

Actors Based Competences Supporting Enterprise Modeling Changes

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Abstract: The competitive environment of companies triggers changes having impacts on the enterprise information system. In this context, Enterprise Architecture (EA) offers instruments to steer enterprises changes and to ensure cohesion and alignment between the different aspects of an enterprise. Despite considerable numbers of EA frameworks, there are not many giving importance to actors competencies supporting EA changes when modeling. In this paper, we present an approach based on competencies to support enterprises' changes. In doing so, we introduce a performance assessment method from the process modeling to the competence selection using a competence-oriented ontology. Moreover, we develop a prototype as an evaluation part of our work illustrated by a case study supporting EA decision making.

1 INTRODUCTION

The growing importance of alignment, compliance and manageability issues have increased the attention to EA (Braun et al., 2005). EA promises to better align technical projects with business needs, where business values could best be realized by a holistic approach to systems architecture that explicitly looked at every important issue from every important perspective (Zachman, 1987).

EA presents methodology for guiding changes. Those changes can impact different levels of the enterprise. This needs an approach steering EA changes. More specifically, the organizational aspect is more and more considered where actors, roles and competencies have a fundamental contribution in the success or the failure of desired changes (Gagnon, 2008). Enterprise performance depends on the alignment of the corporate strategy and business process. The performance of business process depends on the involved actors. These actors have skills to achieve their tasks using relevant IT systems (CIGREF, 2008). Hence, any EA change should take into account actor's competencies to assess its performance. The importance of actor and competency concept is clearly shown in enterprise

models while ignoring change issues (Le Boulaire et al., 2008).

In this paper, we aim to focus on competencies management supporting EA change. Our approach is based, firstly, on a BPEL (business process execution language) process that optimizes EA change scenarios. The BPEL process ensures the orchestration of services using business rules from our performance assessment method. The performance assessment integrates, then, a competence-oriented ontology to ensure capturing relevant information for actors' performance (e.g., skills, training, etc.). Finally, we develop a prototype as an evaluation part of our work illustrated by a case study supporting EA decision making.

The remainder of this paper is structured as follows. Section 2 introduces the research context and problem statements. The approach is presented in section 3, where we explain our methodology to monitor process execution based a competence-oriented ontology. Section 4 evaluates our work illustrated by a real world scenario. Section 5 concludes and discusses future works.

2 BACKGROUND

2.1 Related Work

Traditionally, improvement initiatives are currently positioned at two types of performance improvement: continuous improvement and radical improvement. EA is a continuous improvement approach. The improvement is one of the basics of quality managed by a set of standard such as the ISO 9000 that describes which requirements a system needs for quality management. The ISO 9001 standard emphasizes the continuous improvement of the overall performance of the company. This principle means that management must measure performance based on quality (Hachicha, 2012).

Competence management aims to improve the enterprise performance through the effective deployment of resources allocated to the business process. Competence management involves the following steps: (i) Analysis of existing data; (ii) Analysis of decision change, and (iii) The design of the new organization.

Several meanings and definitions of *competence* exist, but no common definition seems to satisfy all viewpoints (Pepiot, 2012). In fact, there is an evolution in the considerations of the competence concept in enterprise modeling languages. The Unified Enterprise Modeling Language (UEML) proposes a consensus in the scientific community both at the terminology and conceptual (Petit et al., 2002). The actor concept in UEML is considered as a resource which is a specialization of the enterprise object. Resources can be specialized into three categories: applications, human resources and machines. UEML project has open research perspective. There are investigations of complementary language for competencies modeling such as the Unified Enterprise Competence Modeling Language (UECML). UECML is an enterprise modeling approach based on competences. UECML is based on a set of core constructs and a set of additional constructs. These additional constructs are specialized constructs required by the competence and resource based on enterprise modeling needs (Pepiot, 2012). The actor here is considered as an enterprise object. It is a subclass of enterprise object class. Therefore, it inherits all the properties of objects organization. The actor is assigned to a role and is characterized by a set of competence. We notice three granularity levels related to competence: (1) Unit competence which is considered as the basic level and entity in the model is tightly linked to an activity; it is defined

as the ability to mobilize effectively material and non-material resources in order to respond to an activity; (2) Individual competence is the set of unit competences and resources developed/required by an actor within the framework of assigned activities; (3) Collective competences is considered as the highest competence level and linked to processes and group of actors.

Another aspect is about the link between competence and performance. In literature, many researches develop the competence integration in performance assessment. In (Bennour et al., 2006) authors proposed to model and assess the competence based on knowledge, rather than an overall assessment of competence. In (Hlaoittinun et al., 2009), they quantify the impact of both individual core competencies (technical, decision autonomy) and collective (management, relational) to assess the modulation rate of the nominal performance to execute an activity. Finally, the approach proposed in (Gruatet al., 2006) introduced the level of competency where a performance is calculated based on the operator's productivity such as in production line.

2.2 Research Motivations

Despite the competence extension, UECML is still lacking of a systematic approach evaluating competences based on resources. In a context where actors vary from the manager who makes strategic decision to the worker who performs operational activities, the issue is to ensure consistency with regards to actor's understandings and viewpoints. We think that leveraging competence features in EA can ensure this consistency. To that end, we propose a performance method that predicts impacts based on actor's competence. Prediction will allow architects to deal with situations such as the lack of resources when an actor is absent or has no skills to execute an activity with the process. Based on our approach, we can offer alternatives as anticipatory actions such as training, outsourcing to solve such problems.

3 THE APPROACH

The performance assessment based on competence is realized in three main steps: (1) Identification of KPIs and metrics derived from EA strategy in order to deal with the normative dimension of performance assessment; (2) Collecting relevant data relevant for competence computation where we

propose an ontology to deal with cognitive dimension; (3) Development of business rules in order to orchestrate services invocations from the BPEL process.

The normative dimension is based on a set of KPI and corresponding metrics. It provides metrics for business rules to assess performance. From the literature (Rezaei et al., 2011), we have identified the different services: developing a performance measurement system needs the conversion of strategic objectives into key goals, the establishment of metrics to compare the desired performance with the actual achieved standards, the gaps identification to allow us to understand performance and finally the initiation of improvement actions.

The trend in performance assessment is geared towards intangible success factors such as competencies, customer satisfaction, motivation and staff satisfaction (Rezaei et al., 2011). In our approach, we are based on competence concept because it is interrelated within EA layers, and so, provides a broad vision that facilitates decision making. Moreover, KPIs depend on the competence family. In fact, according to (CGIREF, 2009) competencies related to design, operation, infrastructure and technical architecture tend to move away from the enterprise core and even to move geographically away.

Performance assessment may have some semantic issues when dealing with metrics interoperability due to cultural differences between actors, e.g., business people and information technology professionals (Frank, 2002). It is a critical problem because it may lead to data collection aberrations.

Ontologies have been considered as solution to ensure the metrics interoperability in process reengineering (Charlet et al., 2002). We define an ontology entitled Ontology of Enterprise Oriented Competence (OnEOC) (see figure 1). The OnEOC ontology is composed of the following components:

- Thing, an abstract object representing the class of all things.
- Urbanization view refers to the different EA views: strategy view, the business view, the organizational view and the technical view.
- Work unit is a component that refers to a decision Unit it is linked with the performance estimation and the choice of changes reasons.
- The actor concept is a key concept. Actors have different competencies and roles. The actor in OnEOC can be considered through different views depending on his role and his capabilities.

- The competence concept identifies the unitary competence, personal competence and collective competence.
- The change concept is also defined in the OnEOC where it ensures the evolution of an existing state (AS-IS) to a desired target state (TO-BE).

The OnEOC ontology allows different types of research via ontology queries. For instance, actors executing tasks with a given KPI value such as the number of resolved complaints in an hour. The ontology allows a semantic interpretation of KPI, where technical actors interpret the KPI query execution time by the computer system, while actors at the strategic level interprets this KPI according to customers satisfaction percentage. Then, after identifying KPI and collecting relevant data; the performance assessment needs to develop business rules. Every business rule depends on the identified KPI and the extracted data from the ontology. These business rules will be executed via a process implemented by the business process execution language (BPEL). The idea is to allow combining a set of services for specifying business rules where performances are evaluated by orchestrating these rules.

BPEL is an XML language designed to allow the composition and orchestration of web services. BPEL inputs translate the different possible changes scenarios and the output is a value of the expected performance after change. BPEL inputs define the subject (reason) of the desired change, e.g., the stakeholder management to modify existing business processes. Changes criteria are either immediate or continuous. Change's nature can be related to specific actions such as add, delete or modify involving actors, systems, and processes. Then depending on the input, an invocation of a web service is executed based on business rules. The principle of performance assessment depends on the identification of the gap between existing competences and required competences allowing the adaptation to a given change. So the output of this process represents the value of performance after change. Note that depending on the importance of the impacted actor and the importance of the impacted business domain, a decision can be taken in order to plan appropriate actions to deal with any performance lowering.

Welcome to the Support Change Process

Task :

Change Subject :

Change Type :

Change Nature :

Action :

Figure 3: Change process interface.

5 CONCLUSIONS

The main contribution of this paper is to support enterprise changes based on the competence concept. This concept contributes in performance assessment to monitor changes and support decision-making in EA. Supporting change process using competence is supported by the OnEOC ontology of competence addressing semantic issues when defining metrics for actors' performance.

We aim to improve this approach by proposing a method for modeling business rules. The idea is to help business experts to model the desired business domain in a natural language supported by a vocabulary that supply the necessary semantics to describe the overall framework. Standards like Semantics of Business Vocabulary and Business Rules (SBVR) and the Semantic Web Rule Language (SWRL) will be our next step to rationalize actors' performance in EA frameworks.

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