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Application of Business Process Management in the Libyan International Medical University: *History and Development*

Esra A. Abdelnabi
Business Process Management
Libyan International Medical University
Benghazi, Libya
isra.ali@limu.edu.ly

Maram A. Fadel
Business Process Management
Libyan International Medical University
Benghazi, Libya
maram.fadel@limu.edu.ly

Latifa A. Erhoma
Business Process Management
Libyan International Medical University
Benghazi, Libya
latifa.rahoma@limu.edu.ly

Bariq A. Elbarghathi
Business Process Management
Libyan International Medical University
Benghazi, Libya
bareiq.elbarghathi@limu.edu.ly

***Abstract*— Business Process Management (BPM) as a management discipline has become crucial for organizations to be competitive and also an important area of research for many business organizations. The need for employees with skills and knowledge in business process management, as organizations develop their processes through modeling, simulation, implementation and continuous improvement may require an appropriate workforce to develop people with knowledge and expertise such as business process modelers, analysts, designers and implementers etc. This places a great demand on higher education institutions to provide these competencies by teaching business process management to their students. It has become necessary to develop educational approaches that actually allow for effective BPM teaching. Furthermore, to provide high-quality education and research, the universities themselves may take advantage of Business Process Management. Due to the emergence of BPM a number of higher education institutions around the world have begun implementing BPM over the past few decades. However, the number of institutions that offer specialized education on BPM in a systematic and in-depth manner is rare compared to other disciplines. This paper presents a business process management project at the Libyan International Medical University (LIMU) for the purpose of digital transformation from a functional management system to a business process management system. We will present the project from its inception, the process of selecting trainees, the stages of development they have gone through and the current stage of the project. In general, the selected trainees have achieved high levels of learning using the assisted self-learning method.**

Keywords—Digital Transformation, Higher Education, Business Process Management, Functional Management

I. INTRODUCTION

Business processes are the activities that enable an organization to implement its strategy, therefore a structured approach to managing business processes is essential to achieving strategic objectives and goals. Business process management (BPM), - a group of structured techniques and methods for managing business processes -, has emerged as a business process-based management system and as a powerful tool for organizations in recent years [1, 2, 3]. Although the term BPM has recently become increasingly popular, it actually originated in the 1980s. Then, the focus was, and also now is on viewing business processes as properly defined and managed organization's assets. This more general view of business processes and management is the evolvement of the process movements of the 1980s and 1990s that included business reengineering [4], business process innovation [5], Six Sigma and Total Quality Management (TQM) [6], and Workflow Management Approaches [7]. All of these initiatives emphasized the importance of customer orientation and deconstruction of activities within functional silos into end-to-end processes across organizational units while supporting modern information and communication technology (ICT). Several technologies are associated with BPM such as process modeling, Enterprise Resource Planning (ERP) systems, simulation applications, and Business Process Management Systems (BPMS) [8].

According to Kohlbacher [9], the main effects of process-oriented management versus function-oriented management are to improve process cycle time, improve quality, improve financial performance, increase customer satisfaction, and reduce waste and cost.

The need for BPM expertise increases as organizations seeks to be more process-oriented as BPM tools and methods continue to evolve. Some job descriptions such as process owners, process designers, process analysts, process managers, and BPM centers of excellence require specialized skills in BPM. Most organizations interested in adopting BPM methods and implementing BPM techniques lack sufficient proficiencies to undertake these BPM efforts. In general, there is a lack of knowledge of BPM principles in most business organizations, the responsibility of stakeholders to adopt and support BPM initiatives, and managers' knowledge of BPM concepts. This situation is exacerbated by the fact that BPM practitioners, scholars, and professional bodies lack a shared understanding of the meaning and scope of BPM. [8].

Furthermore, due to the increasing need for BPM professionals, there is also an increasing set of BPM certification standards. Two professional associations, the Object Management Group (OMG) and the Association of Business Process Management Professionals (ABPMP) offer certifications in business process management. OMG offers an "OMG Certified Expert in BPM (OCEB)" certification with three certification levels and each level has a published set of syllabi and recommended readings related to each level. The ABPMP offers the "Certified Business Process Professional (CBPP®)" certification and has published its

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own body of core knowledge which it claims has been developed by practitioners and attempts to integrate these perspectives while recognizing BPM as a "management discipline and set of technologies that support management by the process". To this end, it borrows the practitioner's essential book of knowledge and refines and expands techniques, concepts, tools, and ideas from the areas of technology, management, and quality [8].

This paper aims to cover the Business Process Management project at the Libyan International Medical University (LIMU), where the history of this project at the university since its inception, the construction and development of this project during the previous years, the progress reached by this project and the goals that have been achieved will be presented. Furthermore, it presents an analysis of the background of business processes from a historical perspective and postulates the importance of business management to business education today.

The paper explores the current case of using business process management at the Libyan International Medical University (LIMU) and answers research questions about how the university applies the process approach. It discusses the importance of business process and business process management (BPM) in the context of current and emerging information technologies (ICT) and business education and highlights its potential to provide a missing link between business, information technology, and strategy.

The remainder of the paper is organized as follows. Section 2 background includes several subsections, each of which provides a brief description of concepts related to Business Process Management, namely Digital Transformation, Business Process Management of Universities, and Teaching Business Process Management. Section 3 presents a literature review related to Business Process Management history. Section 4 explains the university's experience in digital transformation and the transformation of the management system into a business process-based system. The paper concludes with a discussion and a review of the main contributions and progress made by the Libyan International Medical University in the Business Process Management project and the future directions of the university.

II. BACKGROUND

A. Digital Transformation

Digital transformation is the incorporation of technology into business areas leading to fundamental changes in how the business operates and how value is delivered to customers [10]. Many organizations including higher education institutions have been forced to rapidly adopt digital transformation due to the COVID-19 pandemic. However, implementing digital transformations has been a major challenge as it is estimated that less than 30% of digital transformations are successful [11].

Moreover, Business Process Management (BPM) has emerged as an effective management strategy and effective technology management strategy for implementing technology solutions to manage cross-functional business processes. Whereas, BPM is a structured approach to analyze core activities and support continuous improvement in various areas such as communications, manufacturing, and other major elements of an organization's processes [12]. In addition, BPM is an important topic that focuses on key aspects of business processes where there is a great deal of added value and has emerged over the past two decades as an effective management strategy [11].

BPM has been introduced as critical for organizations to achieve their strategic goals and to be competitive through some previous research [13, 8]. Organizations using BPM have increased over the past decade due to the increase in applications of Enterprise Resource Planning (ERP) systems. Furthermore, organizations that deliver successful digital transformation have also been linked to BPM [10].

According to previous research, organizations need employees with experience and knowledge of BPM [13], and in recent years the need for BPM knowledge and skills has become critical to support digital transformation. However, a lack of BPM skills and knowledge is considered an organizational problem so it is necessary to integrate the BPM curriculum into higher education with the increasing importance of BPM in the industry [11]. BPM is not an easy topic to teach and is traditionally taught in an in-person learning environment with a number of institutions providing distance education in this field. Higher education has had to go through its own digital transformation and distant learning due to the closure of in-person learning due to the Covid-19 pandemic. Therefore, reimagining how BPM is taught in a digital environment has become a critical task [11].

B. Business Process Management of Universities

BPM is suitable for the full spectrum of business organizations if they want to compete in the 21st century, and higher education institutions are no exception. Universities themselves are organized by departments according to functions so universities reside in functional silos. Even business schools that teach modern management methods are organized into functional units such as management, finance, logistics, etc. [14]. Hence, students then lack cross-functional awareness and practical awareness because they are not accustomed to connecting many diverse fields and knowledge, and thus implementing and developing process approach in the organization [15].

As a result, the study programs correspond to these functional departments and the graduates do not possess the knowledge and capabilities required by information technology development, business practice, and organizational structures based on business processes [16].

Process owners in higher education institutions must establish and communicate a strong and clear vision of the implementation of BPM and what changes in processes will look like. Leaders and decision-makers have to link the institution’s strategic goals to specific processes and then have to advocate for and enable the changes needed, by appointing people and then allowing them to make the changes successful. Leaders must train empower and engage the entire workforce [17].

It was previously mentioned that BPR peaked in the mid-'90s and after that became somewhat unpopular. It was stated in the Business Reengineering review, that reengineering was poorly managed and was understood as mere downsizing or automation rather than a strict process [18]. Smith and Fingar [19] have criticized the performance of the re-engineering movement as dogmatic and incapable of providing further continuous improvement. Therefore, BPM occurred as a

combination of previous approaches with the aim of providing better-added value and continually improving performance [20].

According to the study conducted by Hrabala et al. [16] the main processes that are mostly mapped are educational processes, followed by research and development processes. Some universities have also defined their cooperation process. There are also other processes that are modeled for example teaching and learning and supporting processes such as management processes.

C. Teaching Business Process Management

Over the past two decades, the need for specialized BPM skills and knowledge has increased, and in response to this need, BPM has begun to make strides in academia. Faculty members have begun to promote the teaching and research of BPM in academia in areas such as information systems (IS), computer science (CS), Business Administration (BA), Information and Communication Technology (ICT), and other disciplines. In order to attract students to struggling majors in information systems, some departments of Information Systems and Computer Science began to take an interest in teaching and providing new courses on BPM [8].

In previous research, Sarvepali and Godin [13] emphasized the importance of teaching BPM. However, according to Bandara et al. [8], higher education still focuses on program design on function-based knowledge rather than cross-functional business experience and process-based management which may lead to difficulties in integrating BPM into the curriculum [11].

European universities seem to be advancing in this endeavor, with their focus on design sciences. As an answer to efforts by professional associations and representatives of employers in Australia to include employability skills in university curricula, BPM has been proposed [15]. Based on indications, few schools establish academic departments to develop courses to improve the knowledge of college graduates and prepare BPM professionals [8].

However, the lack of a common vision and definition of BPM among researchers hinders the development of a unified body of BPM knowledge that can be used for instruction by both professional certification bodies and universities around the world [8]. There were a few places where academic societies could come together in order to shape courses, share experiences, and engage in serious dialogue regarding BPM education efforts. The 2009 BPM Education panel at the European Conference on Information Systems (ECIS) in Italy [21] was one of the first attempts to do so with the participation of academics who were instructors of BPM education initiatives in universities from North America, Europe, Australia, and Africa and represented various universities, academic departments, and degree programs.

Bandara et al. [8] have documented what these schools are doing in the field of BPM, around the world based on discussions generated throughout and after the panel. Accordingly, their article builds on and expands on the panel's goals in documenting a sample of current BPM initiatives in academia in terms of, programs, modules, courses, and techniques [8].

III. LITERATURE REVIEW

Business Process Management (BPM) has seen a rise in interest over the past 20 years from a community of managers, end users, analysts, consultants, vendors, and academics. A sizable body of knowledge, a broadening breadth, and a bevy of methodologies, tools, and strategies are indicative of this growing interest. The difficulty of offering succinct and commonly accepted definitions, taxonomies, and overall frameworks for BPM has expanded as the demand for it rises and BPM capabilities develop [22]. By this statement, the authors add value to the field of BPM, and its importance. The article is a handbook, a guide for proper BPM with a detailed definition of the terms.

Through process management, an enterprise can create high-performance processes, which operate with much lower costs, faster speeds, greater accuracy, reduced assets, and enhanced flexibility [22]. Business process management has plenty of constructive and productive features and advantages, according to Rosemann and Brocke [22].

Profound knowledge and skills in business process modeling are becoming necessary for analysts and business managers. Many organizations want to discover, document, and optimize their business processes. However, it is more difficult to express the process by a chosen, simple standard due to the abundance of standards and sophisticated notation. Process modeling should be heavily included in educational programs as a result. Particularly in higher education, at institutions that educate not only managers but also personnel who will oversee future industrial, logistical, or administrative processes [23].

The authors of this second article [23] confirm the importance of BPM in general and add that there is a need for BPM in higher education institutions. The article offers a list of computer programs that help in BPM and could be easily used in higher education institutions.

The third article [8] is a set of examples of the implementation of BPM in courses and universities. In conclusion, this paper offers an example of BPM initiatives throughout the world and the difficulties in putting such initiatives into practice. The authors' perceptions of specific institutional strengths and challenges—drawing on their substantial knowledge of BPM education at respective institutions—are made clear, potentially paving the way for collaborative efforts to advance BPM education. The essay summarizes the main issues and suggests a course of action, urging both academics and businesses to contribute to better BPM training and education. Shortly, we anticipate that all IT- and business-related degree programs will have to include a course in business process management [8].

REFLECTION

The literature review was performed on three different articles, written over the past two decades. All cover the topic of Business Process Management (BPM). The first article discusses and defines the term in general, and its importance in the business and industrial world. The other two articles are focusing on the explanation of the importance of BPM implementation in higher education institutions. The literature review is a good milestone for additional research and wider reviews to understand and improve the term Business Process Management. All three articles are clear and very helpful to the reader or researcher. After making the review we

concluded that the term and field of business process management haven't been properly researched nor introduced to the public, especially to students and future industrial managers. It is visible that articles indicate the need for a better and wider understanding of the term.

IV. Methodology

Since 2009 Libyan International Medical University has had an orientation towards the digital transformation of the university's processes and the adoption of business process management instead of the current functional management.

At the b 2020, an official decision was issued by the university's president for the creation of the Business Process Management Project. The project has three main goals: the first goal is the digital transformation of the university's processes, the second is to start BPM education programs, and the third, establish a business process consulting team.

In the first phase of the project selection of trainees, an announcement was made, inviting applicants to interview for a training course for the purpose of creating a team of business process management experts considering the lack of specialists in this field in Libya specifically and regionally in general. The individuals interested in this topic applied to join the business process management course, interviews were conducted and out of 80 applicants in total 16 were chosen to continue with the project from both business and information technology backgrounds.

The second phase was training that took place in the second half of the year 2020. The selected trainees took a self-study learning program in business management and business process management. The learning discipline throughout the course was a combination of self-directed study, presentations, online meetings, and assessments based on the Object Management Group standard which was selected for this purpose. At the end of this phase, an internal exam was held and the successful trainees were interviewed for employment by the project.

The subsequent phase was implementation/training starting off by applying the BPM lifecycle 6 phases as per "Fundamentals of Business Process Management [24]" see Fig. 1.

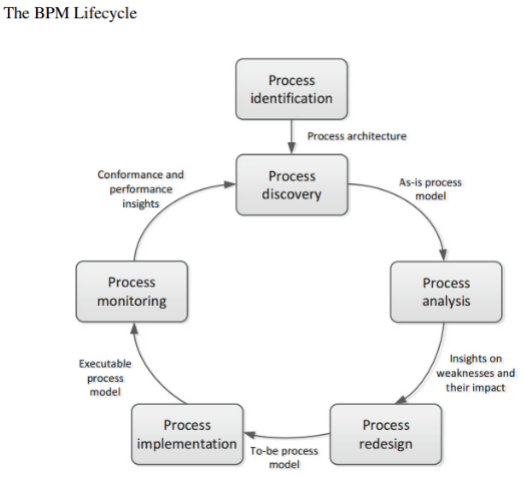

Fig. 1. The BPM lifecycle [25]

On the first stage of the BPM lifecycle, the university's Process Based Organizational Structure classified the university's processes into three categories which are core, management, and support. Following that the team conducted a series of workshops that targeted the process owners and the process managers where all of the important concepts were introduced.

The aforementioned workshops included: Introduction to Project Management, Basic Principles of Business Processes and Business Process Management, The BPM Lifecycle, BPMN Business Process Model and Notation, Analysis, Improvement & Implementation, Business Process Management Governance, Roles of Process Managers, Communication Skills and Organizational Change Management.

Simultaneously the BPM team members were undergoing training in different topics including BPMN Method and Style, MicroGuide to Process and Decision Modeling, Risk Management, and communication skills.

Carrying on to the BPM lifecycle second phase (process discovery) the priority was given to one of the core processes of the university (Research & consulting center) and the team started to document the scenarios for the two main processes i.e., Research processes and consulting processes as well as the as-is process model using BPMN 2.0 standard. The Process discovery method chosen was meetings with the process owner and process managers.

The team then continued to the next process (Human Resource Management), one of the support processes. The core process was identified (personnel affairs). In addition, one of the support processes projects was financial management; it has five core processes (Resource collection, payroll, Purchasing and budgeting, inventory, and asset management). The most important support process is the payroll process so it was documented and an as-is model was prepared. The team also continues to work on one of the core processes "Teaching and learning" and the process which was documented and modeled as-is as well as the improved version.

Before moving on to the third phase (analysis) of the BPM lifecycle the team decided to familiarize itself with some automation tools and test some of the modeled processes, so the team tested some of the existing tools used in BPM automation including (Camunda, Bonita, Process Maker, Bizagi, JBPM, etc.).

Meanwhile, the team continued self-improvement in many aspects such as "Research development ", and "Six sigma", as well as preparing for the OCEB certification examination.

V. Discussion and Conclusions

The application of a business process management system in higher education can achieve significant gains in the quality of education such as improving the effectiveness and efficiency of the educational process, increasing customer satisfaction and reducing waste within higher education institutions. In this paper, we dealt with the topic of BPM from several aspects, as we discussed the importance of digital transformation for institutions, including higher education institutions, especially after the Covid-19 pandemic, which incited many institutions to adopt digital transformation. The paper also explained the relationship between business and technology and how BPM bridges the gap between these two areas.

Moreover, we discussed the tendency of higher education institutions to apply the business process management system as a management system within their institutions for the purpose of continuous improvement of their performance and to achieve their strategic goals. We also discussed the topic of teaching business process management in universities, as some universities have begun to offer academic and training programs in this field due to the increased need for expertise in BPM. In addition to the importance of developing study programs in BPM to cover the demand for experts in this field, we are perusing the idea of forming a consulting team to assist other organizations in developing their conversion efforts.

In this paper, we presented the experience of the Libyan International Medical University (LIMU) in adopting the business process management system of the university and the university's vision and goals for the process of continuous improvement in the educational processes of higher education institutions, as well as the improvement of the management and support processes. The paper presented the BPM project at the university from the beginning of its establishment to the stage of recruiting, training, preparing and hiring the project team to the commencement of the actual work on the introduction of the business process management system at the university and the university's goal towards digital transformation.

The paper presents the university's orientation to develop academic programs in BPM, as well as establish a consulting team to provide consulting services to other institutions aiming to implement business process management.

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