Newer Approach to Flexible Business Architecture of Modern Enterprise

Alexander Gromoff, Nikolay Kazantsev, Mikhail Ponfilenok and Yuila Stavenko

National Research University Higher School of Economics, BPM Department,
Science & Education Centre of Information Control Technologies, Moscow, Russia

Abstract: In this study with the aim to increase the agility of enterprise we try to analyze a co-adoption of modern concepts: application of enterprise architecture (EA) in combination with real-time business process generation on cloud-based service. The process of business model generation was simulated by transformation of particular business request in semantic form into sequence of executable blocks thus forming workflow. During the generation all necessary requirements for resources, such as information, intellectual and professional skills, inputs and outputs, quality and operational risk limitations, controls and monitoring, are formed. Next the formed requirements are to be satisfied by appropriate selections from the Cloud facilities and approved by expert commission. Finally after several iterations the required business model will be created in reality and could be executed with predicted results.

1 INTRODUCTION

The problem of how organizations can successfully deal with unpredictable, dynamic, and constantly changing environments has been a prevailing topic both in industry and academia for a few decades. «Flexible enterprise» - one of the most popular terms considered as possessing the ability to adjust and respond to change. The idea of flexible organization has originated from the contingency approach in organizational research. This theory represents organisation as an organic and open system and there is a relationship of interdependence between an organisation and its environment, as well as within and between its various sub-systems. According to contingent approach CEOs should focus on organisational design as a combination of sub-systems, define objectives and formulate policies and plans according to the prevailing environmental conditions and integrate them into practice in an open system framework.

Strictly following to strategic management in practice, CEOs lack system approach; they do practically focus on the revenue growth as a general goal of creating value to shareholders. The technical aspect is normally out of consideration at this level (management and financial aspects are the priority), despite of the fact that the agility of an enterprise is a key factor of the goal success in the fluctuated market. In this context agility is seen as an adequate reaction or reflection on currently changing environments as inside, as well outside enterprise that results in change in business processes logic, IT resources allocation and organizational structure. Enterprise agility is caused by proper Business/IT alignment in frames of an organic and open system: *Enterprise Architecture (EA)* (Ross et al., 2006).

The development of a flexible EA framework using models presents a serious challenge; the following components of the enterprise have to be taken into consideration: business perspective, organizational structure, applications, data, and technology. Each of these elements is multidimensional and complex itself. Quality of constructed EA becomes a measurable characteristic of Agility being depended from delay time and solution accuracy.

For upcoming market challenges, companies seek for new innovative solutions that could support their business needs, and in reality proper application of Information technologies can offer them apparently newer look of business and lead to competitive advantage of the enterprise.

2 RESARCH MOTIVATION AND METHODOLOGY

Participating in a large number of consulting and educational projects in Russia, the authors face certain customer problems:

- Impossibility to reflect changes of requirements rendered to business (compliance) in terms of information system;
- Fear of losing control over the information systems while optimization;
- Impossibility to optimize organizational structure without gap in productivity and operability of business structure;
- High dependence on specific person at a certain place;
- Threat of financial risk with changes or modernization of information systems.

The primary motivation for this research was to show the systemic nature of these problems and provide strategic look to the managers' attitude, readiness and ability to implement changes in organization, management and IT practices. We aimed to keep the enterprise architecture consistent with the external and internal challenges using the advanced EA approach. Finally our motivation was in connecting the academic theoretical view on business architecture with actual demands of business (practical view).

In preview of further literature review it's essential to express the key-pipeline of the EA development.

First step consists in business goal content analysis, up-to the form of clearly structured business target horizon, these results were obtained in earlier works during experiments with content extraction from current information flows (a prototype of workflow), (Gromoff et al. 2005). Next is a process of generation required BPs dedicated to the particular low-end targets from a collection-set of referenced best-practice processes. Up-to-date this collection consists from more than 15 000 valued referenced process able to satisfy most intrinsic targets and concentrated mainly in several consultancy bases. Being removed to the social access through clouds with certain price reduction it could be a good basis for certain structural approaches for automated business architecture generation.

2.1 Literature Review

In the context of this research, the theoretical foundation will be set in a form result of literature review research in order to gather opinions from scientific domain about current Enterprise Architecture benefits in terms of flexibility, its current issues and problems. We concentrated on pitfalls of running of Enterprise Architectures and potential issues that could emerge from ill-practicing of EA.

Regarding the critique and pitfalls of EA, the number of related aspects was found during literature review. Very often in the literature, EA is criticized for:

- The lack or even absence of stakeholders/business group's involvement caused by rigidity of inner business processes and predetermined nature of organization (Van Diepen, 2000), (Jonkers H. et al, 2003), (Lange et al., 2011), (Timmers, 1999);
- Poor alignment of IT and Business domains in the organizations that result in emergence of challenges to align Business strategy with IT strategy (Brown et al., 2005) and to implement effectively strategic change in terms of business agility and time to market (Radeke, 2011);
- Lacking communication between enterprise domains (Timmers, 1999), what is happening in running EA's domain architectures in concordance of business, IT, organization, and technology (Kluge et al, 2006), (Radeke, 2011);
- Cultural aspects (Hofstede,1991) such as, for instance, organization and political problems are not properly addressed by the running EAs (Lange et al., 2011);
- Lack of solid concepts of EA addressing complexity and maintenance (Timmers, 1999).

Following these issues many papers raise a concern related to the lack of value in Enterprise Architecture concepts and tools in the current state of things (Brown et al., 2005), (Lankhorst, 2004), (Osvalds, 2008), (Saha, 2006).

As a consequence to mitigate aforementioned problems several attempts by the researches were made. We mention in this context:

- research of Saha (2006) to create common understanding of Enterprise Architecture;
- attempt to adjust the concept of EA to practical application and to enable interoperability among various business functions in the organization (Dietz and Hoogervorst, 2011);
- its post-implementation benefits and agility (Radeke, 2011).

Having outlined the most important aspects regarding Enterprise Architecture pitfalls and

proposed solutions from academics, we note that this sound theoretical base from the academic sources provides beneficial insights into the current state of the Enterprise Architecture body of knowledge.

2.2 Five Paradigms of Business Model Development

Providing strategic outlook to the critical challenges faced by organizations in their quest for business value in today's rapidly changing, technology-enabled environment, we seek for solution in combinations of several "building blocks" with existing understanding of enterprise architecture (EA) requirements, to create EA that could be transformed according to business requirements much quicker.

In order to overcome lack of flexibility and adaptability or enterprises, authors attract the attention to the following paradigms appeared in IT the recent years:

- BSM, Business Service Management (Rosemann, 2009);
- BPM, namely, business process management (Scheer and Nuttgens, 2000);
- S-BPM, subject-oriented business process management (Fleischmann, 2010);
- BPO, namely Business Process Outsourcing (Nellis and Parker, 2006);
- ICS, I-Cloud Services (Gartner, 2009).

Both scholars and practitioners have rarely attempted to estimate the influence combining all the paradigms in frames of Enterprise Architecture. First of all, it has happened due to different scientific schools approaches and due to various views on running processes.

Business Service Management deals with strategic managerial decisions for an enterprise, e. g: "make or buy". In BPM knowledge area the question of process modeling and optimization arises. S-BPM as cutting-edge derivative from BPM (Fleischmann, 2010) puts the emphasize on post-industrial economy knowledge workers, that allows them to describe and execute processes jointly without top-down directives and thump-up methods. Business process outsourcing deals with near shoring/offshoring of secondary business functions and processes. Finally the I-Cloud Services makes number of new business models possible that have to be flexible in order to respond quickly to changing circumstances and to adapt the business model, if necessary (Boh and Yellin, 2007).

3 MODERN ERA OF ENTERPRISE ARCHITECTURE

In classical view of enterprise architecture model we see three areas of possible innovation: business service design (1), business service outsourcing (2) and service-oriented architecture (SOA) (3).

3.1 Business Services Design

Classic Business Architects create blueprints (widely known as business concepts) that represent the business executives and managers viewpoints. Respectively, this provides the basis for more detailed designs and other organizational planning. Information, Application, Security & Privacy, Policy & Rules and Technology Architectures each contribute to the design of required IT solutions associated with organizational change. The design is focused on business process modeling and management. Throughout the design process, architects help conveying possible innovation opportunities arising from the world of technology and how these opportunities contribute to business objectives. The primary design provides an overall definition of major business domains. The choices made are extrapolated consistently into design based on general organizational principles and on the lower-level strategy statements.

Considering enterprise - system of business processes as a self-adjusting system which is flexibly reacting to environmental changes, Sheer (2011) carried out top-down system management that imposed serious restrictions on decomposition level with compliance preservation of processes models and real situation in business design. But when the basic design is developed on the basis of the top-level strategy statements only we neglect the proficiency of employees that execute the processes and have deeper technological engagement than their managers in process optimization of their working environment. Since business subjects are in charge of responding to changing conditions they should be distinguished from ordinary (routine) business resources by their internal motivation to reach business objectives and ability to have coherent views with running business aims and, indeed, as main feature, professionally gained skills based on accumulated experience of the socialized business group of subjects.

Fleischmann's approach to business processes management known as subject-oriented approach (S-BPM) successfully adds its value here. Based on performers' self-organization while formulated

task accomplishment, it reflects the real executive mechanism within almost any human activity accordingly. However, picked up separately from other approaches, it does not allow to create bandage between strategy and processes of organization and to achieve global optimization.

Except the strategic top-down target decomposition, we assigned business activities to various domains and the elements required completing the responsibility for the domain using bottom-up S-BPM approach (Gromoff and Stavenko, 2011). S-BPM describes processes and rearranges models immediately, imitates execution of process models in order to achieve synergy by comparing models with the colleagues using general creative potential and dynamically connect external, new intellectual resources and / or processes performed by external.

3.2 Business Service Outsourcing

Business Service Management approach as it provided by Australian research team lead by Rosemann (2009) provides the opportunity elaborates on outsourcing. Intended for the management of corporate IT assets, this approach provides a roadmap for isolation of business services and integration of the services into a pyramid of strategic requirements. Nowadays, management technologies realizing such approach are in formation stage. As prototypes of such outsourcing technologies, we could mention: biological organization of business and creation of financially independent divisions, which were extended in the late nineties – the beginning of the 2000th.

Researches claim that the outsourcing models will be flexible in order to respond quickly to changing circumstances and to adapt the business model if necessary (Boh and Yellin, 2007). Cloud services via Internet make number of new business models possible (Gromoff and Kozhevnikov, 2011), that gives extra outsourcing possibilities. By storing services using cloud computing, it is possible for enterprise customers or inner clients to exploit the service twice (or more as long as it is required) in various orchestrated combinations in real-time for minimum time. While using cloud computing it is possible to provide the response to executives about project deadlines, implementation of a new product or service for minimum time. The model of application of cloud computing to business function, e.g. cloud outsourcing of a business function could bring fruitful results in the future (Gromoff, Stavenko, 2011).

3.3 Service-Oriented Architecture 2.0

Any business function may be realized as a set of services in the private corporate IT infrastructure and in Cloud environment of the technologic service-oriented architecture (SOA) of information systems. SOA of 1990s itself was agile enough in comparison with other IT Architecture structures but the standardized set of services reacted to changing business preferences with a severe time lag (time needed to plan, estimate and launch an internal IT-Project for adding new service or changing the existing one). Now, when the vitality of business is accelerated each year with e-solutions and global marketing, the speed of reacting on changing client demand is crucial. Here ICS Solutions combined with freelance outsourcing gives real chance to following latest trend completely. I-Cloud offered by Gartner Company (Gartner, 2009) represents the generalization of service-oriented architecture for cross-corporate applications case. It allows technologically independent implementation of functions realization both inside company and out of it. Being the technological tool, I-Cloud allows allocating and realization of functionality decomposition up to each expert (or a functional role).

The technology of services choreography in service-oriented architecture is well studied. The most popular BPMN 2.0 standard realized in Software AG product "WebMethods", inherited together with the acquired ARIS product all range of BPM possibilities, contains full set of functionality necessary for both: early (orchestration), and for late (choreography) services linkage in uniform process. Here we applied Metasonic S-BPM Suite to involve the process participants in process of gathering fresh data collected in real-time for new compositional services.

From these considerations we obtain two modifications of classical Information Service-Oriented Architecture (SOA) with effect of synergy:

1. Firstly, reformations of executive activities with the S-BPM approach, thus, transformation from rigid process structure into Subject-orientated Business Process moderation due to market excellence requirement. This transformation is organically realized in S-BPM paradigm by lowest level of process executives in ad-hoc mode, moderated by senior expert responsible for goal achievement. In this case, the real orchestration of real-time market requirements is developed.

2. Secondly, while monitoring the process of moderation, we extract repetitive or long lasting fragments of the processes and fix them in the clouds for further usage. Thereby, a set of extremely required services is obtained and immediately become valid for exploitation.

Developers of these compositional services should be provided with certain environment where the convenient mechanism of services storage and retrieval and also the mechanism of receiving money for these services will be developed. The client subscriptions mechanism on service will solve another problem - sales of the same service to several customers. In the offered Services–store (S-store), each customer can leave the request for creation of wanted service. Virtual SOA torrent indexes services that have an intellectual property risk and provide it to the interested users.

The business case of S-store seems to us as follows: a company reconstructing its business processes with orientation on S-BPM is able to design certain Enterpriser Service Bus (ESB) where arrive cloud services which were bought in S-store as inputs. For instance, automating the HR function in the company an enterprise architect chooses in S-Store services from main vendors: SAP, ORACLE, etc. After having bought the service, it is connected to the tire and gets ready for exploitation. Thereby, service is stored in a cloud and supported by a vender. When standard service customization is necessary, an inquiry is created online and exterior developers (e.g. integration companies, freelancers) customize this service in order to fulfil business needs of concrete organization.

4 REAL-TIME BUSINESS ARCHITECTURE

Combining the areas of possible innovation and existing understanding of Enterprise Architecture requirements, we anticipate movement of EA to Real-time Business Architecture (RBA) that becomes more flat and market adaptive and could quicker be transformed according to business requirements.

The new architecture contains on the one hand the pseudo-constant – static component provided by BPM and services corresponding to them in BSM; and on the other hand the variable component - dynamic component representing system of activity which is always in process of constant changes and improvement, described as system of business processes, projects and the objectives.

Another feature of these transformations is increased business mobility. This feature became real not only because of created and used 'tangible' services but also because of 'intangible' ones, so called 'intellectual assets'. While solution of the known task is developed by known, fixed and established process, the new solution search of a problem or unknown task is provided by this intellectual asset constrained on a platform of search-based applications (SBA). Therefore, instant intellectual support is provided to modern business architecture "just-in-time". It will allow expanding, and subsequently – dissolving organization borders (see Figure 1).

The suggested approach to formation of real-time architecture allows merger of listed achievements in the uniform mechanism which can work within the limits of traditional enterprise, providing high level of flexibility and tune-ability of business, and in cross-country and over corporate communities frameworks, such, as crowd sourcing projects (instead of traditional organizations) which are gradually taking place in new knowledge economics.
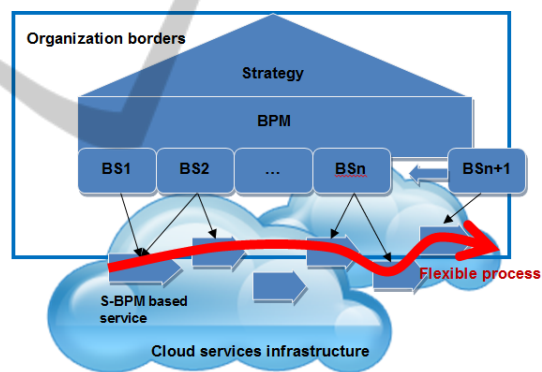

Figure 1: Model of Real-time business architecture.

5 CONCLUSIONS

The carried out research presented in this work shows the extended possibilities of *Real-time Business Architecture* (Gromoff et al., 2012) in order to support the modern environmental and business/technology challenges and explains the concept of its implementation. Provided approach reforms market from classical market-of-advertisement-use into market-of-value-use, because of business accessibility since its transparent and reflective nature representing core feature of S-BPM approach. Launching new free services market it responds to global trend of moving from static

hierarchies (vertical structures) to flexible electronically built markets. On this way it is necessary to solve number of serious problems as technical (safety and productivity at flexible interaction of services), and organizational and administrative character (assessment of quality of competing services and qualification of related performers, ensuring risks control in self-organizing environment, ensuring quality in the subject-oriented paradigm of management).

The further approaches and results of these studies may be used afterwards for improvement the processing and transferring of the complicated unstructured information content within the Enterprise 2.0, joined ventures or modern vertical integrated organization.

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