Enterprise architecture and foresight based business process adequacy analysis

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Abstract. From the point of view of systems theory the business process is the very essence of a business organization, because it transforms inputs of the organization into the outputs, which are the reason of existence of the organization. In a complex modern business environment the term “adequacy of business process” has multidimensional meaning that can be interpreted in several ways. One of the ways of addressing this multidimensionality is to view business process in the context of enterprise architecture. Thus different enterprise architectures will correspond to different interpretations of business process adequacy. The complexity of adequacy analysis depends on the complexity of enterprise architecture chosen, as well as on the possible changes of enterprise architecture elements. An adequate business process would be one that corresponds to current and foreseen enterprise architecture elements that can provide intended outputs of organizational performance.

1 Introduction

There are different ways of how to reason about adequacy of systems. The main issue, however, is to choose the adequacy dimensions to the considered. The most important dimension is business goals: if the goals change, proper processes for their achievement may be created or chosen from the process repository [1]. However, the goals of a business system are not the only issue, which influences the business process. In present turbulent environment [2] the process must be designed so that it can “endure” changes in legal systems, technology, organizational structures, employees responsible for the process and other factors that influence the process. This is a challenge to any business process designer and causes a growing interest in business modeling environments. The problem is that none of currently existing environments provides suitable means for adequacy analysis [e.g., 3]. To solve this problem at least partly, we propose an enterprise architecture sensitive visualization of business process combined with foresight based “to be” process adequacy analysis that would let to timely foresee the necessary changes in business processes and their support systems with the purpose to dynamically maintain business process adequacy [4].

The paper is structured as follows. In Section 2 we introduce some issues of business process adequacy. In Section 3 we propose the enterprise architecture...
sensitive business process visualization and analysis framework and ponder over the adequacy analysis support possibilities. In Section 4 we discuss the reactive and foresight based predictive adequacy analysis. In Section 5 we present brief conclusions.

2 Some issues of business process adequacy

According to the Free Dictionary of Farlex [5], to be adequate is to be sufficient to satisfy a requirement or to meet the need, i.e., it means being as much as needed without being abundant.

To analyze the business process adequacy it is necessary to understand what are the requirements to be met and what it means to be sufficient to satisfy these requirements or needs. In agile software development projects requirements prioritization is used as a means for adequacy detection [6]. Business process adequacy analysis requires taking into consideration a large variety of internal and external factors that influence organizational business processes, which are not directly considered in the analysis of software systems requirements. Additionally, in many cases an organization is a member of the inter-organizational network [7] and therefore has to be adequate to the needs of other organizations belonging to this network.

When changes in organizational environment are taken into consideration we have to deal with dynamic systems [2] in adequacy analysis of the business process. Thus we can distinguish between reactive adequacy analysis, which deals with current organizational situation, and proactive adequacy analysis which deals with the analysis of some new envisioned business situation.

In the next two sections we will address some adequacy analysis problems related to the above discussed issues.

3 Enterprise architecture based business process adequacy analysis

Enterprise architectures have become a well known tool for handling organizational development and change [8]. In this paper the Zachman Enterprise Architecture, the oldest enterprise architecture framework, is considered to discuss the possibilities of the enterprise architecture based business process adequacy analysis [9]. The Zachman Enterprise Architecture prescribes six dimensions of abstraction (data, function, network, people, time, and motivation) and six perspective dimensions (scope, business model, system model, technology model, detailed representations, and functioning enterprise). We could assume that a business process is adequate if it is adequate in terms of each dimension imposed by enterprise architecture framework.

To be able to assess the business process adequacy a business process model giving an insight into each dimension is needed. To simplify the discussion we have made an adequacy analysis oriented mapping of twelve dimensions of Zachman Enterprise Architecture (six abstractions and six perspectives) into five working dimensions,
namely, place, performer, time, goal, and business process support system. The mapping scheme is shown in Fig. 1.

![Fig. 1. Mapping adequacy analysis dimensions (middle) to abstraction (top) and perspectives (bottom) dimensions of Zachman’s framework](image)

The business process usually is regarded as a sequence of activities or tasks that are performed to achieve a particular organisational goal. There is no general agreement regarding what exactly has to be considered an activity or a task. Sometimes, especially in quality management related publications, three level hierarchy, namely: process, activity, and task, is suggested [10]. However, in reality the work of people is not organised in predefined layers of hierarchy and granularity. Usually business process classification depends on the process analyst’s mastery or particular standards chosen by the company [11]. We propose to analyse adequacy of business process with respect to the smallest granularity of issue representation in a particular adequacy dimension (Fig. 2). Thus at Goal dimension the process will be decomposed to show which of its sub-processes correspond to each leaf goal in the hierarchy of organisational goals. At Place dimension the process will be decomposed up to the smallest geographical unit under the consideration. At Time dimension the process will be decomposed up to the smallest time interval used in organisational planning. At Performer dimension the process will be decomposed until the level where tasks of each employee are seen. In this way we come to the notion of elementary business process for adequacy analysis, which is a process that is performed with respect to the smallest useful granularities of each adequacy analysis dimension.

![Fig. 2. Task classifications according to business process adequacy dimensions](image)

The business process may be considered as adequate if the composition of elementary business processes at each dimension separately is a valid business process, i.e., it can transform intended inputs into intended outputs. To apply this approach to complex business processes it is necessary that business process
modelling environment would be able to support different decompositions of business processes (see Fig. 2), and proper business process adequacy analysis tools with respect to each adequacy dimension. It is evident that the business process is the system that has to be supported by business process support system (understood in this paper in a very broad sense as the scope of all different software and hardware means for business process support, including legacy systems, enterprise portals, etc). The business process adequacy with respect to the business process support system may be analyzed in terms of validity of the composition of elementary processes of business process and elementary processes of business process support system.

4 Foresight based adequacy analysis – hitting the moving target?

In organizational change, to handle complexity, it is suggested to separate concerns between organization, its context and a satisfied need [12]. In the context of turbulent environment we can distinguish between two different types of changes – the changes, which are requested by current situation (current organizational strategy) and changes, which may be requested by some envisioned future strategy, depicted by organizational foresight - a technique utilized to achieve organizational innovation capability and flexibility in turbulent environment [13, 14]. Two different adequacy analyses correspond to these changes. Proactive adequacy analysis will let to deal with changes in current situation while predictive adequacy analysis will be needed for analyzing business process adequacy for some future situation obtained by foresight methods or other future analysis means (See Fig. 3).

The main problem in reactive adequacy analysis is frequency of changes in turbulent environment. It may happen that needs change faster than business process configuration can change with regard to all adequacy analysis dimensions. Therefore it would be valuable to estimate, which of possible changes in the business process (since there are usually more than one way of meeting the need) may happen in the most effective and efficient way. On the other hand, as regards the future situation, the problem arisen by turbulent environment is the uncertainty about the process development when trying to achieve proactive adequacy to changing situations. Future research can attempt to solve this problem.
5 Conclusions

In this paper we introduced the notion of adequacy analysis dimensions and showed that each dimension requires different decomposition framework of organizational business process down to elementary business processes. The adequacy of business process should be achieved at each dimension separately. Adequacy analysis is a complex task that requires taking into consideration not only current situation, but also changes requested by turbulent environment as well as organizational efforts in their future foresight.

Current business process modeling environments can partly support adequacy analysis. Further research is needed to determine what visualization means and adequacy analysis algorithms would be helpful for adequacy analysis support.

References