

BUSINESS-IT ALIGNMENT AND ORGANISATION AGILITY ENABLED BY BPM AND SOA APPROACHES INTERPLAY

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Abstract: Business Process Management (BPM) and Service-Oriented Architecture (SOA) approaches receive considerable attention from scholars and industrial practitioners. Thanks to the three streams of the EMT model (Economy, Methodology, Technology) this paper shows that BPM and SOA approaches are two sides of the same coin, which are different but complementary. This combination enables organisations to improve their agility in the face of uncertainty, complexity and change.

1 INTRODUCTION

Global acceleration of exchanges in goods and services requires organisations to adopt an open view beyond their own boundaries at both business and technological levels. Contingency theorists have, for a long time, emphasized the fact that there is a reciprocal structuring between an organisation and its environment (Burns and Stalker, 1971). More recently, studies have shown that contemporary organisations increasingly collaborate with their partners (Segrestin, 2006). This cooperation is especially motivated by knowledge and research acquisition. Indeed, open organisations can be more responsive to environment changes and they can identify the needs and expectations of their partners.

The contemporary changes are so fast that the reactivity is already a key success factor in today's economy, especially in the immaterial industries. The new requirements of uncertain and rapid changes cause continuous synchronization efforts to assimilate business changes. To face challenges, organisations have invested heavily in methods, architecture frameworks and technological infrastructures to become more agile and flexible. Information technologies have traditionally been seen as mere cost centre for doing business (Korhonen et al., 2010). However, with the wide use of IT (Information Technology) infrastructures at the operational levels, the focus has been shifted to more strategic use of IT (Bigand et al., 2004).

Business and IT alignment issues have been discussed for almost two decades (Luftman et al., 1993), but they are still considered to be of high importance (Luftman et al., 2009). However, the implementation of such alignment has many difficulties (Avison et al., 2004).

Traditional organisation according to functions in separate silos, each optimized for a particular line of business, is not effective. It neither allows business-IT alignment, nor improves business agility. By combining Business Process Management (BPM) and Service Oriented Architecture (SOA) approaches, this article highlights the key factors to align business and IT by allowing organisations to cross functional boundaries seamlessly. This paper is not a case study but a formalization of feedback from the *ASICOM* project. This project, labelled by the two competitiveness poles: *PICOM* and *Nov@log* aims at making enterprises - especially small and medium enterprises (SMEs) in both trade and logistics sectors - benefit from the interoperable solutions which use simplified exchanges in supply chains, and primarily with Customs departments (Lemrabet et al., 2010).

The next section provides the current state-of-the-art for BPM and SOA. Then, the third part highlights the synergies between SOA and BPM and proposes the EMT model (Economics, Methodology and Technology). This model takes into account economic, technological and methodological aspects which advocate the implementation of BPM and

SOA to improve business agility. The fourth section proposes a framework which contains six elements required during the implementation of BPM and SOA approaches. Finally, the conclusion summarizes the main findings and provides an outlook of further research.

2 BPM AND SOA: STATE OF ART

2.1 Business Process Management

BPM is a management discipline focusing on business process to improve agility and operational performances. It improves processes in terms of final users' needs: for example, reducing the process execution time.

BPM is supported by tools, methods and good practises that let to manage business activities from a process perspective. BPM is mostly often associated with life cycles of business processes and it aims to manage processes and activities of organisations in a continuous improvement cycle. BPM approach can be used without IT contribution (Zairi, 1997).

Historically, the advance of business process management can be classified along four major stages. The first stage began in 1920, when non-automated processes were introduced in working practises. The second between 60's and 90's with the emergence of IS, business processes were supported by batch processing systems, no explicit BPM supported by information systems. Later in the 90's of last century, the emergence of enterprise integration approaches and methodologies promotes intra-organisational business processes. Workflows were then widely used to integrate internal business processes. Nowadays globalization and rapid evolution of market opportunities drive the third stage of BPM. This stage is characterized with collaborations supported by expanded business processes which include all partners (suppliers, business partners, clients, administrations, etc) as well as systems and resources. BPM contains three distinct but related blocks: a management discipline, a technology platform and a new implementation style for building automated process solution (Silver, 2010).

▪ BPM as Management Discipline

In the 80s, Rummler advised enterprises to adopt a customer-centric end-to-end process perspective. Later he formalized this new management discipline in his book: *Improving Performance*: (Rummler and Brache, 1990). Modelling business process across

functional and organisational boundaries is a fundamental element in BPM (Figure 1).

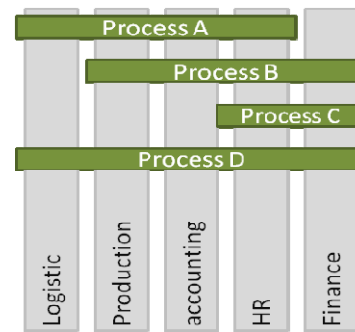


Figure 1: Business processes' example.

Process model is one kind of models needed to improve organisational performances and tools like Business Process Analysis (BPA) allow to manage several models that are specifically used for modelling business processes and information related to the processes.

▪ BPM as Technology Platform

Many aspects must be taken into account to improve business process performance without IT concerns like removing non-value-added tasks. Nonetheless, today it is difficult to undertake a business design project without IT. Process improvement project benefits are much greater with today's techniques and technologies. Business Process Management Suites (BPMS) is an integrated package of tools and platforms that enable a continuous improvement cycle of business processes.

▪ BPM as Implementation Style

Improving business agility requires more direct and prominent business roles in process improvement projects. BPM advocates and allows a new agile and iterative style - within short-cycles - in which business and IT collaborate using a common process model. BPMS architecture is adopted to support continuous change in business processes.

2.2 Service Oriented Architecture

SOA approach was proposed by Gartner in 1996 (Schulte and Natis, 1996). SOA means different things to different audiences, but from a business perspective SOA is a way of organizing and understanding organisations, communities and systems to maximize organisation agility and to achieve economies scale. Thus, it is also regarded as an architectural approach, guideline or patterns to realize a system by combining a set of existent services. According to (Amsden, 2010), "to achieve

its potential, an SOA-based IT infrastructure needs to be business-relevant, thus driven by business and implemented to support business”.

SOA utilizes services as fundamental elements to develop applications. Not only Service is considered as a construction unit of system, but also each service is reusable, shared and loosely-coupled with the other services. SOA is technology independent. It means that the choice of technologies and tools is secondary. Various technologies implement SOA (Marks and Bell, 2006). Thereby, the core objective of an organisation using SOA approach is to rationalize its business. With SOA organisations use Information System (IS) at strategic level, which becomes then a real partner of functional management. SOA helps breaking down organisation silos by providing reusable services that support business process improvement, and enable a seamless IT evolution.

From the technical perspective SOA services can be considered as “functions” that are accessible across a network via well-defined interfaces. Technologies like web services can be used to implement logical services.

3 EMT MODEL TO RATIONALIZE THE BPM-SOA SYNERGY

3.1 BPM and SOA Rivalry or Synergy?

BPM and SOA approaches are different: the former is a business driven initiative and the latter is an IT driven initiative. But several research activities show that BPM and SOA are, together, two complementary approaches. SOA allows discovering a collection of reusable services and to orchestrate them to build a dynamic business processes. The BPM-SOA partnership can realize iterative design and optimisation of processes based on reusable services that can be changed swiftly. This combination creates opportunities by making organisation processes visible and by helping to develop a flexible IT infrastructure. However, according to several authors, it is not as straightforward to achieve synergy between BPM and SOA aligning these two concepts requires a deep transformation of organisations to align the two concepts (Hiemstra et al., 2009).

SOA promotes consolidation of redundant operations and improves organisation ability to adapt to business environment change; business

services remain relatively stable over time. It provides reusable services but without any business agility warranty (Bajwa et al., 2009). As business processes are driven by customer’s requirements, they enable organisations to respond rapidly to changes in order to ensure its agility. But BPM does not provide a fine-granular unit to build a system. Figure 2 is inspired by Cummins (2009).

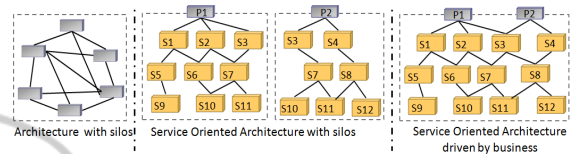


Figure 2: Impact of BPM and SOA in organisation architecture.

SOA is designed as a composition of services; each service provides a capability in response to a request from another service and uses other services’ capabilities. This combination of capabilities allows organisations to provide services at a lower cost and to improve quality of services (Cummins, 2010). Organisations then become an aggregation of reusable capabilities used in different business contexts. While BPM helps to break down the functional silos in organisations and to unify organisation around critical information such as customer needs.

To understand the BPM-SOA synergy, the following question remains: what is a business process in SOA? Two different visions exist. The first is usually used in SOA technical approaches and it positions business processes over business services. The second explains that a business process that invokes a business service belongs to another business service (Cummins, 2010).

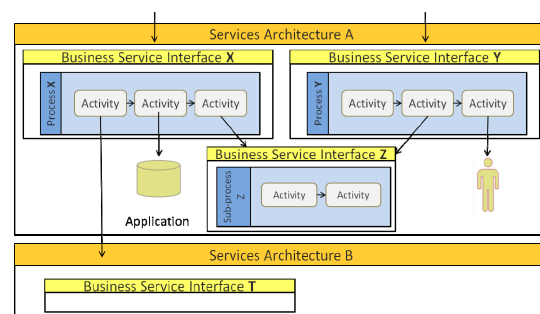


Figure 3: Business process and business service.

Figure 3 illustrates our view on this relationship. The Services Architecture A accepts two requests. Each one invokes different business processes X and Y. The process X delegates some of its

responsibilities to business service T. Both processes X and Y provide respectively different capabilities but they share the same capability (the sub-process Z). Business processes can also invoke different capabilities: human tasks, applications other business services.

3.2 EMT Model

We propose to use EMT model which uses three work streams (Economy, Methodology, Technology) to describe how BPM and SOA interplay can help to develop a cross-functional and customer-focused business process that achieves strategic business objectives (see Figure 4).

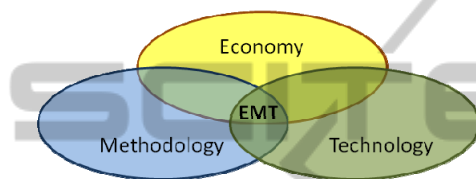


Figure 4: EMT model.

3.2.1 Economic Domain

A recent survey (Gartner, 2010) addresses the following question: what are the strategies behind the 2010 CIO Agenda and how will CIOs meet the competing requirements placed on IT? This survey confirms CIO's interest in BPM, with CIO's continued focus on business process improvement, cost reduction and analysis.

Together, BPM and SOA provide a good combination for enterprise computing (Bajwa et al., 2009), and (Frye, 2006) estimates that "BPM and SOA are two sides of the same coin". BPM is a good reason to deploy SOA infrastructure. SOA infrastructure does not deliver a direct value to the end-user. Without BPM, SOA can only improve the ROI (return on investment) of IT. It is the business process use and benefit from the reusable and loose coupling services that support the ROI resulting from business process improvement.

3.2.2 Methodological Domain

There are several ways to improve processes, top-down or bottom-up, one time or continuous, radical or incremental. The choice of improvement ways depends on organisations strategy. But in BPM (like in Six Sigma) the most recommended form of process improvements are participative, incremental, and continuous (Hammer, 2010). It is also recommended to use a top-down approach to

identify business processes from business requirements and objectives. There is no guarantee that business process requirement will be realized if the requirements are defined from an IT point of view (Gulledge, 2010). However, in SOA both top-down or bottom-up methods provide a unified conceptual unit of work: business service (Catts and St. Clair, 2009). Business services allow IT and business to work together and give each of them a visibility on the other domain. From business perspective, business and BPM experts use BPM tools to identify and create business processes. Then, they refine them to get a set of elementary business services. From IT perspective, developers focus firstly on existing capabilities and transform them into basic services. Then, they aggregate the services to design more sophisticated service until discovering required business services.

3.2.3 Technological Domain

We think that process reengineering is only efficient if information flows are supported by information systems that are aligned with new processes (Gulledge, 2010).

One of SOA promises is to emphasize using IT to automate business processes. Business processes are supported by business services which can be invoked through Internet using standards. Information exchange among partners is then realized by network communication and loose coupling between providers and consumers allows them to use different technologies. SOA-based IT technologies such as Web services or Enterprise Service Bus (ESB) can be used to integrate services.

It is difficult to improve business processes when they are embedded and hidden in organisation applications. BPM enabled by SOA addresses the above issue by dissociating business requirements and logics defined in business processes from technological infrastructures. Then business processes can be implemented by composing services into Service Oriented Business Applications (SOBAs). BPMS can then be used to model, execute, manage, and optimize SOBAs. In SOBAs integration occurs at business process activities through integration of business activities. Business integration is realized with the help of well defined service interfaces which make associated business processes accessible to other services. Then, service reusability becomes the central topic rather than application integration.

While technology is far from being sufficient to automate business processes, it is a necessary

component that underlies any architectural approach. Business requirements must drive any choice for IT components. The choice has to facilitate organisations to take advantage of their legacy systems.

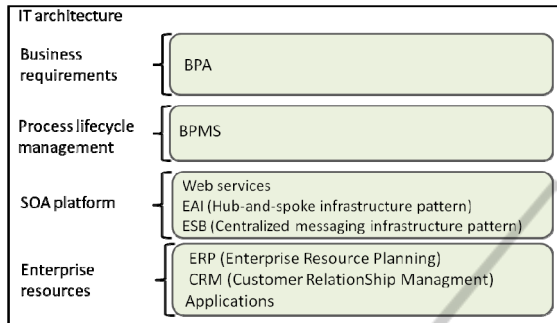


Figure 5: IT building blocks of BPM SOA architecture.

Figure 5 gives an overview of some technologies that support business processes and organisation capabilities. It depicts the relationship between different IT architectural levels. Some major platform vendors like IBM and Oracle are providing products at the four levels in Figure 5, while in the open-source offering no global solution is proposed. Other mid-tier vendors are providing product limited in scope and scale.

We assert that each organisation has to use the software which narrows the gap between the business requirements described with BPA tools (level 1) and its resources (level 4) provided through SOA infrastructures.

4 REFERENCE FRAMEWORK FOR BPM-SOA ALIGNEMENT

We propose a framework to gain a sound understanding of business-IT alignment problem based on BPM and SOA approaches. In the framework six work streams are identified to decompose complexity of this problem and to highlight essential building blocks. These relevant elements address a holistic understanding and consistency of BPM and SOA and identify critical success factors in the implementation of BPM and SOA approaches.

- **Business Strategic Alignment**

Strategic alignment with Information Systems takes place in organisations when goals are in harmony with business processes and systems that support them. When organisations define or modify business strategies, it means that existent business strategies

require change. To identify new business capabilities, strategic and operational elements organisations have to combine knowledge, organisation, process and technology. These capabilities are then used to identify future business processes. BPM and SOA approaches need to be aligned with an overall strategy of organisations (Catts and St. Clair, 2009).

- **Human capital and Organizational Culture**

Success of BPM and SOA initiatives depends on human factors. In this field there are two important dimensions: (a) people's knowledge and skills to improve business performance (human capital) and (b) leadership in a facilitating environment to complement the BPM and SOA initiatives (culture).

- **BPM Governance**

Moving to BPM requires a set of governance mechanisms to define the appropriate roles, responsibilities, and decisions making. BPM governance determines who is responsible for making decisions, what decisions to make, and following which policies for making decisions. Two dimensions of BPM governance can be differentiated: (a) governance of process, and (b) governance of process management itself. The former dimension observes the various mechanisms to design a cost-effective governance structure (Markus and Jacobson, 2010), while the latter examines management practises of BPM governance (Spanyi, 2010).

- **Business Process**

This work stream deals with areas that reflect the process lifecycle stages like design, analysis, implementation, execution, monitoring, and improvement. It also includes definitions of business process performance measurements: Key Performance Indicators (KPI), and metrics.

- **SOA and IT Technology**

This work stream concerns IT environment and SOA solutions and architectures to support business processes.

- **SOA and IT Governance**

SOA governance is a specialization of IT governance within the context of business processes and the life cycle of services. The lifecycle management is the key goal of SOA governance.

5 CONCLUSIONS

This article has presented an overview of BPM and SOA approaches, as well as the interplay between them from academics and practitioners points of view. Different aspects of the two approaches are

introduced, especially from our vision about the relationship between business processes and business services.

We have put forth, the EMT model (Economy, Methodology and Technology) to show that SOA and BPM are two complementary approaches that bring a new way for achieving economies of scale and organisation agility. They support together a complete business-IT alignment from business requirements to executable business processes. We have also proposed a brief overview of a framework composed of six core elements; each element represents a key success factor for implementing BPM and SOA.

Currently, there is a little research about achieving a BPM-SOA synergy. There is a need for further studies to understand the relationship between SOA and BPM and the benefit of their combination. Another area for future investigation is to formalize the applicability of these approaches in the context of SMEs using the reference framework proposed in this paper and from our experience in the ASICOM project.

To formalize SOA and BPM relationships advanced in this paper a methodology must be developed, documented, implemented, and validated. This methodology will guide the evolution at the operational level of business-IT alignment using BPM and SOA approaches to obtain a better aligned situation.

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