BUSINESS MODEL DESIGN AND EVOLUTION

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ABSTRACT

In today's rapidly evolving world, companies need to constantly adjust their business models to changes in their environment. A good approach to evolving business models strikes a balance between capitalizing on new opportunities, and preserving investments in existing business processes. In this paper we argue that the User Requirements Notation (URN) provides such an approach. URN supports the modeling and analysis of user requirements in the form of goals and scenarios. Goals can be used to model high-level business (as well as system-level) objectives, and scenarios to describe the business processes to meet those goals. The approach is lightweight, and allows the quick evaluation of business model alternatives. Business models are represented in terms of actors and their dependencies, which correspond to value flows between the actors. Those value flows can subsequently be refined into business process activities. The approach gives business managers a tool for the systematic and incremental evolution of business model alternatives for their organizations. It allows them to model the strategic options available to them, and the conditions for their successful application.

INTRODUCTION

The objectives of this paper are to:

— introduce a lightweight approach for evaluating business model alternatives.

— demonstrate with an example how the approach allows business managers to model the strategic options available to them, and the conditions for when they apply.

The focus of this paper is on the early stages of business model design given a set of business objectives and informal requirements. We describe how a business model can be represented in terms of actors, the goals of those actors, and the dependencies between actors in achieving those goals. The dependencies indicate value flows between the actors, which can subsequently be refined into business process activities. In this paper, we do not discuss those later refinement stages, but refer the reader to our recent work on business process modeling using URN (Weiss and Amyot, 2005).

The paper first provides a short introduction to URN, illustrates business model design using goals, and introduces the supply chain management case study. It then discusses business model evolution and describes how URN allows stakeholders (such as a manufacturer) to experiment with different business model alternatives from their perspective. A brief overview of related work and conclusions follow.

USER REQUIREMENTS NOTATION

The purpose of URN is to support, in a semi-formal and lightweight manner, the modeling and analysis of user requirements in the form of goals and scenarios. URN has many concepts relevant for business process modeling, such as behavior, structure, goals, and non-functional requirements. URN combines two complementary notations.

The *Goal-Oriented Requirements Language* (GRL) is described in (URN Focus Group, 2003) and summarized in Figure 1. GRL captures business or system goals, alternative means of achieving goals, and the rationale for goals and alternatives. The notation is especially good for the modeling of non-functional requirements. It provides a higher, strategic level of modeling of the current system and its future evolution.

GRL originates from the Non-Functional Requirements (NFR) and *i** frameworks (Chung *et al.*, 2000), and supports multiple types of diagrams. Actor diagrams are used to model the *strategic dependencies* between actors, as well as the internal goals of individual actors. Rationale diagrams are used to compare architectural alternatives. They allow us to model the impact of each alternative on high-level business or system goals.

The second part of URN is the *Use Case Map* (UCM) notation, described in (URN Focus Group, 2003b). This notation was first proposed to capture emerging behavioral scenarios during the high-level design of distributed object-oriented reactive systems (Buhr, 1998). It was later found to be an appropriate notation for describing operational requirements and services. A UCM model depicts *scenarios* as causal flows of responsibilities that can be superimposed on underlying structures of components.

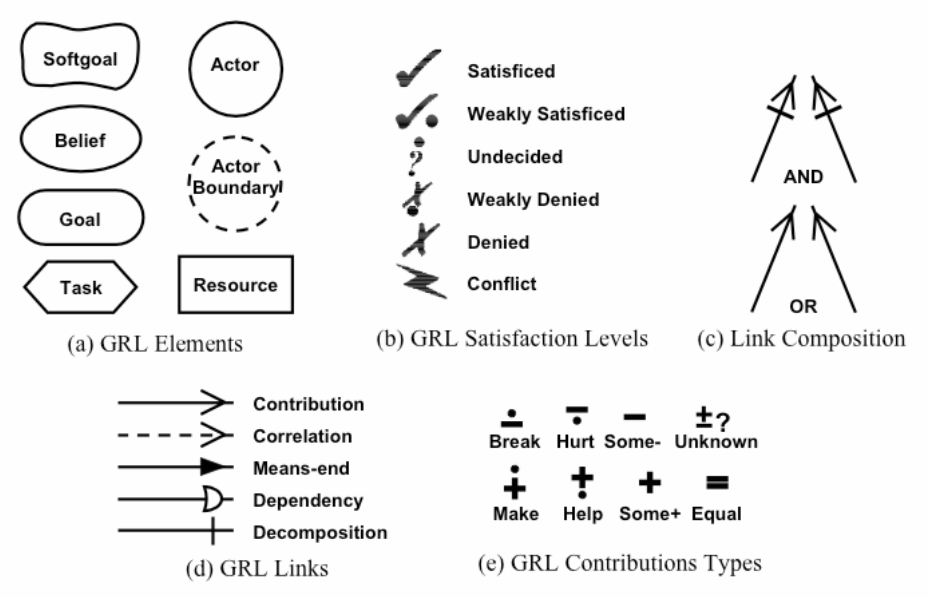

Figure 1. Elements of the Goal-Oriented Requirements Language

As noted earlier, our emphasis in this paper is on modeling strategic options and the conditions on applying them. For this reason, we will not discuss the refinement of GRL models into UCMs in this paper. However, interested readers are referred to the URN tutorial by (Amyot, 2003) for a general overview on the use of UCMs in URN, and to our work on business process modeling using URN (Weiss and Amyot, 2005).

BUSINESS MODEL DESIGN

In this section we focus on modeling the current business (its evolution is discussed in the next section). We also introduce the supply chain management case study.

We adopt the definition of an *(e-)business model* from (Weill and Vitale, 2001) as a set of participants and the flows between them. The participants include the company whose business model we are describing, its customers, suppliers, and allies or intermediaries. Value is created in the form of information, product, and money flows between the participants. At present, we do not represent the type of value flow in our GRL models (they are expressed in abstract terms as actors dependencies).

Figure 2 shows a GRL actor diagram for a manufacturer that sells to stock via warehouses and retailers. This model represents each participant in the business model (consumer, retailer, warehouse, and manufacturer) as an actor, and indicates their dependencies. Thus, for example, the Consumer depends on the Sales Support provided

by the Retailer, whereas the Retailer relies on the Consumer to Receive Payment. The half-moon symbol indicates the direction of the dependency.

Given the dominant role that the intermediaries (warehouse and, in particular, the retailer) play, we will also refer to this business model as the **R** (Retailer) strategy. In this business model the retailer controls the customer relationship. On the demand-side, customers benefit because the retailers offer a one-stop shopping portal, and support them during product selection. On the supply-side, the retailer gives warehouses access to consumers, and to high-volume sales. The manufacturer benefits from this arrangement as it gains in market share, and demand fluctuations are buffered by the warehouse.

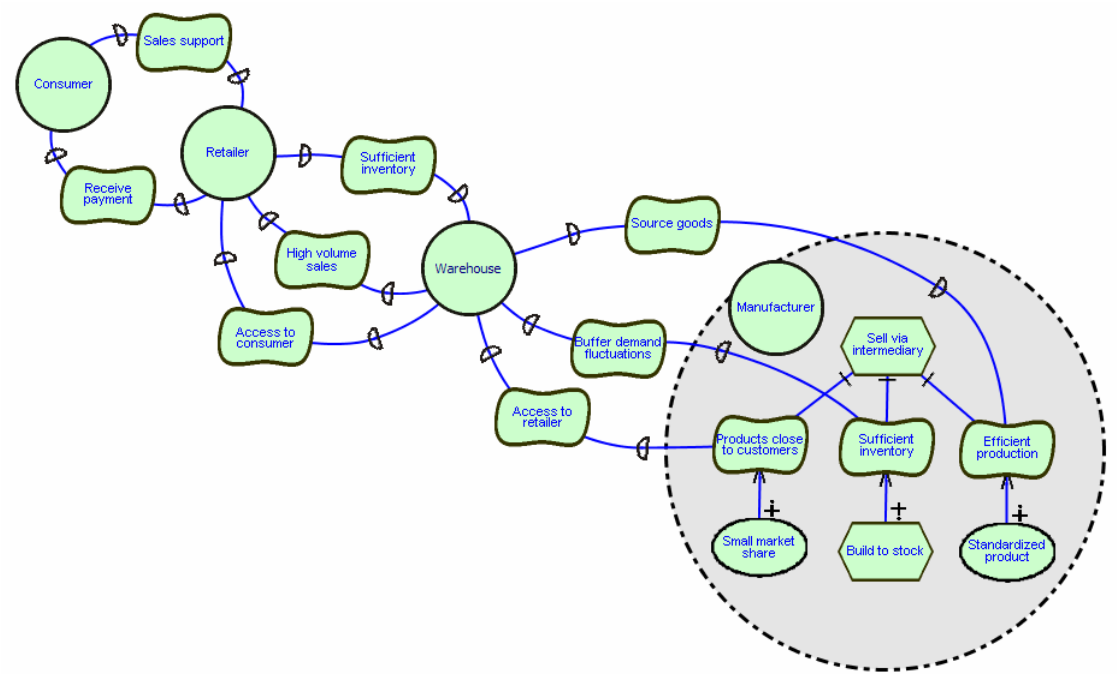

Figure 2. GRL actor diagram for the **R** strategy (sell to stock)

In addition to dependencies, actor diagrams can also show the internal goals of a particular actor. Here, the main actor of interest, the Manufacturer, is expanded (its boundary is shown as a dotted circle partially under to the actor) to reveal its internal goals. There are two tasks (hexagons) that the manufacturer performs, Sell via intermediary and Build to stock. The Sell via intermediary task is decomposed into three softgoals (where softgoals, shown as clouds, are goals that can never be fully satisfied).

Tasks, goals, and softgoals can be recursively refined via such decomposition. As shown in the diagram, the manufacturer wants to position its Products close to customers, as supported by the Access to retailer that the warehouses provides (modeled as a dependency). This goal is also guarded with two preconditions (Small market share

and Standardized product) modeled as beliefs (ellipses). This allows us to state that the goal is only an appropriate business objective for a manufacturer who does not have a recognizable brand in the marketplace, and a correspondingly large market share, and who offers undifferentiated products, and is thus likely to focus on Efficient production.

The manufacturer also ensures Sufficient inventory by building products to be held in inventory (modeled as the task Build to stock). The inventory levels try to anticipate the market demand. However, as there can be unexpected changes in the demand, the manufacturer relies on the warehouse to Buffer demand fluctuations. Preconditions for this business model are modeled as beliefs and connected to other model elements through *make* contributions. Therefore, the *levers for evolving this business model* are strategic moves that increase the market share or make the product more differentiated.

BUSINESS MODEL EVOLUTION

This section discusses business model evolution and describes how URN allows stakeholders to experiment with different business model alternatives.

Consider the strategic options for evolving the current business model implied by the actor diagram in Figure 2. The levers for evolution are changes to either one or both of the two preconditions, Small market share, and Standardized product. Both options also result in increasing control over the customer relationship as they are applied. The possible evolutions of the business model are summarized in Figure 3 below.

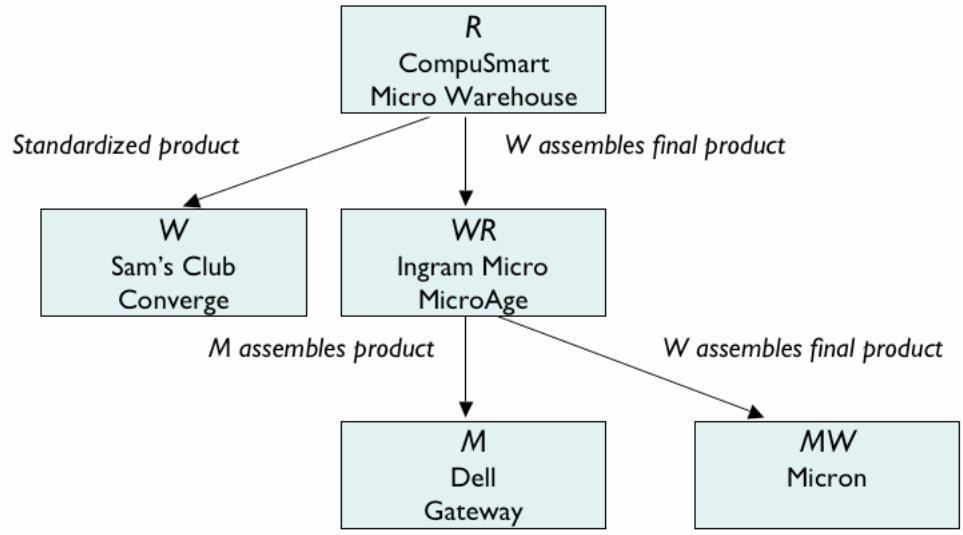

Figure 3. Possible evolutions of the current business model

The arrows indicate the evolution between these business models, and the labels on the arrows characterize the nature of the transition between the models. For example, the transitions from **R** to **W**, and **R** to **WR**, are both about increasing market share. However, in the former the manufacturer keeps selling a standardized product, whereas in the latter, it can offer a differentiated product. It is the warehouse that assembles the customized product. In both options the warehouse (**W**) keeps control of order processing.

The manufacturer could increase its market share by partnering with a warehouse. In the **W** strategy, the warehouse now owns the relationship with the customer, and its implications for the manufacturer are in many ways similar to the **R** strategy. However, a higher revenue can be expected due to the shorter supply chain. The manufacturer also keeps selling a standardized product. In the **WR** strategy, the warehouse assumes additional responsibilities such as (partial) product assembly. The main difference from the **W** strategy is that the manufacturer can now (via the warehouse) offer a customized product, and can strengthen its market position against competitors who do not.

Of greater interest to the manufacturer, however, should be the third option (**MW**). In this strategy the manufacturer is in the driver's seat. It sells its products directly to the customer, but, in part to share revenue risks, and in part to leverage the distribution experience of a warehouse partner, it outsources distribution to a warehouse. Traditional shipping service providers such as Micron's partner FedEx have developed additional capabilities to manage the inventories of their clients.

The most evolved of these strategies (**M**), however, is to assemble all key responsibilities (order processing, inventory management, and production) within the manufacturer. Note that this does not necessarily imply that the manufacturer handles the physical product, but refers to the control the manufacturer exerts over the information flow in the supply chain. The manufacturer could manage a virtual value chain.

The impact of choosing any of these alternatives can be analyzed within an actor diagram. The GRL model for the **M** strategy is shown in Figure 4. It shows that the benefit of selling direct via an internal warehouse allows the manufacturer to Provide tailored services, Collect customer data, achieve high rates of Repeat business, and sell at a Low price, while realizing a high margin. The latter is the result of only assembling a product upon receipt of a firm order (Build to order), and efficiencies in inventory levels (Low inventory), as well as the float resulting from receiving Advance payment.

However, the **M** strategy can only be adopted, if two preconditions are met: that the manufacturer already has a Large market share, and can offer a Differentiated product.

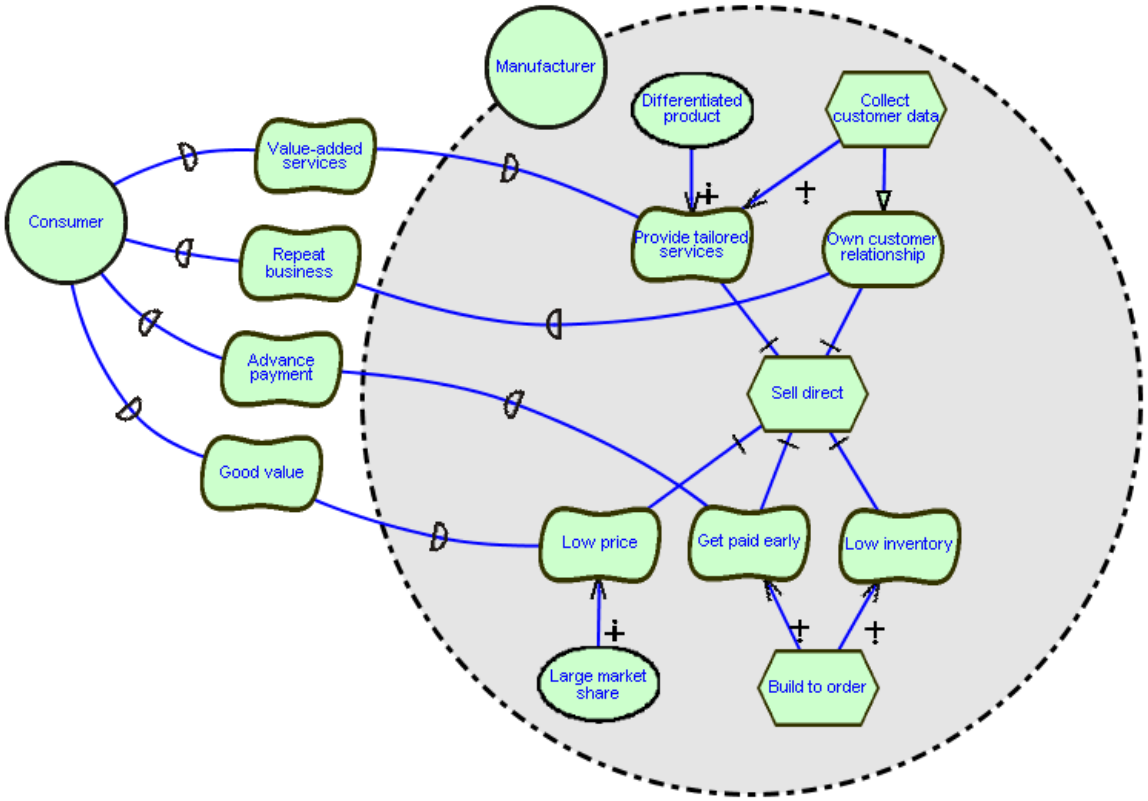

Figure 4. GRL actor diagram for the **M** strategy (sell-to-order)

To compare the business model alternatives we use a GRL rationale diagram. For reasons of space, we will only consider the two extreme strategies, **M** and **R**. Figure 5 summarizes the impact of choosing either alternative two business objectives: High Profitability and Low Risk. High Profitability can be achieved by increasing revenue (High revenue), or reducing cost (Low cost). The contributing factors of these goals are the five subgoals of Sell direct identified in Figure 4. However, the model also indicates a key obstacle for evolving quickly from the **R** to the **M** strategy for manufacturers with existing resellers: Channel conflict, which (on opting for **M**) results in Lost sales.

For a full understanding of the implications of each business model alternative on the underlying business processes, we also need to look at the UCM scenario models at the next level of refinement. In order to support our goal of protecting the investment and organization has made in its existing business processes, we do not want the business processes to change significantly as we evolve our business model. In related work (Weiss and Amyot, 2005), we present evidence that we can use the *same* scenario to describe *different* business models at the level of the business architecture. This property of UCM models lays the basis for the incremental evolution of the business model.

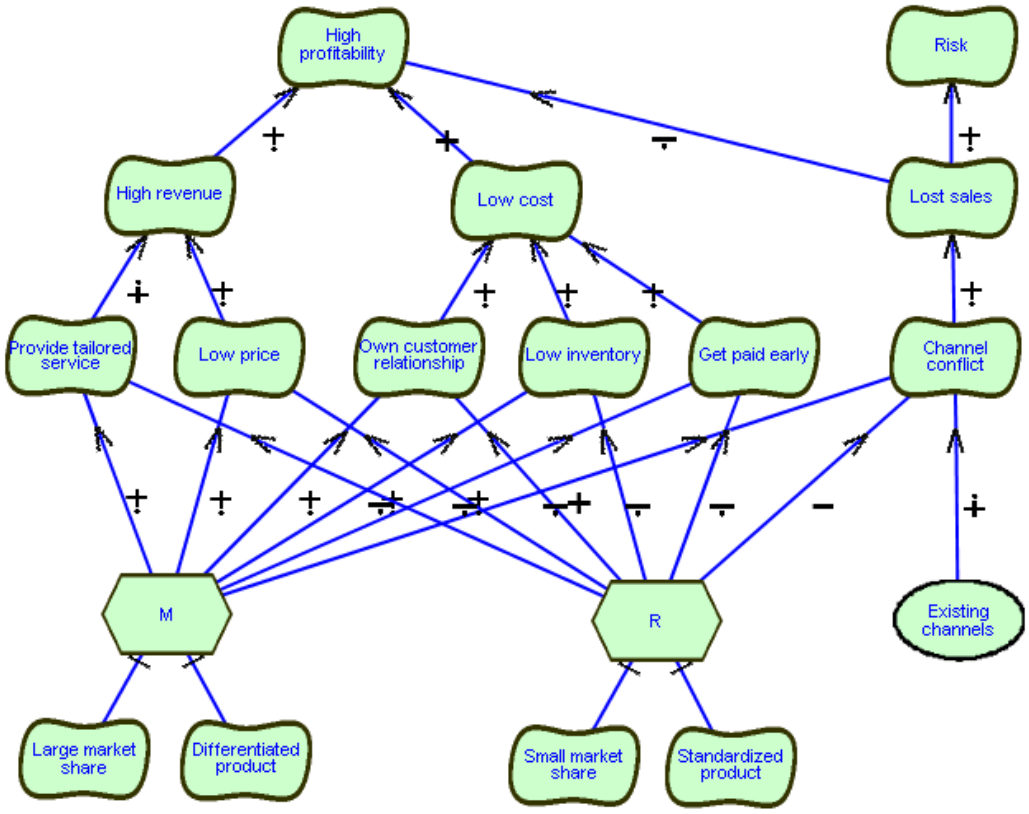

Figure 5. GRL rationale diagram for comparing the **R** and **M** strategies

RELATED WORK

The application of use-case driven design to business process reengineering has been proposed by (Jacobson *et al.*, 1995). However, the use case approach has a number of well-known disadvantages that can be averted by using UCMs to model the early requirements of a business process. Use-case driven approaches also seldom provide notions of modeling design goals and linking them to other design artifacts, as in URN.

Conceptual value modeling or *e3-value* (Gordijn and Akkermans, 2003) provides means to evaluate the feasibility of an e-business model focusing on the creation, exchange, and consumption of objects (i.e., the revenue streams) in a multi-actor network. *e3-value* uses scenarios to model causal flows. It also provides a means for performing value-based trade-offs. However, unlike in URN, value is mainly expressed in monetary terms; other non-functional goals cannot be modeled directly.

The Strategy-oriented Alignment in Requirements Engineering (SOARE) approach (Bleistein *et al.*, 2004) uses GRL to link requirements for strategic-level e-business systems to business strategy, as well as documenting recurring patterns of best business

practices. They explore goal modeling for providing traceability and alignment between strategic levels (business model and business strategy) and tactical and operational ones (business process model and system requirements). This work is still preliminary and does not address how goals are converted to operational requirements.

SUMMARY OF THE APPROACH

Our approach for business model design and evolution can be summarized as follows:

1. Model the current business by capturing its business objectives and informal requirements in terms of actors and their strategic dependencies in an actor diagram.
2. Document the internal goals for the actor of interest, as well as of any other actors when it further understanding of the current business situations.
3. Model the preconditions associated with the actor diagram. Changes that can be made to these provide the strategic options for evolving the business model.
4. Explore the application of those strategic options in a series of business model alternatives (which can be related to one another in a line of evolution).
5. Compare alternatives by assessing their implications using a rationale diagram. Include in the model the preconditions that drive each business model.
6. Perform a qualitative evaluation[1] of the rationale diagram to determine the best next stage of the evolution of your business model as well as any associated risks.

As discussed earlier, for a full understanding of the implications of each business model alternative, we also need to look at the refinement of the GRL models into UCM models. The above steps only cover modeling of the *strategic options*. A full picture of the business situation emerges only from a combination of both approaches.

CONCLUSION

The approach described in this paper gives business managers a conceptual tool for the systematic and incremental evolution of business model alternatives for their organizations. We have illustrated the approach with a supply chain management case study. However, its capabilities are in no way limited to supply chain scenarios. Evidence

[1] The Organization Modeling Environment (OME) tool (Yu and Liu, 2005), which we used to generate the GRL models in this paper, also supports the qualitative simulation of those models.

of that is the variety of applications to which URN has been put previously as summarized in (Amyot, 2003). One objective for future work is to analyze various other business situations such as the (expected) evolution of the wireless payment industry.

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