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Next Wave in Business Architecture Design

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Abstract

Nowadays there is a variety of views on future business architecture design. Influenced by the rapid development of IT concepts it is still trapped by the traditions and lack of corporate managementresilience. On the other hand, the necessity of transformation is already here, forcing companies to overcome corporate borders and early adopting innovations in IT, as well as in managerial practice. The key to understanding the new wave of architecture lays in a combination of approaches and getting out of concept layer. In this study we analyze co-adoption of several modern concepts of the new enterprise architecture creation- real-time business processes generation on the global cloud-based self-generated business service basis. The feedback loop makes business processes as visible for corrections as locally efficient. The architecture itself takes a responsibility for the global efficiency.

Keywords: *Enterprise architecture (EA), Real-time Business Architecture (RBA),Subject-oriented Business Process Management (S-BPM), Service-oriented Architecture (SOA).*

Introduction

According to strategic management theory CEOs are focused on revenue growth as means of creating value to shareholders. The technical aspect is normally out of consideration at this level, but management and financial aspects gets a priority. From this point of view, in order to maintain the layer correspondence the system management approach is used, which based on organizational structure design, functions and processes, as parts of Business Architecture.

Although the term “Business Architecture” is used in numerous publications, it is still not defined unambiguously since there are few case studies of Enterprise Architecture available (Versteeg and Bouwman, 2006). The “Enterprise Architecture” concept plays fundamental role in organization development. The concept is used as well as in information management theories within modeling approaches (IEEE 1471, ISO 15704) or classification frameworks (Zachman, 1987, TOGAF ADM), or used in practice by consultancy organizations (IBM, Ernst and Young) to manage correspondence between the strategic-level enterprise aims to IT solutions. That is why in the most general classification the Enterprise Architecture is linked to informatics area.

First of all, the basic definitions will be made clear. Majority of notions usedin current researchwill be derived from (Hoogervorst, 2002).

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- *Business architecture* can be defined as "a logically consistent set of principles and standards that guides how a particular field of (commercial) endeavour will be exploited and explored*".*
- *Organizational architecture* can be defined as "a logically consistent set of principles and standards that guides how the purposeful activities within a particular field of (commercial) endeavour are actually organized".
- *Information Architecture* is "a logically consistent set of principles and standards that guide how information is to be managed*".*
- *Enterprise* as well as *Business Architecture* uses a *layering strategy* to separate the essential complexity of business from the accidental complexity of the enabling technology.
- *And finally we suggest that modern business architecture is a current frame of operations, being realized as reflectivity process by self-organized groups of business subjects (Gromoff, 2010). Business subject should be distinguished from ordinary (routine) business resources by their internal motivation to reach business goals and ability to have coherent with running business aims, and indeed, as a main feature, professionally gain skills, based on accumulated experience of the socialized business group of subjects.*

Traditional top-down approach to the Enterprise Architecture development involves four conceptual architectural layers: business concepts, organizational architecture, information architecture and technology architecture). Some approaches describe the conceptual layers differently: 3 layers (business architecture (BA), organizational architecture (OA) and IT architecture (ITA) (Hoogervorst, 2002)) or even 2 layers – BA and ITA (Versteeg and Bouwman, 2006). Each concept encapsulates various domains with sub-architecture's layers, where the importance of coherence and consistency plays the leading role. On the other hand, the visibility of the layers differs greatly depending of the viewpoint, so as general management rarely can look into technology or even information layer, and the IT specialist is quite far from business concept. Current study is intended to provide an outlook to the adoption of modern concepts on the different architectural level and provide a new approach to combine these approaches across the layers to obtain much more flexible management instrument.

Research Motivation and Methodology

Participating in large number of consulting and educational projects, authors face real problems of customers, among which: impossibility to reflect changes of requirements rendered to business (compliance)in information systems; fear to lose control over the information systems while the processes optimization; impossibility to optimize organizational structure without gap in productivity and operability of business structures; high dependence on specific person on a certain place; high financial risk with changes or modernization of information systems.

The authors of the article decided to test the situation in more formal way in order to prove the systemic nature of these problems. The primary motivation for this research was to provide strategic look to the managers' attitude, readiness and ability to implement changes in organization and management practices and in IT to keep the enterprise consistent with the external and internal challenges. Finally, on top of the analysis of collected data we are researching the possibility and nature of the new EA paradigm.

In frames of our methodological platform we did a number of surveys to cover the bride scope of various IT- cases in Russian enterprises. The results are shown in graphical form in the main part of the paper.

Research Conditions

The majority of the enterprises available for the research are Russian medium scale companies(100 to 1000 employees) and large scalebusinesses 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:

G1: *Are you satisfied with speed of changes of models which are included in enterprise architecture?*

G2: *Is up-to-date business process model for managerial decision-making used in your company?*

G3: *Do you attract employees to the description of their activity?*

G4: *Do you use any forms of internal self-determination?*

G5: *Whether the usage of business-service architecture is essential for your business model?*

Each group detailed in 3-8 close questions with thediapason of answers from 0 (no information or does not exist) to 5 (strong positive)

The first group is designed to be internally divided to 2 or more architectural layers according to selected approach.

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 (Figure 1).

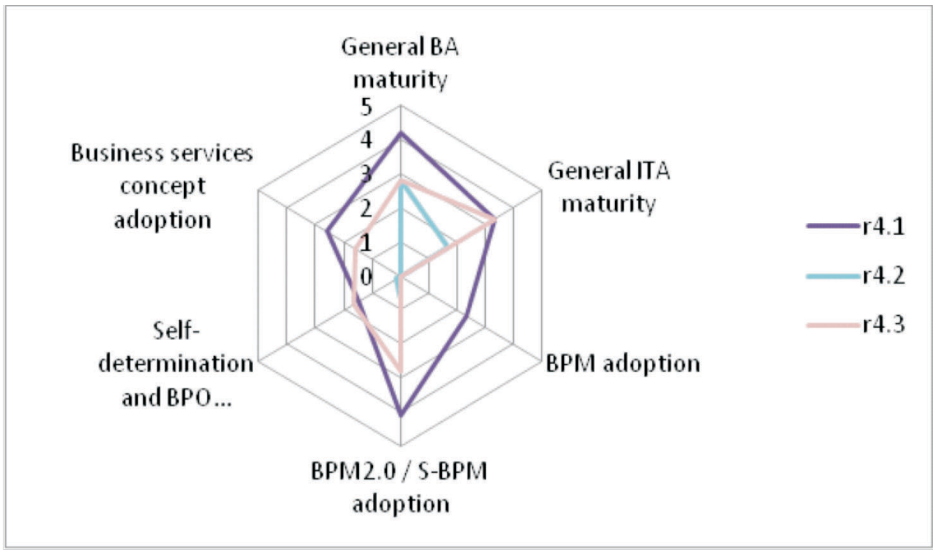

Figure 1: The Difference in the Manager's Perception of the Architecture Maturity of the Group of Service Companies, ó=10.8

Research scope

In our survey we have challenged the alignment between BA and ITA in the perception of *managers*.

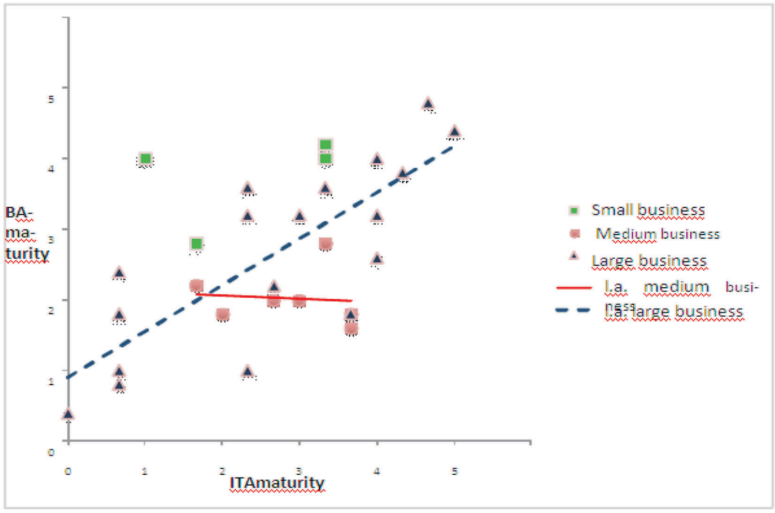

Figure 2: Dependence between BA and ITA Processes Maturity in Companies of Different Size

We found out 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. At the same time we registered low dependence between ITA and BA processes in small and medium businesses.

The problem of Enterprise Architecture implementation can be expressed by two major factors. First of all it, should be mentioned, that companies are hampered in their response to changes in the environment due to existence of static organizational structures. Van Diepen (2000) also insists 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 happened to be rather marketing trick than effective method of realization. Well described and logically proven (Scheer, 2000) it practically has never been properly implemented mainly due to lack of sufficient flexibility in actual business processes designed top-down and its rigid structures.

On the other hand, attempts to follow standards of decade freshness and binding them with clouds computing have lead to extremely expensive solutions overloaded with unnecessary components and links between unexecuted functions. More importantly, attempts to universalize functions of information systems 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 is registered for the majority of companies in our research.

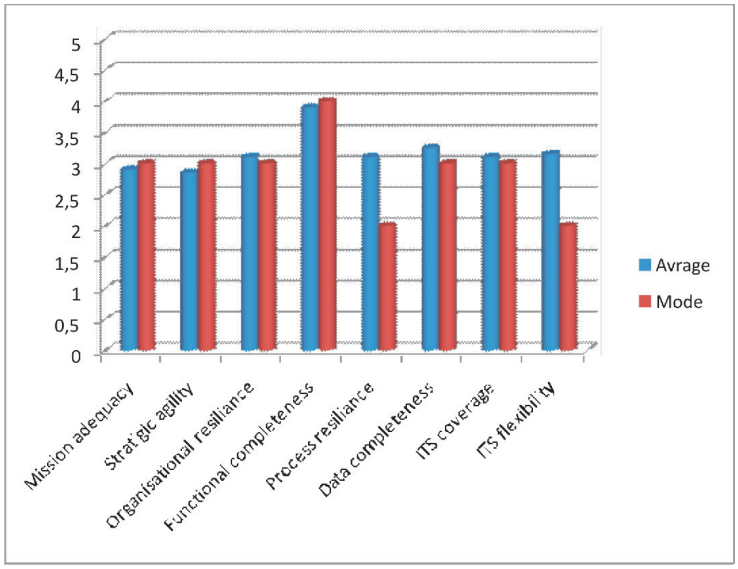

Figure 3: Level of Satisfaction of Managers with the Architectural Flexibility

Appearance of New Paradigms

In order to overcome lack of flexibility and adaptability increasing companies' response to changing market circumstances, attention to cutting edge paradigms is being attracted:

1) BPM, namely, business process management (Sheer, 2000);
2) S-BPM, subject-oriented business process management (Fleischmann, 2010)
3) Cloud Services (Gartner)
4) Business Service Management (Michael Rosemann *et al*, 2009)
5) BPO, namely Business Process Outsourcing (IDC, 2001)

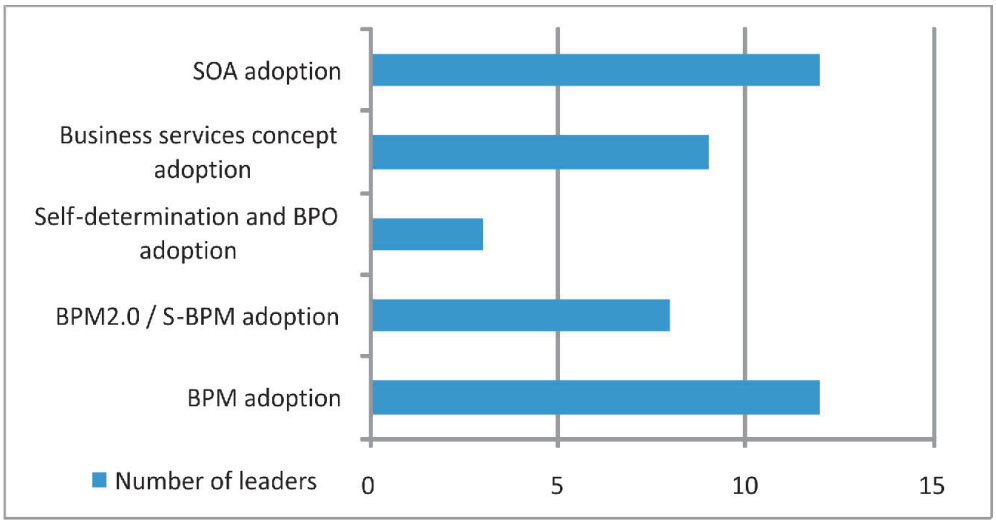

Figure 4: Number of Groups with Level of Technology Adoption Higher Than 2

Either scholars or practitioners have rarely attempted to combine all the paradigms. First of all, it has happened due to different scientific schools approaches and due to various views on running processes. In our research no group has adopted all the approaches, but the average adoption of the paradigms is unexpectedly high (Figure 5).

Classic Business Architects create blueprints (a.k.a business concepts) that represent the business executives and managers viewpoint. 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.

Business processes management as dynamic structure was offered by Prof. A-W. Sheer in the late 90-s. Unlike approaches of Davenport and Hammer-Champi, Sheer considers system of business processes as self-adjusting system which is flexibly reactable to environmental changes. However, such system management is supposed to be carried out “top-down” that imposes serious restrictions on decomposition level with compliance preservation of processes models and real situation in business.

Fleischmann’s approach to business processes management known as subject-oriented approach (S-BPM) is based on performers’ self-organization while formulated task accomplishment, and 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.

The technology of services choreography in service-oriented architecture is known for a long time and well studied. The BPMN 2.0 standard realized in Software AG product “WebMethods”, for instance, which has inherited together with the acquired ARIS product all range of BPM possibilities, developed by A.W.Sheer, contains full set of functionality necessary for both: early (orchestration), and for late (choreography)services linkage in uniform process. Metasonic S-BPM Suite is unique product for today, completely realizing the S-BPM concept; it also supports services orchestration, and choreography. Choreography presented in the product is fully-featured (without binding to services logic). However, the case here is technical realization instead of management technology.

Nowadays, management technologies realizing such approach are in formation stage. As prototypes of such technologies outsourcing, biological organization of business and creation of financially independent divisions which were extended in the late nineties – the beginning of the 2000th can serve.

Business Service Management (BSM) approach as it provided by Australian research team lead by Michael Rosemann gives the opportunity to cover the gap. 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. Although none of the companies in our research could address BPM paradigm as a whole, its elements on the organizational level are widely presented. On the other hand, the business service may be realized as a service in the technologic service-oriented architecture (SOA) of information systems, in the private corporate IT infrastructure and in Cloud environment.

In order to build flexible SOA[1], aligned with business necessities, the S-BPM approach was chosen due to its supple nature. Since full description of business processes is strongly required the S-BPM usage will help to involve the process participants in gathering fresh data and give

competitive advantage because new compositional services will be collected in real-time.

By storing services in the Internet-based cloud it is possible for customers to exploit the service twice (or more as long as it is required) in various orchestrated combinations in real-time for minimum time. Here is meant, that while using the cloud it is possible for minimum time to provide the response to executives about project deadlines, implementation of a new product or service & etc.

Combining the mentioned paradigms with existing understanding of enterprise architecture (EA) requirements, we anticipate movement to EA to Real-time Business Architecture (RBA) that could be transformed according to business requirements quickly. There is evidence that the combination of these approaches could be positively connected to the architectural resilience.

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 basic design is developed on the basis of the top-level strategy statements. It is defined as top-down process: the most important statements have the biggest impact on design. 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 statements. The basic design, therefore, is based on the most important strategic statements. These relate to cost reduction: synergy through horizontal integration; customer centricity: synergy through sharing customer information; sharing the industry, giving third parties access to the supply chain: synergy through sharing resources within the sector; and multi-channel approaches.

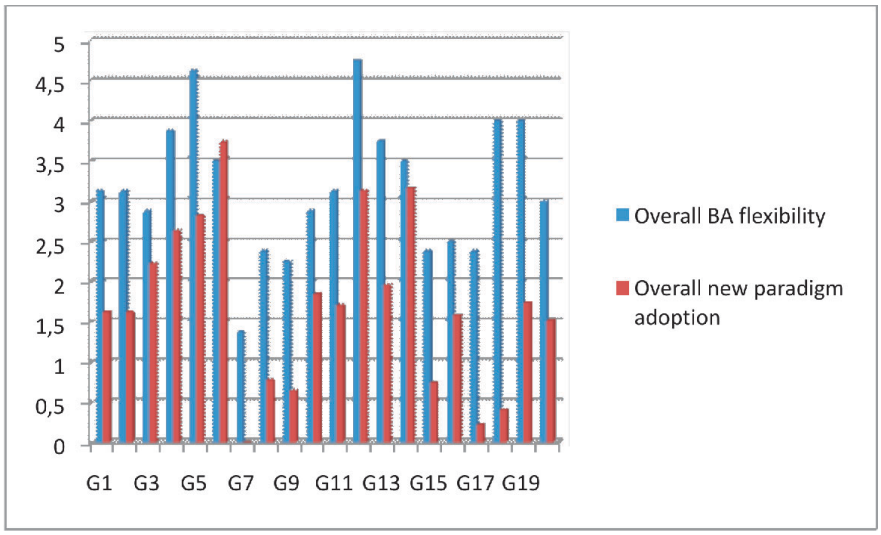

Figure 5: Correspondence between the BA Flexibility and Adoption of the Innovative Paradigms

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

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

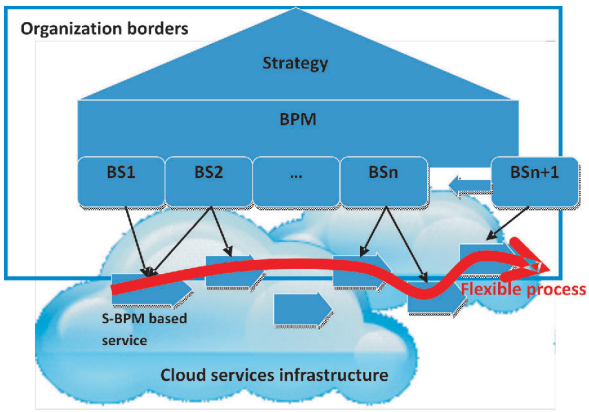

Figure 6: Structure of Real-time Buisness Architecture

high level of flexibility and tunability of business, and in cross-country and overcorporate communities frameworks, such, as crowd sourcing projects (instead of traditional organizations) which are gradually taking place in new knowledge economics. It is necessary to emphasize again that this is the question of approach to higher-level enterprise architecture design instead of technical realization.

Synthesis

The research showed that available technologies of increase in flexibility and are not demanded enough by management in Russia today, although the need for the solution for such class of problems are realized by CEO's. The reasons for this are not only and not so much in disinterest of Russian business in flexibility and efficiency increase of business, but also in lack of complex decision for thought-over concept of above-mentioned problems. The attempt was made to unite technical and management approaches in the business architecture of new type solving flexibility problem at the expense of new approach to decomposition of business, impossible several years ago when technical possibilities of service-oriented architecture were not able to allow its serious projections on managerial tasks.

From these considerations two modifications of classical Information Service-oriented Architecture (SOA) with effect of synergy has been obtained. Firstly, execution activities layer is performed 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 the expert responsible for goal achievement. In this case, the real orchestration of real-time market requirements is developed. 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. It will allow expanding, and subsequently – dissolving completely organization borders.

As a result, all architecture become more flat and market adoptive. Next feature of these transformations is business mobility and instead of today's specific granularity its acquired generality. This feature became real not only because of 'tangible' services that are created and used but also 'intangible', so called 'intellectual assets' and 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 on the fly.

Acknowledgments

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Appendix 1

Survey questions

G0: what is your company size (1 small, 2 – medium, 3 – large)

G1: Are you satisfied with speed of changes of models which are included in enterprise architecture

G1 R2: Mission and vision

G1R2: Strategic objectives and program

G1 R3: Organizational structure

G1 R4: Enterprise functions

G1 R5: Enterprise processes

G1 R6: Data which is used in enterprise activity

G1 R7: Composition and relationship of information systems business support

G1 R8: Functionality and features of information systems

G2: Is up-to-date business process model for managerial decision-making used in your company? (0 – is missing, 1 – occasionally, 2 – while business processes optimization, 3 - while making personnel decisions and monitoring state of affairs, 4 – in most of the issues, 5 – is always used by all executives for management and monitoring)

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? (0 – no, 1 – collecting and taking into consideration their opinion, 2 – involving for discussion, 3 – including in working groups, 4 – direct the development and agree on the result, 5 –fully passing to employees)

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? (0 – no, 1 – for occasional/projects work, 2 – for secondary maintaining activity, 3 – or all none-core activities, 4 – for part of main activity, 5 – for all activities except management)

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? (0 – no, I've no idea what is it, 5 – yes, it is key feature of our business)

G5R1: Technical level (service-oriented architecture of information system)

G5R2: Information level (contracts for information services provision to contractees)

G5R3: Intracorporate 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)