

# A Modeling Method in Support of Strategic Planning: Language Design and Application

*Short Paper*

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## Abstract

*Strategic planning plays a key role in management practice and requires a profound understanding of the firm's organizational context and competitive environment. A consistent and coherent strategic plan prepares for the implementation and execution of a strategy in order to set a firm on a successful future path. As part of an on-going, long-term research project, this short paper outlines essentials of a modeling method in support of strategic planning. Following a design science research process, we report on the design of a domain-specific modeling language, present an intermediate language specification and illustrate how conceptual models of strategic plans could be integrated into existing enterprise models using a well-known application scenario.*

**Keywords:** strategic planning, modeling method, language design, design science research

## Introduction

Strategic planning is a complex activity undertaken as part of strategy making and implementation (Mintzberg 2003). Strategic management literature describes strategic planning as a set of key concepts and corresponding managerial actions aimed at setting an organization on a successful future path (Cumings 2008). A consistent and coherent strategic plan is considered an essential prerequisite for improving transparency and fostering communication to support a subsequent implementation of strategy (Ansoff 1991). Early views on strategic planning suggest a dogmatic, linear sequence of determining goals, establishing courses of action, and of allocating resources (Zeleny 1997). This view has for long been challenged by insights from different angles (e.g., Hofer 1973; Mintzberg 1994) but, still, linear thinking has a profound impact on strategic planning and, in particular, on the conceptualization and use of strategy analysis tools (e.g., Balanced Scorecard or SWOT analysis). While those tools reduce complexity, they primarily focus on specific activities relevant to the strategic planning task (e.g., market segmentation or resource planning) and are used recurrently at different stages of the strategic planning process (Clark 1997; Stenfors et al. 2004). However, they build on remarkable conceptual ambiguities, provide only limited methodical support and largely ignore important organizational context (Bock et al. 2016). Moreover, these tools use differing terminologies (e.g., risks and chances vs opportunity and threat, e.g., Helms and Nixon 2010) and are based on questionable conceptions of relationships among key concepts, see, for example, Nørreklit's (2000) discussion on 'cause-and-effect' relationships. It is, therefore, reasoned that to support strategic planning effectively and methodically, theoretical reconciliation and further conceptual precision and clarity is needed. Prior research suggests that enterprise modeling approaches provide a promising foundation for supporting visual representations of business strategies (e.g., Bock et al. 2016; Kitsios and Kamariotou 2017). These observations motivate research on modeling methods to support the task of strategic planning and, in particular, of creating and maintaining conceptual models of strategic plans. As part of an on-going, long-term research project to extend and refine the "Multi-Perspective Enterprise Modeling" (MEMO) method (Frank 1994, 2012; Bock and Frank 2016), this short paper outlines essentials of a domain-specific modeling method in support of

strategic planning that aims at conceptual precision and clarity and aligned methodical support. Following a design research process (Verschuren and Hartog 2005), the paper presents intermediate results of the modeling method design science research process.

The paper is structured as follows: First, we outline the research method, briefly discuss related work, present the design goals, and describe the results of the domain analysis by presenting domain-specific requirements a prospective modeling method should satisfy. Based on this preparatory work, we demonstrate prospects of a modeling method in support of strategic planning using a well-known application scenario. The scenario outlines how conceptual models of strategic plans support strategic planning effectively. Moreover, we illustrate how such an approach could be integrated with existing modeling methods before we conclude with final remarks and an outline of paths for future research.

## **Research Method**

The research presented is part of a multi-year design science research project that aims at constructing a domain-specific modeling method in support of strategic planning. The present short paper reports on intermediate results of the design process and focuses on the design of a domain-specific modeling language (DSML) as core element of a corresponding method in support of strategic planning (Frank 2012). A main challenge for conceptualizing research aimed at the development of modeling methods as artifacts is their justification according to scientific standards (Frank 2006). In the light of idealized design research processes (e.g., Peffers et al. 2007; Verschuren and Hartog 2005), the present work reports on the clarification of design goals and the development of domain-specific requirements (cf. phase 1 ('first hunch') and 2 (requirements and assumptions) in Verschuren and Hartog (2005)'s model) and, in more detail, on the phases structural specification, prototype and implementation (3 to 5).

The design of a DSML is an intricate challenge which comprises an analysis of the technical language of the targeted domain (Ortner 2008). One widespread approach to conceptual reconstruction is to review, analyze, and interpret pertinent literature in the field under consideration. The reconstruction of technical terminology is an iterative process involving more than the identification of (meta) concepts, their attributes and relations, for instance, the identification and resolution of terminological ambiguity and truncation which may imply the introduction of additional abstractions. That in turn may require the shaping of their semantics with regard to method and language design objectives, e.g., which analyses the language should support. This implies the (re-)interpretation of observed terms and concepts and leads to a design of abstractions appropriate for specific analyses and applications. Notably, the domain of strategic planning is exceedingly challenging regarding the development of a DSML since even essential technical terms are used in a variety of meanings depending on use context and frame of reference. This holds especially true for the concept of strategy itself (Porter 1996) but also for related concepts including goal (objective, target), risk and threat, chance and opportunity, strength and weakness. A more detailed analysis of the technical terminology of the domain of strategic planning is provided in Bergmann and Strecker (2018). It includes the underlying rationale of the requirements, corresponding assumptions and an outline of the corresponding conceptualization of a strategic plan as a 'living' and 'dynamic' document. In this short paper, we focus on the language design, procedural guidelines, and design rationale of the prospective DSML introducing key concepts, their semantics, presenting design decisions, and an initial draft of a graphical notation (concrete syntax) that helps to improve clearness and comprehensibility of strategic plan models (phase 3 and 4 in Verschuren and Hartog (2005)). In order to demonstrate the use of the prospective modeling method (phase 5), we focus on an application scenario that illustrates the reconstruction of a strategic plan of the Honda company in the late 1950s (Pascale 1984). However, the success of using a modeling method depends on various factors (e.g., qualification of prospective users, previous experience with other languages, and attitude toward learning new methods). Therefore, a study on the practical utility of the modeling method is subject to future work (phase 6).

## **Related Work**

Conceptual modeling of strategy-related topics has been subject to a number of design science contributions, e.g., to work on domain-specific modeling languages, e.g., for modeling risks, goals, and resources (e.g., Frank 2012; Lankhorst et al. 2009; Sandkuhl et al. 2014). Furthermore, conceptual modeling approaches have been proposed to support analyzing strategy-related topics such as strategic

alignment (Giannoulis et al. 2012), business models (Object Management Group (OMG) 2016), the integration of business processes into strategy making (Horkoff et al. 2014), and, extensively, organizational goals (e.g., Azevedo 2017; Cardoso 2017). Related approaches provide abstractions of organizational goals that are augmented with further concepts relevant to strategic plans (e.g., business process types or resource types) focusing on means-ends-relationships and ‘strategic decision trees’ (Horkoff et al. 2014). In order to ease the use of these methods, some approaches offer methodical guidelines to support strategic goal planning efforts (Cardoso 2017). Different from the present work, these approaches focus on enriching (strategic) goal models (Azevedo 2017) and do not provide dedicated abstractions for modeling strategic plans. Hence, these approaches may not offer nuanced and dedicated concepts to (re)assess comprehensive strategic plan models and do only provide limited methodical support regarding the creation of comprehensive strategic plan models. At present, we identify 38 related contributions that extend 11 different modeling approaches by strategy-related aspects including i\* (e.g., Giannoulis et al. 2011), Archimate (e.g., Azevedo 2017), and Tropos (e.g., Bresciani et al. 2004). The present work builds on prior work (Bock et al. 2016) to extend the MEMO (meta) modeling method and its present support for strategy modeling (Frank 2012) and for goal modeling (Overbeek et al. 2015) with dedicated concepts for a reflective treatment of strategic plans. To support prospective modelers and model viewers (e.g. business analysts), this research emphasizes (1) the importance of an elaborate visual language—a notation and corresponding diagram types—for representing strategic plans (see Figure 2) and (2) a thorough reconstruction of the domain's technical terminology and (3) a grounding in the domain's theoretical foundation as exemplified, e.g., in strategic management literature.

## Design Goals and Requirements

This section briefly reports on domain-specific requirements that a method in support of strategic planning and, in particular, of creating strategic plans should satisfy (for a more detailed requirements analysis, see Bergmann and Strecker (2018)), refining the high-level requirements (reducing complexity, improving transparency, fostering communication, and collaboration) outlined in Frank (2012). The general objective of the modeling method is to stimulate and foster the creation, documentation, and analysis of dedicated organizational strategic plan models based on a conceptualization of strategic plans as a ‘living’ and ‘dynamic’ document. In order to foster communication and collaboration, conceptual strategic plan models created with the prospective modeling method should provide multiple perspectives, such as an organizational, a technological, and an informational perspective since strategic planning involves stakeholders with different professional backgrounds and responsibilities, as well as their specific sentiments. Accordingly, the overall design goal is to enhance present enterprise modeling approaches with constructs for modeling organizational strategic plans to enable a model-based and multi-perspective management of organizational strategic planning as illustrated in Figure 2.

### Requirements Regarding Strategic Planning

**Requirement RP1:** *The method should support different procedural schemes for strategic planning. It should allow for, e.g., an iterative process as well as a linear sequence of tasks. Moreover, the method should not impose a particular procedural scheme on its prospective users.*

**Requirement RP2:** *The method should support the design of a coherent and consistent strategic plan. It should provide a conceptualization and account for precise and elaborate representation of the concepts and their supposed influence and impact described in a strategic plan and, thus, support the integration of the concepts (e. g., planned activities and resources) as well as their coordination.*

**Requirement RP3:** *The method should provide the means to establish an intersubjectively traceable justification for the concepts and relations laid down in a strategic plan. It should provide the means to describe and to document assumptions in quantitative terms where possible and means for qualitative description where quantification is either not feasible or not appropriate.*

**Requirement RP4:** *A method should provide perspectives specific to (groups of) stakeholders involved. A perspective should, as far as possible, correspond with the abstractions, concepts, and (visual) representations known and meaningful to the targeted (group of) stakeholders. All perspectives should, be integrated with each other to foster cross-perspective communication and cooperation.*

## Requirements Regarding Key Concepts of Strategic Plans

**Requirement RC1:** The method should provide purposeful concepts for modeling different types of organizational goals and their interrelations.

**Requirement RC2:** The method should provide meaningful concepts for modeling organizational courses of action. It should also provide the means to account for an orchestration of courses of action.

**Requirement RC3:** The method should provide purposeful concepts for modeling the demand for and the consumption of resources anticipated by a strategic plan. It should also provide means to account for different types of resources.

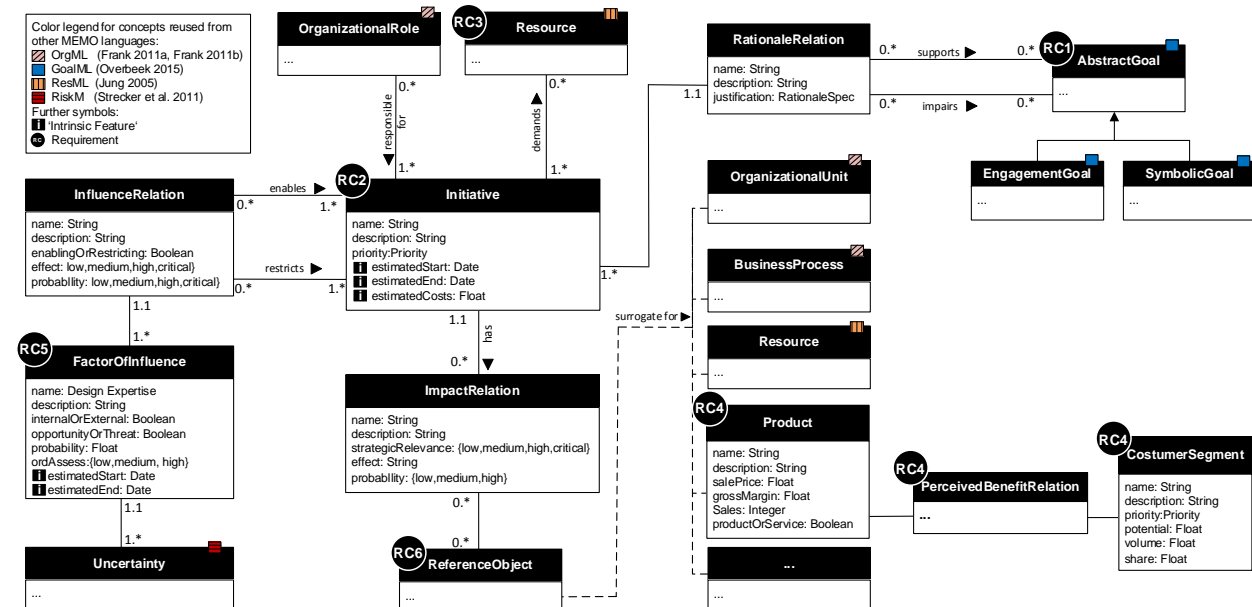
**Requirement RC4:** The method should provide purposeful concepts to describe and document markets, products and services, as well as their perceived benefits.

**Requirement RC5:** The method should provide purposeful concepts for modeling the presumed influence of the organizational environment within a strategic plan and provide the means to allow for a representation of how environmental factors affect the concepts described in a strategic plan.

**Requirement RC6:** A method should allow for integrating the concepts of a strategic plan in the context of an enterprise and link them to the surrounding organizational action system which is composed of all relevant organizational entities (e. g., organizational units, business processes etc.). This suggests an integration with existing modeling languages.

## Prospects and Challenges of an Enterprise Modeling Approach

The rationale for choosing MEMO is based on several considerations: MEMO provides a variety of modeling concepts relevant to the modeling of strategic plans (e.g., organizational units, roles, resources, and goals). In contrast to proprietary approaches, the specifications of the MEMO method and its meta models are publicly available and documented in several publications. Further, MEMO draws upon on a language architecture extensible through DSMLs (Frank 2008). In MEMO, DSMLs are specified using the MEMO Meta Modeling Language (MEMO MML) (specified at the meta-meta or M3 level).



**Figure 1. Intermediate draft of the meta model and integration points to MEMO languages**

Using MEMO MML for defining and reusing common concepts at the meta level (M2) leads to integrated models at type level (M1), e.g., an organization structure model integrated with a model of an IT landscape and a performance indicator model. Each modeling language in MEMO provides a set of reusable modeling concepts for the aspects they focus on. Of particular importance for modeling strategic

plans are, for instance, concepts for modeling organizational context, i.e., organizational units (e.g., to assess scope and responsibilities); business processes (to determine the organizational action system) as well as organizational goals and objectives (to analyze existing goal systems with respect to (new) strategic plans). Thus, MEMO promises a number of advantages for the development of the prospective DSML outlined in this paper. Figure 1 depicts an intermediate draft of a meta model as part of the language specification using MEMO MML and illustrates potential points of integration to existing modeling languages of MEMO that are highlighted by a colored rectangle attached to the meta type (Frank 2008). An elaborate language specification of each indicated DSML is provided by Frank (2011a, 2011b), Jung (2007), Overbeek et al. (2015) and Strecker et al. (2011).

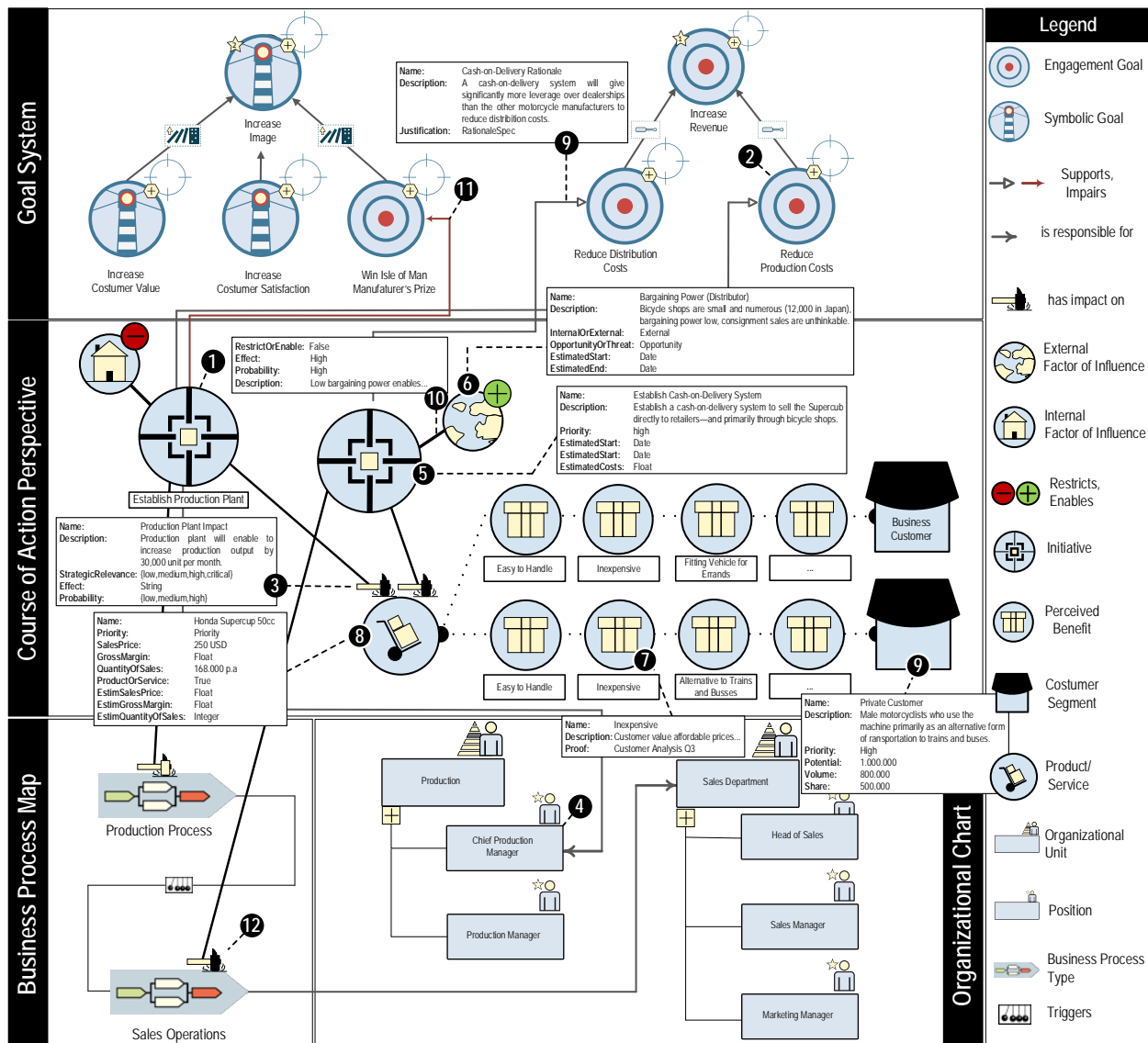
### **Application Scenario**

Based on an exemplary application scenario, we illustrate how a conceptual model of a strategic plan integrates with existing enterprise models to enable support for strategic planning tasks. Further, we outline how associated enterprise models would benefit from such an approach. The enterprise model is created using several DSMLs mentioned in the previous section. Relationships between concepts of the enterprise model are explicitly modeled using qualified associations (e.g., between organizational units, goals, and business processes). In particular, the augmented enterprise model points out how models of strategic plans can be integrated with other models in the context of an enterprise. In the scenario modeled in Figure 2, a goal model is shown at the top of the diagram; a business process map and an organizational chart are shown at the bottom of the figure. The center part of Figure 2 shows the ‘Course of Action’ perspective of the modeled strategic plan which integrates with the other conceptual models of the application case. Hence, Figure 2 primarily illustrates how models of strategic plans may be integrated with other models using different DSMLs. With regard to the inherent complexity of such models and to practical applications, not every prospective analysis scenario needs to consider all aspects since they may overcharge users with too much detail and impair the understandability of such models. In order to cope with this challenge, concepts such as ‘product’ and ‘customer segment’ may be ‘faded out’ to focus on analyzing specific courses of action and their impact outlined in the strategic plan. Goals and organizational units may be faded out to focus on the identification and assessment of potential factors of influence. It may be the case that a presentation medium (e.g., computer screen) may not suffice for a readable presentation of a complete model. A common approach to address this issue is to make use of aggregations to replace a number of symbols by one symbol depicting the aggregation (i.e., ‘sales operations’ as shown Figure 2). Moreover, we assume the availability of modeling tool support for this DSML which allows modelers and model viewers (e.g., strategy analysts) to fade irrelevant aspects out not currently needed for the intended analysis. The development of such tool support is on our agenda. Further, the assumption that the usability and productivity of a DSML depends on the graphical notation is backed by various studies (Moody 2009) and, therefore, it should be designed with care and consideration.

The following scenario is based on a reconstruction of Honda’s ‘success story’ in the late 1950s described in Pascale (1984). We chose this example over a fictional scenario for two reasons: Firstly, the introduction of the motorcycle ‘Supercub’ is a well-documented and, therefore, a frequently used example in management literature to outline the complexity of the domain by emphasizing that the concept of strategy is subject to partly deviant interpretations and, secondly, in order to establish conceptual clarity, we outline that the underlying conceptualization of strategic plans suffices to support various interpretations of the term strategy and related concepts. As a result of (re-)interpreting observed terms in the domain, we intentionally exclude commonly known concepts (e.g., ‘vision’, ‘capability’ etc.) and focusing only on mandatory concepts for strategic plans.

First, we will focus on the *initiative type* ‘establish production plant’ (cf. ① in Figure 2). According to Pascale (1984), this initiative had been of significant strategic importance in order to reduce production costs ② by increasing the production output of the firm ③. Moreover, the senior manager Fujisawa figured out that instead of using traditional distribution channels, he rather wants to reduce overall costs by bypassing conventional industry distribution channels by means of establishing a ‘cash-on-delivery-system’. However, this initiative ⑤ could only succeed if the numerous Japanese bicycle distributors ⑥ were positively inclined to broaden their product lineup with the ‘Supercub 50cc’. If the initiative would succeed, he reckoned, potential customer (e.g., business and private customers) in search for an ‘inexpensive’ and ‘safe-looking’ motorcycle would respond to the ‘perceived benefits’ ⑦ the Supercub ⑧ would offer to the targeted groups ⑨ (Pascale 1984). While Figure 2 provides an ex post description of a

'realized strategy' that outlines how Honda established a strong competitive position in the Japanese motorcycle market, a subsequent scenario could focus on an 'intended strategy' describing Honda's plan to enter the North American market in the following years. Based on a strategic plan model, different stakeholders with different professional backgrounds could quickly gain insights into the general idea of the proposed future path and engage in further discussions. An augmented enterprise model (as illustrated in Figure 2) provides a foundation for several domain-specific analyses. For instance, it enables to identify which initiatives contribute to which organizational goals by analyzing relationships from *initiative types* (1) to *goal types* (2) in order to assess their strategic intent. Another conceivable analysis is the assessment of the organizational impact of an initiative (3), e.g., which business process or organizational unit is affected by the implementation of a specific initiative and how?



**Figure 2. Outline of a language application for modeling strategic plans**

Further, one may want to conduct (automated) inquiries to discover a lack of a 'rationale' of an initiative (9). It may also be conceivable to analyze the chance of success of an initiative by discussing potential factors of influence (6) that restrict or enable (10) an initiative. Moreover, one may want to initiate a tool-supported cost inquiry of a strategic plan by accumulating the estimated costs of all initiatives as well as the utilization and consumption of resources to estimate the resulting overall expenditures and eventually suggest a re-evaluation. Taking on a different perspective, a marketing manager might want to contribute additional information regarding market forecasts such as 'market volume', 'market share' or 'market

potential' (8). Please note that the conceptualization of products and customer segments follows from the domain analysis (Req. RC4) that demands that strategic plans have to take both into account: The perspective of the firm and that of the targeted customer. An appropriate interpretation of the '*perceivedBenefitRelation*' is that it is supposed to provide a description for the means of a firm to interact with its customers. However, this relationship is intended to be augmented in future work.

### **Language Design and Prospects of Procedural Guidelines**

This section outlines initial procedural recommendations on the principle use of essential language concepts. A process model to guide the application of the modeling language will include more detailed guidelines on how to use the language for specific model-based analyses. Further, specific language design considerations regarding the language concepts are discussed along the outlined methodical guidelines.

Strategic planning is (conceived as) an iterative process that starts with an 'opaque' idea of doing business and eventually leading to a 'complex web of thought' that is set out in a consensual agreement of the parties involved (Req. RP1). However, various starting points are conceivable. For instance, in the present scenario, a manager realized that Honda had 'rankled' under the two-tier distribution system that prevailed in the industry leading to high costs and little leverage over its dealerships. In order to address these problems, it was intended to be established an innovative new distribution system (Pascale 1984). As a procedural first step, one could have interpreted the goal system in Figure 2 to realize that a new distribution system could address the problem at hand. However, it is also conceivable that the notion of the initiative could have been there beforehand as an 'opaque' idea although without a clear understanding of its implications. At any rate, the idea and the description of the *initiative type* 'establish cash-on-delivery system' (5) may arise 'around' the creative process of strategic thinking and, thus, a strict and prescriptive starting point may be ill-advised. In order to provide an adequate visualization of an *initiative type* that is easily assessable (Req. PR4) and puts emphasis on a concrete action, we chose the symbol of a crosshair. Further, in order to establish a rationale between an *initiative type* and *goal types*, the modeler may associate these with the '*rationaleRelation*' (9) to provide a (preferably intersubjectively traceable) rationale of why and how an initiative may contribute to organizational goals (Req. RP3). In the process, new factors of influence may be identified that pose new and yet unknown risks and chances. A language user is able to describe these factors of influence that enable or restrict specific initiatives. To visually distinguish between external and internal *factor of influence types*, we choose a 'globe' for the former and a 'house' for the latter. In the given scenario, the relationship between 'bargaining power' and 'establish cash-on-delivery system' is perceived as an enabling influence (10) since the distributors provide the infrastructure needed and their relative bargaining power is perceived as low (6). To further elaborate, the language user should provide a window of opportunity by describing a starting and end date. Information regarding the probability and effect of this relationship should also be provided (10) in order to document all corresponding and relevant assumptions. The design rationale for '*influenceRelation*' is that *factor of influence types* may have an enabling relationship to a specific *initiative types*, while on the other hand having a restricting relationship to other *initiative types*. This conceptualization provides more flexibility to the language user and additionally prevents potential inconsistencies within the plan (Req. RP2). A restricting relationship is represented by a 'minus symbol', whereas an enabling relationship is represented by a 'plus symbol', which is to be attached to the respective *factor of influence type*. The association '*has impact on*' is intended to provide the means to describe implications and consequences to the organizational context following a specific course of action (Req. RC6). Figure 2 illustrates that the new production plant is supposed to increase the production of the Supercub 50cc by 30.000 units per month and additionally requires an adjustment of the business process type 'production process'. As a visualization, we chose an impacting hammer in the shown preliminary notation. After having established a sufficient understanding of the initiatives, the corresponding factors of influence, the restricting and enabling relationships and the organizational impact, we suggest to review the associations (e.g., between an initiative type and goal types). In the process, it may become evident that an initiative may impair other organizational goals (11) and may have a yet unknown impact on the organizational context (12). Furthermore, it may be revealed that a factor of influence may also affect already established initiatives which in turn may lead to an iteration of the procedure, too. This iterative process fosters consistency and coherence of a strategic plan model and contributes to the design goals mentioned in the previous sections. Subsequent to these steps, responsibilities and accountabilities may be coordinated. The visual inspection of a goal planning diagram

provided by GoalML (Overbeek et al. 2015) enables a modeler to suggest responsibilities for specific initiatives. For instance, the production department is accountable for the achievement of the goal 'reduce production cost', thus, a member of this department may be recommended to lead the initiative 'establish production plant' (4). Important organizational context is provided through differentiated representations of the involvement of different stakeholders depicted on the bottom right in Figure 2.

## Conclusions and Future Research

The contribution of this paper is twofold. First, we investigate potential integration points to an enterprise modeling approach to support strategic planning efforts. The presentation and the analysis of the application scenario reveals that enterprise models provide an appropriate conceptual basis for modeling meaningful strategic plans since they enable an elaborate description of the key concepts required. With regard to practical applications, our short treatise assumes that prospective method users need precise conceptualizations of domain concepts to create comprehensive models of strategic plans. As suggested, further work is required to arrive at such concepts. This short paper intends to initiate a discussion of prospects and challenges the domain poses to conceptual and enterprise modeling approaches.

The refinement of the intermediate meta model-based specification is our current research focus as well as a dedicated, refined process model. The method will comprise additional application and analysis scenarios to demonstrate how it will support language users by offering support for tasks specific to the creation of a strategic plan. These analyses will be based on and aligned to mandatory and crucial tasks performed within the planning process (e.g., incorporating and processing information from various and commonly used tools such as Balanced Scorecard, Business Model Canvas, SWOT or PESTLE and to integrate further sources of information used within strategic planning (i.e., market reports etc.)). However, by re-evaluating such analysis scenarios at draft stage, it becomes ever more evident to reconsider and to specifically exclude commonly used modeling concepts (e.g., 'strategy', 'vision' or 'capability') to resolve terminological ambiguities in order to design purposeful and appropriate abstractions to create comprehensive strategic plan models (Bergmann and Strecker 2018; Bock et al. 2016). Nevertheless, specific details may be added to existing modeling concepts in order to offer a specific interpretation of strategies as strategic plans based on precise and consistent semantics readily assessable and familiar to domain experts. To evaluate the practical usability of the prospective modeling method, the research process is accompanied by interviews with prospective users such as partners of strategy consultant firms as well as managers entrusted with strategic planning tasks. Further discussions with prospective method users remains on our research agenda.

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