Capturing Consumer Preference in System Requirements Through Business Strategy

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ABSTRACT

A core concern within Business-IT alignment is coordinating strategic initiatives and plans with Information Systems (IS). Substantial work has been done on linking strategy to requirements for IS development, but it has usually been focused on the core value exchanges offered by the business, and thus overlooking other aspects that influence the implementation of strategy. One of these, consumer preferences, has been proven to influence the successful provisioning of the business's customer value proposition, and this study aims to establish a conceptual link between both strategy and consumer preferences to system requirements. The core contention is that reflecting consumer preferences through business strategy in system requirements allows for the development of aligned systems, and therefore systems that better support a consumer orientation. The contribution of this paper is an approach to establish such alignment, with this being accomplished through the proposal of a consumer preference meta-model mapped to a business strategy meta-model further linked to a system requirements technique. The validity of this proposal is demonstrated through a case study carried out within an institution of higher education in Sweden.

Keywords: consumer preference, business strategy, strategy maps, balanced scorecards, i*, meta-model.

INTRODUCTION

Value proposition describes how a business delivers unique value for a distinct set of uses or a distinct segment of customers enabled by their strategy (Porter, 2008). A unique offering is generally framed around an economic value exchange expressed quantitatively, as an amount in goods, money, services or rights, considered as a suitable equivalent for something else: a fair price or return for an investment (McCarthy, 1982). In contra poise are qualitative measures, which detail how a good or a service is delivered to, or perceived by, the consumer. These include non-economic values (Afuah & Tucci, 2003), internal values (Ilayperuma & Zdravkovic, 2010), and consumer values (Holbrook, 1999), among others.

Kotler (1991) considered consumer preferences as playing a key role in business; as the key motivator behind, and the primary driver within, economic value exchanges, these induce the consumer to seek solutions to fulfill their needs. For a business to deliver on its value proposition by successfully providing those fulfilling goods or services which consumers desire in the method and manner which they prefer, it is necessary for it to create a supporting infrastructure, a key component of which are often information systems. More recently, evolving these ideas, Kotler, Kartajaya, and Setiawan (2010) have stated that the next phase of marketing will be values driven, an evolutionary step from the original product-centric and the latter consumer-oriented types. They claim that collaborative consumers, savvy in the tools of the Internet that rapidly evolved in the past decade, and living in the age of globalization as part of a creative society, are driving companies to design their propositions around values.

Book selling, which is highly dynamic and price-sensitive, can illustrate the significant impact consumer preferences can have on the IT systems created by businesses to deliver their value proposition to customers. *Borders* was the largest bookseller in the United States, but they missed the shift of their business from physical locations to e-sales, going so far as to completely outsource their online store to *Amazon*. Shopping online instead of in bookstores became appealing to consumers for reasons such as convenience, while the core value exchange remained money for books. However, a brick-and-mortar competitor *Barnes & Noble* did not overlook this shift in consumer preferences and extended its traditional business into the online world while preserving its bookstores. The final outcome was that *Borders* recently went out of business (Merced de la & Bosman, 2011). Moreover, *Apple's* late move into e-book selling necessitated that it either improve convenience or choose other values to attract consumers, thus to better compete with *Amazon* and *Barnes & Noble*. As a consequence, *Apple* recently put forward the idea of providing books to consumers directly from the authors via its online platform, aiming to attract consumers based on how acquiring books directly from the authors is perceived, thus aiming at values different than simple convenience (Neumayr & Monaghan, 2012).

In both cases, targeting particular consumer preferences suggested that the business (re) designed their systems to support the provision of these values. *Amazon* set up its entire business around this shift in consumer preferences towards greater convenience, and soon dominated online book selling. Entirely new capabilities have been developed to purchase and deliver e-books, something for which *Amazon's* original infrastructure for processing and shipping physical goods would not have been designed. This shift has lead *Amazon* to the top of

online sales of both physical and e-books. Similarly, to better support their e-publishing idea, *Apple* had to not only leverage the wide popularity of their authoring tools among book authors to create features that would allow them to publish and sell to their readers directly via Apple's online platform, but they also undertook the myriad changes to their existing products and introduced new ones. All of these necessitated changes to the underlying architecture of Apple's online delivery platform. While in both instances the core value exchange remained money for books, the preferences making this exchange appealing changed greatly among consumers.

These examples highlight the variability of consumer preferences and show how they directly influence the success of the value proposition via the attendant value exchange. Such success depends on an enterprise's capability to utilize its IT systems to efficiently marshal its resources and aid effectively on presenting, and delivering upon, its value proposition to consumers. Conversely, overlooking, not supporting, and/or not maintaining consumer preferences can lead to catastrophic consequences, such as in the example of *Borders*. These examples also illustrate how consumer preferences impact business decisions, which results into either building new or altering existing information systems to support and maintain the fulfillment of these consumer while at the same time remaining aligned to their business strategy.

Despite the significance of business-IT alignment, a concern both for top management (Luftman, Kempajah, & Nash, 2005; Luftman & Derksen, 2012) and IT executives (Tallon & Kraemer, 2003), few proposals addressing this concern have been widely accepted, such as the Strategic Alignment Model (SAM) (Henderson & Venkatraman, 1993), and the Business IT Alignment maturity model (Luftman, 2004). However, to the best of the authors' knowledge, there exists no systematic approach capable of capturing consumer preferences and presenting these to the business at an appropriate level in an understandable way, such as through requirements for developing information systems. Such an approach would allow building new or altering existing information systems to support the fulfillment of consumer preferences while aligned with their business strategy, thus delivering on their value proposition.

The goal of this paper is to propose *an approach for an enterprise to establish a relationship between consumer preferences and system requirements within the scope of its business strategy* by extending the work of (Svee, Giannoulis, & Zdravkovic, 2012). The approach proposed in this study leverages characteristics from model-driven development such as traceability and goal orientation. Relating consumer preference to business strategy and then deriving system requirements provides reason to systems developed beyond functionality. . Moreover, this increases the understandability of particular system features and the need for the change (if any) for architects and developers. Such linkage also allows for the evaluation of features and/or changes towards strategy (e.g. strategic goals, targets and objectives for balance scorecards, value proposition, etc.), making changes less prone to creating problems.

Traceability enhances maintainability and adoptability of systems over possible consumer preferences being trailed to both strategy and requirements (Atkinson & Kühne, 2003), which allows for their prioritization and the consequent allocation of effort and resources. This allows companies to focus on what consumer prefer. Such consumer preference-oriented system features become explicit, making the impact of their modification traceable, which allows for impact assessment (e.g. system disruptions, conflicts, etc.).

Goal orientation enhances the association of desired functionality of systems to strategic goals by reinforcing the evaluation of system features towards business strategy (how well do systems support/enhance/implement strategy?) as well as strategy towards consumer preference (how well does strategy satisfy/consider what consumers desire or value most?).

This work follows *Design Science (DS)* as a research methodology, which suggests an innovative solution is proposed to solve a problem of general interest (Hevner, March, Park, & Ram, 2004). As such, the research framework followed includes five design cycle steps (Vaishnavi & Kuechler Jr., 2007), all-present in this study.

The layout of the paper is thereby aligned with the five design cycle steps. The introduction presented and motivated the problem (*Step 1: Awareness of the problem*) but also outlined a tentative proposal (*Step 2: Suggestion*). The background section presents consumer preference and business strategy, which are the primary variables of the proposal. The core section of this work, *a model centric approach capturing consumer preference in system requirements through business strategy*, presents all phases constituting the proposal. Every phase includes its implementation at an institution of higher education institute in Sweden, which includes consumer preferences of students and the institution's education strategy (*Steps 3 and 4: Development and Evaluation*). Thereafter, the discussion section includes reflections on the proposal and its applicability (also contributing to *Step 4: Evaluation*). Finally, the conclusion summarizes how the research goal has been achieved and provides directions for future research (*Step 5: Conclusion*).

BACKGROUND

This section introduces the concept of consumer preferences, frameworks and methods for working with it, as well as established business strategy.

Understanding Consumer Preferences

To clarify the concept of value, conceptual frameworks for its description and discussion, as well as means to measure it, are utilized within this research. There are a number of possibilities to choose from, coming from various fields such as psychology and organizational theory with the Three Needs Theory of McClelland (1987), and retailing with ServQual (Parasuraman, Zeithaml, & Berry, 1988), among others. For illustrative purposes, this work relies on three: the Hierarchy of Needs (Maslow, 1943), the Value Theory (Schwartz S. H., 1992), and the Typology of Consumer Values (Holbrook, 1999). These were selected due to their wide acceptance, application across a variety of industries, and robust conceptual frameworks.

A term that captured both the intentional and evaluative aspects of what drives the value exchange process was sought, with consumer preference selected. This was chosen over the more commonly used customer to highlight and then reinforce the conceptual break that this research attempts to make: by adopting a term that is not explicitly bound by economic transaction, the focus shifts to the comparative act of consumption rather than remaining on the level of simple resource exchange.

The term *consumer*, used in this paper, more fully encompasses the *a priori* nature of values that the meta-model introduced within this work (CPMM) seeks to capture. The term *customer* indicates that a value exchange is ongoing or has occurred, whereas consumer deals more with the evaluative phase that occurs both before and after: a consumer is a potential customer, or one that is appraising their previous value exchange. Holbrook's definition of consumption as an evaluative preferential experience, deemed *consumer values*, further supports the choice of terminology.

Additionally, the choice of consumer preference is grounded in the work of Powel-Mantel and Kardes (1999), who break down consumer preference into two types: attribute-based, involving comparing brands based on specific attributes, and attitude-based, involving overall evaluations. The term will be used in this work as a rubric for the three primary drivers that cause consumers to seek out goods and services: Consumer Need, a basic human need that must be satisfied (derived from psychology via Maslow); Consumer Motivation, a belief for what is important in life (coming from psychology via Schwartz); and Consumer Value, a judgment based on a comparative, preferential experience (coming from marketing via Holbrook).

Consumer Needs

Human motivation was explored by Maslow in which he first proposed his *Hierarchy of Needs* (Maslow, 1943). In its final form offered nearly thirty years later, there are seven categories. Beginning with those of a basic necessity then moving to those that are needed for a more fully realized life, these are: *Physiological* (breathing, eating, excreting), *Safety* (security of body, employment, resources, health, property), *Love* (friendship, family), *Esteem* (self-esteem, confidence, achievement), *Cognitive* (knowledge, meaning), *Aesthetic* (appreciation and search for beauty, balance, and form) and *Self-actualization* (realizing personal potential, self-fulfillment).

The *Maslowian Assessment Survey* (MAS), a 195-item, Likert-type instrument offered by Williams and Page (1989), is designed to measure three levels of Maslow's Hierarchy in adult populations: safety and security, belongingness and love, and esteem. This relates to the attitude-based consumer preference of Powel-Mantel and Kardes (1999).

Consumer Motivation

Another type of consumer preference is found in the motivational constructs of Schwartz's *Value Theory* (SVT) (Schwartz S. H., 1992). It adopts the definition of value from Rokeach (1973), which can be summarized as a belief that a specific mode of conduct or end-state is personally or socially preferable to its opposite. This relates to the attitude-based consumer preference of Powel-Mantel and Kardes (1999). According to this, values serve as criteria for judgments, preferences, choices, and decisions as they support the person's knowledge, beliefs, and attitudes. SVT emphasizes the profound nature of values, but at the same time can offer a new consumer research approach by concretely combining these value structures with an analysis of human motivation.

Schwartz (1992) claims that items found in earlier value theories, in value questionnaires from different cultures, as well as religious and philosophical discussions of values, can be classified into one of ten motivationally distinct basic values: *Power*, *Universalism*, *Achievement*, *Benevolence*, *Hedonism*, *Tradition*, *Stimulation*, *Conformity*, *Self-direction*, and *Security.*

Schwartz's *Value Survey* (SVS) was developed to measure the basic values laid out in SVT. SVS focuses on a universally applicable method for capturing and describing values across cultures and has been applied in numerous places (Schwartz S. H., 1992), among which business as well for business strategy development support (Epstein & Manzoni, 1998). The Value Survey operationalizes all ten values with a set of 56 items, and the answers from the questionnaire can be converted into a set of numerical results that can be used directly, or visualized via a value structure. Using the same core theories, Schwartz later developed this into the Portrait Value Questionnaire (PVQ) as a means for working with individuals with less literate backgrounds (the SVS utilizes very fine gradations in meaning and syntax). The European Social Survey, which is utilized in this work, is an implementation of the PVQ designed by Schwartz for online use (Schwartz S. H., 2003) and is still in active use (ESS DATA - Round 5, 2012). Schwartz's Value Survey (SVS) has been used within marketing to discover values of consumers (Sarabia-Sanchez, De Juan Vigaray, & Hota, 2012). Other means for ascertaining consumer values also include more empirical approaches, ranging from working solely with data in the areas of sentiment analysis and opinion mining (Archak, Ghose, & Ipeirotis, 2011), to the medical, where cognitive neuroscience has been utilized (Dimoka, Pavlou, & Davis, 2010).

Consumer Value

Holbrook (1999) refines the value concept, focusing on those held by individuals during a value exchange, referring to them as consumer values and classifying them into a *Typology of Consumer Values*.

A consumer value is "an interactive, relativistic preference experience" (Holbrook, 1999). Interactive entails an interaction between some subject and an object, relativistic refers to consumer values being comparative, preferential refers to consumer values embodying the outcome of an evaluative judgment, and experience refers to consumer values not residing in the product/service acquired but in the consumption experience. Holbrook's definition allows for a rather expansive view of value, because all products provide services in their capacity to create need- or want- satisfying experiences. This related to Powell-Mantel's attribute-based consumer preference.

Three consumer value dimensions are the basis for his typology (Holbrook, 1999): Extrinsic/Intrinsic, Self-oriented/Other-oriented, and Active/Reactive. Based on these eight archetypes that represent distinct types of value in the consumption experience—Efficiency, Excellence, Status, Esteem, Play, Aesthetics, Ethics, and Spirituality —are identified.

In the area of information systems, value is most commonly used in an economic sense, to mean an object that can be offered by one actor to another (Weigand, Johannesson, Andersson, Bergholtz, Edirisuriya, & Ilayperuma, 2006) often where the worth or desirability of something is expressed as an amount of money (Wieringa, Gordijn, & Eck van, 2005). A value object (also called a resource) is considered as something of economic value for at least one actor, e.g., a car, a book, Internet access or a stream of music (Afuah & Tucci, 2003). Values can be of more psychological and social natures, such as beauty, pleasure, health state, honor or a feeling of safety (Henkel, Johannesson, & Zdravkovic, 2007). Additionally, a user experience is also recognized as having a value (Gordijn, Akkermans, & Vliet van, 2000). To distinguish between these different kinds of values, Ilayperuma and Zdravkovic (2010) identified two categories of values— economic and internal — where internal value could be a certain property attached to an actor, such as their beauty or health, or it could be a property of some enabling service, such as speedy delivery.

None of the aforementioned terms stemming from information systems functions sufficiently to capture and classify explicitly value in a non-economic sense. While there is a long tradition of research, stretching back to the 1950s, that stresses the social and value implications of technology within business environments, why have economic values been the primary focus of present methodologies? While some researchers have acknowledged this implicit and explicit linkage, the preponderance of work still focuses solely on economic values. For example, within Business Value Modeling, an internal value could be a certain property attached to an actor, such as their beauty or health, or it could be a property of some enabling service, such as delivery. An example of such internal value could be the convenience attached to the home-delivery of a product. Internal values cannot be directly transferred between actors, and it is not meaningful to talk about legal rights on these values. Neither is it possible to transfer any of these resources from one actor to another (Gordijn, 2002).

The values of an individual have an effect on their behavior as consumers through their attitudes, which in turn impact on their choices within the value exchange (Steenhaut & Kenhove, 2006; Cai & Shannon, 2012). Additionally, it was shown that values relate to choice real-life, and may also influence behavior through different manifestations, such as habits (Schwartz & Bardi, 2001).

Many authors have pointed out that cultural and psychological dimensions of consumer behavior should be considered at the core of the retail strategy (Weeks & Kahle, 1990; Cox & Brittain, 2004) as such data could allow marketers to create new consumer experiences (Carpenter, Moore, & Fairhurst, 2005).

Business Strategy

Business strategy is defined as the determination of long-term goals and courses of action using resources to achieve them, thus setting up the organization to enact it (Chandler, 1962). The realism of attaining long-term goals makes strategy prone to a changing environment, varying from external opportunities and threats as well as internal strengths and weaknesses. A *business strategy formulation* refers to established representations (e.g. text, graph, etc.) of business strategy within the discipline of *Strategic Management.*

Conceptualizations of business strategy formulations exist for each of the three views of business strategy identified by Barney (1986); for the "resource-based view", where internal capability shapes strategy, a conceptualization of strategy maps and balanced scorecards (Kaplan & Norton, 2004) exists in the means of the SMBSC Meta-model (Giannoulis, Petit, & Zdravkovic, 2011a); for the "industrial organization", where positioning based on competition shapes strategy, a conceptualization of the value chain (Porter, 1985), the value shop and the value network (Stabell & Fjeldstad, 1998) exists in the means of the value configuration (VC) meta-model (Giannoulis, Petit, & Zdravkovic, 2011b); for the "Schumpeterian view of competition", where innovation shapes strategy, a conceptualization of the Blue Ocean Strategy (Chan & Mauborgne, 2005) exists in the means of the BOS Meta-model exists (Giannoulis & Zdravkovic, 2012).

While all three views have a different perspective on business strategy, they share the notion of customer/consumer. Consequently, business strategy formulations across all three views also share the notion of customer/consumer, which constitutes them eligible candidates for being part of the approach proposed in this work that aims at capturing consumer preference. SMBSC includes a customer perspective that highlights the customer value proposition; VC is built around the notion of the customer value proposition; BOS includes a tagline that resembles significantly a customer value proposition and also includes a set of offerings of varying level to customers/consumers.

For the scope of this study the conceptualization of SMBSC is used as an extension to the work of Svee, Giannoulis, and Zdravkovic (2012), however, as it will be discussed further on, the approach is not limited only this business strategy formulation. A strategy map is a business strategy formulation serving as a mediator between the mission, core values, and the vision of a business to the work performed. Kaplan and Norton (2004) proposed a template for strategy maps representing how an organization can create value. Starting from a mission statement and core values, a strategic vision is defined, which projects the organization's overall goal. A set of goals is defined and initially grouped within the financial and customer perspectives, along with goals for all types of capital, both human and economic (Kaplan & Norton, 2004). Goals are extended to a set of targets using measures to evaluate their achievement, and thereafter, initiatives are identified to achieve the targets, the balanced scorecard. This extension of the strategy map is the *balanced scorecard*, which is essential for monitoring and assessing the cause-effect links between strategic goals across an organization.

A MODEL-CENTRIC APPROACH CAPTURING CONSUMER PREFERENCE IN SYSTEM REQUIREMENTS THROUGH BUSINESS STRATEGY

This section presents the main contribution of this study: an approach to capture consumer preference in system requirements through business strategy. Business strategy and consumer preference both belong to the business side of the enterprise (Kotler, 1991) and have more in common than with system requirements, which belongs to the IT side of the enterprise. Ambiguity across domains negatively affects the social dimension of business-IT alignment because it raises communication barriers and hinders the establishment of shared domain knowledge (Chan & Reich, 2007), which is an antecedent of long-term alignment (Reich & Benbasat, 2000). Addressing ambiguity allows for communicating and understanding consumer preference and business strategy towards requirements in a systematic and traceable way. Hence, the proposal builds upon the use of models for both consumer preference and business strategy to leverage model-level mappings between them and towards system requirements.

The approach consists of four phases, where each phase description is accompanied with reference to the case scenario that the approach has been applied. An overview of the approach is depicted in figure 1 in the form of a workflow:

- Phase 1: Capture consumer preferences, which are conceptualized as the Consumer-Preference-aware Meta-model (CPMM).
- Phase 2: Capture business strategy, which is conceptualized as the SMBSC Meta-model.

- Phase 3: Map consumer preferences to business strategy: CPMM to SMBSC, which presents mappings of consumer preferences to business strategy.
- Phase 4: Derive enterprise business goals from business strategy, and further to system requirements.

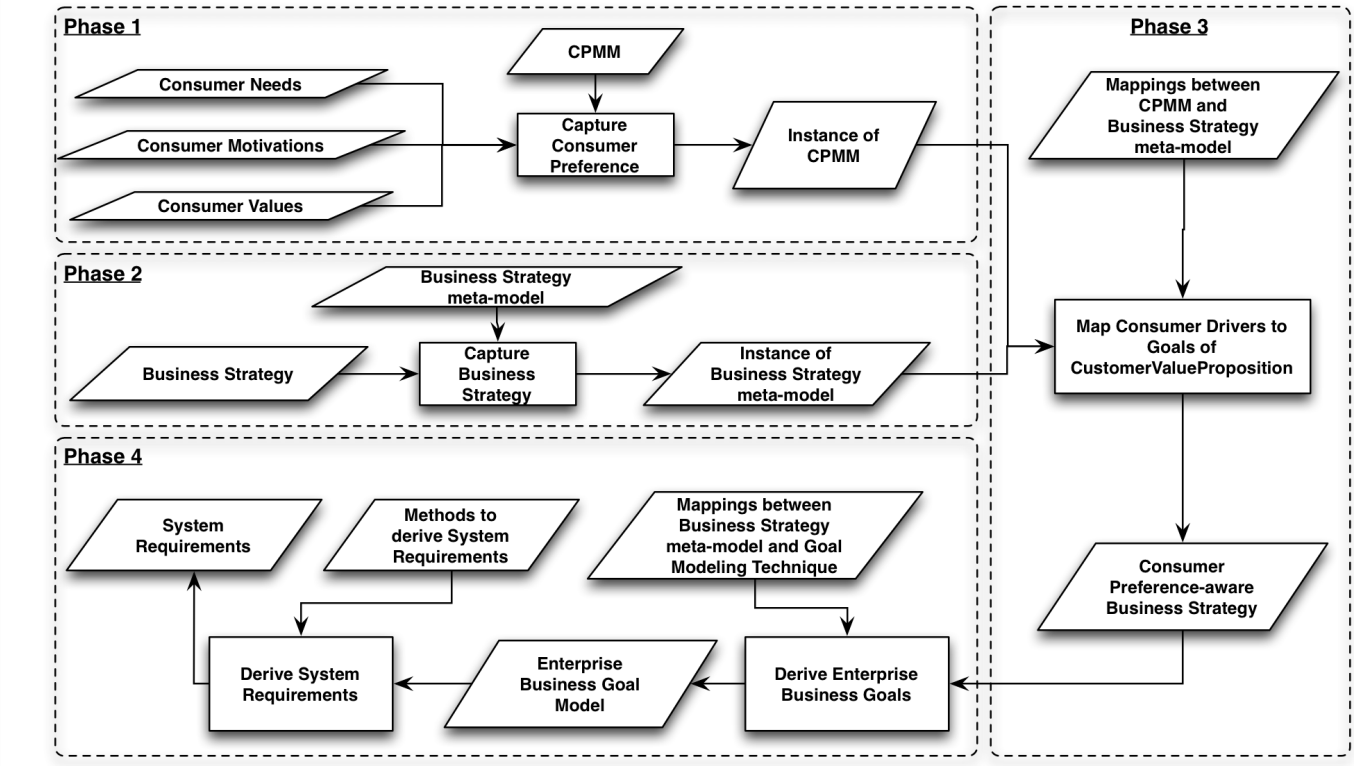

Figure 1. Workflow of the model-centric approach capturing consumer preference in system requirements through business strategy.

Phase 1: Capture Consumer Preferences

The objective of this phase (Figure 1) is to capture the consumer preferences that will be mapped onto business strategy. Input in this phase consists of collecting consumers' motivations, values, and needs, and through frameworks such as those of Schwartz (1992), Holbrook (1999) and Maslow (1943), respectively. Moreover, a conceptualization of consumer preferences is also required to capture not only these values, but also all contextual information, which altogether enables their mapping to strategy in Phase 3. Such conceptualization is introduced through the Consumer-Preference-aware Meta-model (CPMM), which entails frameworks for consumer needs, consumer values, and consumer motivations. Output of this phase is the instantiation of CPMM for a particular set of consumers.

The following subsections present CPMM and how it has been used in the higher education case, where consumer motivation has been captured as an instantiation of CPMM.

Consumer Preference-aware Meta-model (CPMM)

The conceptualization is built on established theories and approaches on consumer motivations, consumer values, and consumer needs, and is presented as a UML class diagram in Figure 2 with class descriptions found in Table 1.

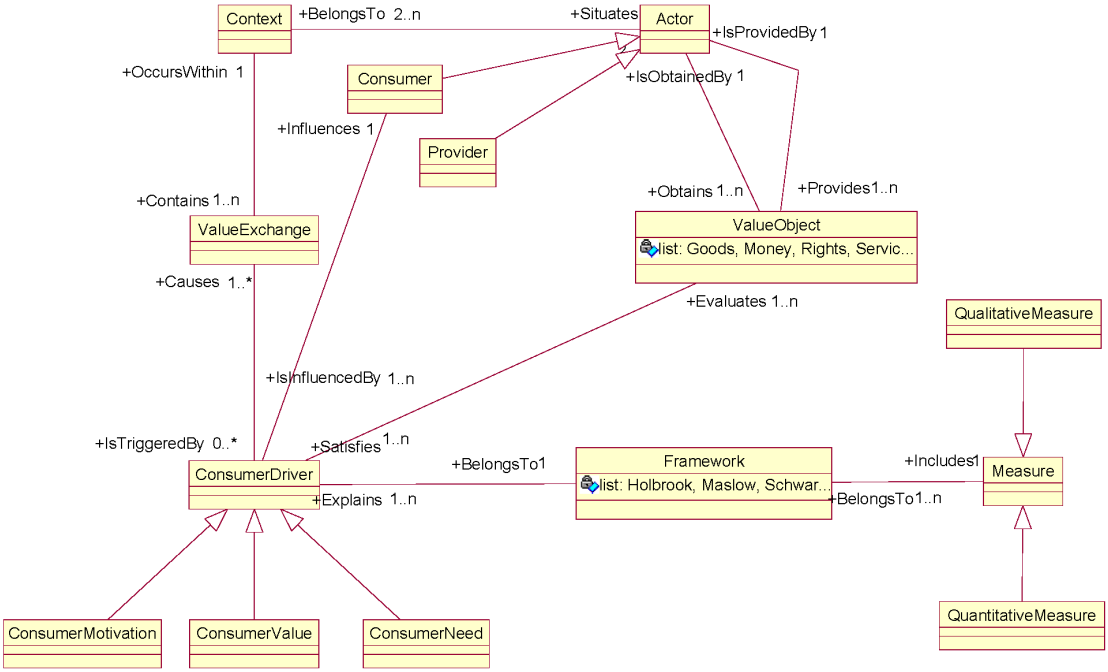

Figure 2. [The Consumer Preference Meta-model (CPMM) (Svee, Giannoulis, & Zdravkovic, 2012)**.]**

CPMM Class	Description
Context	Represents the premises within which a transaction takes place (i.e. it may refer to either a physical or virtual location).
ValueExchange	Captures the transaction between two parties (a consumer and a provider) where ownership is exchanged.
Actor • *Consumer* • *Provider*	Contains the economically independent entities that are the primary participants within the exchange of goods, money, rights, or services.
ValueObject	Constitutes the focus of the process wherein the consumer evaluates whether the value object satisfies the motivation, value or need driving their desire to participate in the exchange process.
ConsumerDriver • *ConsumerMotivation* • *ConsumerValue* • *ConsumerNeed*	Captures the preferences that drive a consumer's evaluative process as they seek fulfillment
Framework	Captures a theoretical means to understand and explain consumer drivers that need to be satisfied through the consumption experience, and contains: • Maslow's Hierarchy (Physiological, Safety, Love, Esteem, Cognitive, Aesthetic, Self-actualization) • Holbrook's Typology (Efficiency, Excellence, Status, Esteem, Play, Aesthetics, Ethics, Spirituality) • Schwartz's Values (Power, Universalism, Achievement, Benevolence, Hedonism, Tradition, Stimulation, Conformity, Self-direction, Security, and Spirituality)
Measure • *QuantitativeMeasure* • *QualitativeMeasure*	Quantifies and conceptualizes values, with its sub-classes being means contained within each of the various frameworks that can be used for conceptualization and quantification.

Table 1. Class descriptions for CPMM.

Apart from the cardinality constraints included in the meta-model, a set of constraints is also introduced to capture the permissible instantiations of concepts found in the frameworks:

- At least one instance of both *Consumer* and *Provider* classes must belong to the same *Context.*
- Moreover, an instance of *ValueObject IsProvidedBy* an instance of *Provider* that is an instance of *Actor*, which belongs to an instance of *Context*, is the same instance of *ValueObject ObtainedBy* an instance of *Consumer* that is an instance of *Actor* that *BelongsTo* the same instance of *Context.*
- The frameworks of Maslow and Schwartz possess quantitative measures, whereas only Holbrook's includes qualitative measures. Therefore, an instance of *QuantitativeMeasure* is an instance of *Measure* that *BelongsTo Framework:Schwartz* or *Framework:Maslow.* Whereas an instance of *QualitativeMeasure* is an instance of *Measure* that *BelongsTo Framework:Holbrook.*

- Each sub-class of *ConsumerDriver* is related to a particular framework; *an instance of ConsumerNeed* can only *BelongTo* an instance of *Framework:Maslow*, an instance of *ConsumerMotivation* can only *BelongTo* an instance of *Framework.Schwartz*, and similarly an instance of *ConsumerValue* can only *BelongTo* an instance of *Framework.Holbrook*.

Case Study Application

The European Social Survey (Schwartz S. H., 2003), an implementation of the Portrait Value Questionnaire (Schwartz S. H., 1992), has been used to capture the values of applicants to master's programs beginning in the autumn of 2012 at Swedish universities. The Swedish Agency for Higher Education Services (*Verket för högskoleservice*), the authority coordinating the admission process for higher education courses and programs in Sweden (VHS, 2012), has been used as a data source for a simple random sample of the aforementioned population.

Beyond certain demographic information, the primary portion of the survey consisted of the 20 questions that constitute the ESS which, via statements tailored to each participant's gender, captures motivation values: *Universalism*, *Benevolence*, *Self-determination*, *Achievement*, *Stimulation*, *Security*, *Hedonism*, *Conformity*, *Tradition*, and *Power*. For the European Social Survey (Schwartz S. H., 2003), Schwartz used the term "self-determination" instead of "self-direction" found in his seminal works: the Value Survey and Portrait Values Questionnaire (Schwartz S. H., 1992).

Surveys were available in either English or Swedish and responses were given using a *Likert scale*. Results from 218 participants (91 men, 127 women) are ranked in Table 2. Weights closer to 1 indicating a strong personal identification with the value, while those approaching 6 indicate a lack thereof.

Rank	Schwartz's Value	Weight
1	Universalism	1.888
2	Benevolence	1.924
3	Self-determination	1.977
4	Achievement	2.472
5	Stimulation	2.513
6	Security	2.587
7	Hedonism	2.839
8	Conformity	3.057
9	Tradition	3.062
10	Power	3.996

Table 2. Survey results: valuated weights for each of the consumer value of Schwartz's framework.

These value weights constitute measures for the ESS. From CPMM (Figure 2 and Table 1), each Schwartz value in Table 2 constitutes an instance of the *ConsumerMotivation* class (Table 1), and each value weight in Table 2 constitutes an instance of the *QuantitativeMeasure* class carrying weight (with a scale 1 - 6) as attribute (Table 1), which *BelongTo* ESS that is an instance of *the Framework:Schwartz* class that *Explains* student motivation which is an instance of the *ConsumerMotivation* class. Each *ConsumerMotivation Evaluates* education (instance of *ValueObject*) which *IsProvidedBy* Teachers (instance of *Provider*) that *BelongsTo* the Higher Education Institution offering education (an instance of *Context*) and which *IsObtainedBy* Students (instance of *Consumer*). Moreover, each *ConsumerMotivation Causes* enrollment, students registering, (instance of *ValueExchange*) that *OccursWithin* the Higher Education Institution (instance of *ValueObject*).

Based on Schwartz's Value Theory (Schwartz S. H., 1992) these value profiles of students can be directly related to consumer values via the mappings between Schwartz and Holbrook (Svee, Zdravkovic, & Giannoulis, 2012).

Phase 2: Capture Business Strategy

The objective of this phase (Figure 1) is to capture the business strategy that will allow the consumer preferences captured in Phase 1 to be mapped during Phase 3. Input in this phase consists of the business strategy of the enterprise in focus and a conceptualization of the business strategy formulation relevant to the business strategy of the enterprise. Such conceptualization is introduced through the Strategy Maps and Balanced Scorecards (SMBSC) Meta-model, a conceptualization of the proposal of Kaplan & Norton (2004). Output of this phase is the instantiation of SMBSC meta-model with the enterprise's business strategy.

The following subsections present SMBSC meta-model and how it has been used in the high education case with the institution's strategy map captured as an instance of CPMM.

Strategy Maps and Balanced Scorecards (SMBSC) Meta-model

The SMBSC Meta-model presented in Figure 3 is a conceptualization of strategy maps and balanced scorecards able to support mappings of consumer preferences to the four generic types of customer value proposition (Svee, Giannoulis, & Zdravkovic, 2012): *Best Total Cost*, *Product Leader*, *Complete Customer*, and *System Lock-In* . These four generic types of customer value proposition frame the set of generic goals set in the customer perspective (Kaplan & Norton, 2004).

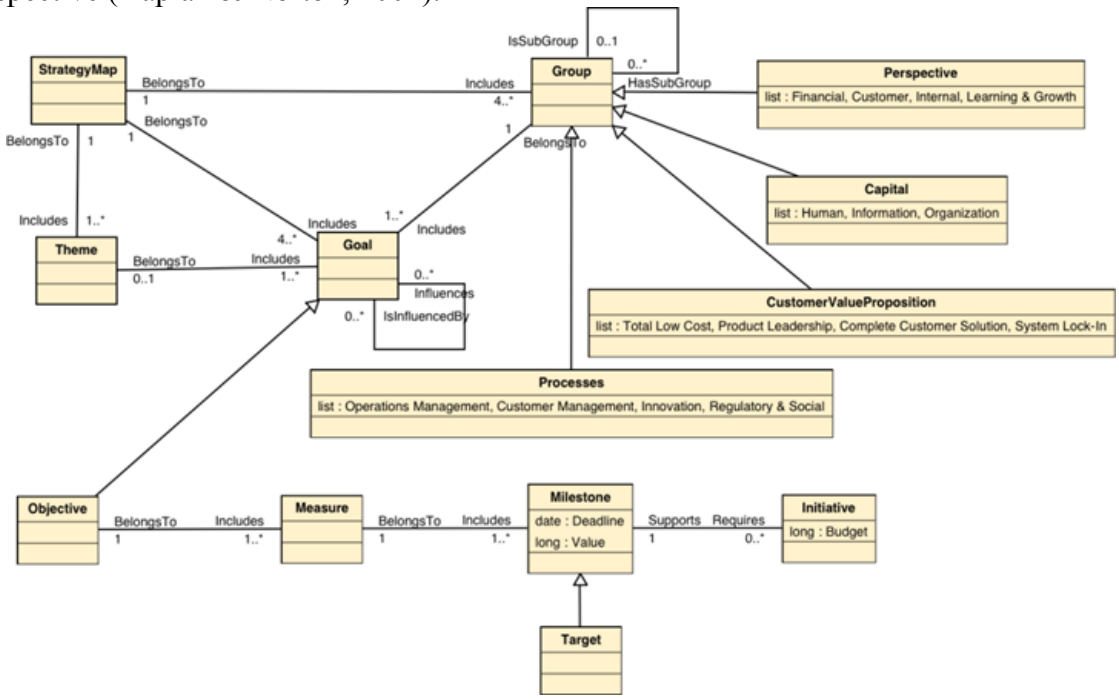

Figure 3. The SMBSC Meta-model (Svee, Giannoulis, & Zdravkovic, 2011)**.**

Case Study Application

Upon request of the authors of this paper, the institution of higher education from Sweden used for the case has shared its education strategy through 2015 in the form of a strategy map, as presented in Figure 4. As a public, non-profit organization, the institution's vision for 2015 is expressed as the highest goal in the strategy map and is not targeted towards increased shareholder value in terms of profits but rather expresses the institution's aims for education towards taxpayers and donors, which are considered to be the institution's shareholders (Kaplan & Norton, 2004): "*Maintain national leadership and assume a leading position internationally in priority areas within computer and systems sciences*". The customer perspective, where students are customers, adheres to one the four generic types of customer value proposition as previously mentioned (Kaplan & Norton, 2004). Based on the institution's vision for education—maintain national leadership and assume leading position internationally in priority areas within computer and systems sciences— the customer value proposition they have chosen is the one of *Product Leader*.

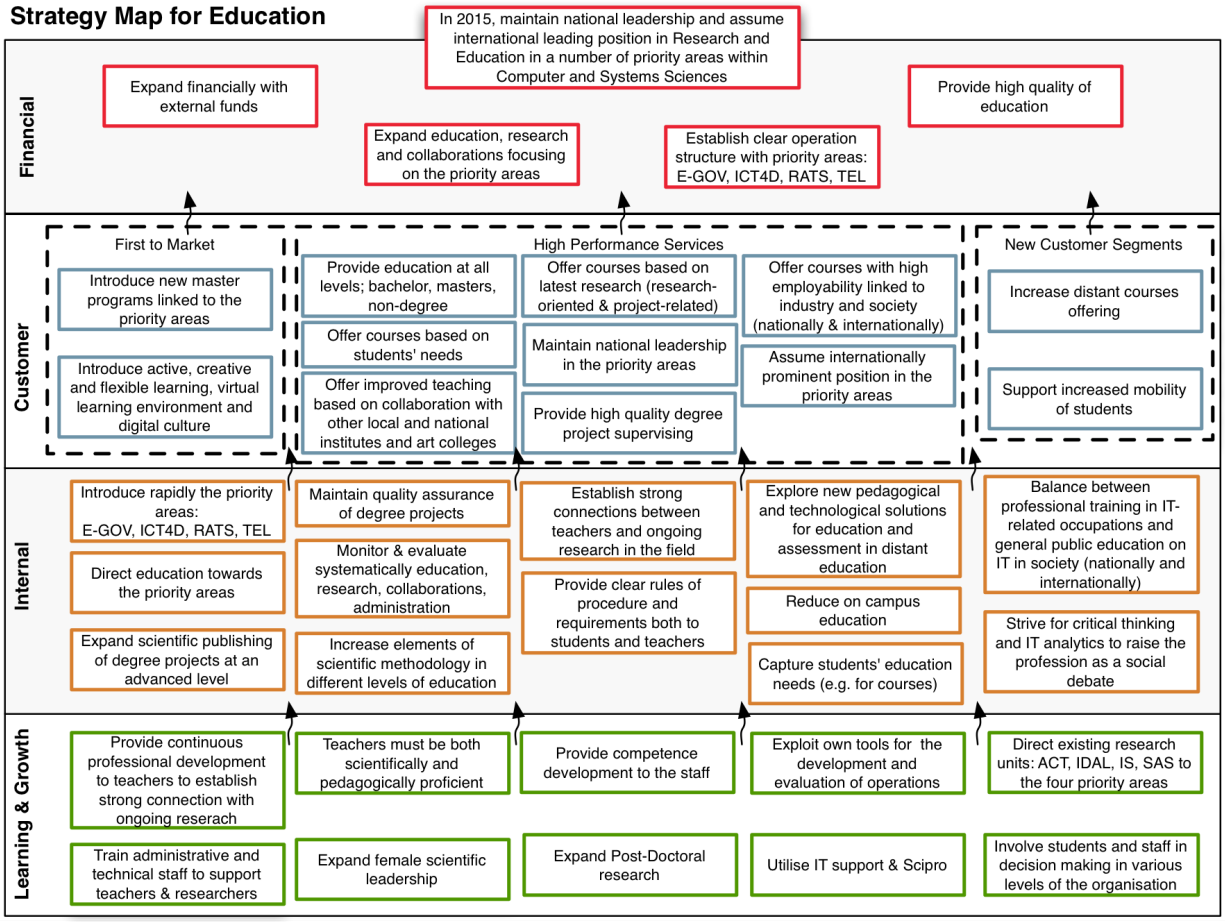

Figure 4. [The Strategy map of a higher education institution in Sweden.]

From the strategy map of the institution and in respect to the SMBSC Meta-model, three generic strategic goals can be identified under product leadership, which group all customer perspective goals: *First to Market*, *High Performance Services*, and *New Customer Segments*. Each goal defined under these three generic strategic goals is an instance of *Goal*, which *BelongsTo CustomerValueProposition:ProductLeadership* which *IsSubGroupOf Perspective:Customer* which is a *Group* (exemplified in Table 3).

Goal: "Introduce new master programs linked to the priority areas" ***BelongsTo*** *{CustomerValueProposition:ProductLeader* ***IsSubGroupOf*** *Perspective:Customer}*
• ***Influences*** *{Goal: "Expand education, research and collaboration focusing on the priority areas"* ***BelongsTo*** *Perspective:Financial}*
• ***Influences*** *{Goal: "Establish clear operation structure with priority areas: E_GOV, ICT4D, RATS, TEL"* ***BelongsTo*** *Perspective:Financial}*
• ***IsInfluencedBy*** *{Goal: "Introduce rapidly the priority areas: E-GOV, ICT4D, RATS, TEL"* ***BelongsTo*** *{Processes:OperationsManagement* ***IsSubGroupOf*** *Perspective:Internal}}*
• ***IsInfluencedBy*** *{Goal: "Direct education towards the priority areas"* ***BelongsTo*** *{Processes:OperationsManagement* ***IsSubGroupOf*** *Perspective:Internal}}*

Table 3. Example of a customer value proposition goal from the higher institution's strategy map instantiated through the SMBSC Meta-model.

Phase 3: Map Consumer Preferences to Business Strategy, CPMM to SMBSC

The objective of this phase (Figure 1) is to link consumer preferences to the business strategy through a set of model-centric mappings. Input in this phase consists of the instantiation of CPMM for a particular set of consumers (output of Phase 1) and the instantiation of SMBSC meta-model for the enterprise's business strategy (output of Phase 2). A set of model-level mappings between consumer preferences captured in CPMM and business strategy, particularly concepts related to the customer value proposition as captured in the SMBSC-meta model are applied to establish linkage between consumer preference and business strategy. Particularly, consumer drivers in CPMM are mapped to goals expressing the customer value proposition in the SMBSC meta-model. Output of this phase is a consumer preference-aware business strategy from which system requirements are going to be derived from in Phase 4.

The following subsections present the mappings of all types of consumer drivers conceptualized through CPMM to all types of customer value propositions conceptualized through the SMBSC meta-model and how they have been applied in the high education case extending the institution's customer value proposition with consumer preference.

Map Consumer Preferences to Business Strategy

The four generic types of customer value proposition of SMBSC, *Best Total Cost*, *Product Leader*, *Complete Customer*, and *System Lock-In,* shape an enterprise's offerings towards customers. A set of generic goals for each customer value proposition type exists, constituting the basis for the customer perspective (Kaplan & Norton, 2004). Therefore, consumer drivers of CPMM (Table 1) are mapped towards these generic goals in Table 4. Mapping consumer drivers to these generic goals relates the customer value proposition with what motivates customers, what customers value, and what customers need, allowing the goals' refinement to reflect them and thus plan how to appeal to them (Svee, Zdravkovic, & Giannoulis, 2012). In terms of the meta-models, consumer drivers captured by the class *ConsumerDriver* in CPMM are related to the generic strategic goals the belong to the four types of customer value proposition captured by the class *CustomerValueProposition* in the SMBSC Meta-model.

Goals from Strategy Map Templates	**Consumer Drivers**		
	Consumer Need	**Consumer Motivation**	**Consumer Value**
	Best Total Cost		
Lowest Cost Supplier	Safety	Security	Efficiency Excellence
Consistently High Quality	Aesthetic	Conformity, Security, Power, Hedonism, Tradition	Efficiency, Excellence
Speedy Purchase	Safety	Self-direction	Efficiency, Excellence
Appropriate Selection	Safety	Self-direction, Spirituality	Efficiency, Excellence
	Product Leader		
High Performance Products	Esteem, Aesthetic	Conformity, Security, Power, Stimulation, Hedonism	Efficiency, Excellence, Play, Aesthetics
First to Market	Safety, Love, Esteem, Aesthetic, Self-actualization	Self-direction, Stimulation	Efficiency, Excellence
New Customer Segments	Safety, Love, Esteem, Aesthetic, Self-actualization	Stimulation, Tradition, Universalism, Spirituality	Efficiency, Excellence, Play, Aesthetics, Esteem Status, Ethics, Spirituality
	Complete Customer Solutions		
Quality of Solutions Provided	Safety	Conformity, Security, Hedonism, Tradition, Power, Spirituality	Efficiency, Excellence, Play Aesthetics Esteem
Number of Products/ Services per Customer	Safety, Esteem	Self-direction	Efficiency, Excellence
Customer Retention	Safety, Love, Esteem, Aesthetic, Self-actualization	Conformity, Security, Tradition, Universalism, Spirituality	Efficiency, Excellence, Play, Aesthetics, Esteem, Status, Ethics, Spirituality
Lifetime Customer Profitability	Safety, Love, Esteem, Aesthetic, Self-actualization	Tradition, Spirituality	Efficiency, Excellence, Play, Aesthetics, Esteem
	System Lock-in		
Broad Selection/ Convenient Access	Safety, Esteem	Self-direction, Security	Efficiency, Excellence
Widely Used Standard	Safety, Esteem	Conformity, Security, Achievement, Tradition, Universalism	Efficiency, Excellence
Stable Platform Innovation	Safety	Achievement, Tradition, Universalism	Efficiency, Excellence
Large Customer Base	Safety	Achievement, Tradition, Universalism	Efficiency, Excellence
Easy-to-Use Platform and Standard	Safety	Self-direction, Tradition, Universalism	Efficiency, Excellence

Table 4. SMBSC Strategic Goals related to Consumer Drivers (Svee, Giannoulis, & Zdravkovic, 2012).

Case Study Application

Considering the case scenario, the higher education institution strives for the *Product Leader* customer value proposition (Phase 2), and the consumer drivers captured through the use of the ESS are consumer motivations (Phase 1). Therefore, following the mappings of Table 4 the generic strategic goals under *Product Leader* ("High Performance Products", "First to Market", "New Customer Segments") (Kaplan & Norton, 2004) are linked to particular consumer motivations. The goal "High Performance Products" is linked to *Conformity, Security, Power, Stimulation* and *Hedonism* for consumer motivation:

Conformity expresses restraint of actions possibly to negatively affect others and violate social norms. The institution must ensure that provision of high performance services, aka education, will offer students clear rules to follow within a setting of politeness and will not violate social expectations.

Security expresses safety and stability of social interactions, and of self. The institution must ensure that provision of high performance services, aka education, will offer students a safe and stable social setting maintaining social order, protected from threats.

Power expresses social status, prestige, control and, dominance. The institution must ensure that provision of high performance services, e.g. education, will offer students such prestige and social authority over students of other institutions as well as preserve their public image.

Stimulation expresses excitement, novelty, innovation, and challenge. The institution must ensure that provision of high performance services, e.g. education, will offer students variability and challenges making their student lives more exciting, making them more daring students.

Hedonism expresses pleasure and sensuous gratification. The institution must ensure that provision of high performance services, e.g. education, will be fun and pleasurable, thus allowing students to enjoy life.

From the SMBSC Meta-model, the generic strategic goal "*High Performance Products"* is an instance of *Goal*, which *BelongsTo CustomerValueProposition:ProductLeader*, which *IsSubGroupOf Perspective:Customer* which is a *Group*.

From CPMM, each consumer motivation is an instance of *ConsumerMotivation*, which *BelongsTo Framework:Schwartz* that provides both the quantitative measure of a value, but also the conceptual framework to explain it. Moreover, each instance of the aforementioned consumer drivers *Evaluates* the same instance of *ValueObject:Service* which is education, where each teacher is an instance of *Provider* which is an *Actor* and the student is an instance of *Consumer* that *IsInfluencedBy* all aforementioned *ConsumerDriver*.

These linkages identified between generic strategic goals (SMBSC) and consumer preferences (CPMM) allow for enrichment of the former with a set of goals focused on capturing consumer preferences, thus increasing SMBSC's level of detail.

This means that the generic strategic goal "*High Performance Products*" is influenced by goals on conformity, security, power, stimulation, and hedonism aimed at satisfying the motivations of students (consumers), whose priority among motivations is presented in Table 2 with weights for each value. Table 5 presents how this influence can be captured in the SMBSC Meta-model.

Goal: "High Performance Products" •***BelongsTo*** *{CustomerValueProposition:ProductLeader* ***IsSubGroupOf*** *Perspective:Customer}* •***IsInfluencedBy*** *{Goal: "Ensure conformity to rules with no violation of social norms"* ***BelongsTo*** *{CustomerValueProposition:ProductLeader* ***IsSubGroupOf*** *Perspective:Customer}}* •***IsInfluencedBy*** *{Goal: "Ensure a safe, secure and stable setting"* ***BelongsTo*** *{CustomerValueProposition:ProductLeader* ***IsSubGroupOf*** *Perspective:Customer}}* •***IsInfluencedBy*** *{Goal: "Ensure a prestigious public image for students"* ***BelongsTo*** *{CustomerValueProposition:ProductLeader* ***IsSubGroupOf*** *Perspective:Customer}}* •***IsInfluencedBy*** *{Goal: "Ensure a challenging and exciting setting"* ***BelongsTo*** *{CustomerValueProposition:ProductLeader* ***IsSubGroupOf*** *Perspective:Customer}}* •***IsInfluencedBy*** *{Goal: "Ensure students have fun and are self-indulged"* ***BelongsTo*** *{CustomerValueProposition:ProductLeader* ***IsSubGroupOf*** *Perspective:Customer}}*

Table 5. SMBSC goals derived from consumer motivations.

Consumer motivations linked to the generic strategic goals "First to Market" and "New Customer Segments" generic strategic goals can be elaborated similarly. Such instantiations can be derived for each generic strategic goal of the four types of customer value propositions of SMBSC based on the mappings of Table 4.

Phase 4: Derive Enterprise Business Goals from Business Strategy, and further to System Requirements

The objective of this phase (Figure 1) is to use the refined business strategy that reflects consumer preference to derive system requirements. Business strategy expresses strategic goals, which are not directly related to system goals or system requirements - e.g. they have different vocabulary, different level of abstraction, different concerns, etc. Therefore, to address such differences this phase consists of two steps: the first derives enterprise business goals and the second derives system requirements.

Input for deriving enterprise business goals, as proposed by Giannoulis and Zdravkovic (2011), consists of a consumer preference-aware business strategy (output of Phase 3) along with a set of model-level mappings between business strategy, SMBSC meta-model and i*, a goal modeling technique (Yu, 1995).The outcome is an enterprise business goal model presented in i*, capturing the enterprise's refined customer value proposition that is reflective of consumer preferences.

This i* model expressing enterprise business goals constitutes input for deriving system requirements along with the OO-Method (Alencar et al., 2009) that prescribes how to derive system requirements from i* goal models. Output of this phase is a set of system requirements derived from enterprise business goals that stem from the consumer value proposition of the consumer preference-aware business strategy.

The following subsections first present the mapping of the refined SMBSC meta-model to i* which results in an enterprise business goal model, and then demonstrates how they have been applied in the high education case by deriving an i* model of the institution's customer perspective (customer value proposition of their strategy). Furthermore, the OO-Method for deriving system requirements from the derived enterprise business goal model is also discussed.

Mapping consumer preference-aware business strategy to enterprise business goals

Consumer preference is closely related to the customer value proposition, therefore, mappings to i* are relevant only to the customer perspective of SMBSC that shapes the customer value proposition. This study uses the mappings between SMBSC and i* already proposed (Table 6). Based on these mappings, SMBSC strategic goals obtained from consumer drivers of CPMM can be represented as goals or soft-goals in i*.

SMBSC	i*
Strategy Map	SD, SR
Group, Perspective	Actor
Goal	Goal, Soft-goal
Objective	Goal
Measure	-
Target	Goal
Milestone	Goal
Initiative	Task, Plan, Resource
Theme	Critical dependencies

Table 6. Mappings of SMBSC to i* (Giannoulis & Zdravkovic, 2011).

Strategic goals originating from consumer needs or consumer motivations are represented as goals in i* because the frameworks they belong to use quantitative measures:

- *CPMM.ConsumerDriver.ConsumerNeed* can only *BelongTo* an instance of *CPMM.Framework.Maslow* which *Includes CPMM.Measure.QuantitativeMeasures*
- *CPMM.ConsumerDriver.ConsumerMotivation* can only *BelongTo* an instance of *CPMM.Framework.Schwartz* which *Includes CPMM.Measure.QuantitativeMeasures*

Strategic goals originating from consumer values are represented as soft-goals in i* because the framework they belong to uses qualitative measures (see CPMM):

- *CPMM.ConsumerDriver.ConsumerValue* can only *BelongTo* an instance of *CPMM.Framework.Holbrook* which *Includes CPMM.Measure.QualitativeMeasures*

The outcome is an i* SR model capturing the institutution's strategic intentions as an actor expressing enterprise business goals focused on the customer value proposition.

Case Study Application

For the higher education institution, in Phase 1, consumer preferences have been captured using the Portrait Value Questionnaire based on Schwartz's Value Theory (see CPMM), which is a framework that explains consumer motivation (see CPMM). Consumer motivation is demonstrated via quantitative measures (see CPMM), the valuated weights for each of the ten variables. In Phase 3, these consumer motivations have been mapped to the generic strategic goals of the institution's strategy map for education (Phase 2), which resulted in the introduction of new goals under the generic strategic ones.

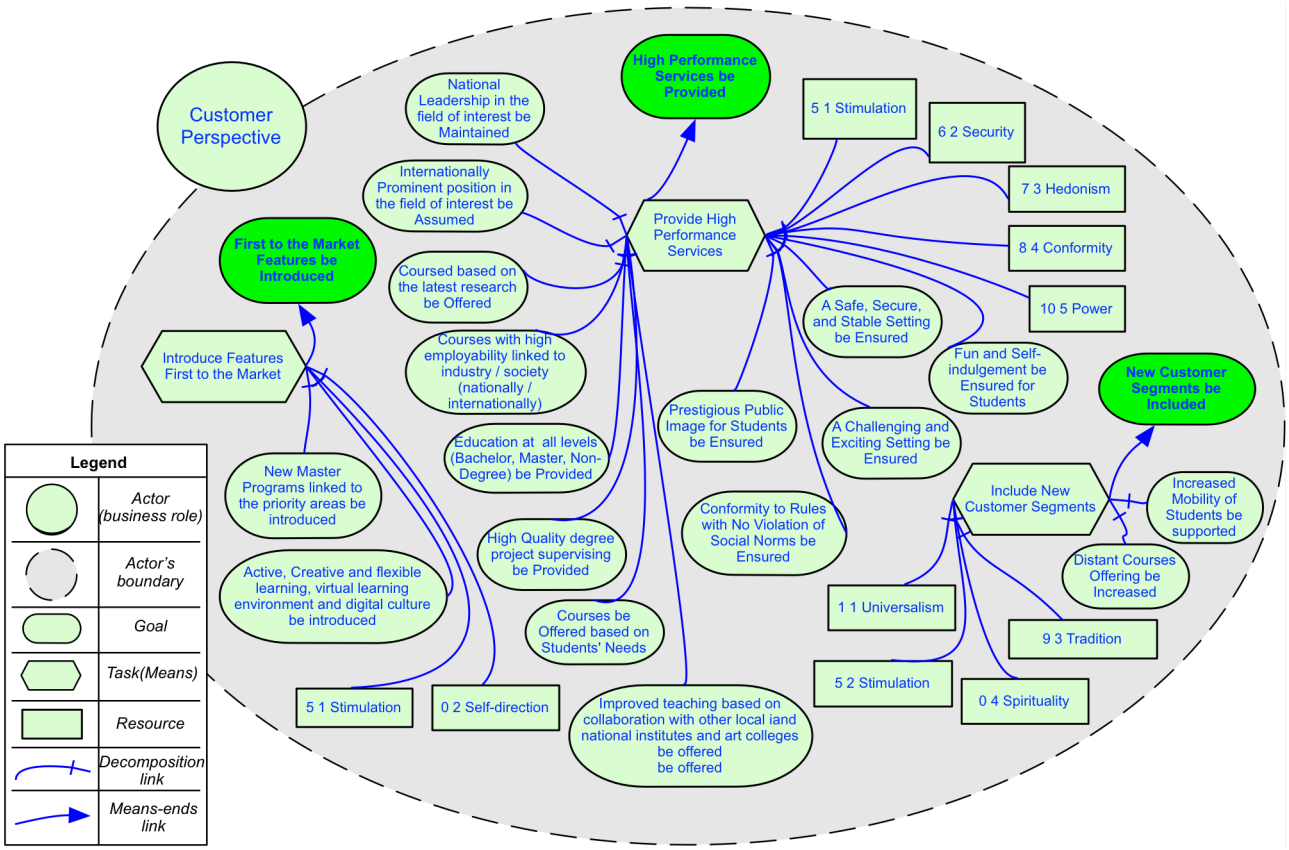

Figure 5. The customer perspective of the strategy map of the higher education institution capturing consumer preference in i* with additional goals and resources.

The i* model presented in Figure 5 has been generated based on the mappings of Table 6, capturing the institution's business goals that shape the customer value proposition while embedding consumer motivation. Applying the mappings entailed the following guidelines and heuristics:

- Strategic goals originating from consumer motivations are represented as i* goals due to the use of quantitative measures (weights) which makes them measurable, unlike i* soft-goals.
- New goals have been introduced through decomposition links under the generic strategic goal "*High Performance Services be Provided*", as identified in Phase 3, which are related to the consumer motivations captured by students in Phase 1.
- All related consumer preferences have been added as resources (informational resources) in the decomposition of the generic business goals and they have been annotated with two numbers; the first number indicates their overall ranking as found in Table 2 and the second number indicates their ranking within the decomposition of the generic business goal in respect only to consumer preferences relevant to the same business goal. For example, *Stimulation* appears as a resource under the generic strategic goal *High Performance Services be Provided* named as "*5 1 Stimulation"*, where the first number indicates it is overall ranked fifth among consumer preferences according to Table 2 and the second number indicates it is ranked first among consumer preferences related to this generic goal.

From Enterprise Business Goals to System Requirements

Once the consumer preference-aware strategy is captured in an i* goal model then derivation of system requirements can be initiated.

It is commonplace to use goal models as the starting point for the elicitation of requirements related to information systems. Having the focus of the research on the relationships and dependencies of the business goals of related actors, Raadt van der Raadt, Gordijn, and Yu (2005) used enterprise business goals expressed with i* to construct business models and used them to indicate requirements for business- and software services. Andersson et al. (2007) have proposed a similar method, and additionally used i* for a goal-based analysis to elicit requirements for Web services in a service-centric business model.

The OO-Method uses i* to capture the organizational context and the actors intentions as a business requirements model, which is used for the elicitation of a conceptual model capturing the functional requirements of a system (Alencar et al., 2009). The conceptual model is created by first indicating the process to be automated by considering the tasks obtained in the i*model, and by structuring further the elements of these processes in an actor-resource conceptual model, where the actions of actors and resources are modeled as the requirements for system (Web) services.

DISCUSSION

The approach establishes linkages between consumer preferences and system requirements through business strategy by using models and model-centric mappings. This offers flexibility of application for the approach as components across all four phases can be extended and customized. Transitions between phases are based on the mappings prescribed by the approach and require the assessment of those involved as they cannot be fully automated and neither had this been the intention of the approach nor had automation been part of the research goal. For example, formulating strategic goals for each associated driver requires the understanding of the strategic goals already in place. Implementation of the approach as a concrete process would have to be tailored to the specificities of the business environment.

Phases 1, 2, 3

Modeling consumer preferences included frameworks on consumer needs (Maslow, 1943), consumer values (Holbrook, 1999), and consumer motivation (Schwartz S. H., 1992), which are used today (Sarabia-Sanchez, De Juan Vigaray, & Hota, 2012). These frameworks look at peoples' deeper values. The fact that values are currently becoming the key marketing concept (Kotler, Kartajaya, & Setiawan, 2010) indicates their importance. Values such as the one's captured by Schwartz's framework (1992) are not really subject to change (although things can and do change over time, though slowly) and present more stable preferences rather than remaining on the surface with short-term wants and trend-influenced desires. Using values as a key marketing concept results in the provision of a stable product/service that satisfies a deeper value or offers a need-fulfilling experience. To that end, CPMM can be further extended to include relevant frameworks or concepts that could emerge as it has been built around the notion of a generic transaction, thus constituting the model relevant to any kind of preference type entailed.

While SMBSC has been used in this study, mappings to business strategy can be extended or derived for any business strategy formulation. As the approach is model-centric, the only prerequisite for a business strategy formulation to be considered is for its conceptualization to exist because this would allow for model level mappings. For example, mappings proposed in this study can be extended to the value chain (Porter, 1985) whose conceptualization already exists (Giannoulis, Petit, & Zdravkovic, 2011), where three generic value propositions are identified instead of SMBSC's four; product differentiation (similar to product leadership in SMBSC); cost leadership (similar to best total cost in SMBSC); and segmentation.

Phases 4

Considering strategic goals as long-term enterprise business goals, they can be presented by more goal modeling techniques than i* such as BMM (Business Rules Group, 2010). i* has been chosen in this paper because it can capture enterprise business goals. It is known for being used in the early phases of requirements engineering by focusing on the social aspects of systems by capturing the intentionality and rationale of actors within an organizational setting. It supports derivation of system requirements (Andersson, Johannesson, & Zdravkovic, 2007) (Alencar et al., 2009) and furthermore because mappings between SMBSC and i*already exist. Mappings to i* lead to deriving system requirements benefiting the advantages brought by the approach: traceability and classification.

Regarding traceability, each generic strategic goal, and thus each of its sub-goals, is related to particular consumer preferences. This allows the enterprise to further develop and refine these enterprise business goals by focusing on the related consumer preferences, making them more targeted to their customers. System requirements derived from these enterprise business goals are also framed by the same consumer preferences. Based on this traceable link, systems developed or employed are appealing to these consumer preferences.

In terms of classification, the associated weights (quantitative measures) captured for consumer preferences allow for the enterprise to identify which preferences are more important than others. Such importance is identified both overall for the customer value proposition as well as for each enterprise business goal and its sub-goals. Apart from adding goals related to consumer preferences, using i*'s construct of resource allows for the introduction of consumer preferences as an influencer to the achievement of the business goal. This means enterprise business goals found to be important, due to the associated consumer preferences, can be prioritized over others, allowing them to be further and more exhaustively refined. This allows the system requirements derived to embed the prioritized consumer preferences that should be taken into account when developing or deploying a system. Subsequently, weights of consumer preferences can support business decisions when deriving system requirements from the business goals to focus on system features aimed to appeal on the most important consumer preferences.

Such mappings are not limited to i* but they can be extended to other goal modeling techniques that can also support model level mappings. System requirements can be derived either directly through constructs included in the notations themselves or through existing methods that make use of them and leverage the benefits of traceability and classification provided by the approach. Consequently system requirement derivation methods not related to i* can also be used, such as Intentional SOA (ISOA) (Rolland, Kirsch-Pinheiro, & Souveyet, 2010) that extends SOA to enable relating requirements for software services with intentional aspects. ISOA uses graphs to represent intentions (i.e. business goals) and formally relates them with software services operationalizing them.

Another way to elicit system requirements from business goal models is to consider Enterprise Modeling (EM) approaches. For instance, the Enterprise Knowledge Development method (EKD) (Loucopoulos et al., 1997; Bubenko, Persson, & Stirna, 2001) is a common EM process, capturing business goals, requirements for change, and business process on a generic level. Moreover, EKD has been combined with MDD principles to propose an enterprise meta-model including multiple complementary models, offering a holistic view of the organization, as well as enabling generation of IS requirements described by the relevant models (Zikra, Stirna, & Zdravkovic, 2011). The meta-model defines models representing enterprise knowledge, namely business goal model, concept model, business process model and business rules model, as well as system-level models, namely requirements model representing IS requirements and IT architecture model describing the technical components and user interfaces that are involved in the implementation of the IS. When system development is considered, the business goal model is first created, where the other models are designed in the way to support the goal model, and eventually through development of information systems.

In conclusion, various methods exist for deriving system requirements from business goals, including enterprise modeling techniques, as well as numerous business-IT alignment approaches, and goal-oriented requirements engineering techniques.

CONCLUSION

This work has addressed the importance of consumer preferences for a business to deliver on its value proposition, as well as for the non-existent systematic and traceable link for creating the information system infrastructure supporting it.

Based on this problem, the goal was to establish linkages between consumer preferences and system requirements aligned with business strategy. Therefore, a novel approach was presented: *a model-centric approach capturing consumer preference in system requirements through business strategy*. Its purpose is to reflect consumer preferences through business strategy to system requirements allowing for the development of systems that better support a business's customer value proposition. The approach consists of four phases:

- Phase 1: Capture consumer preferences.
  A Consumer Preference Meta-Model (CPMM) has been presented to establish linkages between consumer preferences and generic strategic goals.
- Phase 2: Capture business strategy.
  The conceptualization of SMBSC has been used as the business strategy to be mapped with consumer preferences.
- Phase 3: Map consumer preferences to business strategy.
  Mappings between consumer preferences, as captured by CPMM, and business strategy, as captured by the conceptualization of SMBSC, have been proposed.
- Phase 4: Derive enterprise business goals from business strategy, and further to system requirements.
  Mappings between the consumer preference-aware business strategy and i* have been applied to derive an i* model that captures strategic goals reflecting consumer preferences allowing for the derivation of system requirements, thus providing traceability between consumer preferences and system requirements through business strategy.

Evaluation of the approach combines characteristics of descriptive and observational design evaluation methods evaluation as it includes the use of informed arguments and case study respectively (Hevner, March, Park, & Ram, 2004). The observational portion has been carried out in the form of a real case where the approach has been applied in a real business environment (Hevner, March, Park, & Ram, 2004). This took place at a higher education institution in Sweden involving both the collection of consumer preferences of 218 applicants to Swedish higher education institutions during the fall of 2012, and an institution's strategy map for education. During Phases 1 and 2 the conceptualizations proposed and used have been instantiated with the information collected: for CPMM, the valuated weights for consumer motivation collected using Schwartz's survey, while for SMBSC, the official strategy documentation of the institution. During Phases 3 and 4 all

derived goals from students' consumer preferences that have been added to the institution's strategy have been verified against qualitative statements collected from students on these preferences. The descriptive portion was undertaken in the form of the informed argument, using the knowledge base (Hevner, March, Park, & Ram, 2004). For Phases 1 and 2 this included relevant research on business strategy modeling and modeling consumer preference based on values, needs and motivation stemming from psychology as it has also been used in marketing. For Phases 3 and 4, relevant research included works on mappings between business strategy and consumer preference, mappings of business strategy to goal modeling, as well as methods for system requirements derivation from enterprise business goals. Overall the use of the real case has illustrated the applicability of the approach as well as the traceability of consumer preferences to business strategy to enterprise business goals to system requirements, which has been the goal of this paper.

The proposed approach addresses the problem of overlooking and missing consumer preference both in business strategy and systems developed, and thus constitutes prescriptive knowledge (Johannesson & Perjons, 2012). Contribution of this paper consists of the approach as a whole, the models it includes (CPMM as a novel model), the mappings between them, as well as the instances of the approach applied in the real case. This is aligned with contribution types acknowledged in design science, models, methods and instantiations (Gregor & Hevner, 2011).

FUTURE WORK

Future efforts around this work can be taken towards many directions. One example could be to explore and demonstrate the applicability of the approach with more business strategy formulations, with more consumer preference types, and with more goal modeling and requirement derivation techniques. Another direction could be to abstract and examine possible generalizations of the approach resulting into a method. A concrete path in this direction is to map CPMM to the Unified Business Strategy Meta-model (UBSMM) (Giannoulis, Zdravkovic, & Petit, 2012) which will result into abstracting the current approach to being applicable to every business strategy formulation mapped to UBSMM. Other possibilities for future work could include evaluating and refining the current approach by applying it to more real cases, especially when a particular system is being developed to demonstrate the traceable linkage of system features to system requirements to business strategy and consumer preferences. Moreover, longitudinal studies could be initiated to assess the impact of the approach on business-IT alignment and consequently on business strategy. Finally, another aspect worth exploring is the future development of tools to support automation or semi-automation of the approach, which is very challenging due to the nature of concepts tackled as a well as due to the numerous possible combinations of methods across the four phases.

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