Business Capabilities Utilization Enhancement Using Archimate for EAS Projects Delivery in an Agile Environment

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Abstract. Businesses of all sizes are constantly seeking to improve their daily business processes to stay competitive in the modern-day economy. Enterprises take for granted that they are utilizing their business capabilities in the best way possible. The purpose of this paper is to present a manual method to minimize the gap of misalignment between business and IT when delivering enterprise application software (EAS) projects in an agile environment. The research is based on literature review and empirical data from 3 EAS projects over a one-year time. By introducing a regular reference check to minimize the gap of misalignment between business and IT or deficit, during EAS project delivery between the requirements and strategical organizational goals described using enterprise architecture frameworks, specifically Archimate, it was observed that cost of projects and overall enterprise effort towards its goals decreased and provided significant cost savings. A more automated approach than previously available is required.

Keywords: Business capability modelling, Enterprise application software development, Enterprise architecture framework Archimate, Business strategy execution

1 Introduction

Business strategy execution has been identified as a problem a long time ago. In 2008 R.S. Kaplan and D.P. Norton presented their book "Execution Premium: Linking Strategy to Operations for Competitive Advantage" [1] where they state that "various surveys <...> indicate that 60 to 80 percent of companies fall far short of the targets expressed in their strategic plans." If simplified, that means, that 20 to 40 % of all business efforts (financial, people capital, technological) provide no significant business value towards executing business strategy. Various research by Hrebiniak [2], Kaplan and Norton [3] and others [4, 5] identify that the problem is still valid and relevant.

Business strategy execution has a direct impact on utilizing business capabilities. Organizational capability in the context of business capability dates back to 1987 when Ulrich [6] described organizational capability as "the firm's ability to manage people to gain competitive advantage". Organizational capability is what connects the financial,

strategic and technological capability of the organization. Business capability is any endeavor that helps an organization to achieve its goals. The most efficient business strategy execution is utilizing key organizational capabilities often based on the level of competence in a department in the organization or individual domain knowledge of people in the organization.

There are various researches on how business strategy execution could be supported in utilizing IT capabilities. Henderson and Venkatraman presented business strategy alignment with the IT strategy model thus providing an analysis method aimed for competitive advantage [7]. Another approach is to use enterprise architecture frameworks such as MoDAF [8], TOGAF [9], Archimate [10] and others to overview and utilize overall organizational capabilities.

Quite often business strategy execution is based on various project implementation. Usually, agile approach is used to achieve organizational goals or deliver the value for the customer and improve time to market for IT-related product development whether it is a new entertainment application or complex IT system. However, using an agile approach means business decisions need to be taken quickly, on-demand when the development team needs to know business decisions that impact their product or project development. Such a quick pace means that business must be always ready to provide support to IT development, and if it's not, that might cause IT development to be stopped because it is not aligned with organizational goals as identified in business strategy and captured in enterprise architecture frameworks.

This paper is structured as follows. In the second section, the basic concepts of enterprise architecture, enterprise agile software development are presented. In the third section, related works are described. The fourth section contains the concept of deficit in business strategy and enterprise application software project delivery and a method to minimize it. In the fifth section, the case study using the suggested method is explained. Finally, conclusions cover the overview of results and summarize the case study.

2 Key Concepts

2.1 Enterprise Architecture

Organizational capabilities and overall organizational "map" from the as-is situation and to-be situation perspective is best described using enterprise architecture frameworks.

Enterprise architecture is a well-defined framework for conducting enterprise analysis, design and implementation of relevant IT necessary to execute their strategies, to guide organizations through the business and technology changes. The history of "Enterprise Architecture" as a concept started in 1987 when John Zachman coined the term [11]. The first version of one of the most widely known frameworks TOGAF – was created in 1995. Different enterprise architecture frameworks emphasize different aspects of the enterprise. Recent researches show the topicality of enterprise architecture and a need for even further research [12]. However, enterprise architecture is often per-

ceived as high-level overview that does not bring value to daily business strategy execution – specifically projects delivery, where ongoing questions arise that require quick response in order not to have delays in project deliveries while waiting for reference how the requirement in project is related with any part of enterprise architecture and what action should be taken project-wise to adhere to organizational goals in the best way. However, I believe that information captured in enterprise architecture models has most if not all information needed to answer the questions that arise executing business strategy through IT projects in agile project delivery.

2.2   Enterprise Agile Software Development

The agile approach for software development is becoming an increasingly popular software development methodology. Agile approach could be used not only in software development but in most product development-oriented business cases. So-called traditional or "waterfall" project management approach becomes less and less efficient when it comes to accepting changes that emerge during the lifetime of the project.

As Pikkarainen et al. states [13] companies are becoming agile in order to improve the productivity of product development teams. Business development teams are also making business-related product development decisions based on the agile methodology approach. For a company to become agile means changing the mindset of employees or orienting them towards accepting emerging changes instead of strictly following product development plans or roadmaps. It also means that employees in all levels of organization needs to adapt to the new way of working, which is getting the results of their daily duties evaluated much faster than in the traditional way of working. However, when "going agile", the overall goals of the organization are not always supported with an organizational change. There are researches that emphasize the importance of supporting the agile way of working from an organizational perspective (provide appropriate physical atmosphere, work environment that encourages creativity) [14]. The gaps between business and IT strategies appear. It might result in not sufficient quality of software products, that are not in line with the overall goals of the organization both short and long term.

As Portman has described in his book "Scaling agile in organizations - Guide for project managers and agile leaders" agile has over 15 different frameworks [15]. The most popular agile software development frameworks for team level are Scrum and Kanban. For enterprise or large scale Agile LeSS, SAF'e and others are used.

3   Related Works

There is a significant number of research done in the IT and business alignment area where the starting point could be identified in Henderson's and Venkatraman's alignment framework distinguishing two alignment dimensions (business strategy and IT strategy) [7]. One of the most well-known methods is Guidelines Regarding Architecture Alignment (GRAAL). The GRAAL is a conceptual framework providing a collection of concepts and relations among them [16]. But these and other notable methods

are conceptual and not adapted to be used in most popular enterprise architecture modelling tools.

Other approach is service-oriented architecture (SOA) based methods like BITAM by Chen et al. [17]. BITAM uses a twelve-step process for managing, detecting and correcting the misalignment at the architecture level. Also, SBISAF framework by Morkevicius et al. [18] is a SOA based framework that has its implementation in MagicDraw CASE tool using UPDM enterprise modeling language and proved to significantly reduce the misalignment between business and IS in the enterprise model.

However, most of the suggested methods take significant time to evaluate the misalignments, and although they provide metrics to track misalignments, models still needs to be translated to project requirements or the requirements themselves should be adjusted manually, therefore more automated solution is demanded.

4 Minimizing Alignment Deficit in Business Strategy and EAS Project Delivery

As mentioned, Scrum is one of the most popular agile software development methodologies. To successfully run agile-based projects, it requires business representatives to have timely decisions to provide input for upcoming development iterations to maintain optimal pace of development as soon as any questions impacting development arise. In Scrum, this is done by a person called the product owner. But this usually takes time for that person to seek out information and provide it to the development team. Sometimes the answers or priorities change over time which is natural, also that might result in development delays or some part of work redone. These situations can be identified as a deficit in the EAS project and enterprise architecture alignment (Fig. 1)
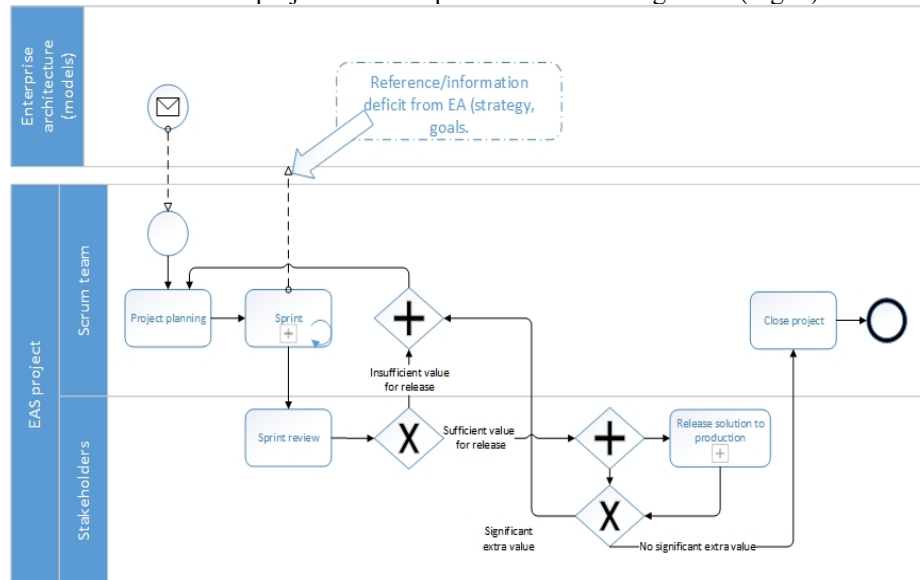

Fig. 1. Enterprise architecture and EAS development project delivery alignment deficit

Enterprise architecture frameworks, specifically Archimate, has capability modelling notation therefore it is available for presenting business capabilities in a standardized way. It also contains sufficient elements to translate business strategy through capability utilization to be able to be used as indicators for answering EAS project delivery questions such as priorities, guidelines for requirements.

The model in the example in Fig. 2 shows a brief example of how strategical goals could be modelled using organizational capabilities. This further can be modelled for answering questions regarding EAS project delivery.
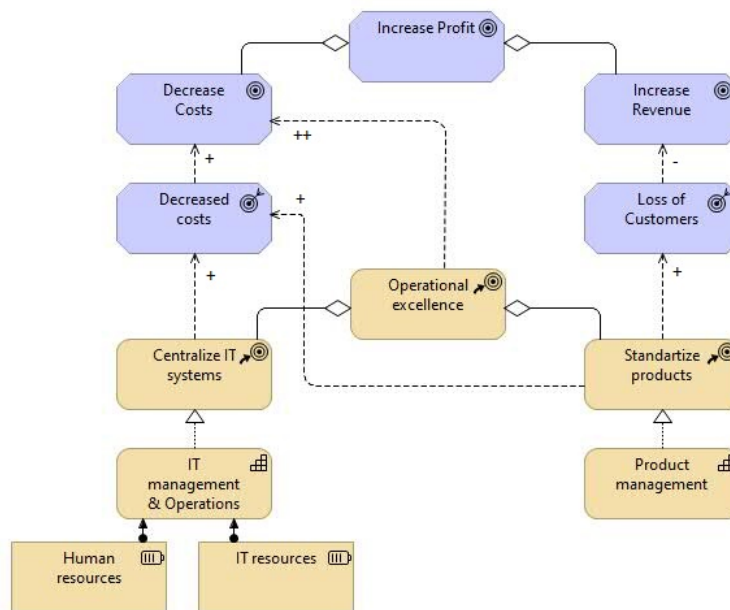

Fig. 2. Business capabilities modelling example (based on [10])

If there would be a regular check during EAS project sprint, the impact of the deficit would be reduced. This should be done on each development iteration during product backlog refinement sessions by validating the product backlog items against enterprise business strategy through enterprise architecture models from Archimate framework.

The diagram of the Scrum process and deficit has even bigger impact on enterprise agile frameworks, like Scaled agile framework (SAFe) (Fig. 3). In SAFe the whole organization is committed to deliver business value through aligned timeframes where each team is contributing to the overall goal with their skills and capabilities. Therefore, the impact of team not being presented with timely and precise answers required to create the next product increment is multiplied by the number of teams involved in a Scaled agile framework setup.

In order to minimize the issues of delays in product delivery or work to be redone due to changed priorities, it is suggested to constantly advise against business strategy goals and their representation in enterprise architecture models, specifically Archimate.
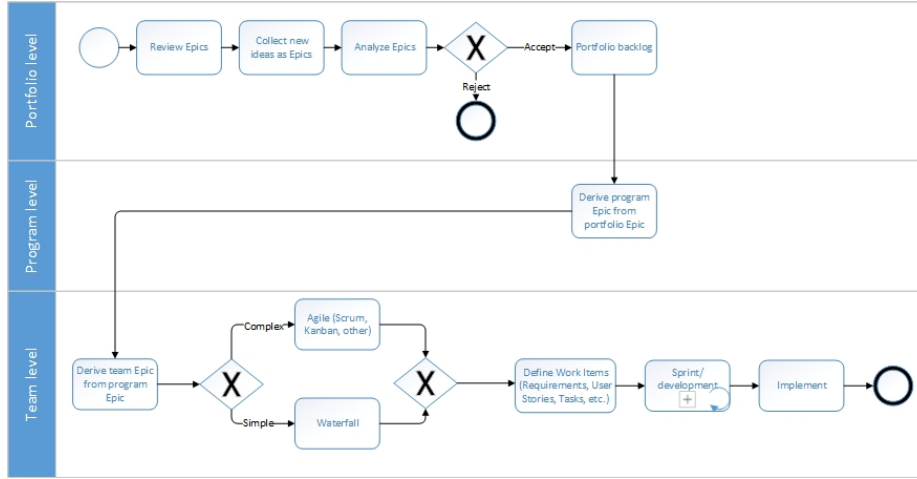
Fig. 3. Scaled Agile framework specification in BPMN (based on [19])

5   Case Study

Once delivering projects in a SAF'e Agile framework environment there were observations done on 3 EAS projects. The requirements in the format of user stories, change requests and bugs were analyzed during the project lifecycle of 8 to 12 months. The results are displayed in Table 1 below.

Table 1. EAS projects requirement distribution

Parameter	Project #1	Project #2	Project #3
Initial requirements	138	224	236
Change requests	273	173	36
Bugs	135	252	304
Project duration	8 months	12 months	10 months

When manually using the suggested method to minimize deficit in business strategy execution and EAS development project delivery the data was analyzed and findings are displayed in Table 2.

Table 2. EAS projects requirement distribution when using suggested method

Parameter	Project #1	Project #2	Project #3
Initial requirements	138	224	236
Change requests	238	146	30
Bugs	107	238	304
Project duration	8 months	11 months	10 months

As it was observed, the initial set of requirements did not change due to the fact, that the deficit between business strategy execution and EAS development project delivery arises during sprints or product development. But in change request and bugs categories, the differences are quite significant as in the 1st project the number of bugs was reduced by more than 20 % and in project 3 the number of change requests was reduced by more than 16 %. The comparison results are displayed in Table 3.

Table 3. EAS projects requirement distribution comparison

Parameter, %	Project #1	Project #2	Project #3
Initial requirements	0	0	0
Change requests	-12,82	-15,61	-16,67
Bugs	-20,74	-5,56	0
Project duration	0 months	-1 months	0 months

The savings observed should be evaluated based on their required development effort and based on the average hourly cost of developer, the cost savings can be calculated.

6   Conclusions

Enterprise architecture is becoming the most efficient way to capture organization strategy, capabilities and overall assets as it has clear rules how the information about the organization should be structured.

Agile software methodology is already popular for some time but still gaining popularity across product development based organizations and new ways of working are being developed for teams, departments and whole enterprises.

Given that, the before mentioned areas are still subject for further research. By observing Scrum usage for EAS project delivery under the Scaled Agile Framework and Archimate enterprise architecture framework there was a deficit identified in alignment between business strategy and IT project execution in an agile environment and a method provided to minimize the deficit. This resulted in part of work not needed to be redone anymore and some previously missed requirements, that needed to be done in order to reach project and business goals, done on time. Also, significant cost savings were observed. Further automation is to be researched as it is possible to utilize the method, presented in this paper, more seamlessly.

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