

# Towards the alignment of business and IT in insurance company

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**Abstract-** The relationship between business and IT is a constant theme in both academic and industrial circles for more than 30 years. Aligning Business and Information Technology (IT) is generally seen as an important component of the foundation to optimize business performance. Due to constant changes in both the IT world and in modern business, working on an alignment of business and IT is becoming increasingly important.

The aim of this paper is to offer an approach to solving the alignment problem of IT and business complex in the company, with particular emphasis on applications in the field of insurance industry. The cause of alignment problem lays primarily in different abstraction levels of business and IT concepts [9]. In order to solve this problem, this paper proposes the construction of Enterprise Architecture (EA) [25], which connects models of the organization and its business processes to software architecture models and an implementation environment. The first layer of this architecture is a Business architecture that is defined here as the map of comprised business processes, and is a concretization of contemporary business models in the field of enterprise architecture. Concretization is done here in the context of the insurance company, and is the basis for the definition of the other layers of the architecture.

**Index Terms-** ACORD, Business and IT Alignment, Enterprise Architecture, NGOSS, Process map.

## I. INTRODUCTION

The insurance industry operates in an uncertain business environment that is changing rapidly. Uncertainty of operations is, among other things, caused by the following facts:

- New technologies are becoming available,
- Requests for new services are coming everyday,
- New and increased competition appears daily.

Insurance companies usually can not quickly adapt to such radical changes. The reason for this lies primarily in the fact that most have outdated enterprise architecture that can be difficult and slow to change. The variety of new services that this company should provide under a very rapid growth in market demand, the constant emergence of new technologies, require adequate changes in the development of information system (IS)

as well as changes in the way of performing business. New business models need to be developed through complex and comprehensive electronic communication with all types of partners (e-business), a new approach to IS development should be based on a service-oriented architecture (SOA) and the use of packaged software products and services provided by other companies or independent software vendors.

Thus the objectives of development of insurance companies are usually implemented through the general approach for the development of complex distributed systems and specific international initiatives and standards, in the field of service-oriented business. Despite all efforts, a complex problem of alignment of business and IT, [3, 4, 36, 41], usually is not fully resolved in practice. IT services cannot fully meet the business requirements, i.e. IT is not aligned with business. The problem arises due to different levels of abstraction between the business and IT services (applications). In fact, there is no compliance of levels of abstraction, since the level of abstraction of the implemented IT is low, while business steadily has requirements to automate a high level of business abstractions. An example of the high level of business abstraction is an End-to-End process, which contains a number of chained activities, [14]. On the other hand, IT typically provides services that represent the lower levels of abstraction that can automate individual activities or activities of the parts of the process. For example, bidding, invoicing, contracting, etc.

In the last thirty years, the more general EA approach has been proposed, [5, 29, 37, 38, 39, 42], each of which has its advantages and disadvantages, and they are complementary to each other, [35]. It turned out that the existing EA approaches are not sufficient to cover the domain of companies providing ICT services. Thus, in the telecommunications sector in the last decade appeared The New Generation Operating System and Software (NGOSS). NGOSS program develops international association Telemanagement Forum, and it is an EA for telecom domain [23, 32].

The organization ACORD (Association for Cooperative Operations Research and Development), formed by the insurance companies all over the world, in the 2006 defined development strategy of the business architecture of insurance companies - EA (Enterprise Architecture). The main result of this activity is the ACORD Framework - a framework that provides the

architectural basis of insurance companies to faster and easier prepare and implement the changes necessary for a successful business in a dynamic market, [21]. ACORD framework offers insurance companies a robust, detailed, consolidated, and a complete set of models that support business process innovations, transformations and improving their efficiency.

In this paper, the direction of possible solutions of above mentioned alignment problem is given, through the incorporation of: EA, NGOSS and ACORD approaches. Combining them the methodological framework for the development of a flexible insurance industry domain EA has been achieved.

The following section provides an overview of the literature that has had an impact on the motivation and approach to EA in this paper. The third section gives a brief presentation of the results of the analysis of the current state in the case study of an insurance company, which pointed out the basic characteristics and problems of current business. The fourth chapter presents the main contribution of this paper, through the definition of an insurance company's business architecture. Finally, the fifth section provides an overview of achieved and plans for future work.

## II. LITERATURE REVIEW

This section gives a brief overview of the literature, which has had the most influence on this study, whose results are partly shown in this paper. Review is separated in two parts, the first related to the alignment of business and IT (BIA) and the other to Enterprise Architecture (EA).

### A. Business and IT Alignment

A key factor for the success of the company in a dynamic environment is effective and efficient IT support of business strategy and processes. The paper [36] concludes that in most companies IT and business are not aligned and that it remains a constant concern. Despite the importance of this problem, in the literature still remains unclear definition and in practice the unclear application of this concept. Consultants and IT companies use this concept in ambiguous and often different directions.

The most accepted framework of alignment is given in [22], which is defined by the model for the conceptualization and the strategic management of information technology (called the Strategic Alignment Model). This model describes the BIA in two dimensions (Figure 1), [36]. Strategic coupling (strategic fit) has external focus, directed towards the business environment and internal focus, directed towards administrative structures. The second dimension, functional integration separates business and IT. Along with these dimensions, the model defines four fundamental domains: business strategy, information technology strategy, organizational infrastructure and processes, and infrastructure and information technology processes. These domains should be harmonized in order to achieve alignment. From this model, four perspectives of alignment were derived with specific implications for management practices (Strategy Execution, Technology Transformation, Competitive potential and Service level) [22].

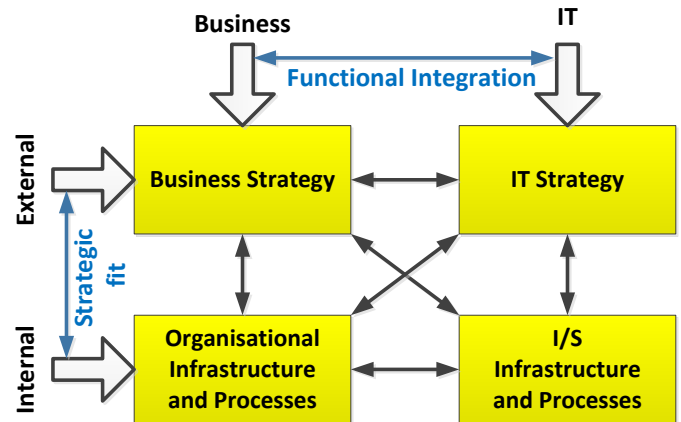


Figure 1: The 'Strategic Alignment Model' [36]

The paper [8] starts with a thesis that IT strategy usually depends on the business strategy and the alignment of both strategies improves their strategic plans. That paper presents an overview of strategic importance of business and IT alignment, and suggests the use of EE (Enterprise Engineering) approach to achieve this alignment. The necessary components for modeling IT strategy and increase the alignment of business strategy and IT have been identified. According to the EE approach the specific building blocks are defined and a new phase of life cycle required for the incorporation of IT strategy in the EA framework.

In [3], a literature review is conducted and the framework is proposed, useful for evaluating different approaches to the alignment problem. Referring to the results of some studies that have addressed this issue, it was noted that the performance of the business and IT is firmly connected and that the company can not be competitive if their business and IT strategy are not aligned. These studies are oriented at different levels of abstraction, from the operational to the strategic. Strategic alignment occurs when goals, activities and processes of the business organization are in harmony with the information system that supports them, [7]. On the other hand, the functional level of analysis of the existing alignment between business processes and software systems is essential in order to optimize the effectiveness of software support, [3].

In [40], a framework for the specification of requirements, oriented towards company objectives is presented, taking into account the organizational context and that should enable IT department to better understand the business objectives of the organization, with the aim that the IT system better meet business expectations. The process of managing the procurement of automotive company is presented as a case study to illustrate the approach.

### B. Enterprise Architecture (EA)

EA is a comprehensive approach to modeling organization architecture. At first, it only applied to application development but after that, it became a framework for modeling the entire enterprise. In his paper [42], the author has presented challenges

and vision for enterprise architecture for the next twenty years. Challenges were related to manage complexity of distributed systems. Zahman EA was multiple perspectives approach.

Zahman EA has had a major impact on the first attempt of the U.S. Department of Defense to create an EA. This effort is known as the Technical Architecture Framework for Information Management – TAFIM, [39]. TAFIM EA gave promise of technical projects to be better aligned with business needs. Consequently the US Congress passed an act in 1996, also known as the Information technology Management Reform Act, [6]. In April 1999, the CIO Council, which was formed by CIOs (Chief Information Officer - responsible for major IT) from the main state institutions has launched a project called the Federal Enterprise Architecture Framework – FEAF, [37]. New ideas in this paper were related to segmentation architecture in large enterprises. FEAF, in 2002, was renamed in FEA - Federal Enterprise Architecture.

TAFIM is then submitted to The Open Group, and thus transformed into a standard known as The Open Group Architecture Framework (TOGAF), [29, 38]. In 2005, EA FEA was dominant in the public sector, while GARTNER dominated in the private sector, [5, 11].

EA approaches, discussed above, are very different. The answer to the question "Which approach is best for a particular company," is ambiguous. In [35] a comparison of these approaches is performed using 12 criteria, giving score of 1-4 (4 is the best score). According to this comparison, none of EA approaches that are compared is complete, each of them has its advantages and disadvantages and they are complementary.

However, it appears that previously presented approaches to EA are not sufficient to cover the domain of companies providing ICT services. Thus, in the telecommunications sector in the last decade appeared The New Generation Operating System and Software (NGOSS) program. NGOSS program develops international association Telemanagement Forum, and it is an EA for telecom domain, [23, 32].

NGOSS is a reference architecture for the telecommunications industry, [32]. It contains a set of frameworks which represent the generic classification scheme for design of a complex domain as the telecom domain, [18, 23].

A framework for business processes - eTOM (Enhanced Telecom Operations Map) defines all major business processes within and outside the company, [12-17].

The framework related to the company information - known as SID (Shared Information and Data Model) provides a comprehensive general information model for performing telecom activities in the company, [32, 33].

A framework for system integration - known as TNA (Technology Neutral Architecture) defines the basic principles for the development of NGOSS solutions. Architecture is

intentionally called "Technology - neutral" because it does not define the implementation [20].

Framework for applications - known as TAM (Telecom Application Map) is designed to be used by all participants in the software chain of telecom company. eTOM provides a framework for telecom processes and TAM framework for telecom applications, [19].

Telemanagement Forum changed the name NGOSS industry standard to Framework. All events related to the further development of this industry standard for the telecommunications, members of TMF associations can follow through the website, [23].

The organization ACORD (Association for Cooperative Operations Research and Development), is formed by the insurance companies all over the world, in 2006 defined development strategy of the business architecture of insurance companies - EA (Enterprise Architecture). The main result of this activity is the ACORD Framework - a framework that provides the architectural basis of insurance companies to faster and easier prepare and implement the changes necessary for a successful business in a dynamic market, [21].

ACORD framework offers insurance companies a robust, detailed, consolidated, and a complete set of models that support business process innovation, transformation and improving their efficiency. The five basic components of the model are, [24] : (1) The common vocabulary of terms that exist and are used in insurance ecosystem - Business Dictionary. The main purpose of this dictionary is to improve communication through standardization of business terms names and unambiguous mutual understanding of work teams; (2) Model of functionalities that are basic in business of insurance companies - Business Capability Model. This model provides multilevel decomposition of field of business up to the level of business processes. The business functions are located on the upper levels of the hierarchical decomposition and include all the standard features found in insurance companies; (3) Information model that is the reference model for the implementation of enterprise applications of insurance companies - Information Model . This is the most detailed model that represents a conceptual overview of the insurance industry. It is based on UML (Unified Modeling Language) and covers all functional areas of the company and ensures the communication of other XML, EDI and XBRL standard forms with ACORD standards; (4) Data model specifically designed to meet the needs of enterprise data architecture of insurance companies - Data Model. It represents the logical level of entity-relationship model and is used primarily as the basis of a physical model of relational database model for data warehouse; (5) Comprehensive model of components that form business processes with a detailed definition of the interface and service in the entire chain of value creation in insurance companies - Component Model.

In [25], EA is defined as a set of concepts and practice, based on a holistic view of the system, the principles and the common language and long existing disciplines of engineering and

architecture. The paper sets the EA as the architecture of the whole company, including its IT. It also describes the ontology necessary for holistic definition and representation of architecture and highlights the significant challenges faced by IT professionals, educators and researchers. Finally, it is emphasized that EA is one of the most critical tools for the success of the organization and will take on an increasingly important role as the requirements for speed, agility, synergy, efficiency, quality and complexity are escalating.

### III. FEATURES AND PROBLEMS OF CURRENT OPERATION OF INSURANCE COMPANY

The methodological approach for the development of a flexible EA for the insurance industry, which is proposed in this paper, has two main steps: analysis of the current state of the company and defining the new architecture of the organization. Enterprise architecture has four layers: business architecture, application architecture, data architecture and technological architecture. In this section we briefly present the results of an analysis of the current state in the case study of an insurance company, [31], and in the next section, business architecture as the first layer of the new architecture is defined.

In the step of the current state analysis, business procedures and business documents are studied, and interviews with the heads of organizational units were conducted. After, IT supports of business processes in the company were analyzed. The result was precise and detailed specification of the company's business, [31]. Below are the basic characteristics of an existing business.

**Business is not sufficiently well defined.** Technological procedures are the most often, well-defined and documented for the current mode of operations. However, there is a tendency that they slowly change and adapt to the rapid changes required. Business processes are not formally specified in a standard notation such as, e.g.. BPMN (Business Process Model and Notation), [28], which would create the conditions for their proper automation by the IT sector.

**System technologies are fragmented.** In the company, there are different software products from different manufacturers: operating systems, data management, programming languages, different user interfaces, different applications, and so on. Fragmented solutions in the current mode of operations, are the constraint in the implementation of business processes.

**Fragmentation of business processes.** Many business processes are very fragmented and often isolated in organizational units. Business processes are adapted to the existing fragmented IT solutions and this is one of the reasons for their fragmentation. In the company, there is no system for business process management (workflow engine) as the technological foundation for the implementation of the business processes, which is another reason why the processes are not automated end-to-end.

**Problems of business adaptation.** Fragmented processes and system technologies, significantly affect the capacity to adapt to

change. It is, for example, seen clearly in the moments of launching a new product or inability to respond to new competitive products.

**High costs.** Due to the above, operating costs are inevitably higher with a very inefficient processes and a low level of End-to-End process automation. Financial investments in the IT sector are high. Nevertheless, the IT sector usually does not give the required results; IT services cannot meet the business needs of the company.

**Meeting the needs of top management.** Company's IT system usually can not meet the needs of top management, such as: management of objectives, management of plans, performance management, etc. Because it requires IT services to be at a much higher level of abstraction. The overall conclusion of the analysis of the current state is that the business and IT are poorly integrated, developed in isolation, which leads to problems of business and IT alignment.

### IV. DEFINING BUSINESS ARCHITECTURE

Business of companies dealing with insurance is very complex. In order to overcome this complexity and to define business processes, which are many, the standard models for the domain of insurance defined NGOSS and ACORD are used. A model presents a pattern to specify the operations of the company, which is engaged in service-oriented businesses in the insurance industry. According to these models, the processes in the company firstly are classified by similarity at the highest level and then through gradual decomposition detailed specifications are obtained. Thus, business insurance company at the first level of classification consists of three major functional areas (Figure 2):

- Enterprise Management
- Development Management
- Operation Management

Enterprise Management refers to joint activities of the company. This area is a common part not only in companies engaged in insurance industry but in many other ones. Development Management and Operation Management are the core of insurance companies business. For each of these areas a process class can be further defined, representing so-called functional domains. They are unique in the system (only one is defined). These functional domains according to the NGOSS also called "horizontal processes". In addition to the functional domains, the so-called "vertical processes" or processes end-to-end are defined. They are defined in terms of the point of view of users of the company and in the exercise of passing through horizontal processes (different functional domains).

Figure 2 shows the three major functional areas and functional domains (horizontal processes) dividing these two areas. In addition, it shows the vertical (end-to-end) processes.

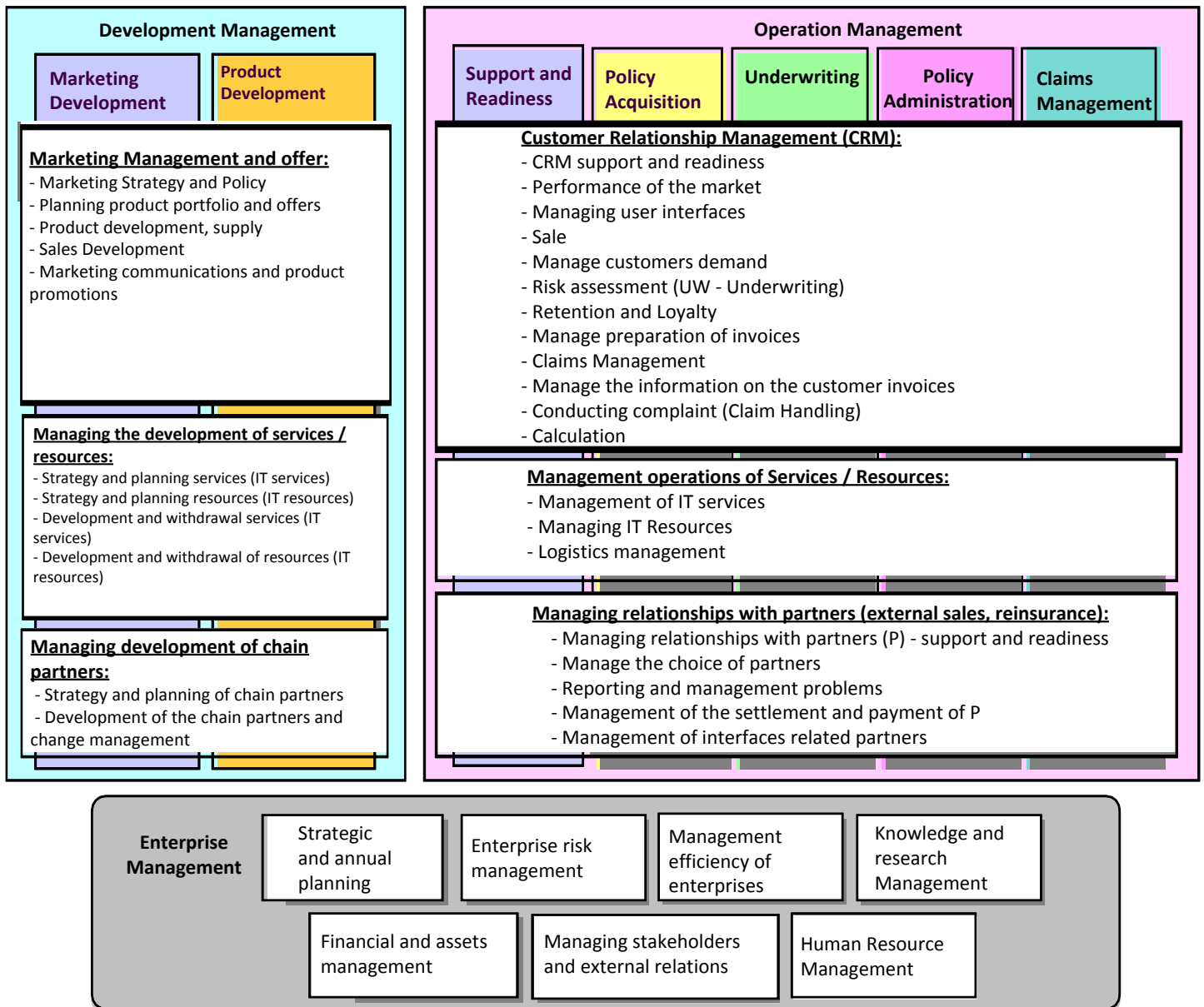


Figure 2: Process map of insurance company (starting level)

Enterprise Management includes the following functional domains:

- Strategic and annual planning
- Enterprise risk management
- Management efficiency of enterprise
- Knowledge and research management
- Financial and assets management
- Managing stakeholders and external relations
- Human Resource Management

Development Management includes the following functional domains (horizontal processes):

- Marketing management
- Management of development Service/Resource

- Managing development of chain partners.

Operation Management includes the following functional domains (horizontal processes):

- CRM – Customer Relationship Management
- Management operations of Service/Resource
- Management of relationships with Suppliers / Partners.

End-to-end processes related to the field of Development Management are classified into two major groups:

- Marketing development
- Product development.

End-to-end processes pertaining to Operation management, are classified into five major groups:

- Support and readiness,
- Policies acquisition,
- Underwriting,
- Policy administration,
- Claims management.

Business processes are formally defined in order of their automated transformation in accordance with MDD approach [30]. One of the major problems in modeling and specification of business processes is the communication of business experts with software engineers. It is therefore of utmost importance, the choice of a common language and a methodology for modeling business processes. The most graphically oriented languages for business process modeling are BPMN 2.0 (*Business Process Model and Notation*) [2, 28], UML activity diagrams, [27], EPC (*Event-driven Process Chain*) [10, 34], IDEF3 (*Integrated DEFinition for Process Description Capture Method*), [26], and Petri nets, [1]. Version 2.0 of BPMN modeling language for business processes has a very rich set of concepts and provides several different types of diagrams to express the choreography and orchestration at different levels of abstraction and in this study BPMN, [31], has been used.

## V. CONCLUSION

This paper points out the problems, the insurance companies are faced with and that are a direct consequence of outdated and inflexible business architecture not allowing for easy and fast changes. In order to solve these problems, the main features of insurance companies business are defined. These features relate to business processes and IT supporting them. Starting with premise that *IT and Business Alignment* is of essential importance, an approach for solving the alignment problem is given and necessary initial conditions are given. First of these conditions is defining the Enterprise Architecture, here following the general TOGAF approach, [29] and two domain approaches, suitable for insurance companies (NGOSS, [18] and ACORD, [24]).

This paper defines the business architecture using the map of insurance company business processes, by applying the abstractions of classification and decomposition. A kind of concretization of the above mentioned approaches is performed in the context of the insurance company. Three categories of functional areas and functional domains (horizontal processes) are identified, in what are divided two of these areas, i.e. core business. In addition, the vertical processes i.e. end-to-end processes, are defined.

From this basic specification of enterprise architecture, given in this paper, one can see that the business in insurance companies is very complex. Complex operations require the construction of a complex information system for its automation and support. To build such an information system it is necessary to define the multilayer application architecture, which is planned for future work. In addition, it should be noted that the complexity of business arises from its multi-dimensional nature. Namely, the division of business to the functional domains is only one view of the business. End - to - end processes represent

a completely different view of the business that is orthogonal with respect to functional domains. Besides, new dimensions, such as: functional domains, end-to-end processes, for certain class of services, etc.

Complex business architecture characterized by different concepts, such as the functional domains, the end-to-end processes, subdomains and functionality, non functional requirements, and so on. The software architecture (application architecture) must support all of these different concepts. Diverse business requirements dictate different categories of software that software architecture should contain.

## REFERENCES

- [1] Aalst, W.M.P. van der, Hee, K.M. van: *Workflow Management: Models, Methods and Systems*, Massachusetts Institute of Technology, 2002.
- [2] Allweyer, T.: *BPMN 2.0 Introduction to the Standard for Business Process Modeling*. Herstellung und Verlag: Books on Demand GmbH, Norderstedt, 2010.
- [3] Aversano L., Grasso C., Tortorella M., "A literature review of Business/IT Alignment Strategies", *Procedia Technology* 5 ( 2012 ), pp 462 – 474
- [4] Avila O, Geopp V., and Kiefer F., "Understanding and Classifying Information System Alignment Approaches", *Journal of Computer Information Systems* Fall 2009
- [5] Bittler, R. S., and Kreizman G., *Gartner Enterprise Architecture Process: Evolution 2005*, Gartner ID: G00130849, October 21, 2005.
- [6] Clinger-Cohen Act of 1996 (PL 107-347) (See THOMAS (Library of Congress).)
- [7] Croteau A. M., Bergeron, F. 2001 "An information technology trilogy: Business Strategy, technological deployment and organizational performance", *Journal of Strategic Information Systems*, vol. 10, pp. 77-99, 2001.
- [8] Cuenca L., Boza A. and Ortiz A. "An enterprise engineering approach for the alignment of business and information technology strategy", *International Journal of Computer Integrated Manufacturing*, Vol. 24, No. 11, November 2011, 974–992.
- [9] *An approach to build information system of telecommunications company based on models*, R. Cvetkovic, Ph.D. Thesis, University of Belgrade, 2012
- [10] Davis, R., Brabänder, E.: *The Event-driven Process Chain*, Springer London, 2007.
- [11] *Gartner Enterprise Architecture Framework: Evolution 2005*, Gartner ID: G00130855, October 25, 2005.
- [12] GB921, "Business Process Framework (eTOM) - Concept and Principles", Release 8.1, Version 8.5, TeleManagemnt Forum 2010.
- [13] GB921B, "Business Process Framework (eTOM) – Addendum B: B2B Integration Work", Release 7.0, Version 7.2, TeleManagemnt Forum 2009.
- [14] GB921D, "Business Process Framework (eTOM) – Addendum D: Process Decompositions and Descriptions", Release 9.0, Version 9.2, TeleManagemnt Forum 2010.
- [15] GB921F, "Business Process Framework (eTOM) – Addendum F: Guide to Applying Business Process Framework", Release 8.0, Version 7.7, TeleManagemnt Forum 2009.
- [16] GB921G, "Business Process Framework (eTOM) – Addendum G: Process Flow Examples", Release 8.1, Version 0.1, TeleManagemnt Forum 2010.
- [17] GB921P, "Business Process Framework (eTOM) – Addendum P: An eTOM Primer", Release 8.0, Version 4.7, TeleManagemnt Forum 2009.
- [18] GB927, "The NGOSS Lifecycle and Methodology", Release 4.5, TeleManagemnt Forum 2004.
- [19] GB929, "Application Framework (TAM) Map – The BSS/OSS Systems Landscape", Release 4.0, Version 4.2, TeleManagemnt Forum 2010.
- [20] GB942CP, "Integration Framework – Business Services (Contracts) Concepts and Principles", Release 7.0, Version 1.2, TeleManagemnt Forum 2010.
- [21] Gregory A. M., *THE BUSINESS INFORMATION REVOLUTION: Making the Case for ACORD Standards*, Communications Department, ACORD, Two Blue Hill Plaza, Pearl River, NY 10965, 2005.



- [22] Henderson, J.C., Venkatraman, N., "Strategic alignment: Leveraging information technology for transforming organizations", *IBM Systems Journal*, Vol. 32, no. 1., 1993.
- [23] <http://www.tmforum.org/browse.aspx>
- [24] Jones D.F., Schmitz D., France N., Orlandi M., *The ACORD Capability Model*, ACORD Corporation, 2010, (available online at [https://www.acord.org/Knowledge/Resources/Library/Documents/ACORD\\_CapabilityModelBook\\_2010.pdf](https://www.acord.org/Knowledge/Resources/Library/Documents/ACORD_CapabilityModelBook_2010.pdf))
- [25] Kappelman L. A., Zachman J. A., "The Enterprise and Its Architecture: Ontology & Challenges", *Journal of Computer Information Systems*, Summer 2013.
- [26] Mayer, R., Menzel, C., Painter, M., Perakath, B., de Witte P. and Blinn T.: Information Integration For Concurrent Engineering (IICE) - IDEF3 Process Description Capture Method Report, Technical Report, September 1995.
- [27] Unified Modeling Language (UML) Specification ver. 2.4 Superstructure, OMG Document ptc/2010-11-14
- [28] OMG 2011, *Business Process Model and Notation (BPMN), Version 2.0*, January 2011. [Online]. Available: <http://www.omg.org/spec/BPMN/2.0>
- [29] Open Group Standard , TOGAF® Version 9.1, Document Number: G116
- [30] Pavel H., *Model-Driven Design Using Business Patterns*, Springer Berlin Heidelberg New York, 2006.
- [31] *The IT project to support processes of life insurance company*, The Dunav Insurance Company, Belgrade, 2013.
- [32] Reilly J.P., Creaner M.J., *NGOSS distilled: The Essential Guide to Next Generation Telecoms Management*, The Lean Corporation, TM forum, United Kingdom. 2005.
- [33] J.P. Reilly, "Getting Started with the SID: A SID Modeler's Guide", TM forum, 2007.
- [34] Scheer, A.W.: *ARIS Business Process Modeling*. Springer Verlag, 1999.
- [35] Sessions R., *A Comparison of the Top Four Enterprise-Architecture Methodologies*, ObjectWatch, Inc. May 2007.
- [36] Silvius, A.J.G., "Business & IT Alignment in theory and practice", Proceedings of the 40th Hawaii International Conference on System Sciences – 2007, Waikoloa, Hawaii, USA. 3-6 January 2007.
- [37] The Chief Information Officers Council A04, "Federal Enterprise Architecture Framework", Version 1.1. September 1999.
- [38] The Open Group, "The Open Group Architectural Framework (TOGAF)", version 9. 2009.
- [39] U.S. Department of Defense, "Technical Architecture Framework for Information Management (TAFIM)", Volumes 1-8. Version 2.0. Reston, VA: DISA Center for Architecture, 1994.
- [40] Ula A. and Lai R., "Modeling Business Goal for Business/it Alignment Using Requirements Engineering", *Journal of Computer Information Systems*, Spring 2011.
- [41] Wang S. and Wang H., "Towards Innovative Design Research in Information Systems", *Journal of Computer Information Systems* Fall 2010.
- [42] Zachman J. A., "A Framework for Information Systems Architecture", *IBM Systems Journal*, vol. 26, no. 3, IBM Publication G321-5298. 914-945-3836 or 914-945-2018. 1987.

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