2016

Towards a Framework for Business Process Management and Enterprise Systems Competency Building in Higher Education Institutions: A Comparative Study of South Africa and Kenya

Elizabeth Wamicha
University of Cape Town, ewamicha@strathmore.edu

Lisa Seymour
University of Cape Town, lisa.seymour@uct.ac.za

TOWARDS A FRAMEWORK FOR BUSINESS PROCESS MANAGEMENT AND ENTERPRISE SYSTEMS COMPETENCY BUILDING IN HIGHER EDUCATION INSTITUTIONS: A COMPARATIVE STUDY OF SOUTH AFRICA AND KENYA

Completed Research

Elizabeth Wamicha, University of Cape Town, Cape Town, South Africa,
Strathmore University, Nairobi, Kenya
ewamicha@strathmore.edu
Lisa Seymour, University of Cape Town, Cape Town, South Africa,
lisa.seymour@uct.ac.za

Abstract

There are a growing number of Enterprise Systems based courses on offer in Universities, these courses have become a core part of teaching in Higher Education Institutions (HEIs). However, competency building focusing on the Business Process Analyst (BPA) role within Enterprise Systems are a very new area with a high level of potential. The BPA is charged with discovering, validating and documenting organizational business processes. The BPA, through Business Process Management enables organizations to remain relevant in today's competitive world. In addition to this, understanding the business processes of an organization is an important aspect of success of an Enterprise Systems implementation. The study argues that developing contexts have not attempted to determine the interventions and interactions that can develop BPA competencies required by organizations with Enterprise systems. This is a comparative study of two contexts in sub-Saharan Africa that is, South Africa and Kenya. The study analyses competency requirements from industry with the aim of developing pedagogical and curriculum changes in HEI.

Keywords: Business Process Analysts, Enterprise systems, Competencies, Higher Education Institutions, Education, Curriculum

1 Introduction

Several countries in Sub-Saharan Africa are experiencing major growth in the area of Information and Communication Technology (ICT) (Mbarika, Payton, Kvasny, & Amadi, 2007). In addition to this, the digital divide in countries such as Kenya continues to reduce at a rapid rate especially in areas such as development and establishment of telecommunications infrastructure (Brännström, 2012). Other critical areas such as electronic governance and improvement of government processes have also been initiated and implemented at a rapid rate in the continent (Estevez & Janowski, 2013). While much has been done in ICT and IS research in developed countries such as North America and Europe, develop-

ing countries including those in Africa continue to have issues that are not well analysed in IS research (Avgerou, 2010). In addition to this, an unfortunate assumption is made that developing countries will have no challenges in adopting already existing knowledge (Hawking, 2011). While ICT has the potential in the continent to enable strategic and transformative development, hardly any research has delved into this rapidly growing area (Thompson & Walsham, 2010). Studies have also shown that there is a growing need to research issues of ICT from a context perspective such that we do not assume that what works in one context will automatically work in another (Heeks, 2010). Gaining a clearer evaluation of this context is urgent since substantial funding is being spent on ICT in these countries (Hawking, 2011; Heeks, 2010).

Competency building within the IS arena has also been viewed as critical to enhancing educational achievements in developing countries and this is important for using IS optimally (Ngwenyama, Andoh-Baidoo, Bollou, & Olga, 2006). This argument remains as important in the case of Enterprise Systems (ES) and Business Process Management (BPM). These areas are prominent in research in information systems literature (Klaus, Rosemann & Gable, 2000). This paper seeks to establish if there exist any contextual differences in the competencies required for BPM and ES in two specific countries South Africa and Kenya. These countries have in the past few years experienced significant technological advancement. South Africa leads the way, in the continent, in terms of ES implementations and BPM while Kenya has been earmarked by vendors and industry players a significant player for ES growth leading for an increased demand for experience in BPM (SAP University Alliance, 2015). The contribution of this paper is to identify any contextual differences in BPM competencies for ES in two separate contexts; that is South Africa and Kenya. The paper presents a general literature review of BPM and ES which includes the integration process between BPM and ES, the competency building initiatives that are currently in place in Higher Education Institutions.

2 Literature Review

BPM trends span a period of more than thirty years (1980s –2000s) and have been defined as focusing on continuous process improvement and business process redesign (Scheer & Nüttgens, 2000; vom Brocke, Becker, Braccini, Butleris, Hofreiter, Kapočius, 2011). BPM is defined as a critical management practice that is focused on ensuring that there is a good understanding of the business processes of an organization in order to enable organizational effectiveness and efficiency (Sonteya & Seymour, 2012; Xu, 2011). BPM has been viewed as a holistic management discipline (Rosemann and vom Brocke, 2015). BPM is also seen as a very relevant field of management as it attempts to find common ground between computer science and business administration (Weske, 2012). Several studies have attempted to investigate BPM maturity frameworks (Harmon, 2007; Röglinger, Pöppelbuß, Becker, 2012; Rosemann and de Bruin, 2006). Studies have also investigated the evolution of BPM (Harmon, 2015; Smith and Fingar, 2003). These studies have suggested that by having an understanding of business processes, organizations are better able to keep up with the demands of the current global market (Smith and Fingar, 2003; Weske, 2012; Weske, 2007). This is because BPM aims to understand what the organization does and from this it attempts to manage the process improvement and optimization lifecycle (Smith and Fingar, 2003). The business process lifecycle is defined as a set of phases that are dependent on each other and that aim to improve or optimize existing business processes or add new business processes that are critical to the organization (Weske, 2012).

In this regard, the Business Process Analyst (BPA) is defined as: “mid-level person who deals with tactical, more day-to-day aspects of discovering, validating, documenting and communicating business process knowledge’’(Antonucci & Goeke, 2011 p.134). Several studies address the importance and scarcity of BPAs (Chakabuda, Seymour, & Van Der Merwe, 2014; Jarrar, Al-Mudimigh, & Zairi, 2000; Motwani, Mirchandani, Madan, & Gunasekaran, 2002; Sonteya & Seymour, 2012). Currently

this role of Business Process Analysis (BPA) has been passed on to the Business Analysts (BA) of the organization. This often leads to a situation where the BA requires additional training in order to fit into the BPA role. Some studies have carried out a comparative analysis of the BPA and BA roles (Mathiesen, Bandara, Delavari, Harmon and Delavari, 2011) and have indicated that while there are certain BPA skills that align with BA skills, there are still additional capabilities that the BPA is required to have such as Process Architecture competencies (Harmon, 2007; Mathiesen et.al, 2011), Process management competencies (Harmon, 2007; Mathiesen et.al, 2011), Process oriented thinking (Moormann and Bandara, 2012), Social BPM (Caporale, Citak, Lehner, Schoknecht, Ullrich, 2013) and Process Management and Social Networks (Rosemann et.al, 2006; Mathiesen et.al, 2011). In addition to BPA skills, studies indicate that top managers and people in supervisory positions also require BPM and process analyst competencies (Bandara and Moormann, 2012).

2.1 BPM and Enterprise Systems integration

Enterprise Systems (ES) have been described as enterprise wide systems that are designed and developed with the aim of integration and optimization of organizational business processes (Moon, 2007). As more organizations automate their business processes, customers running ES continue to demand software that is flexible, mobile and with no hidden costs (Hamerman, Moore & Margerie, 2011). ES provide an integrated database. Through this architecture, it is possible to automate large parts of an organization as described below:

> An enterprise system stores its data in one centralized database, and a set of application modules provides the desired functionality, including human resources, financials, and manufacturing. Enterprise resource planning systems have effectively replaced numerous heterogeneous enterprise applications, thereby solving the problem of integrating them (Weske, 2007, p. 30)

BPM has been described as critical in facilitating ES integration of business processes throughout an organization (Xu, 2011). In the ES context, BPAs require an intensive understanding of the process layer of many ES (Møller, 2005) and some of the benefits of a robust BPM strategy, within the context of ES, is operational efficiency that lowers operating costs and increases customer satisfaction (vom Brocke & Rosemann, 2010). As part of ES implementation, efforts have been made to develop the process management life cycle that includes designing, documenting and implementing critical processes (vom Brocke & Rosemann, 2010). Given the critical nature of implementing a robust BPM strategy for ES integration, organizations have felt the need to revamp competencies around BPM (Chakabuda et al., 2014; Sonteya & Seymour, 2012).

2.2 BPM and ES competency building initiatives in Higher Education

In order to better understand the focus of the study, it is important to have a clear understanding of the concept of competency. The definition of the term competency has been a source of much debate over the years (Jackson, 2010; Le Deist & Winterton, 2005). Authors have described competency as the skill that is often associated with performing optimally within a particular job, including the attitudes of the project members (Aydinli, Brinkemper, & Ravesteyn, 2008). BPM education, focusing on building BPA competencies, has gained importance because the area has recently emerged as a critical discipline that affects a broad range of organizational practices (Antonucci, 2010; vom Brock and Rosemann, 2014). However, researchers in BPM education have argued that the area is making strides in academia and most Information Systems departments in the world are looking to BPM as a relevant Information Systems course (Bandara, Chand, Chircu, Hintringer, Karagiannis, Recker and Welke, 2010). Bandara et.al (2010) argue that the area of BPM is significant in Information systems curricula but that certain challenges exist such as lack of resources including coursework repositories and textbooks. Bandara and Moormann (2012) further argue that there are several areas that require further

examination in the area of BPM this includes learning in BPM, which involves the development of individual and collective knowledge and teaching in BPM which involves the strategies to be used to develop appropriate curricula for training of BPM both in organizations and in Higher Education Institutions (HEIs).

On the other hand, in an effort to develop dynamic curricula for ES competency building, a variety of approaches have been used such as including hands-on approaches in curricula and the usage of ES by academia (Noguera & Watson, 2004; Pridmore al., 2014; Leyh et al., 2011). Other approaches have included a multi-course approach that addressed a three tiered approach and ES integration across multiple business courses (Bradford, Vijayaraman & Chandra, 2003; Peslak, 2005; Springer, Ross, & Humann, 2007). Other studies have focused on pedagogical change and pedagogical innovation to stimulate reflective learning of ES (Hustad and Olsen, 2011; Ask et al., 2008; Hawking et al., 2005). Another recurring concept in ES Education literature is the extent of collaboration with industry. Most of the literature encountered supports strong industry collaboration when developing ES curriculum such as embedding industrial knowledge into curriculum and the use of industry-based projects to facilitate learning (Hawking, et al., 2005; Stewart & Rosemann, 2001). Industry continues to focus on improving and managing business processes (Antonucci, 2010; vom Brock and Rosemann, 2014). This is more so for those organizations running ES (Al-Mudimigh, 2007; Malinova and Mendling, 2012).

2.3 BPM and ES competence development in South Africa (SA)

From a general perspective, studies on ICT competency or skills development have analysed the process by which SA has developed Computer Science, Information Systems and Information Technology courses with the aim of reducing the skills gap in the current ICT graduates (Calitz, Greyling and Cullen, 2014; Ansen, 2014). Other studies have developed frameworks for graduate development focusing on improving both the quality and the quantity of ICT graduates and students (Beytenbach and De Villiers, 2014). Research from SA has also addressed the challenges facing the country from the perspective of e-skills within the value chain (Calitz, Greyling and Cullen, 2010). These studies indicate clear concern that there is a significant skills shortage both within SA and also at an international level. This is especially so because current business practices require a skilled workforce conversant with new technology (Calitz, Greyling and Cullen, 2010). From the perspective of teaching ICT skills, SA studies have attempted to identify key challenges or tensions facing HEI focusing on aspects such as policy coherence, balancing finances with intellectual research imperatives, promoting strategic balance in partnerships with flexible regulations in HEI (Krauss, 2006). As regards studies covering ES, most studies have covered aspects such as adoption and usage of ES architecture and the idea that these processes are largely complex and ES implementations are often focused on the organizational need to make complex decisions (Scholtz, Calitz and Connolley, 2013).

Several studies focusing on BPM curriculum and BPM competency building have also been carried out. Such studies have developed a competency framework for the BPA (Sonteya and Seymour, 2012), an analysis of the challenges facing teaching business process related courses in SA HEIs (Flugel, Seymour and van der Merwe, 2014) and a further explanation of the competency gap found in the emerging Business Process Analyst role (Chakabuda and Seymour, 2014). The synthesis of the existing literature on SA in the area of curriculum for ES and BPM is presented in Figure 1. However there is a lack of understanding of the competences needed for the role of BPAs in an ES context which therefore forms the purpose of this paper.

3 A comparative Analysis of BPM and ES competency requirements in SA and Kenya

The following section analyses the interventions that are currently taking place in industry and pedagogical and curriculum changes that are taking place in HEI in SA and in Kenya. The main research questions that were achieved through the study were:

What competencies are perceived as most important for both BPM and ES implementation?

What competencies are viewed as most important for BPM in two country contexts, South Africa and Kenya?

For the SA study a literature review was carried out. The main purpose of a literature review is to carry out a comprehensive summary of past research, to examine critically the contributions that have been made in past research, to explain the results achieved in past research and to clarify alternative views made in past research (Rowe, 2014). This study analysed a total of 16 articles based on the South African context. The following table provides a summary of the articles analysed.

Theme	Paper title
Enterprise Systems	Chuang, 2010 Malie, Duffy and van Rensburg, 2010 Scholtz, Calitz and Connolley, 2013 Scholtz, 2014 Scholtz and Atukwase, 2016
Business Process Management/Business Process Analyst role	Haasbroek and Rensburg, 1998 Rensburg, 2011 Kruger, 2015 Pretorius, Leonardo and Strydom, 2012 Siriram, 2011
Enterprise Systems Competency Building	Garbutt and Seymour, 2015 Mahanga and Seymour, 2015 Scholtz et al., 2012
Business Process Management/Business Process Analyst Competency Building	Sonteya and Seymour, 2012 Flugel, Seymour and van der Merwe, 2014 Chakabuda and Seymour, 2014

Table 1. Further analysis of the Kenyan based online survey.

In Kenya, the current trend around ES is that of growth and dynamic change (Otieno, 2010). Wamicha and Seymour (2015) state that no articles in the area of ES curriculum or the BPA role within ES were found in the Kenyan Context but several acknowledge the need for further analysis of competency requirements in the use of ES (Abdullabhai & Acosta, 2012; Makokha, Musiega, & Juma, 2013; Otieno, 2010; Wanjugu & Ngugi, 2015). As part of a larger study, that intends to determine the interventions and interactions that can develop BPA competencies required by organizations with ES, this paper analyses preliminary data collected from an online survey of open ended questions.

3.1 Discussion

From the literature analysed, no study on the SA context has specifically addressed both BPM education and ES education. However, there have been two significant studies covering BPM education

(Sonteya and Seymour, 2012) and ES education (Scholtz et.al, 2012). These two studies developed frameworks on required competencies for both BPM and ES. These frameworks discuss a total of 26 different competencies. These are further analysed in Table 1 to uncover which competencies, from a SA perspective, are critical for both BPM and ES. In addition to this, Chakabuda and Seymour (2014) went on to rank the most critical competencies from a SA perspective. Their results were based on the Sonteya and Seymour (2012) Framework. The Table 1 also provides an initial data analysis of the results from the Kenyan based online survey. The survey was distributed to interns (working with business application software) and experienced business process analysts. The total number of respondents for the online survey was 28. The main aim of the online survey was to uncover the BPA competencies that organizations with ERP systems found most critical.

Key Competencies derived from the two Frameworks	**Framework of Competencies for BPM (Sonteya and Seymour, 2012)**	**BPM competency Ranking by Chakabuda and Seymour (2014)**	**BPM competency Ranking from the Kenyan based online survey**	**Framework of Competencies for ES (Scholtz et.al, 2012)**
Trustworthiness	√	1	11	
Business Communication Competency	√	2	5	
Business Analysis	√	3	7	
Business Requirement Elicitation	√	4	6	
Client Experience Thinking	√	5	14	
Business Process Thinking	√	6	8	√
Business Process Improvement	√	7	9	
Organizational Knowledge	√	8	4	
Facilitation and Leadership skills	√	9	13	
Business Process and Value Chain modelling	√	10	12	
Business process Risk and compliance Assessment	√	11	10	
BPM drive and promotion	√	12	16	
User Interface Design Skills	√	13	3	
Mathematical and Statistical Competency	√	14	15	
ERP Knowledge	√	15	2	√
Software Oriented Architecture (SOA) Knowledge	√	16	1	

ERP Security				√
ERP Management				√
ERP Programming				√
ERP Implementation and Configuration				√
ERP Transactions				√
ERP Theory and Concepts	√			√
Business Process Management	√			√
Interpersonal Competency	√			√
Business Competency	√			√
IS Competency				√

Table 2. Analysis and ranking of competencies from Sonteya and Seymour (2012), Chakabuda and Seymour (2014), Scholtz et al., (2012) and the Kenyan based online survey.

From the two frameworks analysed in this study, the set of competencies that are viewed as critical, (found in bold in Table 1) for both BPM and ES include (a) ERP Knowledge: Need for training in ES software. It is viewed as a core competency for both BPM and ES; (b) Business Process Thinking: having a holistic view of organizational business processes. It is viewed as a core competency for both BPM and ES; (c) Business Process Management: understanding of how business processes work. It is viewed as a core competency for both BPM and ES; (d) Interpersonal Competency: Ability to build strong relationships. It is core for BPM but viewed as a supportive competency for ES; (d) Business Competency: ability to understand various facets of the business. It is core for BPM but viewed as supportive for ES. It is interesting to note that the least important competency, according to Chakabuda and Seymour (2014), was SOA architecture and the most important was trustworthiness.

On the other hand the results from the Kenyan based study indicated that the more technical competencies of SOA, ERP knowledge and user interface design skills were viewed as the most important other soft skills such as trustworthiness and client experience thinking did not rank as high in the Kenyan study. The reason for this may be because the Kenyan market is still relatively young and the number of experienced BPAs may not be as many as in the SA context. There may therefore be a higher demand for technical personnel to implement and manage Business Processes and ES in a given organization. It is likely that as the market grows and more professionals attain the required technical competencies that there may be an increased realization that soft skills such as trustworthiness are also critical to BPM and ES implementation. Further analysis of the Kenyan based online survey can be found in Table 2 below:

Organizations with Enterprise Systems	**Yes**	**Partial**	**No**
	71%	10%	19%

Level of maturity of Business Processes in the Organization	**Initial**	**Repeatable**	**Managed**	**Optimized**
	21%	33%	16%	30%
How the respondents access training on BPM and ES	**Through a personnel development office**	**Through a certification body**	**Through a HEI such as a college or University**	
	33%	50%	17%	

Table 3. Further analysis of the Kenyan based online survey.

A majority of the respondents stated that they were working in organizations with Enterprise Systems (71%). Approximately 33% of the respondents believed that the level of maturity of business process was repeatable (where some processes were understood and could be repeated but had not yet been documented) and optimized (where the organization had harnessed continuous process improvement). Approximately 21% of the respondents believed that they had little or no awareness of the business processes within the organization. As regards access to education and training on BPM and ES, most of the respondents (50%) stated that they had received certifications from bodies external to their organizations while only 17% had received related training from a Higher Education institution.

4 Conclusion

This paper outlines a literature review of BPM and ES competency requirements in SA and contrasts and an initial data analysis of an online survey (with 28 key respondents) in Kenya. These findings indicate that there are significant contextual differences in perceived critical competencies in the two countries. There are several likely reasons for this that require further investigation. The findings also highlight the idea that it is important to understand context in order to successfully implement any competency building interventions. This understanding can shed light on the specific requirements that industry within the given context requires. This can also reduce the assumption that what works in one place can work in a different place with a different set of contextual issues.

Going forward the researchers intend to further uncover BPM and ES competence requirements in Kenya and how these can be mapped onto HEI interventions in the country. This will be done through additional data collection via the online survey tool and face to face interviews with BPAs working in the Kenyan Industry. The aim of this will be to establish the organizational interventions that are used to build competencies in up and coming BPA graduates. The larger study then intends to the use these findings to develop and test a HEI intervention that can be incorporated into HEI curriculum. This intervention will aim to bridge the gap between what critical BPM and ES competencies organizations require and what competencies HEIs can develop in their graduates.

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