SUPPLY CHAIN DIGITALIZATION AND BUSINESS TRANSFORMATION: THE CHANGE MANAGEMENT CHALLENGE

[1]Sebastian JARZĘBOWSKI, [2]Natalia BEZAT

Kozminski University, Warsaw, Poland, EU,
[1]sjarzebowski@kozminski.edu.pl, [2]1118-sd@kozminski.edu.pl

Abstract

Digitalization has made its way to all industries. Technological enablers like broadband and mobile internet, wearables and big data or the Internet of Things and cloud computing have made it possible to develop entirely new business models and provide new offerings (value propositions) to customers. None of those, however, would be possible without paying particular attention to how these innovations will be rolled out, and the impact they will have. Within the paper, Enterprise Architecture (EA) approach, that describes the relationships of an organization's fundamental business elements (such as business goals, products, processes, applications, and technologies), and the process of its implementation was presented. The evaluation to what extent business processes and business requirements were supported by IT systems was made. In the course of the analysis, the benefits in this respect were identified.

Keywords: Supply chain, Enterprise Architecture Management, digitalization, business transformation

1. INTRODUCTION

Information technology is penetrating every aspect of the business, and without a sound IT infrastructure companies will soon realize that they cannot keep up with the rest of their competitors making use of information technology in their firms [9]. Successful companies have already recognized this trend and have started to adapt - both to continually stay one step ahead of their competitors and to exploit the potential of digitalization in order to increase sales revenue and/or reduce costs. Many markets are already witnessing the successful introduction of digitally enhanced versions of existing products and services, as well as entirely new offerings. In the waves of this mega-trend, nearly every company has started to take measures aiming at digitalization or business transformation. For making the right choice of initiatives that should be pursued, and for the successful implementation assuring sustainable changes, identifying and analyzing correlations within the company and its supply chain is a critical success factor. For many firms, this is the biggest challenge. Regardless of whether their current focus rests on increasing the competitive advantage or on re-orienting the entire business towards the new possibilities of digitalization, ultimately, initiatives in the context of digitalization will involve the implementation of capabilities through information technology. What organizations must remember, however, is that as information technologies become cheaper to acquire, more standardized and more replicable, their ability to create value and gain competitive advantage has become lessened as more and more people have access to the same types of technologies. As these trends in information technologies continue, the market for IT will soon become a commodity market, as IT systems, services and suppliers can easily be interchanged without loss of functionality and productivity [4].

Over the last decade, the importance of information technologies (IT) for the business has increased immensely. It resulted in a paradigm shift in the application of IT that ceased to determine which IT projects and operations the business could conduct but became an enabler of the business that decides what IT support is needed - leading to IT Alignment. At the same time, businesses continue to be more dependent on IT and its performance which has become the primary driver of competitive advantage. This, in turn, results in growing expectations of internal and external customers with respect to their IT systems. The concept of Enterprise Architecture (EA) has long been considered as a means to improve system integration and achieve

better IT-business alignment by IT professionals [6]. EA describes the fundamental structures of a company and enables its transformation by bridging the gap between business and information technology (IT) [1]. According to Sobczak, EA can be understood as a discipline, practice or activity in the area of defining, representing and managing fundamental corporate properties. In the last approach, creating a corporate architecture is not an IT project, but a complex set of activities in the field of organization, management, and informatics [10]. Such an approach to the development of enterprise architecture provides, i.e.:

- alignment of organizational strategy, business processes, and their support through IT systems,
- optimization of resource allocation (including financial resources) allocated for the development of IT systems,
- the ability to quickly make consistent decisions in the development of information systems,
- more effective coordination of long-term modifications and development of individual IT systems from the perspective of activities,
- reuse once implemented IT components,
- ensuring effective information flow between individual systems [10].

EA describes the relationships of an organization's fundamental business elements (such as business goals, products, processes, applications, and technologies) and their further development (**Figure 1**). The gathering, description, and analysis of these elements play an essential role.

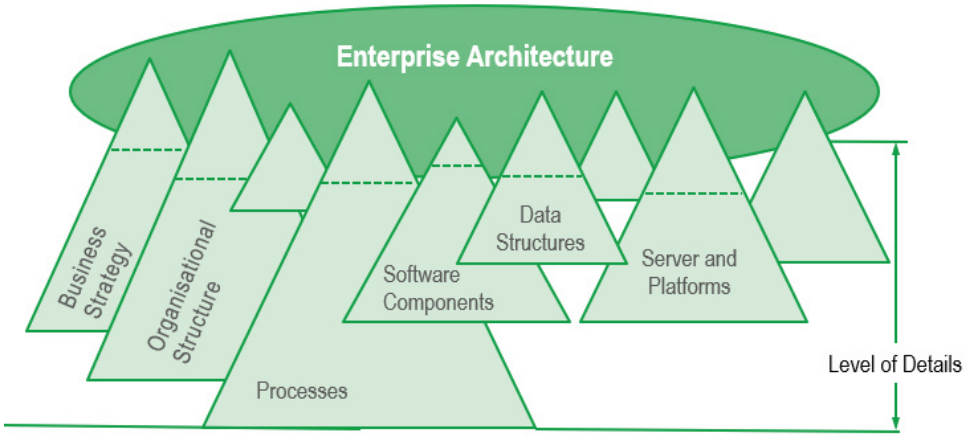

Figure 1 Enterprise Architecture and organisation's fundamental business elements

There is a close relationship between IT Service Management and Enterprise Architecture Management (EAM), particularly with respect to the development of future architectures and transition planning. This link ensures that the IT support is well aligned with the existing and planned IT architecture at all levels. It results in transparency in the planning of IT architecture and the ability to predict changes in the IT landscape. Moreover, the relation between EAM and IT Service Management implies the provision of more business-oriented information to the management. These dependencies ensure a stronger business orientation of the IT side of the company.

2. IMPLEMENTATION OF ENTERPRISE ARCHITECTURE MANAGEMENT

In business, we face the trend of increased global competition, which forces companies to improve their efficiency. One of the measures for efficiency improvement is supply chain management [12]. Supply chain management is an integrative approach to planning, control and monitoring of product flows, from suppliers to end users, aiming at improved customer service at reduced overall costs [2,5]. One of the significant difficulties of supply chain quality management is in information management. Supply chain quality management has experienced difficulties in predicting and controlling quality factors due to a lack of correct information

[3,7,8,11]. These difficulties are predicted to be significantly compounded as the scope of supply chains are increasing in which the complexity is even greater. Thus, it seems evident that supply chain operations are not possible without appropriate information sharing and enterprise architecture.

In most companies, IT processes are still not sufficiently structured to deliver the expected value to the business effectively. In order to change this state, various best practices have been created, aiming to provide a roadmap and serve as a reference for structuring company's processes. A widely known best practice for ITSM is the IT Infrastructure Library (ITIL) that supports companies in optimizing their IT processes by introducing the concept of IT services (therefore also called a Framework for IT Service Management). Other frameworks and standards exist such as CobiT - a Framework of Control Objectives for Information and Related Technology - and ISO 20000 that certifies processes structured according to ITIL recommendations.

Established IT landscapes with hundreds or thousands of applications, interfaces and functions develop into large networks where all applications are closely linked together. All too frequently, IT architects are confronted with applications which have been in place for more than 20 years. Moreover, the increasing number of inadaptable and technologically out-of-date legacy applications makes it extremely difficult to integrate new or modified systems. Under these circumstances, it is quite a challenge to shape the IT strategy for two simple reasons. Firstly, it is necessary to build the IT infrastructure in such a way as to meet the requirements of all departments of an organization in the shortest time possible. And secondly, it is crucial to keep a close eye on the overall structure to prevent weakening of the architecture, while at the same time technologies and standards need to be kept up to date through periodic technology refresh cycles. This being the case, it seems to be a rigorous challenge to maintain the balance between an organization's business and IT requirements, and at the same time gain control of the skyrocketing IT costs.

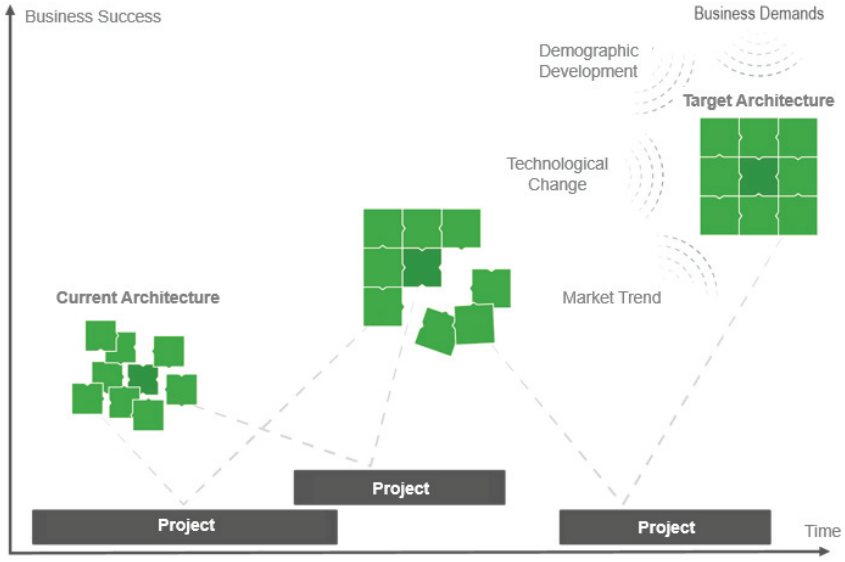

Figure 2 Target-Oriented Regulation of the Enterprise Architecture

However, Enterprise Architecture Management (EAM) provides the tools for effective planning and further development of an entire organization. Focusing on strategic objectives and requirements, EAM provides ways to manage an organization's architecture. EAM maximizes cost savings while striving to minimize all associated risks. From an IT point of view, one can gather information on applications including their software and data architecture as well as their technology platforms. On the other hand, one is also able to assess the IT architecture from a functional point of view, that means getting to know the products, business processes and organizational units. As a result, one has an integrated view on the IT architecture using this opportunity to have valuable discussions with the business side of the organization. Furthermore, EAM

provides a solution how to transform an existing IT landscape into the target IT architecture with changing strategic influencing factors such as market trend, technological change, demographic development, business demands, competition, etc. (**Figure 2**).

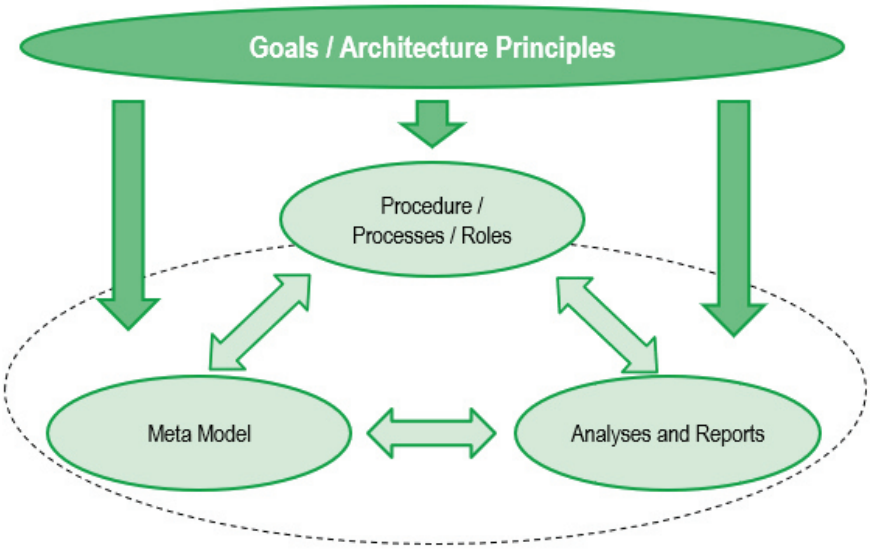

Figure 3 Enterprise Architecture Management approach

The company cannot start changing their IT architecture with a Big Bang Approach. Therefore, it is recommended to use the target-oriented design of EAM (**Figure 3**). The first step is the definition of goals and architecture principles thanks to conducting interviews with stakeholders. Another stage refers to the ways how these goals can be reached. Three components can be determined here: definition of processes, procedures and roles, the creation of the meta model and creation of analyses and reports.

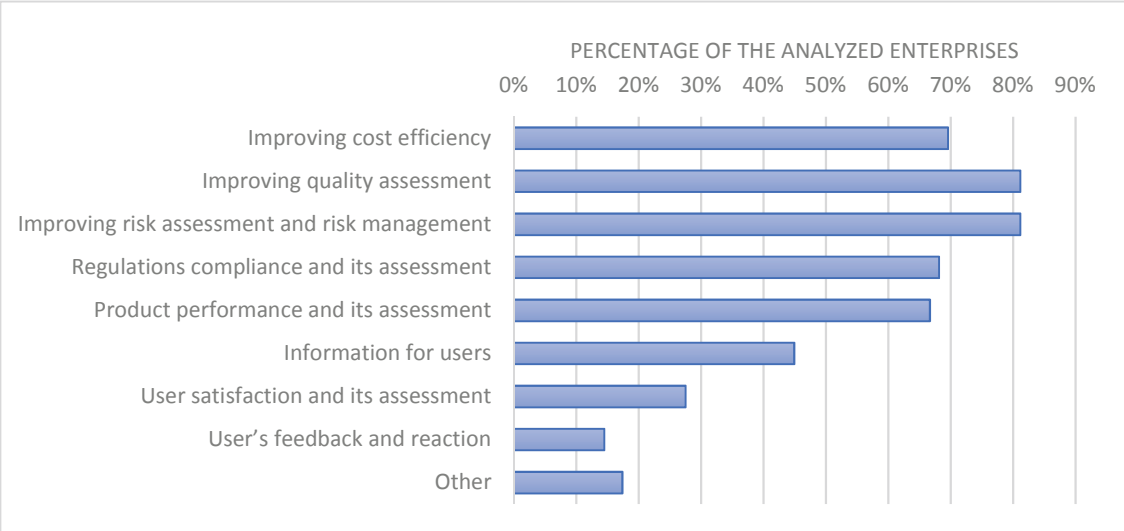

Figure 4 The division of the benefits achieved thanks to EAM implementation (2017)

In order to investigate the benefits resulting from implementation of EAM, 69 small and medium enterprises from eight European Union countries (Slovenia, Austria, Hungary, Italy, Germany, Poland, Slovakia, Belgium) were analyzed. The enterprises used EAM in order to improve their processes within quality and labelling, mechatronics and packaging solutions.

Then, added values resulting from the application of individual innovations were identified. The collected examples had several novelties, benefits and added values which can improve the competitiveness, especially the SMEs' performance and success on the market. The benefits enabling enterprises to increase their competitiveness on the market included improvement of cost-effectiveness, improvement of product quality, improvement of risk management, compliance with legal regulations, product assessment, information provided to users and user satisfaction. Other benefits were also identified, such as product protection, waste reduction, reduction of harmful substances emissions, effective use of natural resources, protection of intellectual property. The majority of the analyzed enterprises noticed the improvement within areas such as quality assessment (81 %), risk assessment and risk management (81 %) and cost efficiency (70 %) (**Figure 4**). The results of the analysis undeniably confirmed the fact that the implementation of EAM provides benefits to the enterprises.

3. CONCLUSION

As companies continue to grow and expand into new markets, the need for increased integration is a must. Enterprise technologies can be the backbone behind an organization's global operation. In order to stay on the market, enterprises have to continually develop and look for new solutions, which can be implemented both thanks to constant investments and the introduction of new technologies, such as implementing EAM within the IT landscape. This underlines the need to take action to stimulate economic activity with the potential to create jobs for regions encountering difficulties in supporting economic development. One way is indeed to improve entrepreneurial competencies and skills through the innovative potential in IT architecture creation. The speed and scale at which business is being done today require intense coordination of business processes, and enterprise technologies give companies the ability to operate at speed and scale demanded in today's business world. Within the framework of the paper 69 small and medium enterprises from eight EU countries have been analyzed in terms of benefits resulting from the implementation of EAM in different areas such as quality and labeling, mechatronics and packaging solutions. It was stated that EAM could influence positively such aspects as quality assessment, risk assessment and risk management, and cost efficiency.

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