Classifying Business Rules to Guide the Systematic Alignment of a Business Value Model to Business Motivation

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Abstract. Business Motivation Modeling is fundamental and crucial when trying to achieve strategic alignment for sustainable enterprise solutions. Business Rules also play a central role among motivation modeling concepts and could range from fine-grained process directives to coarse-grained governance policies. Therefore, the effective utilization of Business Rules is heavily dependent on the development of classifications with separation of modeling concerns and (semi) formalisms to capture relevant business directives. Further, a Business Value Model typically consists of economic concepts (resources, events and agent) and of descriptions of particular value propositions to the customer and is equally important in enterprise solution designing. In this work, we report on a classification schema and a template structure to capture Business Value Rules that could affect resulting Business Value Models. The proposed classification and Business Value Rules helps to achieve strategic alignment of business value models that can be used as a basis to define economically sustainable enterprise solutions.

1. Introduction

In the prevailing knowledge economy, sustainable enterprise solutions are the key to success of any business. The term sustainable enterprise solution could be defined from many different perspectives such as environmental, economic and IT. However for the work reported here, we adopt a consolidated definition as "an enterprise's ability to deliver value to concerned stakeholders throughout enterprise's life". During the production of value to be delivered, enterprise acquires resources (such as raw materials, labor) and output value-increased resources to its environment. This resources acquisition and outputting of value-increased resource to the environment, make the enterprise a part of a "value constellation" consisting of the enterprise itself, other enterprises and different actors. All these enterprises operate in a highly competitive environment and sustainable enterprise solutions have to be developed

for these dynamic value constellations to ensure their survival and success.

During enterprise solution development, different models are constructed to understand the dynamics and highly competitive environment and to design new enterprise solutions to cope with the environment changes. Within this work, we propose, as other authors, three layers of abstraction (or "perspectives"), named respectively motivation, value and processes (MVP) for separation of the concerns during the modeling efforts:

1. ***Business* M*otivation Perspective:*** the main focus is on identification, organization and management of the concepts that provide governance and guidance to the business being modeled. The concepts used include e.g. strategy followed and goals to be achieved;
2. ***Business* V*alue Perspective:*** this covers modeling of economic concepts such as economic resources, economic agents, economics events, relationship that exist among them and value propositions;
3. ***Business* P*rocess Perspective:*** this describes procedural and operational realizations of the business value creations and exchanges.

In order to sustain the enterprise solution, when changes pop up in the enterprise or within its environment, it is necessary to reflect these changes in the relevant perspective. Further, according to change occurring in a particular perspective, other perspectives might also need to be aligned. In our work, we propose a systematic approach for inter-perspective alignment.

The business motivation modeling perspective proposed here is based on the Business Motivation Model [16] that has also been adopted by the OMG. The business value modeling perspective is based on e^3value [7]. The business process perspective is not dealt with in this paper but could be represented with e.g. BPMN.

The main research objective of this paper is to define the notion of Business Value Rules (namely, business rules that have a direct effect on the value perspective), and to show how these rules influence the alignment process. We will investigate how business value rules influence the transformation of value models and help to bridging the gap between the business motivation and value models.

The paper is structured as follows. In Section 2, we describe the elements on which our proposal is based, namely BMM, e^3value, the notion of business rules and a previous approach [1] based on templates that describe how to systematically change the business value perspective in response to changes in the business motivation perspective. Based on these elements, we then define more precisely the research objective of this paper. Section 3 then describes the notion of Business Value Rule (BVR) and proposes a classification (taxonomy) of BVRs and a semi-formal textual structure (called "BVR template") for expressing them. Section 4 then illustrates how BVRs influence the alignment process by prescribing specific changes to the value model. Section 5 concludes the paper with discussions and perspectives.

All along the paper, we will use a toy case study in order to illustrate the ideas.

2 Research Background

2.1 Modeling Business Motivations

Business motivation modeling is a central and important aspect of enterprise solution development. Most of the concepts used in motivations modeling are also covered under goal modeling which is an initial phase in development of workflows or IT requirements. A number of approaches have been proposed to understand and model different motivation concepts [14, 4, 13]

The work presented in this paper is based on the Business Motivation Model (BMM) adopted by the OMG [16]. The purpose of business motivation modeling is to analyze, understand, and to design intentions, actions and relationships among them in semi-formal manner that can support vague representations by business domain experts wherever necessary. BMM provides a broad framework to model desired results that an enterprise wishes to achieve and possible courses of actions that it could perform in order to reach those ends.

Fig. 1 shows the main concepts of BMM relevant in our work. Business motivations can be categorized into two high level groups called *Ends* and *Means*. *Ends* are used to capture desired states that the enterprise intends to reach while *Means* are used to represents different *Courses of Actions* and *Directives* in order to reach aforementioned desired results.

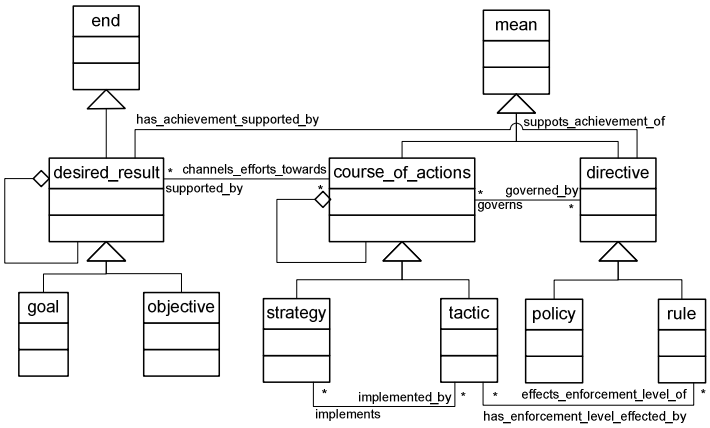

Fig. 1. Business Motivation Modeling Framework (derived from [16])

Within *Ends*, a distinction is made between *Goals* and *Objectives*. "A *Goal* tends to be longer term, and defined qualitatively rather than quantitatively. It should be narrow - focused enough that *Objectives* can be defined for it. An *Objective* is a step along the way towards a *Goal*. It must have an end date, and criteria to determine whether it has been reached or not. *Objectives* provide the basis for measuring whether progress is being made towards *Goals*." [16].

A *Course of Actions*, is a way of configuring some aspect of the enterprise (things, processes, locations, people, time) to channel efforts towards Desired Results. A distinction is made between *Strategies* and *Tactics*. "*Strategies* tend to be long term and fairly broad in scope. Each *Strategy* is implemented by *Tactics*, which tend to be shorter term and narrower in scope. A *Tactic* may contribute to the implementation of more than one *Strategy*." [16].

Fig. 2 Extract of BMM model from the MMGO case

Directives are categorized into *Business Policies* and *Business Rules*. "In general, *Business Policies* exist to govern – that is, control, guide, and shape – the *Strategies* and *Tactics*. They define what can be done and what must not be done, and may indicate how or set limits on how it should be done. Compared to a *Business Rule*, a *Business Policy* tends to be less formally-structured; it may not be atomic - i.e. not focused on a single aspect of governance or guidance - and may be less formally articulated."[1] [16]. Therefore, *business rules* can be considered as an actionable mechanism for making policies effective. Similarly, *business tactics* implements *business strategies*.

Fig. 2 shows an extract of a BMM model corresponding to the case study used in this paper. It shows the objectives of a Massively Multiplier Online Gaming (MMOG) company offering games online. We consider that the figure is self-explaining. For avoiding clutter, labels of relations among model elements are omitted.

2.2 Business Value Modeling

In enterprise solution development, business value modeling has been discussed in great lengths. There are different ontologies for conceptualization and different notations for business model specification in the literature (e.g. [9, 7, 13, 2]).

e^{3}value is one such ontology and aims at identifying exchanges of value objects between the actors in a business case in order to represent and analyze what value actors in a partnership network offer each other. It also supports financial profitability analyses of business cases represented as value models. The ontology was designed to

[1] The BMM notion of Business Policy that we adopt in this work is not exactly the same as proposed e.g. in [MPRA-paper] for the REA framework for enterprise planning. There, it is represented by fulfillment relationship and typification and grouping of REA elements.

contain a minimal set of concepts and relations to make it easy to grasp for its intended users. The e^{3}value model also includes a graphical notation to design business models. Fig. 3 shows an entity-relationship representation of the meta-model of e^{3}value. The basic concepts in e^{3}value are actor (an economically independent entity), market segment (set of similar actors), value object (something that is of economic value), value port (used by an actor to provide or receive value objects), value interface (grouping several in/out ports of an actor), value activity and value exchange (flow of a value object between one out port of an actor and an in port of another actor).

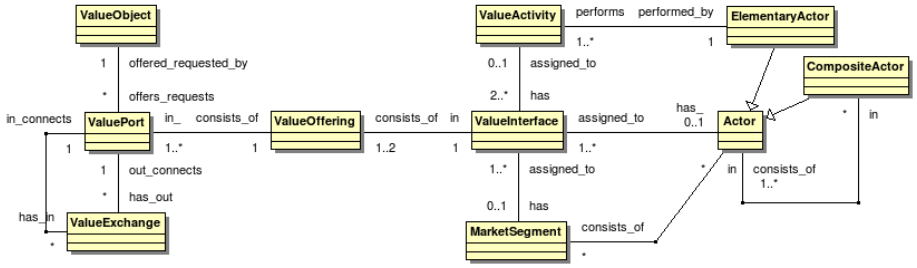

Fig. 3 e^{3}value meta-model (adapted from [10])

Fig. 4 depicts an e^{3}value model for the MMOG case. Actors are shown by rectangles, value activities by rounded rectangles, value ports by triangles, value interfaces by oblong rectangles enclosing directed value ports, and value exchanges as lines between value ports with the names of value objects as labels. In this business model there are two actors (Game Provider and Internet Service Provider – ISP) and a market segment (Customer). The Game Provider is responsible for producing the Game Content and selling and distributing its software on CDs to the customers. In order to play the game, the customers need internet access, which they get from the ISP. They also need access to the game server, which they get from the Game Provider.

2.3 Business Rules

Business rules in general are statements about guidelines and restrictions on the enterprise behavior [3, 15]. They are often implicitly captured across several enterprise applications. The importance of their formulation and explicit and separate management has been recognized [15]. They recently have been the subject of some standardization effort in the OMG and are mentioned as one important element of BMM [14] and are the central focus in SBVR [12]. Some ideas of using rules originate from the field of active databases where the notion of Event-Condition-Action (ECA) rules was defined [8]. Basically ECA rules express that when an event occurs, provided that a certain condition holds, an action should be performed. This kind of rules is used to describe quite operational, behavior-oriented and internal aspects of a database. However, the notion of business rule as currently advocated is different because, amongst others:

- it intends to focus on business aspects rather than only on technical/IT oriented aspects;
- it should allow to express rules in a declarative way rather than just in an operational/executable way;
- it does not considers only rules that should always be strictly enforced (constraints). Rules can be associated to different "levels of enforcement" representing the fact that they may or not be violated in some situations.

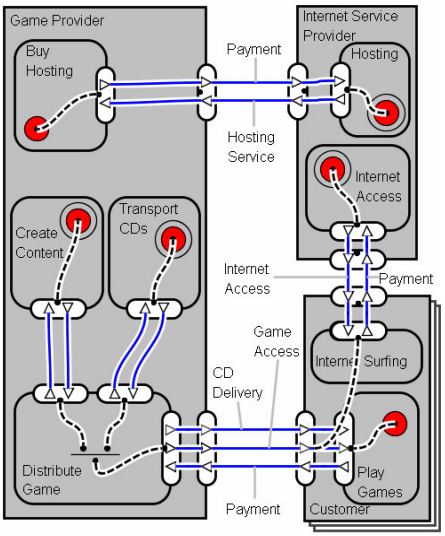

Fig. 4 Business Value Model for the MMOG case

Business rules are usually classified into three main categories: structural rules (constraints on static aspects of the business), derivation rules (allowing derivation of new information) and action related rules (expressing some restrictions on business actions or processes). As the main focus of this paper is on aligning the business value model onto the business motivations, we concentrate on business rules that have some effect on the resulting e^3value model. As we will argument later, these rules are always related to some value process. Consequently, we will only propose in Section 3.2 a template for description of action-related rules, without excluding the possibility of existence of the other two kinds of rules at the value model level. Other authors have also investigated the use of rules at the value level (see e.g. [17]) or how specific kinds of rules (such as ECA rules) can be used with benefits for defining control aspects in workflow models (see e.g. [6]).

2.4 Means Templates

The work presented in this paper provides an extension to a systematic approach [1] for systematic alignment of business motivation models and value models, based on a set of pre-defined templates, called the "means template approach". Here is a brief summary. For more details interested readers are referred to [1].

A means template describes some reusable knowledge about frequently considered means in business motivation models and how the value model has to be changed in order to make that mean "operational". A means template is made of two parts:

1. a so-called *compulsory part* that describes in structured (semi-formal) text, a means, identified in the BMM model as a way to attain certain business goals;
2. a so-called *optional part* (represented within square brackets) that describes alternative courses of actions that can be used to make the mean operational. Some of these courses of actions can themselves be means that can be described in other means templates;

Additionally, a template is associated to a set of *transformation rules* that describe precisely through a set of operations how the value model has to be changed when a particular course of action was chosen among the alternative ones[2].

There are nine templates categorized into three groups as listed below. As an example, template 1 says that if one wants to start offering a product (ValueObject1) to a customer (Actor1), she has to obtain this product either by using an existing activity (ValueActivity1), or start a new production activity or procure the product from a supplier (Actor2) and additionally she should get a compensation or payment (ValueObject2) from the customer.

Most templates have a "dual" template (e.g. template 2 is the dual of template 1).

Value Object Offering Means Templates

1. offer $ValueObject_1$ to $Actor_1$ [use $ValueActivity_1$ | produce $ValueObject_1$ | procure $ValueObject_1$ from $Actor_2$ AND receive $ValueObject_2$ from $Actor_1$]
2. stop offer $ValueObject_1$ to $Actor_1$ [stop procure $ValueObject_1$ from $Actor_2$ | stop produce $ValueObject_1$]

Value Object Procuring Means Templates

3. procure $ValueObject_1$ from $Actor_1$ [use $ValueObject_1$ in $ValueActivity_1$ | offer $ValueObject_1$ to $Actor_2$ AND provide $ValueObject_1$ to $Actor_1$]
4. stop procure $ValueObject_1$ from $Actor_1$ [stop offer $ValueObject_1$ to $Actor_2$ | produce $ValueObject_1$ in $ValueActivity_1$]

Value Object Producing Means Templates

5. produce $ValueObject_1$ in $ValueActivity_1$ [offer $ValueObject_1$ to $Actor_1$]
6. stop produce $ValueObject_1$ in $ValueActivity_1$ [procure $ValueObject_1$ from $Actor_2$ | stop offer $ValueObject_1$ to all]
7. (increase | decrease) produce of $ValueObject_1$ in $ValueActivity_1$
8. insource produce of $ValueObject_1$ in $ValueActivity_1$ [(increase) produce $ValueObject_1$ AND stop procure $ValueObject_1$ from *Actor*]

[2] Since these transformation rules are not in the focus of this paper, they will not be further described here. Please refer to [1] for details.

9. outsource [fraction of] produce of *ValueObject*$_1$ in *ValueActivity*$_1$ [(stop | decrease fraction of) produce of *ValueObject*$_1$ AND procure *ValueObject*$_1$ from *Actor* AND provide *ValueObject*$_2$ to *Actor*]

The means templates described above actually describe templates for tactics in the BMM sense because they concern courses of actions (what to do) described quite precisely (as opposed to strategies in BMM). They may therefore better be termed "tactics templates". It is important to note here that none of the templates currently includes elements related to BMM directives (which mainly control how or when things have to be done).

As an example of application of the templates, you can see that the e^{3}value model of Fig. 4 was partly created by applying templates under guidance of the BMM model of Fig. 2. Indeed, template 1 was applied to make the "Offer game access" means operational, choosing the "produce" option, thereby creating a new value activity called "Distribute game". Similarly, the mean "Procure hosting service from ISP" was made operational by applying template 3 (with the "use" option).

2.5 Research objective

Based on the elements presented in the previous sections, the objective of this paper is to investigate how business rules (one particular kind of BMM directives) influence the use of means templates in the transformation of value models. More precisely, this paper improves the work in [1] by:

1. Proposing a notion and classification of a certain type of business rules (called "business value rules" - BVRs), namely rules that are specifically relevant in the value perspective;
2. Proposing a semi-formal textual template for expressing BVRs;
3. Showing that BVRs can complement the means template approach in bridging the gap between the business motivation and value models;
4. Illustrating how BVRs may influence the choice of means templates to be applied in a value model alignment process and the choice among alternative courses of actions in the optional part of a means template.

3. Directive Aligned Business Value Modeling

3.1 Business Value Rule Categories

In Section 2, we briefly summarized some of business rules and rules related contributions in literature. However, the central focus of the work reported in this paper is on the alignment of business value design to capture business motivations. Therefore, our main consideration is given to rules that have direct impact on the business value model. They are referred to in this work as Business Value Rules and a

further classification is proposed below.

A sound *value process* classification is proposed in [2] distinguishing Transformation, Interface, Exchange, and Transaction processes. A *Transformation process* produces resources by consuming or using other resources and is typically depicted in e^{3}value inside a *value activity* (rounded rectangles) of a particular actor. An *Interface process* specifies give (*out-port*) and take (*in-port*) trading transfers happening at a particular *value interface* of a particular *actor* (oblong rectangle). An *Exchange process* connects one give transfer and one take transfer from two different *actors* (line connecting two rectangles; i.e. an *out-port* and an *in-port*). A *Transaction process* is consisting of several economically reciprocal *Exchange processes* between two actors (exchanges between two value interfaces of two actors for a particular trading).

Based on this value process classification, Business Value Rules could be classified into four categories depending on the kind of value process they govern. This classification is partially represented in Fig. 5.

Transformation Business Value Rules. Transformation Business Value Rules are the rules that govern value creation activities in an actor of the Business Value Model. This rule category could be seen as prerequisites and conformance requirements for transformation processes. As an example, "Prohibit game content delivery before censoring the game story" could be considered as a transformation business rule governing the "Create Content" value process in the Game Provider. The rule explained in this example governs the order of execution of value processes "Game story censoring" and "Game content delivery" which are sub-processes of "Create Content". Here, the content creation is prohibited until censoring is completed. This example is further explained in detail in section 3.2.

Interface Business Value rules. Interface Business Value Rules are the rules that capture the requirements governing the sequence of occurrence of value transfers at *in-ports* and *out-ports* of a particular *value interface* of a particular actor. Assuming that CD delivery contains software to permit online game access, an Interface Business Rule may enforce that"game accesses are deferred until CD delivery" in Game Provider.

Exchange Business Value Rules. An Exchange Business Value Rules governs a value exchange between two actors. These rules have an impact on both actors that participate in a given value exchange and an example could be a rule to "avoid kids' accesses to the online gaming during school hours". This will be illustrated in detail in section 3.2.

Transaction Business Value Rules. An economic value exchange is not occurring in isolation. There is always an economic reciprocity between two or more exchanges between two actors and Transaction Business Value Rules govern such bundles of exchanges. For example, there could be a Transaction Business rule demanding "complete a down payment for full online game accesses".

The definition of Transformations Business Value Rule and Interface Business Value Rule categories are mainly based on single actor's perspective as they are to govern the processes of a particular actor. Exchange Business Value Rule and Transaction Business Value Rule categories are defined from the perspectives of two *actors* in binary business collaborations.

3.2 Business Value Rule Template

In compliance with BMM, we also adopt flexibility to capture *business policies* and *business strategies* expressed in natural language. However, similarly to the use of structured text in Means Template (see Section 2.4), we also propose to use a textual template structure to capture actionable concepts in BMM, in this case, *business rules*. The intuition behind the formulation of the business rule template proposed below is that the effect of a BVR is on an enterprise's value processes. A Business Value Rules can be described with the following template:

<Enforcement Level, [Condition],
Business Rule Statement Type, Value Process, [Restriction Statement]>

The condition and the restriction statements are optional. Enforcement Level could be one of the six levels that have been proposed in BMM [16] (going from "strictly enforced" through "pre-authorize override" to "guideline"). The Condition must hold for the rule to apply. It is typically defined by using features of business objects. The Business Rule Statement Type is one of "Obligation" (the Value Process must be performed if the condition holds), "Prohibition" (the Value Process cannot occur) or "Restriction" (the execution of the Value Process is constrained in some way). The Restriction statement is mainly used if the rule is of the Restriction type and describes the restriction that applies on the Value Process (e.g. limited duration, constraints on business objects manipulated by the process, …).

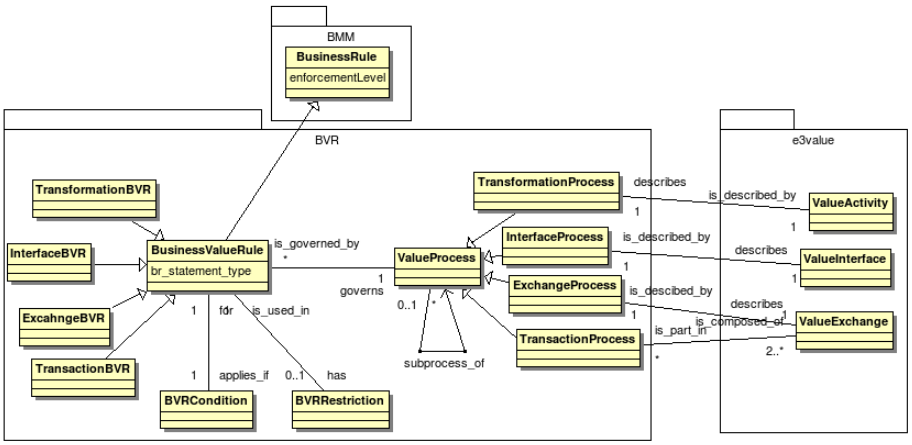

Fig. 5 UML Meta-model for Business Value Rules and relations to the meta-models of BMM and e^{3}value.

The abstract syntax of this template and how it relates to BMM and e^{3}value concepts are also represented on Fig. 5. A Business Value Rule inherits the semantics and properties from the notion of BMM Business Rule. The Value Process governed by a BVR is either a complex value process (decomposed into sub-processes interesting to consider in the value perspective) or a process of one of the four types described in Section 3.1. When it is a Transformation Process, it can be related directly to a Value Activity in the business value (e^{3}value) model. If it is an Interface process, it can be related directly to a Value Interface. An Exchange Process relates to a Value Exchange and a Transaction Process relates to several Value Exchanges (at least two).

Some examples of Business Value Rules captured according to this template are listed below. In Section 4.2 one such Business Value Rule's application is illustrated in details with its impact on the Business Value Model.

1. <Strictly, ContentType="for kids", Obligation, ContentCensoring, - >
2. <Strictly, ContentType="for kids", Restriction, Create Content, "ContentCensoring prior to Game Delivery" >
3. <Deferred, 07:00<AccessTime<14:00 AND Customer.Age<18, Prohibition, GameAccess, - >
4. <Pre-Authorized, Maintenance=ON, Restriction, GameAccess, 10% of full potential>

The first two rule capture obligatory content censoring for game content creation for kids. These rules have to be enforced strictly for all kids' game creation. The first one (an obligation) states that censoring must be executed when content is for kids. The second one (a restriction) says that the censoring must be performed prior to the Game delivery. The third rule is explained in details in the next section. The fourth rule is about restriction of game access service provision (to one tenth of the total capacity) during maintenance period with pre-authorized overriding by the system manager.

The rule template we are proposing here is inspired by some existing approaches for defining rules associated to actions (mainly ECA rules and SBVR). Compared to the above template, ECA rules correspond mainly to "Obligation" kind of rules without specification of the enforcement level (which is usually interpreted as "strict" in ECA). A small difference is that in our template, an obligation does not correspond to the triggering of a process but rather to a responsibility to execute a value process, without expressing when. SBVR [12], a companion standard to BMM, defines "Operative business rules" that can be obligations and prohibitions (and restricted permissions). Compared to SBVR, our template is more basic but also more intuitive, partly because it is intended only for representing business value rules (whereas SBVR allows the representation of many other aspects such as e.g. structural rules and advices).

The motivation of our proposal to capture Business Value Rules through the proposed template is that these rules have an impact on the resulting Business Value Model. However, as illustrated in the next section, such an impact may vary with the business motivation context that we take into account for a case at hand.

4. Application of Directives

In this section, we illustrate how BMM directives can be captured and then influence the changes made in business value models. For the demonstration purpose, we here suppose that the policy to demote kids accesses to online gaming during school hours (already introduced in Section 2.1) has just been added to the BMM model because e.g. of a new regulation imposed by the government. Two main goals (an externally influenced goal to promote school education and an internal goal of sustainability of MMOG) have been detailed.

First, the policy to demote accesses in school hours to support achieving the goal to grant *Priority to school education* could be realized through the business rule to prohibit accesses during 0700 to 1400 by school kids. This rule was used as the second example in section 3.2. According to the Business Value Rule classification proposed above this is an Exchange Business Rule where the activity, Give Game Access (activity at *out-port* of the Distribute Games value activity interface of Game Provider) and the activity Take Game Access (activity at *in-port* of the Play Games value activity interface of Customer) are affected[3]. Indeed, the amount of occurrences of these activities (the time spent playing) will decrease, which has a direct effect on the revenue of the company.

This rule therefore has direct effect on the value activities Play Game of Customer Market Segment and Distribute Game of Game Provider. Treating this in isolation could result in in first scenario in which following means template defined in [1] would be applied:

Decrease produce of *GameAccess* in *DistributeGame*

This expresses that the amount of connection time (and consequently the associated revenues) would be reduced in the future. And as a result of the shrinking number of exchanges, there would be a need to reduce the associated outsourced hosting service. This leads to complete the following means template as well:

Decrease buying of *HostingService* in *BuyHostingService*

As consequences due to these two means realization, MMOG may also decrease its profits resulting in difficulties in achieving one of its goals: “Sustainable Business” (already introduced in Section 2.1). However, as shown in Fig. 6, there are other goals that the MMOG enterprise intends to achieve and that diminish the probability of this first scenario.

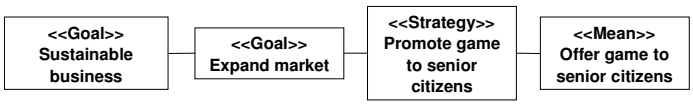

Fig. 6 Possible Additions to the Business Motivations for MMOG Case

[3] It should be noted that these activities do not appear explicitly as activities in the value model. But in a corresponding business process model, they would appear because exchanging value objects obviously requires doing something (for both actors). In relation to the meta-model of figure 5, they would be described explicitly as instances of the Value Process class.

For instance when targeting to achieve sustainability, the enterprise may not wish to get reduced production as a result of a shrinking of the activity of a particular market segment (in this case, school kids). On the contrary, it may try to achieve another sub-goal: Expand Market. One strategy to support that goal could be to *Promote* the service *Among Senior Citizens* (another market segment) to compensate for the shrinking.

This could lead to a split in the current market segment and allow the enterprise to treat Students and Senior Citizens separately or if not delivering to senior citizens at the moment, introduction of a new market segment.

It is clear that these business directives need to be considered when constructing complete and relevant business value models. By comparing the Business Value Model before applying changes in the Business Motivation Layer (Fig. 4) and after the application (Fig. 7) we can notice visible changes (such as a new market segment, new value exchanges, etc) resulting from the application of means templates on the basis of the extended motivation model. For example, the mean "Offer game to senior citizens" was made operational by applying template 1 and reusing the value activity "Distribute game" to deliver the Game Access to the Senior Citizen. This resulted amongst others in the creation of the "Senior Citizen" market segment.

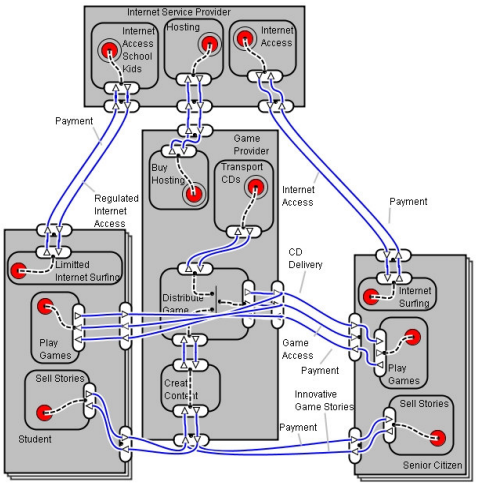

Fig. 7 Final Business Value Model for the MMOG Case

5. Conclusion and Discussion

The main argument of this paper is that business motivations are critical in developing Business aligned IT solutions. We have proposed a systematic approach to model business directives by means of business value rules. Further we have illustrated how the resulting business value model could be aligned according to the captured business value rules. This approach can be considered as an extension to the Means Templates methodology proposed in [1] to accommodate business directives.

Relating and aligning a business motivation model and a value model is not necessarily an easy task because these two perspectives do not obviously share the same concepts. It is in particular not easy to create a BMM model and to identify the appropriate tactics and rules. This is usually done through a top-down decomposition of higher level concepts such as vision, strategy and policies. Ensuring that this process leads to a complete set of rules can be challenging.

This paper contributes in helping to solve the alignment by proposing a methodology with a number of benefits:

- *Uniform Framework and Separation of concern*. The framework provides separation of concern into Business Motivation, Business Value and Business Process Modeling layers while proposing a link between Business Motivations and Business Value Modeling promotes unification in modeling concepts. The notion of business rule in BMM is very generic and can be used to model directives at various abstraction levels (from the motivation perspective through to the process perspective and even down to the IT level). BMM provides little guidance on how to identify rules. Making a distinction between various kinds of rules (namely BVRs and process perspective related rules) helps in identifying appropriate rules by focusing on the value perspective only. Since BVRs are based on the concepts of the value model, the value model itself provides the base for identifying the rules, rather than trying to express rules without any starting point.
- *Business Value Rules Classification*. Business Value Rules Classification supports business designers in making precise specifications of business directives from single actor's and multi actors' perspectives in binary collaborations. The categories can serve as a checklist of kind of rules that may exist, therefore helping to attain a more complete set of BVRs;
- *Semi-structured textual template*. The template allows and easy expression of Business Value Rules;
- *Knowledge reuse support through Mean Templates*. The means template approach helps to identify course-of-actions and supports the development of well-founded business value models;
- *Traceability*. The proposed unified framework supports traceability between the different modeling layers.

The work that we reported in this paper still needs a number of issues to be addressed through future work. Validation of the approach is obviously still limited. More exhaustive empirical studies need to be performed to test the completeness and capability of the proposed templates to capture and to represent business domain knowledge. In particular, the completeness of the proposed BVR categories and the expressiveness of the proposed BVR textual template need to be further investigated. We intend to test this by considering several application cases either real or presented in the literature about business rules and value models. The transformation of elements from the motivation and value perspective to the process level also requires attention in the future. Finally, the completeness and appropriateness of the means template catalogue requires further consideration to allow larger knowledge reuse in Value Models design.

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