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THE INTEGRATION OF THE PROJECT MANAGEMENT APPROACH INTO THE BUSINESS ARCHITECTURE MODEL OF THE COMPANY

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ИНТЕГРАЦИЯ ПРОЕКТНОГО ПОДХОДА В МОДЕЛЬ БИЗНЕС-АРХИТЕКТУРЫ ПРЕДПРИЯТИЯ

The effective business management should be provided by an appropriate management system which is based on the enterprise architecture. The latter provides the achievement of the strategic goals of a company by means of business processes and projects. Many representatives of the community emphasise society confess a great role of working with changes using a project approach. However, there is still no consensus about the place of project management system within the enterprise architecture.

The model of enterprise architecture developed in the paper defines the place of project management within the enterprise architecture. *This paper aims* to develop an approach to the enterprise business-architecture formation and to propose the means of modeling its all business components.

PROJECT MANAGEMENT. PROJECT MANAGEMENT STANDARDS. BUSINESS PROCESS. ENTERPRISE ARCHITECTURE.

Эффективное управление бизнесом должно обеспечиваться соответствующей системой управления, которая находит отражение в архитектуре компании. Последняя позволяет достигать стратегических целей бизнеса посредством реализации системы бизнес-процессов и проектов. Многие представители профессионального сообщества признают важность работы с изменениями в компаниях с использованием проектного подхода, однако в настоящее время до сих пор однозначно не определено место системы управления проектами в архитектуре предприятия.

Предлагаемая в статье модель архитектуры предприятия определяет место проектов в архитектуре предприятия. *Целью статьи* является развитие подхода к формированию бизнес-архитектуры компании и предложить средство моделирования всех компонентов бизнес-архитектуры в рамках единой модели.

УПРАВЛЕНИЕ ПРОЕКТАМИ. СТАНДАРТ УПРАВЛЕНИЯ ПРОЕКТАМИ. БИЗНЕС-ПРОЦЕССЫ. АРХИТЕКТУРА КОМПАНИИ.

Research problem. Dynamically changing conditions of modern business environment make companies face changes in everyday business life. Business in our days is run in the context of open markets and increasing competition. In such circumstances, companies need to build and maintain a flexible management system that would allow the company to operate efficiently and remain competitive. The management system of the company has to ensure the achievement of its strategic goals, to provide stability of operating activities and at the same time to allow the company to adapt easily to the rapidly changing business environment. The solution of the problem requires special approaches to deal with changes, in particular, approaches to planning, monitoring, resource allocation, allocation of the roles and responsibilities while implementing changes. In these circumstances, special attention is paid to project management activities.

A *project* is traditionally defined as «a temporary organization that is created for the purpose of delivering one or more business products» [1]. The project management approach has its own characteristics:

– consideration of the project as a unique combination of processes of project implementation;

– rights and responsibility for the project results achievement shared by the project manager and the project team;

– allocation of the project budget;

– use of the special design of the project organizational structure and the specific motivation of the project participants;

− the development and application of specific standards to the project processes [2].

The project approach is used in different fields: business, social, political, cultural, etc. − in those fields where there is a need to introduce changes and to address unique challenges. In many enterprises, each customer order is considered as a separate project. Such companies are called project-oriented; their projects are large enough, financial and/or resource-intensive and unique. For such enterprises it is critically important to have a systematic approach to project implementation. Typical project-oriented businesses are from such business fields as construction, real estate development business, engineering services, IT-consulting, development and implementation of IT-solutions, manufacturing on the order basis, etc.

But projects can be aimed not only at the realization of external orders, but also at the introduction of innovative initiatives within the company. Among the projects of this type, it is worth mentioning such widely implemented types of projects as business-processes re-engineering and process approach implementation, implementation of corporate information systems and company's website development, implementation of quality management standards, forming and reforming enterprise architecture, and other projects to address specific business challenges.

Project management is an area of management, covering the areas of industrial activity in which a product or a service is implemented as a unique set of interrelated activities restricted by certain requirements for time, budget and quality of the expected results. Taking into account increasing competition, the project management plays a significant role in companies; project-based approach to running business is becoming very popular in companies, a large number of companies in various fields of activity are faced with a need to solve business problems that can not be resolved through the standard routine business processes. It causes a need for the development and implementation of project-based solutions to solve business problems, which states the necessity of introducing the project approach to the enterprise management system. However, there is still no solution for the integration of process

and project approaches so that to model and manage the business architecture effectively.

This paper aims to elaborate an approach to the enterprise business-architecture formation based on the principles of strategic, process and project management that would allow to resolve a lasting conflict between processes and projects within the management system of the company. The approach consists of a model of the business architecture that ensures interests of both process and project management and a model of project management processes that would provide a unified base for modeling process and project activities.

Methodology

Enterprise architecture − development of the concept.

So far, the term «enterprise architecture» was used mostly to define the structure of tools of IT system development and was considered to be the IT-area of knowledge. Now «enterprise architecture» is treated as a broader concept concerning the formation of the management system of a company from corporate strategic to IT hardware infrastructure − the initial definition became a part of the whole architecture concept.

The enterprise architecture traditionally means a series of different components of the management system and the relationship between them:

Corporate Enterprise Architecture is a system view of the key structural sections (certain key components and their relationships), applied to solve various practical problem of the organization [2, 3].

Enterprise Architecture is an interconnected set of principles, methods and models that are used in the design and building of organizational structure, business processes, information systems and infrastructure [4].

Enterprise Architecture is the process of translating business vision and strategy into the effective enterprise change by creating, communicating, and improving the key requirements, principles and models that describe the state of the enterprise and ensure its evolution [7].

These definitions allow us to conclude that enterprise architecture is a complex management

tool which is designed to provide effective enterprise management solutions in response to the challenges of the business environment. A heterogeneous structure of the enterprise architecture requires continuous alignment of the so called architecture layers. In the meantime, the need to follow the realities of today's business causes the need to reform and develop of enterprise architecture.

Currently, the management of many companies realizes the need for the development, formalization, and implementation of the management system, embodied in the form of a corporate enterprise architecture. The need for the implementation of projects (a system of interrelated projects) on the architectural restructuring is caused by the following reasons:

1. Absence of the precise strategy of management architecture development;

2. Absence of an integrated architecture adaptability to market conditions;

3. Discrepancy between the organizational structure and increased business demands;

4. Discrepancy between the organizational structure of companies and organizational structures of projects;

5. Absence of common corporate standards of project management;

6. Absence of precisely prescribed roles and responsibilities in the current organizational structure;

7. Absence of detailed and transparent business processes;

8. Need for the implementation of the enterprise information system [3];

9. The need for alignment of different architectural components − business architecture and system architecture.

The specific characteristic of the enterprise architecture is its heterogeneous composition. Traditionally, the components of the enterprise architecture can be represented as a set of layers comprising a set of structural components [5]:

− Corporate mission and vision, strategic goals and objectives;

− Business architecture: business processes, organizational staff structure, workflow system;

− System Architecture (IT architecture) applications, data, and hardware.

The paper [5] states: «Architecture (in accordance with the document «Federal Enterprise Architecture Framework. Dev. By: The Chief Information Officers Council (USA)») is a strategic information basis which supports the:

− structure of the business;

− information necessary to run business;

− technologies used to support business operations;

− transformation processes of development and transition necessary to implement new technologies in response to a change / the appearance of new business needs» [5].

The last point of the above list confirms that some researchers of the enterprise architecture recognize that dealing with change is the reality of today's enterprises. The enterprise architecture is a dynamic management tool, which requires a build-in mechanism for managing changes that is different from the routine operational processes. This fact, in particular, is emphasized in the enterprise architecture development approach of the TOGAF standards, known as the Architecture Development Method (ADM). This method claims, among other components, a phase named «Architecture realization», bringing together various aspects of the change activity performance related to enterprise architecture: «Architecture Realization artifacts capture change roadmaps showing transition between architecture states and binding statements that are used to steer and govern an implementation of the architecture» [6].

Hence, the need to address the unique challenges and achieve unique results determines feasibility of incorporating the project management technology into the overall management system of the company. Every modern company needs a project management as a mechanism ensuring the flexibility of and conformity with decision making in a rapidly changing business environment.

Business architecture − authors' approach. The definitions and the concepts of the resresentatives of the professional society mentioned above (for example, in [5]) prove the need to add the project viewpoint to the business architecture model. The authors propose to consider project management as one of the

subsystems of the enterprise management system which is presented in the enterprise architecture. This, updated, business architecture:

− provides a company with an effective tool to run projects;

− provides an integration between project management processes and processes of the whole company management;

− provides an effective mechanism of balancing the interests of the operating and innovation activities of the enterprise, i. e. coordination of the interests of process and project management approaches based on the unity of the strategic guidelines.

The authors propose the following development of common approaches to enterprise architecture (Fig. 1), reflecting the list of structural components of the enterprise architecture and the relationships between them. Proposed in this paper, the concept of enterprise architecture describes the structural representation of a set of inter-related and inter-determining logic levels of enterprise architecture which includes a project approach as a component of business architecture.

The structural elements of the enterprise architecture (see Fig. 1) are connected and determine each other as described below. The activity of any enterprise is focused on and determined by business objectives. Therefore, the starting point for the formation of an enterprise architecture is the definition of such categories as mission, vision, and strategy − these categories are on the top of the management pyramid (see Fig. 1). They define the desired image of the business and determine the direction of movement towards it. Mission, vision and strategy are specified by the set of strategic goals and objectives that define the key components of the desired image, and set the roadmap for business. Setting such a high level categories as mission, vision, strategy, goals and objectives is the responsibility of the owners and/or top-management of the enterprise.
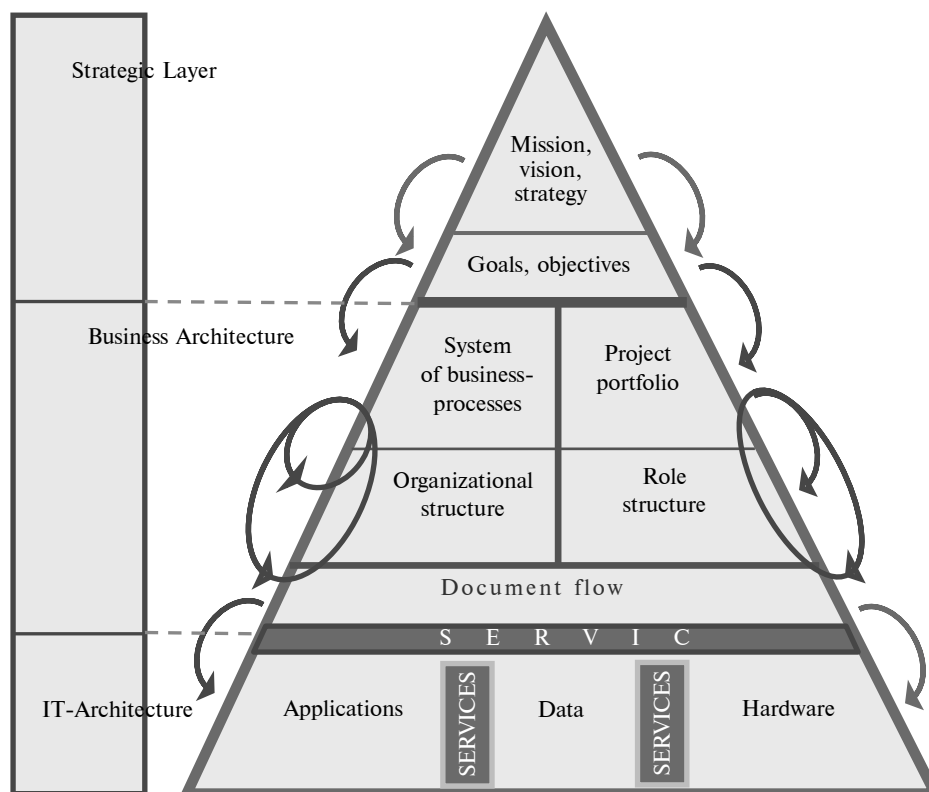

Fig. 1. Logic levels of enterprise architecture

Regardless of the specifics of a particular system, systems theory identifies two types of objectives for each system — the goals of stabilization and the goals of development. The goals of stabilization are aimed to preserve the achieved level of development and operation. The goals of development are aimed to create additional resources that the system does not have, or achieve some new states to which it aspires. It makes sense for the enterprise as a business system as well: the goals of stabilization serve to provide effective operations and stability in the present, while the goals of development are responsible for dealing with changes that allow the business to grow and be competitive in the long term. Different types of goals require different approaches to the organization of activities of their achievement: the system of business processes — to achieve the goals of stabilization, the portfolio of projects — to achieve the goals of development (see Fig. 2).

The business process is «a special process that aims at the implementation of the basic objectives of the enterprise (business objectives) and describes the central sphere of its activity» [9]. The business processes as «a stable (regularly repeated), targeted set of interrelated activities, which, according a certain technology, transforms inputs into outputs of value to the consumer (client)» [8]. The organizational structure is a stable set of interrelated and inter-subordinate organizational units to coordinate human resources of the company. «The process approach to management is a construction of a system of processes, control of these processes in order to achieve the best results by improving efficiency and customer satisfaction» [8]. In modern enterprises implementing process management involves description, regulation, and reforming of business processes system and the organizational structure, which ensures business processes performance. The purpose of the implementation of the process approach is to ensure the stability and reproducibility of the results.

Projects, as well as business processes, are aimed at creating a certain result, but, in contrast to the business processes, projects create unique results; and after achieving them, the project structure has no more reasons for existing. Despite the fact that the implementation of various projects involves the

implementation of a typical set of business processes, the managed objects, the owners and the performers of these business processes will vary from project to project. That is why, the implementation of each project requires a clear framework of roles and responsibilities — the so called role structure, roles being performed by different individuals in different projects. The purpose of the implementation of the project approach is to provide effective solutions to the unique challenges, which occur in the company due to the need to respond to changes in the business environment.

Business architecture forms certain demands for the IT architecture that are transferred and are met through a set of services. The same service interaction takes place between application architecture, data architecture and technical architecture. (A detailed analysis of the IT architecture is beyond the scope of this paper.)

Modeling of business architecture. The creation of the management system of the company starts with the modeling of its architecture . Currently, there are a lot of enterprise architecture modeling tools, such as ARIS, Business Studio, Atchi2 and others. Concerning business architecture modeling, these tools offer a means of modeling business processes, organizational structure, and document flow. Within the framework of project approach, the business architecture requires appropriate tools for modeling project activities. It is reasonable to provide a unified framework for modeling of all the management subsystems.

As for the business processes, the official history of their modeling began in the 1970s with the establishment of a methodology for functional modeling called IDEF0. Thus, the business processes modeling has more than 40-years history and many modern business model tools (such as ARIS, Business Studio) are equipped with a full range of functional languages (notations) for business process modeling (IDEX , EPC, BPMN, etc.).

Currently, there is a number of international and national project management standards. The analysis of the most common project management approaches (standards) aims to identify a common basis for modeling project activities.

The most recognesed approaches within the world professional society are those developed by such organizations as the Cabinet Office (United Kingdom), PMI (USA), IPMA (Switzerland), Microsoft (USA), etc. The methodology of each organization is documented in the form of a guidelines – Managing Successful Projects Using PRINCE2 (Cabinet Office), PMBoK (PMI), ICB (IPMA), MSF (Microsoft) correspondingly – and is associated with a certain system of professional certification. These methodologies are developed by leading professional associations and organizations, and are the result of analysis, synthesis and formalizing of best practices in project management.

Most of the standards in the field of project management cover all major areas of project management, including cost, risk, quality, personnel management. Each standard addresses this subsystem from different points of view.

For the effective implementation of project management activities, it seems appropriate to introduce a single enterprise corporate standard. Its implementation is intended to provide a general understanding of the goals and procedures of project management by all project participants due to a common methodology and uniform terminology to guarantee more effective communications within and outside the project team. As a basis for the corporate standard of project management in a particular company it is possible to implement one of the well-known methodologies adopting it to the company environment.

This paper includes a brief review of the structure of the standards of project management, mentioned above. For project management model within a business architecture model of a particular enterprise it is acceptable to use any of the recognized standard methodologies mentioned above or a own corporate project management standards developed in a company.

PRINCE2 (Projects in a Controlled Environment) is a structured project management method developed by the Cabinet of Ministers of the United Kingdom of Great Britain and Northern Ireland (Cabinet Office), which is a de - facto standard for project management of the Government of the United Kingdom and some European countries. The structure of PRINCE2 method includes the following elements:

– 7 principles – the basic rules that underpin the management of the project and require to constantly follow them throughout the project life cycle;

– 7 themes – the dynamic objects of project management having a particular relationship between each other;

– 7 processes – a structured list of activities aimed at achieving the project objectives [1].

The main features of the standard PRINCE2 are: product-focused planning, division of the project into manageable and controllable stages, flexibility with regard to the scale of the project, prescribed organizational structure of the project management team, which allows to clearly separate the responsibility for decision-making between different management levels. The method focuses on how to operate the project at various stages, and provides a clear algorithm for the organization of the management of the project, which makes it possible to tailor a project for any size and business field.

The disadvantage of the method often points to the lack of specific techniques of implementation of certain activities in the project (eg, budgeting, scheduling, etc.). Other experts note that as a degree of freedom: each manager chooses his/her own (or adopted by the company) methods and approaches to performing certain activities. In addition, PRINCE2 is positioned as the standard applicable to projects of all sizes and areas of activity.

PMBoK (Project Management Body of Knowledge) a national standard in the USA has become popular among professionals in many other countries. It is the body of knowledge on project management developed by Project Management Institute (PMI). The structure of the standard includes:

– 5 groups of processes covering project management throughout the project's life cycle: the processes of initiation, planning, executing, process monitoring and controlling, closing;

– 10 knowledge areas that must be managed in each project: project integration management, project scope management, project time management, project cost management, project quality management,

project human resource management, project communications management, project risk management, project procurement management, project stakeholders management [10].

Generally PMBoK interprets project as a set of structured processes. The standard names the actions to be taken in the management of each area of knowledge, prescribes the tools and methods for their implementation in sufficient detail. PMBoK provides specialists with unique knowledge for project management and knowledge related to other management disciplines as well. However , while the PMBoK contains the principles managing project in general, the standard does not provide a clear holistic project management algorithm: when, how often, what processes should be applied. Often, the difficulty of using PMBoK for small projects is also mentioned.

It is worth mentioning that in September 2012 the International Organization for Standardization adopted a project management standard ISO 21500, based at the PMBoK, and this standard was approved as a project management standard by the Rosstandart (Russia).

The methodology of IPMA, known from the guidelines called ICB (IPMA Competence Baseline), describes the requirements for the competence of the expert in the field of project management. ICB identifies 46 elements of competence, which are divided into 3 groups:
− technical competence (20 competencies) − project management techniques;
− behavioral (15) − the professional behaviour of personnel engaged in project management;
− contextual (11) − dealing with the project in the context of programs and portfolios.

ICB mostly addresses individual managers, focusing on the acquisition and implementation of professional competences in the field of project management, rather than on companies planning to implement a corporate project management standard. The ICB manual does not describe the full-scale project management process.

The basis of the MSF approach (Microsoft Solution Frameworks) by Microsoft is a typical practice used by the software development methodology. MSF technology consists of the following elements:
− 2 models: MSF team model and MSF governance model;

− 3 disciplines: project management discipline, risk management discipline, training management discipline.

Regarding the organization of the project team, MSF offers an original approach to integrate members of the team in the role clusters, typical of IT-projects. The process model also suggests splitting the project into phases, following the logic of the implementation of projects in the field of IT-solutions, and is characterized by a certain flexibility by eliminating strictly prescribed procedures.

The proposed review of project management standards allows us to conclude that the basics of project management standards are:
− guideline;
− set of aspects that describe some certain sections of project management;
− the system of business processes.

As each project management standard requires the implementation of certain system processes, the current paper's methodology is based on the fact that the project is implemented as a set of specific actions related in some way to achieve your business goals, which determines the unique solution of the problem faced by the project management team. This set of actions determines the system of business processes of the project. Therefore, consideration of the project as a temporary process-oriented organization provides the possibility of modeling the project activities on the basis of the process approach [6, 9−11].

As a methodological basis for a demonstration model of project management processes was chosen the PRINCE2 methodology (Fig. 2) because this standard, according to the authors, reflects a structured approach to project management. This conclusion is based on the following characteristics of PRINCE2:
− systematic understanding of the project management process model with prescribed inputs, outputs, events that initiate the process;
− decomposition of the main processes (up to the third sub-level of decomposition), representing a clear algorithm of project management at various management levels;
− a clear definition of process owners («roles and responsibilities» in terms of process management) for all project management processes;
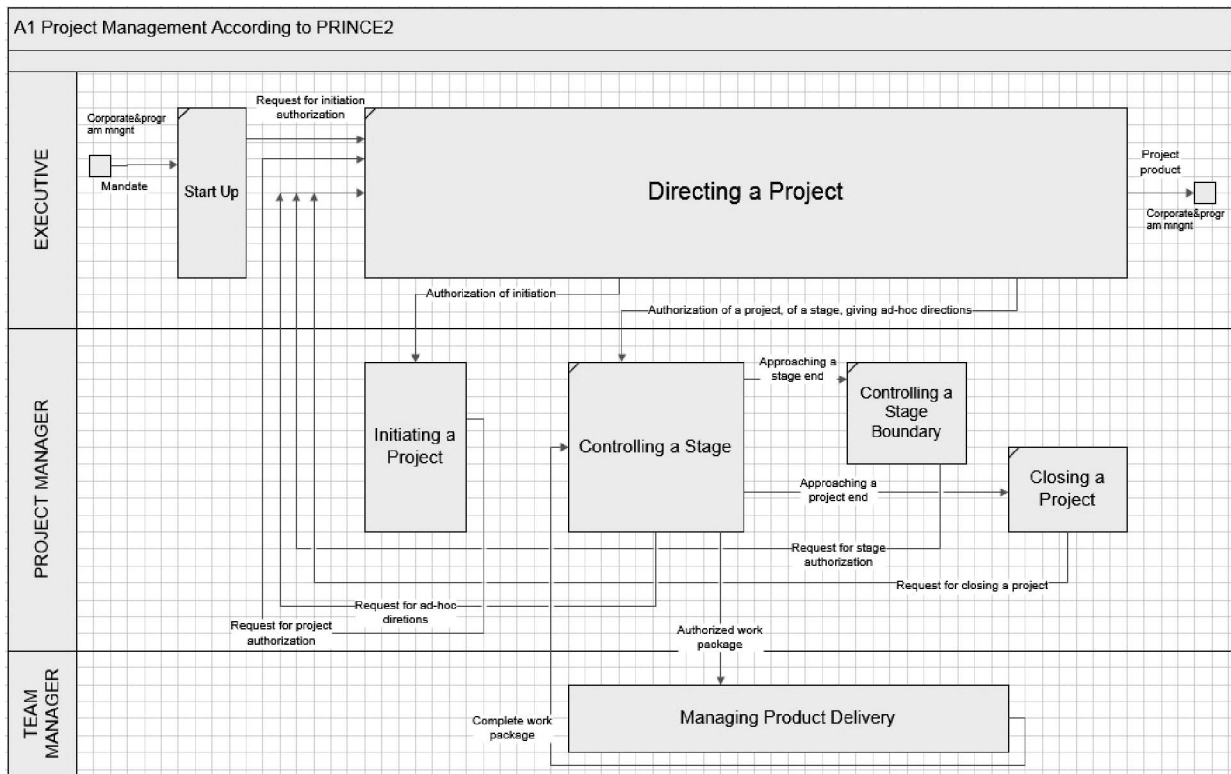
Fig. 2. Landscape of business processes of PRINCE2 project management standard

– document flow system, which accompanies all processes of project management, and the availability of typical document templates.

Fig. 2 shows a model of 7 processes of PRINCE2 which form the landscape of business processes (processes of the first level of decomposition) of project management (using the process modeling notation «Procedure»): Starting Up, Directing a Project, Initiating a Project, Controlling a Stage, Managing Product Delivery, Controlling a Stage Boundary, Closing a Project. Modeling was performed in the business modeling tool Business Studio 4.0.

A detailed description of the sub-processes (which is provided in the PRINCE2 manual) allows to decompose each of the processes and create a model of all processes in any notation corresponding to the rules of decomposition. Modeling of project processes using process modeling tools creates a unified basis for modeling the company enterprise architecture in order to provide effective business performance.

Conclusions. The necessity to meet challenges of everyday business life forces companies to implement approaches of dealing with changes into its management system. It is the reason to add the

project viewpoint to the traditional business architecture models. Project management approach together with corresponding role structure of the project management team is supposed to provide a company with an effective tool of introducing innovations while a process approach intends to fulfill operational activities. Such a model of the business architecture allows to fully realize the strategic objectives of the company, to provide sustainable development of the company in the present and in the future. The business architecture formed according to this approach will create the preconditions for the further business growth.

The authors' vision of enterprise architecture and, in particular, a layer of business architecture, is reflected in the model of logical levels (Fig. 1) and in the process model of project management (Fig. 2). The models developed are intended:

– to provide effective communication of process and project activities within the same management system,

– to ensure integration of project management processes with general management processes,

– to give an effective instrument for modeling processes and projects within a single enterprise architecture model to practitioners.

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