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► **To cite this version:**

Pablo Hernández-Bolaños, Jorge Rodríguez-Díaz. Business Process Management (BPM) and e-Government: An Experience at University of Las Palmas de Gran Canaria (ULPGC). 1st International Conference on Stakeholders and Information Technology in Education (SAITE), Jul 2016, Guimarães, Portugal. pp.114-123, 10.1007/978-3-319-54687-2_11 . hal-01625378

HAL Id: hal-01625378

<https://hal.inria.fr/hal-01625378>

Submitted on 27 Oct 2017

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Business Process Management (BPM) and e-Government: An Experience at University of Las Palmas de Gran Canaria (ULPGC)

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Abstract. The development of business process management (BPM) is a key factor to launch e-Government in a public organization. This development requires first identifying the components that make up the business process management and, second, implementing them. It is just this implementation which has been presented as one of the most complex milestones in the development of BPM. In this paper the authors show how to implement the components of BPM successfully based on construction that deploys an organizational initiative that addresses directly a problem expressing the organization and indirectly the implementation of BPM. This methodology is justified by a case study carried out in the ULPGC.

Keywords. e-Government · business process management (BPM) · success critical factors.

1 Introduction: Need for BMP to Implement the ULPGC e-Government Project

The University of Las Palmas de Gran Canaria (ULPGC) promoted in 2010 the e-Government project, whose purpose was the implementation and promotion of e-Government within this public organization.

The different actions carried out within this project represent a significant evidence of the deployment of e-Government in the ULPGC, as this university has an electronic office system for the identification and authentication of both, citizens and administrative bodies, in the exercise of its powers [1], electronic register, electronic notifications, ability to recognize the validity of an electronic document, electronic management of procedures, availability of electronic information for citizens about the status of procedures and possibility of cooperation between administrations for the promotion of e-Government [2]. All this provides evidence that the ULPGC is capable of supporting an electronic service delivery.

However, the objective of this work has not been directly the implementation of e-Government, but the implementation of the Business Process Management (BPM) as an essential element to promote e-Government in public organizations [3, 4]. This article highlights a methodology to implement the BMP in these organizations consisting of starting an initiative to solve a concrete organizational problem of the institution itself, while the BPM components are developed. This paper also describes

the experience carried out in the ULPGC between 2003 and 2007 to evaluate the methodology. This experience was called Management Memorandum Model (MMM) - see Fig. 1.



Fig. 1. Relationship among Management Memorandum Model (MM), Business Process Management (BPM) and e-Government (Source: Authors' own)

2 State of the Art: The Business Process Management (BPM)

BPM is a management system based on the use and development of organizational capabilities to manage processes and improve results thereof according to their strategies [5]. This management system has many benefits as shown in Table 1, but stresses the advantage of implementation for the deployment of electronic services and process automation.

Table 1. Advantages of BPM (Source: Authors' own, using information from several authors).

<ul style="list-style-type: none"> • Improve the competitiveness of organizations • Develop and continuously improve organizational strategies • Adequately predict and complete their objectives more effectively and efficiently • Streamline decision-making • Adapt quickly to changes in demand and a more complex environment with a growing number of international competitors • Improve production capacity, speeding up processes and reducing unnecessary costs and resources • Reduce errors in the production and timeouts • Transfer information between departments faster 	<ul style="list-style-type: none"> • Maximize the grouping of activities to reduce stress • Geared toward generating customer value and even improve performance • Improve control of its results including financial • Innovation capacity • Integrating people and systems • Automate processes • Simulate contingencies without having an impact on ordinary activities • Manage and monitor staff performance • Beyond the compartmentalized departments in the organization • Improve customer communication and satisfaction to remain competitive • Implementing information technologies and communication technologies (ICT) • Establishing quality management systems
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However, in most cases, BPM projects carried out in organizations have had a high failure rate [6]; this task may be even more complex in the public sector due to the functional culture and departmental thought, an aspect contrary to a process approach [7]. To ensure the implementation of BPM in an organization, it is necessary to ensure

the proper development of a number of critical success factors (CSF), that is, those aspects that should be strengthened to successfully complete the project [6], [8, 9, 10, 11]. Rosemann and vom Brocke [12] state six CSF for BPM: strategic alignment, governance, methods, ICT, people and culture. The work of these authors disaggregates these factors in other components called capabilities, which are referred to as *sub-factors* (s-CSF) in this work and are shown in Table 2. Several authors, such as Fettke et al. [13]; Niehaves et al. [14]; Santos et al. [15] and Lönn et al. [16], support these sub-factors as valid for the public sector.

Table 2. Critical success factors and sub-factors (Source: Rosemann and vom Brocke [12]).

STRATEGIC ALIGNMENT	ICT
<ul style="list-style-type: none"> • A.1. Process improvement plan • A.2. Alignment between business strategy and processes • A.3. Business process architecture • A.4. Key processes outputs and performance indicators (KPI) • A.5. Priority of stakeholders 	<ul style="list-style-type: none"> • D.1. ICT for design and process modelling • D.2. ICT enabler for the implementation and execution of processes • D.3. ICT for measurement and process control • D.4. Tools for innovation and process improvement • D.5. ICT project management and program management
GOVERNANCE	PEOPLE
<ul style="list-style-type: none"> • B.1. Decision-making processes of BPM • B.2. Roles and responsibilities process • B.3. Processes data collected • B.4. Standardized management processes • B.5. Control of process management 	<ul style="list-style-type: none"> • E.1. Skills and expertise in processes • E.2. Knowledge of BPM • E.3. Teaching and learning processes • E.4. Communication and collaboration in the processes • E.5. Leadership in management processes
METHOD	CULTURE
<ul style="list-style-type: none"> • C.1. Design and process modelling • C.2. Processes implementation and execution • C.3. Process measurement and control • C.4. Innovation and process improvement • C.5. Project and program management processes 	<ul style="list-style-type: none"> • F.1. Responsiveness to shift to the process approach • F.2. Values and beliefs about the processes • F.3. Activities and behaviour to processes • F.4. Senior management leadership in process management • F.5. Social networking process management

Nevertheless, the deployment of CSF and s-CSF in an organization is not an automatic task, but on the contrary, it is very complex since it requires an adaptation of these components to the characteristics of the organization [6]. Either way, there are no described models that enable this adaptation, and even less in the public sector [17]. This being precisely what the study identified as the research problem.

3 The Research Method

The research methodology applied in this work has been deducted qualitatively [18] since, from the literature review, it was proposed a construction or model that was evaluated putting it into practice through the case of study [19]. Considering Fettke et al. [13], indicating the need for indirect ways to implement the critical success factors in BPM, and Santos et al. [15], pointing to the desirability of developing strategies with the same objective namely indirect methods, it was decided to design a model to launch a project or initiative that, including the implementation of the CSF and s-CSF as indirect finality or purpose, had the utility to solve a particular organizational problem as direct finality. The model was designed considering the CSF and s-CSF [12]. Likewise, to ensure effective implementation of the s-CSF in the organization, BPM maturity models were taken into account, such that each s-CSF improves its sophistication cyclically [6]. This was achieved by requiring the instrument to solve the direct purpose incorporating the criterion of continuous improvement cycle, closely associated with planning systems. Finally, a set of criteria (*design criteria*) were defined, matching the ten principles of BPM established by vom Brocke [20], which would ensure the successful implementation of BPM in an organization. Hence, to develop the CSF and s-CSF in a public organization, and therefore a successful implementation of BPM, this research proposes as a solution for the research problem the development of an initiative in the organization that solves a major problem and that relies on ten criteria or principles of vom Brocke.

Table 3. Dual purpose of the organizational initiative (Source: Authors' own).

ORGANIZATIONAL INITIATIVE		
TYPES OF PURPOSE	Direct	Indirect
OBJECTIVES	To solve an organizational problem	To implement BMP
METHOD	Organizational instrument (It must rely on BPM)	Criteria based on the Ten Principles of BPM.
RESULTS	Organizational problem solution	Development CSF and s-CSF

Therefore, the organizational initiative is twofold: direct and indirect. Direct refers to an organizational problem solving and the second to implement BPM. The method used for the first purpose will depend on the problem to be solved; to ensure that the initiative answers the two purposes, the model states that the proposed tool to solve the organizational problem should be supported by BPM; at the same time, to achieve this support, the initiative must promote the development of the CSF. On the other hand, the method used for the second one will be the application of design criteria

based on the ten principles of BPM. Table 3 shows the characteristics of the dual purpose of the organizational initiative that arises as a solution to successfully implement BPM.

To evaluate the proposed model, this one should be applied to a specific public organization launching an organizational initiative. The level of implementation of the BPM will show the level of success of the method, so the expected result would be the development of different CSF and s-CSF, shown in Table 2. The results of the evaluation were qualitative conclusions about the validity of the initiative [21]. The data collection was done by direct observation techniques [22, 23], and based on experience because the researchers themselves were part of the senior management team that drove the innovation initiative.

4 The Management Memorandum Model: an Indirect Model to Implement BPM

To evaluate the designed model, the case of study was applied on an initiative called Management Memorandum Model (MMM), developed between 2003 and 2007 by the ULPGC, an institution with an annual budget of more than 130 million Euros.

4.1 Direct Purpose

The main purpose of MMM was to continuously improve their academic and administrative services. This was done to make its own staff identify, implement and evaluate performances to improve those services. The MMM model consisted mainly in implementing the following stages in the recurring cycle of one year:

- a) Identification of potential needs for improvement. Through different instruments for data collection, it pointed to service units with possible needs for improvement, which should be validated by the heads of the units with their teams and endorsed with the senior management of the University in a working group session during two days, that was engaged exclusively to this task.
- b) Solutions design. Multidisciplinary teams, made up of the unit heads, designed solutions to identify needs improvement. This work was done during the working group session and solutions measurements constituted the annual improvement plan.
- c) Implementation and monitoring. The unit heads coordinated the implementation of the measurements. They were put into operation in a collaborative working platform based on Moodle allowing tracking of the implementation of the plan and an adequate transfer of knowledge.
- d) End of cycle evaluation. At the end of the planning period a compliance report was produced from the received reporters. This report served as a working tool in the study days for the planning of the next period or cycle.

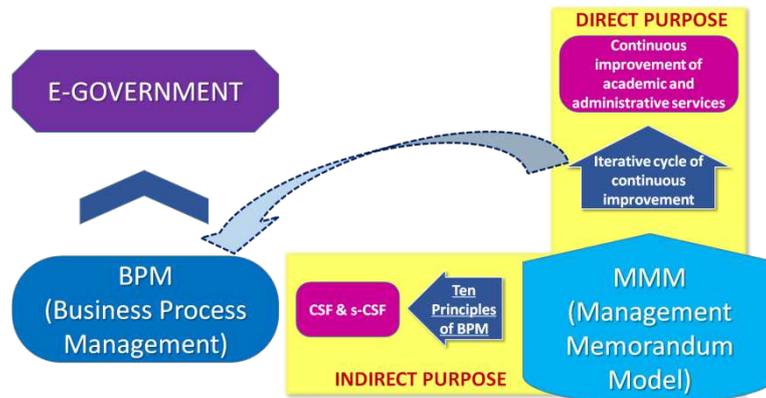


Fig. 2. Direct and indirect purposes of the Management Memorandum Model (Source: Authors' own)

The implementation of the MMM in ULPGC has provided the following information:

- Model execution duration. Since the improvement cycle referred to the model should be repeated several times to assess its validity, the project duration was three years.
- Improvement measures. During the three cycles, the MMM allowed to carry out 150 measures.
- The units involved. All administrative units of the organization were involved in the project, mainly by the exercise of leadership of senior management. In total, there were twenty units participating.
- Enhanced Services. The academic and administrative services that were subject to the improvements were about fifty.
- Implemented procedures. There were three hundred administrative procedures identified and homogenized.
- People involved. It should be noted that there are two types of people involved: the personnel who manage enhanced services and persons belonging to receptor group improvements. They were 400 working directly, 2,600 staff and 25,000 teachers and students as users of services.

To develop s-CSF, MMM required several conditions that made possible s-CSF during its four life cycles (therefore these conditions were needed to undertake the improvement of academic and administrative services). Thus, the MMM enabled the development of the s-CSF, and therefore the implementation of the BPM (see Table 4).

4.2 Indirect Purpose

The MMM incorporated the design criteria set out in the strategy as follows:

- Criterion 1. Critical success sub-factors (see Table 4) should be applied only when they could be assumed by the characteristics of the organization.

Table 4. Equivalence between conditions and s-CSF (Source: Authors' own).

CONDITIONS	s-CSF
The services which should be improved were formulated in terms of processes, so that the annual plan referred to the MMM was a process improvement plan.	A.1. Plan process improvement.
The services were improved in concordance to the business strategy set out in the strategic plans of the organization.	A.2. Alignment between business strategy and process.
The criteria established to standardize processes and services were formulated according to these processes.	A.3. Business process architecture.
The persons responsible for each service were designated, and therefore, for each process.	B.2. Roles and responsibilities of processes.
Criteria homogenization process served to model the services.	C.1. Design and process modelling.
The services were executed according to the life cycle processes.	C.2. Implementation and execution of processes.
Own tool was used to model the processes.	D.1. ICT for design and process modelling.
Technologic workflow was launched to mechanize electronically the processes.	D.2. ICT enabler for the implementation and execution of processes.
Tool based on Moodle was pushed for collaborative work.	E.3. Teaching and learning processes.

- Criterion 2. Sub-factors should be incorporated gradually, as the organization could take over. To ensure the gradual incorporation of sub-factors, we worked at two levels. On the one hand, every sub-factor was launched the first year, but a deal for each cycle repeating pattern was scheduled. On the other hand, in each cycle, sub-factors that have already been built were increasing their level of development, as the organization was becoming more mature [24, 25, 26], applying to this the maturity model of Melenovsky and Gartner [27].
- Criterion 3. Organization personnel led the management model and therefore the sub-factors. Own staff, the management team ahead, not only managed the model, designing, planning and implementing the improvement actions, but established the coordination protocols that made the model work.

- Criterion 4. The scope of the model should cover every aspect of academic and administrative organization. The model was extended to all academic and administrative services and all the units in the organization.
- Criterion 5. The model should be integrated into the regular development of the organization and led by the management team. The unit heads for the operational management of academic and administrative services would manage improvement measurements, which are planned and executed following the budget cycle, marking the pace of activity in the public organization. Thus, the MMM was part of the ordinary activities of the organization
- Criterion 6. Every stakeholder in the organization should be involved in developing the model or perceive its effects. Over 50% of the staff participated in improving measurements arising from the application of the model and 100% appreciated the effect of these improvements in the performance of their activities on development.
- Criterion 7. The model should be formed by elements of the organization for the purpose it was perceived as friendly by all staff. The terminology used for the business process management was the same as the activity of the organization; in this way, nobody perceives the model strangely but as a different way to carry out their responsibilities.
- Criterion 8. The model must answer an important purpose and resolve any organizational problem. The model was launched to solve two problems: a) the lack of adaptation of service units to the needs of receptor groups thereof and b) the existence of multiple plans poorly aligned and with little effect on the improvement of services.
- Criterion 9. The model should be simple. The model consisted of a methodology incorporating developments in the management of the units, but did not involve an increase in the complexity of its business because these developments were improved in each cycle model.
- Criterion 10. The information and communications technology (ICT) plays an important role in the model. The improvements should have a technology component; in this way, everybody perceived improvements more palpable.

In addition to the successful implementation of BPM through the development of s-CSF, the MMM was really useful in order to incorporate the culture of continuous improvement in the teams that manage the academic and administrative services and the technological vision of such services, thus promoting the other two elements necessary for a successful implementation of e-Government [28].

4.3 Results

The direct evidences that corroborated the successful implementation of BPM and matched the critical success sub-factors were:

- The catalog of processes
- The improvement plans
- The planning system
- The tool for knowledge management
- The Information Systems Plan

Anyway, the main evidence of the effective implementation of BPM is the proper e-Government project, as it would not work without a deployed BPM.

5 Conclusion

The BPM is a needed element for the development of a variety of management systems, including the e-Government. Although many authors have highlighted the difficulties in implementing the BPM, especially in the public sector, this work has exposed that BMP solutions may be developed if it is used as a method consisting of launching an initiative that is to solve organizational problems through organizational tools that are based on the components of BPM, as the sub-factors (see Table 2). This method has been proven by its application in three public organizations: a university, case presented in this paper with the initiative called Management Memorandum Model, and two more departments of the Canary Islands Government that have been studied in a doctoral thesis.

The exposed model implies that the organizational tools have the direct purpose of solving a problem posed by the organization and, indirectly, implementing the BPM. It stands out from this that it has been able to compile practically powerful contributions made so far in terms of BPM as critical success factors, maturity models and fundamental principles to implement BPM. However, it arises for future works delving into different ways of assessing the degree of development of every sub-factor in any moment, so that the implementation of the components of BPM is more controllable.

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