

Value modeling for digital platform

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Abstract. The research considers the problem of business and IT languages difference while innovations implementation. That is why business and IT alignment plays a key role in digital transformation, brought value to organization's stakeholders. The paper deals with value modeling approach for network enterprise as a platform, which allows to create value for network enterprise. The paper is built in according to Design Science method. The most famous approaches to integration of different business models are considered in the paper. The developed approach is based on integration of Value Proposition Canvas and Value Delivery Modeling Language (VDML) and afterwards transforming them into the modeling language of the enterprise architecture ArchiMate. The approach allows to connect business strategy and value creation process in terms of Enterprise Architecture. Moreover, the approach was applied in real estate sales company as an owner of digital platform. Transformation to the network enterprise allows to create new services, which will bring value both for its clients and partners.

Keywords: value modeling, enterprise modeling, network enterprise, digital platform, meta models, model integration

1 Introduction

The problem with value modeling is that nowadays Information Technology (IT) penetrate into business more and more, and innovations in IT sphere are rapidly changing the world. IT faces challenges with implementation of logic of value creation from the strategic level to the integration stage. The reason is that both sides use different languages and that is why it is very difficult for them to understand each other correctly and furthermore to adopt all the changes offered. The business side uses business models and related technology to address the business requirements and make new value proposition accordingly. However, usually this value, meant by business side, is created and modeled only for the business needs and business requirements of variable stakeholders satisfaction. Meanwhile, IT managers and specialists use other modeling tech-

techniques to construct the IT infrastructure, which are not fully understood by representatives of the business side. The functional difference between can lead to the difficulty of capturing each other's logics and mutual synergy.

This thesis constructs a value modeling approach with ArchiMate by mapping the concepts in ArchiMate with those in VDMML to solve the problem mentioned above. By comparing the concepts, a series of value related viewpoints with ArchiMate are constructed, which can be applicable in the sphere of an enterprise with many members (network). These viewpoints covers different aspects in the value creation process. To efficiently use these viewpoints, a guideline of the Design Science method is provided to show the construction process of a value model, which means problem solving process, which has its own goals, perspectives, methods and stages. The Design Science method proposes four stages, such as analysis of the existing approaches in this sphere, design for the creation process of the artifacts, which should be made through generally accepted methods on the basis of already analysed researches, then evaluation stage, involved the verification of the created artifacts, whether they satisfy the earlier set objectives, goals and requirements, applying the methods stated in the research plan, and, finally, approbation stage to achieve the best possible results among the target groups and apply the developed business model in real conditions.

The aim of research is development of value modeling approach for the implementation of a network form as a digital platform.

Objectives:

1. To study various approaches and practices to value modeling;
2. Develop an approach to value modeling based on the creation of a pattern;
3. Consider the approach application by the example of the real estate sales company as a platform.

2 Analysis of existing researches

In order to propose new meta-model on creating of a template for business value it is necessary to analyse the papers which have been written before and discover what was laid down to the meaning of meta-models integration between and using the ontology in order to map several concepts.

For example, in [1] authors deal with analysis of different frameworks: Zachman, DoDAF, ARIS and other ones in order to capture strategic planning in EA. The problem, solved in this research paper, is described as strategic planning is currently not explicitly reflected in EA models. That is why NEMO research group deals with this gap by presenting a principled approach to support strategic planning modeling in EA, which means developing a conceptual model for strategic planning that is aligned with a foundational ontology and then proposed a language metamodel that incorporates the conceptual model into the ArchiMate modeling language.

In [2] authors present an ontological analysis of the concepts, focused particularly on the resource, capability and competence concepts. With the help of Unified Foundational Ontology (UFO) the researchers made the analysis of identification of the semantic features and developed a meta-model, which allows organizations to model their

core capabilities and resources and to understand their current status or to improve the organization according to a capability-based planning approach., thereby improving the semantic clarity and usefulness of the proposed ArchiMate extension. As a result, the research covers the integration of the BSVC (Business Strategy Value Concepts) model with ArchiMate language. Also in [3] was covered the similar problem, meant investigation of the real-world semantics underlying risk-related constructs in one of such approaches, namely ArchiMate's Risk and Security Overlay (RSO) by means of ontological analysis. By means of the developed meta-model the researchers analysed it by means of the reference Ontological foundations with the concept of Common Ontology of Value and Risk and then proposed evolving the Risk and Security Overlay into ArchiMate language. The same work was made in [4], where for the motivation extension in ArchiMate meta-model was provided through ontological foundations in order to define all the necessary and additional blocks in the Motivation Extension. Moreover, in [5] a semantic analysis of service modeling fragments in ArchiMate trough developing a meta-model of Business layer taking as basis a reference ontology that is based on the notion of social commitments/claims for characterizing service relations presented, because service as "unit of functionality" hides some important social aspects inherent to service relations and makes some of the models that the language produces ambiguous.

Then, in [6] a formal mapping of the meta models to integrate DEMO and ArchiMate was proposed, accompanied by a rationale of why such a mapping is beneficial and a systematic application of the DEMO and ArchiMate meta models to map a model created in DEMO to a model of an enterprise architecture in ArchiMate. The authors used DEMO transaction patterns for process modelling and then translated DEMO process models into ArchiMate.

The papers [7] and [8] cover in the first research, mapping approach that integrates the value modelling technique of e3value modeling into the Enterprise Architecture language ArchiMate, and in the other one, the integration of the three meta-models: The Business Model Canvas, devoted to representing the business model of a company e3value, interpreted modeling of value networks ArchiMate, allowed enterprise architecture modeling, which considers three different layers: business, application and technology. In [9] a formal transformation of e3value into ArchiMate via DEMO is presented, because using DEMO as an intermediate between e3value and ArchiMate would also enable architects to use the semantically rich way of thinking of DEMO to create ArchiMate models starting from the economic transactions modelled in e3value. The different mapping techniques helps to show how to bridge between three different meta-models by use of ontologies or by use of constructing meta-models and which mapping method should be implemented in the different layer of organisation.

The paper [10] contributed to the identification of the relations between the strategic and operational aspects of the enterprise architecture applying an ontology-based approach, focused on facilitating the alignment between the goals and the operational elements of an organisation (such as processes, roles, and resources) through meta-model development.

Moreover, each paper covered here validates the developed or proposed mapping technique through a case study in the end in order to approbate the model.

As a result of the analysis phase, it is possible to highlight some points:

There are a lot of examples of using different business models and then integrate them together with application of different mapping techniques

There is no research on the theme of integration of different approaches of creating value in network enterprise.

3 Value modeling approach development for network enterprise

3.1 Analysis of the existing approaches to the value modeling

Value modeling process plays a key role in an any business, therefore currently variable approaches to the value creation process modeling in enterprise are developed. Below you can find a range of the approaches, which may be found oftenly.

Value Chain Model was proposed by M. Porter, Harvard Business School professor, for company performance development and a company competitiveness level increasing. [11] According to the concept, a company is considered as a chain of main activities, added value to the end service\product, and their optimization allows to reduce costs and increase profits.

According to the Value Proposition Canvas (VPC), proposed by A. Osterwalder and Y. Pigneur and connected to strategy management tool Business Model Canvas, basically correspondence of two blocks, such as client profile and value proposition, are presented in it. [12]

E3value methodology is considered as a phased approach to the business development process for network of participants, which brings value to the participants from their mutual interaction. [13]

Value Delivery Modeling Language was developed under the consortium OMG and considers a standard modeling language for enterprise activity analysis and designing, emphasizing on value creation and their interchange. [14, 15] The VDML concept consists of the range of the used patterns, which describe value creation for network participants. Moreover, VDML integrate other approaches, mentioned before, such as e3value and Business Model.

Table 1. The result of the analysis of existing approaches to modeling value

Name	Link to the customer	Link to the Products&Services	Link to the business strategy	Link to value network	Link to the activities of the organization
Porter's value chain	-	-	-	-	-

Value Proposition Canvas	Yes	Yes	-	-	-
e3Value	-	-	-	Yes	-
VDML	-	Yes	-	Yes	Yes

The existing approaches' analysis results are presented in the table above. The analysis results show that existing approaches to the value modeling are not connected to business strategy. This research paper mainly represents VPC and VDML approaches, because they allow to describe logics of value creation for network enterprise more precisely, and exactly ArchiMate modeling language allows to consider a connection with business strategy. [16]

3.2 Development of approach to value modeling

Value modeling approach, developed in terms of Enterprise Architecture, is presented on the picture 1 below. The mean of the approach lies in the integration of value description methods, such as Value Proposition Canvas and VDML, and in transforming these approaches to ArchiMate language.

Artefacts creation with VPC, VDML and ArchiMate allows to make connections among business aims, value creation logic, value creation network and value creation process.

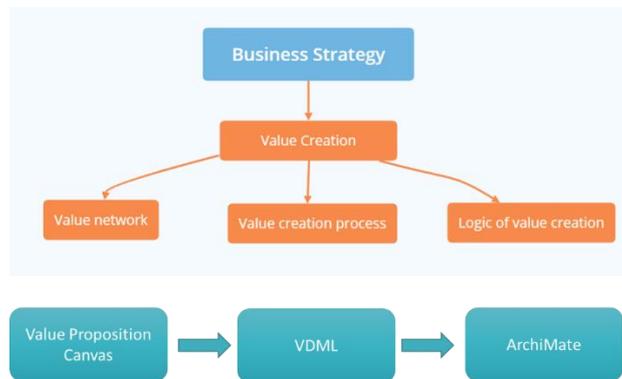


Figure 1. Value modeling approach

For VPC and VDML modeling the research paper uses mapping technique for meta-models. In result, meta-models for such business models, such as VPC, VDML and ArchiMate's Business Layer were developed. The picture below shows mapping for them, reflecting connections among these three meta-models.

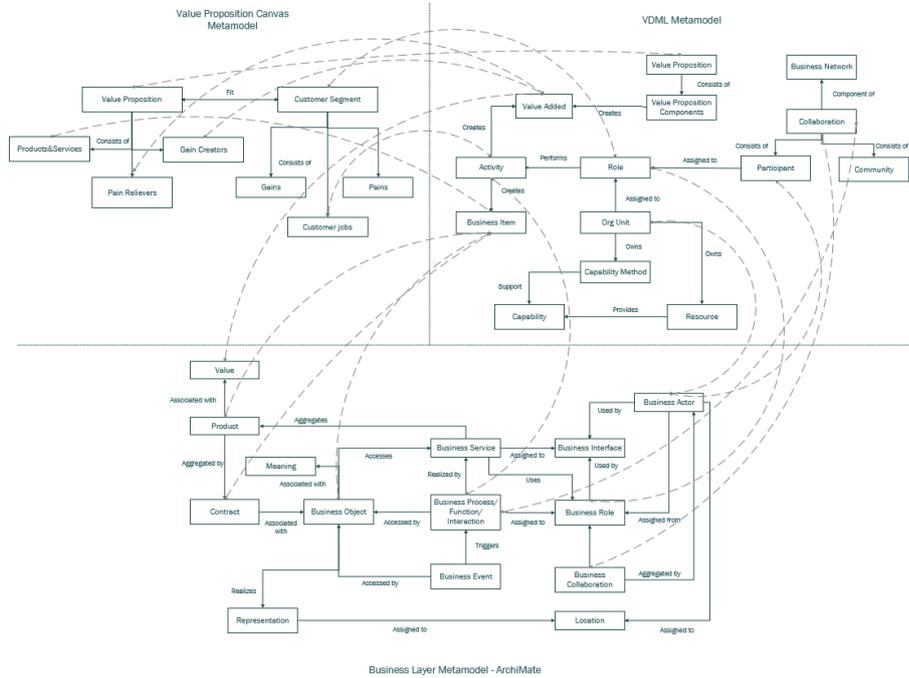


Figure 2.Mapping technique for metamodels

The next table shows connections among the different approaches, presented above.

Table 2.Link between objects in approaches

Value Proposition Canvas	VDML	ArchiMate
Value Proposition	Value Proposition	-
Customer Segment	Role	Business Role
Products&Services	Business Item	Product
		Business Object
		Contract
Pain Relievers	Value Added	Value
Gain Creators	Value Added	
Gains	-	-
Pains	-	-
Customer jobs	Activity	Business Process
		Function
		Interaction
-	Org Unit	Business Actor
	Participant	
-	Collaboration	Business Collaboration

3.3 Value Viewpoint pattern creation

The next step of the research paper is devoted to the Value Viewpoint pattern meta-model development in ArchiMate. Value Viewpoint is considered as a pattern for value modeling, allowed to notice the connections among stakeholders' aims, their requirements, value creation process through services using by the network participants, and the realization process through business services.

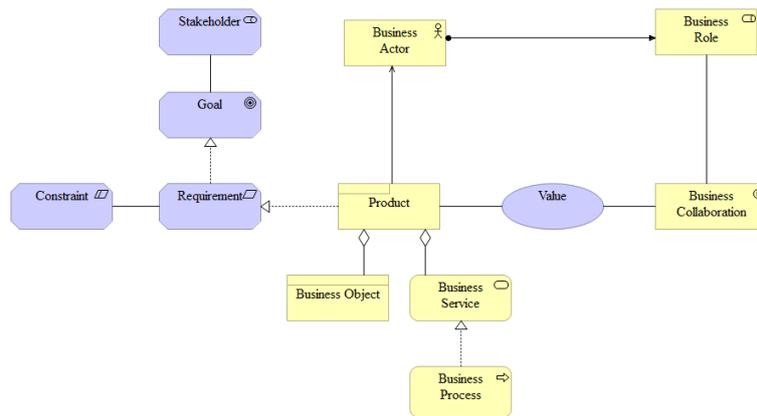


Figure 3. Value Viewpoint pattern meta-model

4 Application of the developed approach value modeling on the example of an organization

The next stage of the research paper is the proposed approach approbation on the example of a real estate sales company as a platform owner. By a digital platform is meant a high-tech business model, which brings value by interaction between two or more its independent participants. [17] The new real estate sales company business-model has its own net of participants, which allows to provide some additional services for real estate sales company customers, for example, property searching property insurance or property repair service.

The result of value modeling of the real estate sales company as an owner of a digital platform may be considered the Value Proposition Canvas. The VPC is formed around the two main blocks, such as a client profile and value proposition of the company. The main type of clients here is individuals.

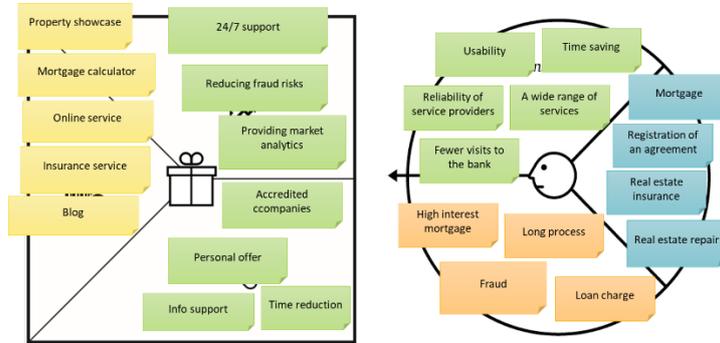


Figure 4. Value Proposition Canvas

Then Value Proposition Exchange diagram and Collaboration Structure diagram in VDML were developed, which define both main participants of the network and products/services provided.

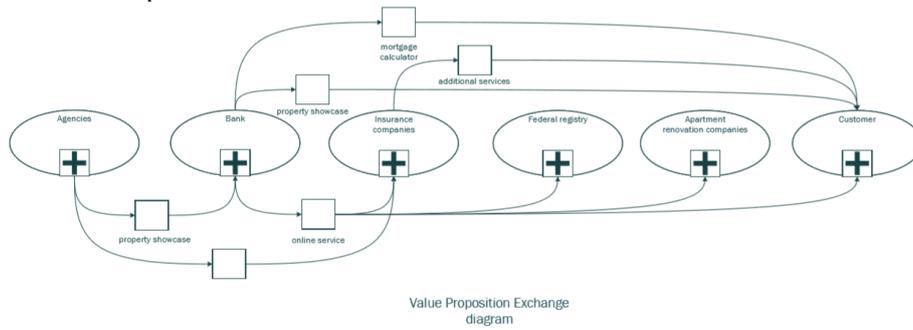


Figure 5. Value Proposition Exchange diagram

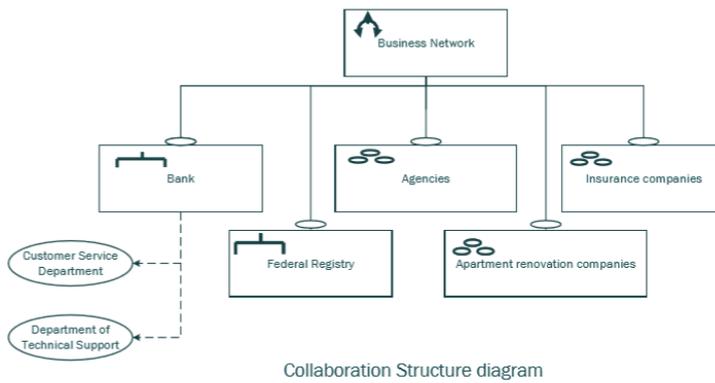


Figure 6. Collaboration Structure diagram

While value modeling process description in enterprise architecture a model Value Viewpoint in ArchiMate was proposed. The model allows to define the logic and the process of the value creation and services through participants interaction. The model

considers network participants' aims, their requirements and products/services range, which realizes the requirements (e.g. the client's aim is to get a service, satisfied with his requirements of a wide property choice and with a possibility to a proposition at the best price, and such requirements are met in the product "Property shop window"). Moreover, the business services, which make up each product/service, are distinguished. The product development through business processes distinguishing allows to define business processes, IT-systems and IT-infrastructure in the company for value realization in a network.

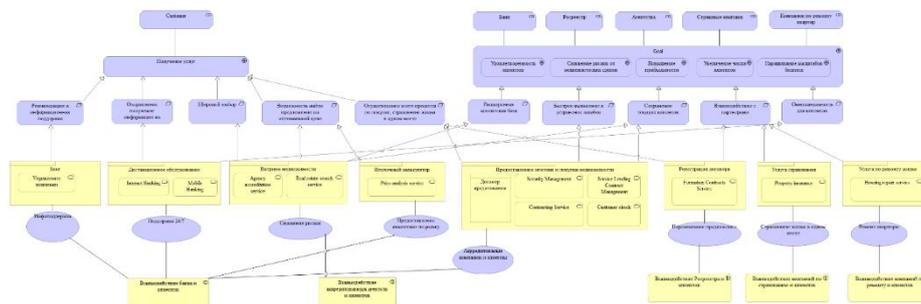


Figure 7. Value Viewpoint model

The picture above shows the Layered model of the enterprise, which allows to consider the enterprise cutaway three layers, such as business layer, information systems layer and infrastructure layer. Through value creation with Value Viewpoint business and IT now are able to define, which services, processes and systems should exist in the enterprise architecture.

5 Conclusion

To sum it up, different approaches and practices for value modeling were investigated.

A value modeling approach was developed, which based on the integration of VDML, Value Proposition Canvas and ArchiMate, application of this approach was considered by the example of a real estate sales company. The approach to value creation process modeling in the context of the enterprise architecture ensures the implementation of the entire value creation logic from the strategic level to the implementation stage.

This will not only achieve alignment of business and IT, but also manage the development of a digital platform throughout the life cycle.

The implementation of the network form will allow the real estate sales company in the future to create new services that are valuable both for the client and for the company's partners.

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