from the South African respondents. By contrast, the data from the 112 Nigerian respondents did not yield a significant level of correlation. These findings suggested that South African businesses might enjoy an improved knowledge sharing culture

through information technology which is good for real-time business operation and efficiency. However, the SMEs from the Nigeria data indicated that epileptic power supply and cost of internet data have been one of the major hindrances to utilization of IT within their BPM.

2.1. Utilization and integration of IT for knowledge sharing

SMEs must understand that the focus of their daily decisions will be impacted by the scope of IT infrastructural integration. Hence, the business leader must make sure that all employees can use interactive IT platforms to share business knowledge and service innovation, especially since the data revealed that IT infrastructure integration strongly correlates with the extent to which the culture of knowledge sharing is appreciated in the business, as the data showed a correlation coefficient of 0.255 and the significance level was 0.007. However, in analyzing the role of IT in promoting effective communication and cooperation regarding the focus of SMEs IT infrastructure, there was a definite correlation, but the correlation coefficient was not very high meaning the SMEs still have significant room for improvement. Based on the SMEs’ scope of architectural integration analysis, the results showed that the IT infrastructure integration correlates with the role of IT in pro-

moting the effectiveness of business process communication or cooperation. The correlation coefficient was 0.194, and the significance level was 0.041, meaning that IT had a substantive role in promoting business intelligence sharing.

Moreover, there were a strong positive correlation between the SMEs communication strategies and governance ($r = 322^*$, $\alpha = .000$). Meaning that these companies' governing activity must promote the importance of sharing business ideas and knowledge. Our findings showed there seems to be some levels of understanding of business process (BPs) by the IT units within these SMEs and knowledge of the IT functions by the business units. However, the descriptive statistics showed that some of the senior and middle-level IT managers do not understand the business units as suggested by 33 respondents representing 14.3% of the total respondents. Additionally, 46 (19.9%) of the total respondents in the study indicated that their IT managers have a limited understanding of the BPs. This result implies that without accu-

rate and robust knowledge of business processes of both technical units and operational business units, it will be difficult to share knowledge effectively, which might be inhibiting these companies from sharing business intelligence which is needed to increase productivity, agility, and sustainable business operations. The summarized data from the factor analysis, the major problem facing the SMEs in their utilization of IT and the level of alignment achieved was as a result of misalignment of IT with business skill development and communication strategies. As these two latent variables (staff skill development and communication) showed an inversely correlated ($-.032$) effect. The findings mean that these SMEs exhibit the inability to understand IT capabilities for the purpose of BPs knowledge sharing to promote a business environment that improves innovation and entrepreneurship. These findings seem to suggest that SMEs employees' have not been allowed to develop IT and business skills that would enable reduced rigid BPs through effective liaison and organizational learning.

CONCLUSION

Some SMEs still exhibit a lack of appreciation for the strategic role of IT in enhancing communication and knowledge sharing between companies to improve their BPM. Howbeit, without the deployment and use of IT, it is difficult in this global economy to communicate with clients. Nevertheless, our findings revealed that communication strategies amongst the SMEs poses huge hinderance to knowledge sharing, which may signal to the clients that there is a lack of synergy by the firm to build a vibrant and responsive business ecosystem with the customer. Without SMEs' ability to improve to a point where there is a strong positive correlation between IT infrastructure integration, communication strategies and knowledge sharing, SMEs in this study may not be able to compete in this highly competitive knowledge economy. Hence, they might be losing leverages to another competitor with robust and mature IT infrastructure capable of sharing business analytics and intelligence that is required to manage a successful business operation. This process requires constant distilling of operational data and converting it to useable business information which is shared amongst stakeholders within enterprises. As our findings indicated, these will be negatively impacted without consistent use of IT to promote knowledge sharing. Yet, the results showed that the SMEs' IT infrastructures have not been adequately and efficiently integrated to improve effective communication which is essential for all-encompassing knowledge sharing within the small and medium-sized enterprises in the Buffalo city and Ibadan North Metropolis.

RECOMMENDATIONS

The SMEs must promote organizational learning through an exchange of ideas and the use of information technology capabilities to ensure secure and quick access to business intelligence that may strengthen efficient decision making. The available IT infrastructure within the SMEs must be inte-

grated to process, disseminate, and archive knowledge worthy of permanent preservation. SMEs might want to review their methods and channels used to share the experience, as some approaches were rigid and inflexible, which may be discouraging open dialogue and the free flow of business intelligence. The culture of knowledge sharing should be open and unrestricted as top management in some instances promote a formal, rather than an informal, approach to knowledge sharing which is counter-productive for innovative engagement. Finally, the current knowledge practices within these firm were not set up to anticipate transnational business operations where online real-time knowledge sharing should be a norm, and it appears the use of social media platforms have not been fully utilized to share knowledge and this is strongly recommended. The use of IT that is able to promote agile and real-time knowledge sharing is recommended.

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