

# Newer Approach to Create Flexible Business Architecture of Modern Enterprise

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**Abstract** *In this study we analyze co-adoption of several modern concepts of enterprise architecture creation and describe real-time business processes generation on global cloud-based self-generated business service basis to increase the agility of enterprise. We simulated the process of generating the business model started by particular business request with the support of subject-oriented business process management approach that results in particular business process architecture, which is approved or rejected/corrected by board of directors and architectural committee of the enterprise. During that generation all necessary requirements for supporting resources, such as information, know-how, intellectual and professional skills, inputs and outputs, quality and operational risk limitations, moderation, control and monitoring, are formed. On a next twist of the development all formed requirements are to be satisfied by appropriate selections from the cloud facilities and again approved. Finally after several iterations business model will be created in reality and could be executed with predicted results. Briefly that*

*means that certain sets of valued and weighted business process replicas are located in Clouds. In addition to that, in this article we have provided the advanced view on the topic with attempt to install a virtual SOA torrent that catches services from the Internet and makes them available to customers and represents a business service basis for real-time business processes.*

**Keywords** Business architecture · Business flexibility · Enterprise architecture (EA) · Subject-oriented business process management (S-BPM) · SOA · Real-time business architecture (RBA) · Cloud computing

## 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 Chief Executive Officers (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

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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 are 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.

### Research Motivation and Methodology

Participating in large number of consulting and educational projects in Russia, the authors face real problems of customers, among which are:

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

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 EA 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).

Main research method for data gathering was deductive trend search using literature review for theoretical foundation and collected empirical results for practical perspective.

Literature review was completed through keyword search in top-cited IS journals and indexed e-Sources: SCOPUS, Emerald, ScienceDirect, blogs of practitioners. The relevance of the journal is based on the publication of the Senior Scholars Consortium, referred to as "Basket of 8" (Table 1). The journals are listed in the table below. Classification is done in the following way:

- *Sources* it is the name of the reviewed journal.
- *Search words* it represents the keywords used in the search query.
- *Hits* it is the number of results as reported by the query engine.
- *Reviewed* it is the number of papers reviewed. The selection process was based on a reading the abstract.

Additional resources were investigated and analyzed for the appropriate content. The results of the extra search are presented in Table 2.

Empirical results we collected using analytical survey of enterprises top-management. The majority of the enterprises available for the research are Russian medium scale companies (100–1,000 employees) and large scale businesses in the different industries of production and services. We received the answers from one or several managers of business units (primarily—the top management). Since the total of 65 respondents from 51 business units of 20 groups of companies isn't statistically representative sampling, it's enough to demonstrate the major EA problems and trends.

The survey questions are arranged in 5 groups, each group addressed some aspect of EA or management paradigm.

Each group detailed in 3–8 close questions with the diapason of answers from 0 (no information or does not exist) to 5 (strong positive) (Table 3). The first group is designed to be internally divided to 2 or more architectural layers according to selected approach. Full results of this survey are available in specialized publication (Gromoff et al. 2012).

### 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 EA benefits in terms of flexibility, its current issues and problems. We concentrated on pitfalls of running of EAs 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:

**Table 1** List of IS magazines used for research

Sources	Keywords	Hits	Reviewed
European Journal of Information Systems	Enterprise	22	2
	Architect	9	3
	Enterprise Architecture	1	1
Information Systems Journal	Enterprise	9	0
	Architect	3	1
	Enterprise Architecture	0	0
Information Systems Research	Enterprise	3	1
	Architect	4	1
	Enterprise Architecture	0	0
Journal of Information Technology	Enterprise	15	2
	Architect	4	0
	Enterprise Architecture	0	0
Journal of Management Information Systems	Enterprise	7	1
	Architect	7	2
	Enterprise Architecture	1	1
Journal of Strategic Information Systems	Enterprise	10	1
	Architect	1	1
	Enterprise Architecture	0	0
Journal of the Association for Information Systems	Enterprise	4	0
	Architect	1	1
	Enterprise Architecture	0	0
MIS Quarterly	Enterprise	10	2
	Architect	2	1
	Enterprise Architecture	1	1

**Table 2** List of other sources used for research

Database	Search words	Hits	Reviewed
Microsoft Academic	Enterprise architecture	14,029	/
	TOGAF	154	51
	Enterprise architecture critique	46	37
	Enterprise architecture framework	5,248	/
	Enterprise architecture overview	860	~ 100
Google Scholar	Enterprise architecture	3,440	/
	TOGAF	87	23
	Enterprise architecture critique	0	0
	Enterprise architecture framework	265	19
	Enterprise architecture overview	29	21
Scirus	Enterprise architecture	3,108	/
	TOGAF	75	19
	Enterprise architecture critique	0	0
	Enterprise architecture framework	118	15
	Enterprise architecture overview	11	11

- 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 et al. 2003; 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 and to implement effectively strategic change in terms of business agility and time to market (Radeke 2011);



**Table 3** Survey content

Question	Group/response
G1: Are you satisfied with speed of changes of models which are included in enterprise architecture?	G1R1: Mission and vision G1R2: Strategic objectives and program G1R3: Organizational structure G1R4: Enterprise functions G1R5: Enterprise processes G1R6: Data which is used in enterprise activity G1R7: Composition and relationship of information systems business support G1R8: Functionality and features of information systems
G2: Is up-to-date business process model for managerial decision-making used in your company?	G2R1: Top-level processes G2R2: Mid-level processes (to departments level) G2R3: Detailed processes (to performers level)
G3: Do you attract employees to the description of their activity?	G3R1: While strategy and objectives development G3R2: While describing top-level processes G3R3: While describing processes of departments level G3R4: While describing detailed processes implemented in information system G3R5: To maintain constant relevance of detailed processes
G4: Do you use any forms of internal self-determination?	G4R1: Piecework jobs G4R2: Creative groups G4R3: Contract basis G4R4: Financial responsibility center G4R5: Outsourcing G4R6: Crowdsourcing
G5: Whether the usage of business-service architecture is essential for your business model?	G5R1: Technical level (service-oriented architecture of information system) G5R2: Information level (contracts for information services provision to contracts) G5R3: Intra-corporate level (regulated entities interaction as mutual formalized services) G5R4: Structural level (the whole activity of the company, including inside subdivisions split into separate related services) G5R5: The network layer (processes are implemented as network of mutual services flexibly configurable with ability to go beyond the borders of the company)

- 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;
- 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 EA concepts and tools in the current state of things (Lankhorst 2004; Saha 2006).

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

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

Having outlined the most important aspects regarding EA 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 EA body of knowledge. However, for further exploration and elaboration on topic we made a practical analytical survey to take data from practitioners.

## Analytical Survey

To complement the theoretical foundation of the literature review, an empirical analysis was performed to set an agenda for the further research for the paper. We analyzed the Russian market of EA during a survey (Gromoff et al. 2012).

Analyzing the results we note that from the systematical view the companies are hampered in their response to changes in the environment due to existence of static organizational structures. It proves the results of Van Diepen (2000) research who insisted on substantial level of redundancy and rigidity of the internal processes in many organizations. This is the reason why being unable to meet customer demands quickly, coordinate processes and offer the necessary transparency, companies seek the *optimal processes redesign* (Hammer and Champy 1993). Therefore, it should be noted, that declared agility of business processes declared by managerial reports happened to be rather marketing trick than effective method of realization.

On the other hand we state, that attempts to follow standards of decade freshness and bind them with thumbs-up best practice approaches from world-known big consultancy companies have led in Russia to extremely expensive solutions overloaded with unnecessary components and links between unexecuted functions. The attempts to universalize functions of ISs lead to enormous growth of overhead charges during technical implementation of service-oriented decisions. Furthermore, workplaces remain rigidly functionally determined, this neutralizes positive effect of open service architecture conversely. As a result relatively low level of satisfaction with the architectural agility and low return on investments for IT for the majority of companies in our research was registered.

We found out also that the level of maturity of the architectural processes in IT aspects and business aspects (described as the ability of the architectural team to keep the architecture up-to-date with the changes in the business) are dependent in the large companies. So where the application of EA methods seems mostly beneficial, managers however show low satisfaction of change management possibilities (from mode to average degree) (Fig. 1).

At the analysis stage we have aggregated the answers to the level of groups of companies. During that we calculated the dispersion in the answers of employees of the company as a measure of overall architectural maturity of the group (Fig. 2).

However combining the aforementioned results, esp. dependence of architectural processes maturity level in IT aspects and in business aspects in the large companies and finally manager's perception of IT maturity importance we state that top-management in Russia are motivated enough to proceed with architectural changes and will encourage efforts that add flexibility in their running EAs.

## Five Paradigms of Business Model Development

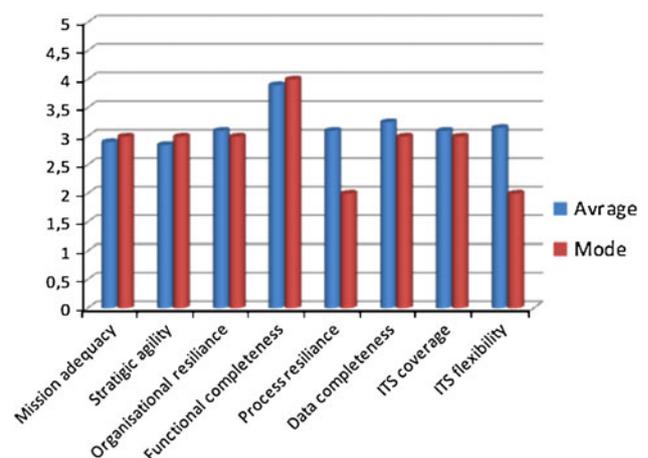
Providing strategic outlook to the critical challenges faced by organizations in their quest for business value in today's rapidly changing, technology-enabled environment, we seek for solution in combinations of several "building blocks" with existing understanding of EA requirements, to create EA that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

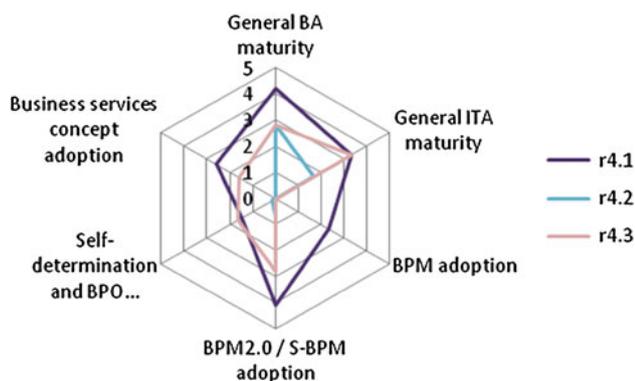
Both scholars and practitioners have rarely attempted to estimate the influence combining all the paradigms in frames of EA. First of all, it has happened due to different scientific schools approaches and due to various views on running processes.

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/



**Fig. 1** Level of satisfaction of managers with the architectural flexibility in 8 perspectives





**Fig. 2** The difference in the manager's perception of the architecture maturity of the group of service companies,  $\sigma = 10.8$

offshoring of secondary business functions and processes. Finally the ICS 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).

Our research has shown that still no group of respondents has adopted all the approaches completely, but the average adoption of the paradigms is unexpectedly high.

### Modern Era of EA

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

#### *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 and privacy, policy and 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.

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 subjects.

#### *Business Service Outsourcing*

Business Service Management approach as it provided by Australian research team lead by Rosemann (2009) provides the opportunity elaborate 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 90s—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, 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 and Stavenko 2011).

### *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 SOA of ISs. 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 represents the generalization of SOA 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 SOA 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 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.

Hence, 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 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 fulfill business needs of concrete organization.

### **Real-Time Business Architecture (RBA)**

Combining the areas of possible innovation and existing understanding of EA requirements, we anticipate movement of EA to 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 Fig. 3).

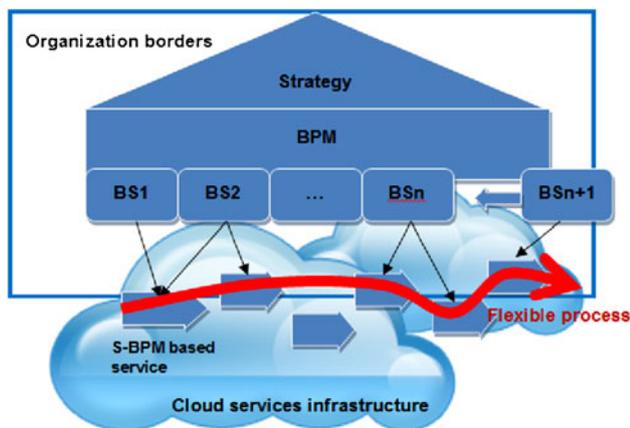
The suggested approach to formation of real-time architecture allows merger of listed achievements in the uniform mechanism which can work within the limits of traditional enterprise, providing high level of flexibility and tunability of business, and in cross-country and over corporate communities frameworks,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

### Synthesis

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.

The provided approach to realization of architecture has certain benefits of the social impact. It gives real freedom to the mass of employees in their intellectual potential realization, as well free time from the operations with ‘wait’ functions.

Provided approach also 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 electronic markets.



**Fig. 3** Structure of Real-time business architecture

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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### Key Questions

1. What are the main pitfalls of nowadays Enterprise Architecture?
2. What are the paradigms that could be used for EA improvement?
3. How the concept of EA flexibility could be realized?
4. How the enterprise architecture can look like?

### Author Biographies



**Alexander Gromoff** educated in Moscow Physical-Engineering Institute; PhD has proved in Moscow State University in 1983; later worked as system analyst in different branches and from 1993 has focused on business process analysis. Established successful consultancy firm “Convera” in the fields of ECM and BPM project management. In 2005 was invited in National

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**Nikolay Kazantsev** is a practical oriented researcher and IT consultant from Moscow. His speciality covers broad scope of information management topics, esp. connection between management and IT practices. Having graduated from National Research University Higher School of Economics (Russia) and University of Muenster (Germany) he makes a bridge between german optimization competences and business reality in Russia. His endeavour is business processes optimization for maximizing competitiveness of Russian companies.



**Dmitry Kozhevnikov** is researcher and consultant possessing wide experience in different consultancy fields and also in IT management, team management, running an enterprise, and crisis management. With more than 25 years of practice Dmitry has participated in the numerous projects, including material supply control system for Gazprom and energy balancing system for the Russian National Utilities Company. As a researcher Dmitry is working on the Enterprise and Business architecture issues for the modern organizational approaches, such as subject-oriented management, case-based management, Enterprise 2.0 and Grid organizations. Dmitry is an author of more than 20 publications.



**Mikhail Ponfilenok** is researcher and lecturer in Russian university—Higher School of Economics. Mikhail has work experience in global companies such as IBM and KPMG and more than 4 years of experience in IT consulting (area: IT strategies, IT governance, high-level business and IT architecture, Project management, ECM Strategy). As a researcher and lecturer Mikhail is working on the Enterprise architecture, Project management and Innovation management issues.



**Yuila Stavenko** is a researcher of National Research University Higher School of Economics (Moscow, Russia). After graduating from Murmansk economic Lyceum, I entered Moscow State Tech University STANKIN and obtained my Bachelor’s Degree in Information Technology, with an excellent grade in my specialization of Information Systems and Networks. Besides my university studies I successfully passed Microsoft courses of Programming and SQL. I decided to continue my education by acquiring a Master’s degree in Business Information. During my studies I learnt basic principles of information systems, programming and Computer-Aided Software Engineering, which inspired and convinced me of the right choice of future profession. Then I found a job as a system analyst in one of the Information Business Systems holding companies that gave me an opportunity to apply my knowledge in real life. Now I am driving away at the projects for automated business process systems. During my work I realized the ability of IT to increase effectiveness and efficiency of business through alignment between business strategy and IT architecture. So it’s very important to choose the optimal approach for achieving business goals by using IT. Correct IT strategy, process management and sense-and-respond model direct all positive changes and influence extremely on maximizing company’s profit. That is why I decided that my career and scientific research should be related to Business Analysis. I understand that IT leverages positive changes in business processes, because companies start to manage their processes in another manner. But this idea should be shown to stakeholders as explanation of IT investment (Value-for-Money principle).