# Continuous Business Model Planning with the Value Management Platform

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**Abstract.** The Value Delivery Modeling Language (VDML) is a standardized language for developing conceptual models that are used for the analysis and design of value creation and value capture in enterprise operations. Although the VDML 1.0 specification was published by the Object Management Group (OMG) in October 2015, as of yet, little is known about applications and experiences of value modeling with VDML. We report in this paper on the industrial practice of applying VDML for continuous business model planning using the Value Management Platform (VMP) tool of the Dutch company VDMbee. Neither the VMP user guide nor the VDML specification prescribe how to perform value modeling using the tool/language. With this paper, we add to the procedural knowledge of value modeling by analyzing the method applied in a continuous business model planning case-study of a low-cost carrier. We focus particularly on how the VMP was used in this case-study for supporting managerial decision making and strategy exploration regarding the company's future growth on both the existing business model and innovation-driven business transformation. By identifying, extracting, and making explicit the method of continuous business model planning using the VMP, we contribute to a better understanding of the practice of value modeling with VDML.

**Keywords:** Conceptual Modeling, Enterprise Modeling, Value Modeling, Business Ontology, VDML, Business Model Planning, Business Innovation, Business Transformation, Strategy Exploration, Managerial Decision Making

## 1 Introduction

A value model is a type of enterprise model that shows how value is delivered in a network of actors (e.g., a supply chain, a consumer market, a smart grid, a healthcare system). As such, value modeling can be used for strategic analysis and the (re)design of value networks. Since the early 2000's, different modeling approaches have been proposed with specific emphasis on value-related aspects (e.g., exchange, impact and

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value creation analyses [1], e-service design [2]). The Value Delivery Modeling Language (VDML) [3], which integrates many concepts of other value modeling as well as business modeling approaches, has been adopted as a standard business modeling specification by the Object Management Group (OMG) [4]. Tool support for VDML is offered by the Dutch company VDMbee [5]. Their Value Management Platform (VMP) provides a user-friendly tool for working with VDML using different kinds of business canvas/map templates and storytelling/mapping techniques for model building. The transparent creation of VDML meta-model instantiations via the tool's highly visual interfaces instead of directly working with the language, targets value management professionals with a business-oriented profile rather than a technology-oriented profile. The approach to value modeling adopted in the VMP is called *continuous business model planning* (CBMP) [6], to stress that it is an approach that uses a business model framework to connect strategy and operations, in a spirit of 'continuous improvement' by steering the business on values. The VMP is thus used as a dashboard for planning and monitoring strategic change and as a decision support system for exploring, evaluating and deciding on strategic plans.

A complete enterprise modeling approach entails more than the definition of a meta-model, a notation, and the development of modeling, analysis, and design tools. A modeling method also consists of a modeling procedure which guides the creation and analysis of models [7]. Currently, there is no research on how to apply VDML as related research focuses on ontological analysis of the conceptualization of value [8-11], VDML extensions and analysis techniques for applications like business model analysis [12,13], compliance engineering [14] and reputation systems design [15], and integration of VDML into enterprise architecture modeling approaches (e.g., ArchiMate [16,17]).[1] Regarding CBMP with the VMP, a brief overview of its stages can be found in the literature [14]. A more up-to-date overview can be found in [6], which is a VDMbee blog post that is deliberately high-level and introductory. Apart from largely anecdotic evidence of (showcase) VDML applications (e.g., case-studies reports [5], master thesis projects [18-20]), knowledge on the practice of value modeling with VDML is largely tacit. For CBMP, this knowledge is embedded in the VMP code and in its documentation, video tutorials and other training materials, not forgetting the tacit knowledge 'embodied' by the tool developers themselves.

The goal of this paper is to make this tacit knowledge explicit. We intend to contribute procedural knowledge (i.e., how to?) of CBMP by making the method underlying the use of the VMP explicit. Via the specific value modeling approach chosen, we also intend to better the understanding of the practice of value modeling. We believe that by demonstrating the VMP-supported approach as a for managers transparent practice of VDML that guides and supports their strategic planning processes regarding continuous

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[1] A systematic search on Google Scholar on December 18, 2017 returned 589 hits for the search string "continuous business model planning" OR "VDML" OR "value delivery modeling language" OR "value delivery modelling language" OR "value delivery metamodel" OR "value delivery meta-model". These hits revealed 108 unique documents in English which referred to VDML as acronym for value delivery modeling language (or value delivery meta-model as it was first coined by the OMG) and one document that mentioned CBMP using the VMP.

innovation and transformation, we help increasing the maturity of value modeling practice and boosting the adoption of VDML. Making the method explicit will also facilitate further research on the use of VDML.

To identify and extract the method underlying the use of VMP for CBMP, we follow the Design Science Research Method for Information Systems Research [21]. In particular, we conducted client/context-initiated design-based research. According to [21, p. 56] "a client/context-initiated solution may be based on observing a practical solution that worked; it starts with activity 4 [*Demonstration: find suitable context & use artifact to solve problem*], resulting in a D[*esign*]S[*cience*] solution if researchers work backward to apply rigor to the process retroactively". In our case, the client is VDMbee that asked us for help to make tacit knowledge about the CBMP method explicit. The context is the application of the approach to the CBMP process of a low-cost carrier (LCC). This LCC case-study was developed by the VDMbee Academy to be used for training value management professionals in the use of the VMP.

VDMbee provided us access to the case-study documentation and data (i.e., business model packages stored in the VMP) and the two VDMbee value architects who were involved in the development of the case-study, joined the research team. The participation of the value architects greatly helped us to reconstruct the development process, while ensuring the correct interpretation of the case-study materials. So, our main research activity was to reverse engineer the demonstration of VMP-based value modeling in the LCC context, to find out the activities performed and techniques applied, and to add some rigor to the CBMP method's design rationale by grounding design decisions in the Information Systems and Strategic Management knowledge base [22]. We decided that the evaluation of this method is outside the research scope of this paper. We also emphasize that this is only a first iteration of adding rigor as we report on an industrial practice, focusing on describing the method underlying the use of the VMP as observed from a particular instantiation (i.e., the LCC case-study). Consequently, the maturity level of the knowledge contribution of our research is still low, being of the type 'situated implementation of artifact' [23]. Further research is required to raise the level of knowledge of CBMP to that of a design theory.

The paper is structured as follows. The second section of the paper introduces the LCC case-study. The third section analyses how the VMP was used in the case-study to identify and extract the underlying CBMP method. The fourth section discusses the most distinctive features of the method, the limitations of the research, and the next steps in developing the VMP and in conducting research on CBMP. The final section concludes by outlining our contribution and its implications for practice and research.

## 2    Case-study

The LCC studied differentiates itself most clearly from a full-service carrier through the adoption of the 'no-frills' business model pattern [24]. Passengers can buy cheap tickets to be transported from point A to point B, but basically any other service (e.g., hold luggage, carry-on luggage, food and beverages, seat allocation) must be bought as add-ons at a premium price. The ancillary revenues generated by the add-ons combined

with a cost-cutting focus (e.g., minimal turnaround time, minimal fuel carriage and consumption, maximal aircraft utilization, low wages) allow keeping ticket prices low. Apart from low costs, other key values of the LCC under study are environmental sustainability (i.e., consuming less fuel per passenger kilometer than competitors do) and passenger satisfaction, which is determined by ticket prices, promptness (i.e., flights in time) and the variety of destinations within the European Union that are served.

Despite the success of the current business model, the LCC's management team realizes that further strategic thinking and action is required to cope with emerging challenges and threats, including a worsening reputation (in terms of lack of customer service quality and bad treatment of personnel), projected market (share) growth (necessitating investments in hundreds of new aircrafts), increased competition by so-called ultra-low-cost carriers, and the Brexit (potentially resulting in a reversing of deregulation and liberalization for flights to and from the UK).

To cope with these challenges and threats, and to realize the CEO's ambition to grow, several ideas for business model innovation are actively being pursued, including operating long-haul flights (e.g., inter-Atlantic flights), setting up short-haul operations in the Middle-East, and offering connecting flights (i.e., feeder lines) for long-haul airlines. Also, several alternatives of the current business model are being explored, to find the best basis for future growth (e.g. lowering of fares, leasing of planes).
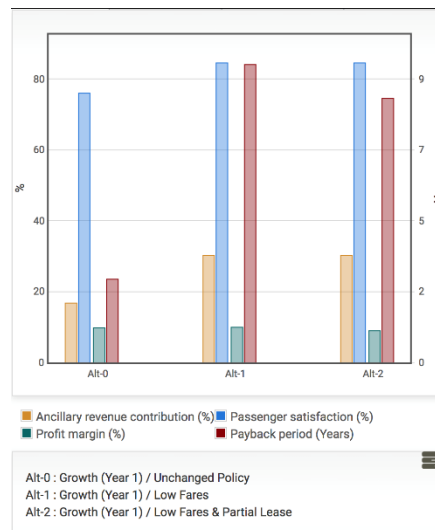


**Fig. 1.** VMP screenshot showing a comparison of four calculated plan values in the next year for alternative implementations of the current business model, based on market prognoses[2].

To structure this strategic thinking and turn it into a systematic strategic planning process, the VMP was used. Using the VMP, business model innovation is moved from

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[2] Market size increases from 2200 million tickets in year 0 to 2250 million tickets in year 1 and market share increases from 5% in year 0 to 5.5% (unchanged policy) or 10% (low fares, low fares & partial lease) in year 1.

ideation to prototyping, allowing managers to take informed decisions on the adoption and implementation of new/modified business models and on the phasing of the business transformation. The VMP informs managerial decision-making by means of prognoses and analyses of scenarios regarding the value impact of the continuation of current business models and/or business model innovation. For instance, a value management dashboard can be created to show the trade-offs in and/or evolution of 'plan values' (see Fig. 1 for an example). The method underlying the application of the VMP is demonstrated and analyzed in the next section.

## 3 Continuous Business Model Planning Method

In this section, a first subsection presents the analysis of the CBMP process performed for the LCC under study. The analysis looks into what activities were performed, for which purpose, in what order, and how they were organized as to who is involved and where they took place. The second subsection then looks specifically into the question with what means the activities were performed. The different techniques incorporated in the VMP are demonstrated on the LCC case and are mapped onto applicable constructs and diagrams of VDML.

### 3.1 Analysis of the Continuous Business Model Planning Process

In CBMP, the business model is considered as the unit of strategic planning. In line with OMG's Business Motivation Model (BMM) [25], strategy is seen as a description of a course of action to reach goals, which express the enterprise's aspirations (i.e., its vision). In other words, the BMM defines a strategy as a component of the plan for the realization of the mission that makes the vision operative. A strategy guides efforts towards the achievement of objectives that quantify the enterprise goals. As CBMP is meant to steer the business on values, the objectives defined are those pertaining to value delivery. In this context, the VDML definition of value as *a measurable factor of benefit, of interest to a recipient* [4] is adopted.

Value objectives can be defined and managed per phase in the plan for the mission. For each phase, alternatives can be defined to explore different approaches for achieving the phase's value objectives.[3] Strategies are incorporated into the plan as business models for phases/alternatives that define how the business operates in each phase (i.e., business model evolution) and alternative (i.e., business model variation). The mission is thus decomposed in a set of interacting business models, together covering all business activities, both customer-facing and internal. It is important to understand that a business model is not merely the formulation of a product-market strategy (e.g., product differentiation, cost leadership), but rather the blueprint of a value proposition and activity system used to deliver value to customers [26]. The CBMP thus focuses on rationalizing strategy in terms of customer and partner relationships, business activities

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[3]  A phase alternative in the VMP thus matches with a VDML scenario within a VDML value delivery model.

and required competencies, and assessing the impact of strategy implementation on the achievement of the value objectives in the future [6].

In the case-study, the VMP was used to define a phased plan for the LCC's mission, distinguishing the current model (year 0), growth (year 1), and growth (year 2) (see Fig. 2). The growth phases take into account both market growth (in terms of prognoses of tickets sold) and the projected growth of LCC's business. For the growth (year 1) phase, three alternatives were defined: unchanged policy, lower fares, and lower fares & partial lease. The first alternative concerns a slight increase in market size and market share, without change of operating model. The second alternative explores a significant increase in market share as a result of dramatic lowering of ticket prices, but also necessitating a significant increase in fleet size. The third alternative builds on the second one, but reflects also a change in LCC's policy of fleet ownership by considering leasing planes instead of buying them.



**Fig. 2.** VMP screenshot showing three phases in the plan for the mission.

When looking into the activities performed, Fig. 3 shows that in the LCC case-study, the VMP was used in three different stages. These stages (i.e., Discover, Prototype and Adopt) provide a high-level structuring of the CBMP process.
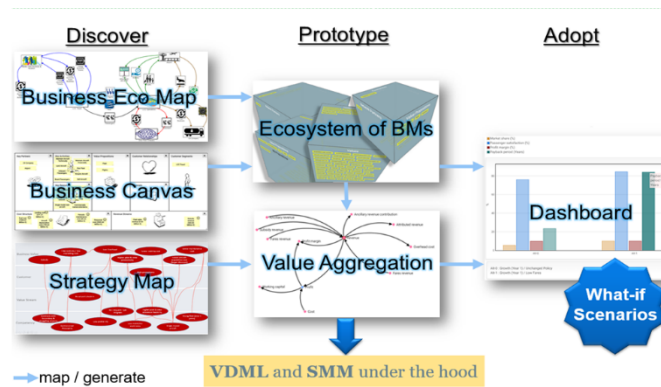


**Fig. 3.** High-level overview of continuous business model planning (taken from [6]).

**Discover Stage.** The purpose of the Discover stage is the discovery of the As-Is and To-Be business models to be further elaborated in the Prototype stage. The discovery of business models to be described, analyzed, experimented, innovated and evaluated

across the defined phases and alternatives is done in a collaborative workshop involving the stakeholders in the CBMP initiative. These stakeholders include a value management analyst (that facilitates the workshop) and one or more participants of the end-user organization that are responsible for strategic planning (possibly with strategic decision-making authority) and possibly participants that are subject matter experts in the end-user organization or from other organizations in the ecosystem of the end-user organization.

The workshop is organized in four sessions, each with their own objectives (see Fig. 4). In the first session, the business ecosystem is sketched and key participants, from whose perspective business models will be discovered, are identified. In the second session, the business models of these key participants are described and related to each other, consistent with the ecosystem. In the third session, the values to steer on are decided upon and other values, which influence them or are influenced by them, are identified by relating them through cause-and-effect relations. In the fourth session, the plan for the mission is outlined or, if already available in case of a continued engagement in the CBMP, further extended with one or more additional phases. The values to steer on are defined as plan values, i.e., values that are the basis for management and measurement of plan progress and the success of plan outcomes, while the other values are related to the business models into which the plan is decomposed. Phases in the plan are defined to add phase-specific objectives for the plan values. Furthermore, phase alternatives can be used to describe scenarios that analyze risks, assumptions, and strategic choices.

The techniques employed during these sessions and their demonstration on the LCC case are presented in the next subsection.
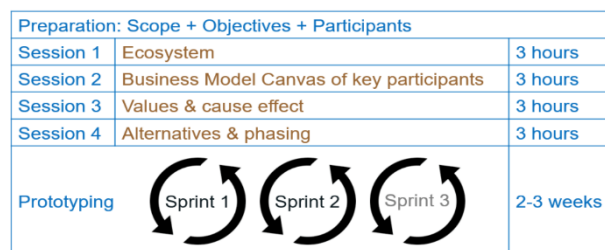
| Preparation: Scope + Objectives + Participants | | |
|---|---|---|
| Session 1 | Ecosystem | 3 hours |
| Session 2 | Business Model Canvas of key participants | 3 hours |
| Session 3 | Values & cause effect | 3 hours |
| Session 4 | Alternatives & phasing | 3 hours |
| Prototyping | Sprint 1 Sprint 2 Sprint 3 | 2-3 weeks |

**Fig. 4.** Organization of the continuous business model planning engagement (taken from [6])

In the case-study, four interrelated business models owned by the LCC under study were discovered (see Fig. 5):[4]

- Business plus: Offering cheap tickets to business passengers;
- Economy: Offering cheap tickets to economy passengers;
- Flights: Internal business model for offering of the fleet and flights to the LCC Travel business unit by the LCC Operations business unit;

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[4] The LCC owns many other business models, but for the sake of simplicity we limit the demonstration of the CBMP to the four models listed.

- Shops: In-flight offering of customers to duty free companies.



**Fig. 5.** VMP screenshot showing four business models owned by the LCC under study.

**Prototype Stage.** The purpose of this stage is to develop a multi-perspective business model ecosystem by further elaborating the interrelated business models from the Discover stage, for each of the phases and alternatives in the plan. This allows comparing plan values and business model values across phases and alternatives to gauge the effectiveness of the business ecosystem design and business model innovation, and to decide upon the most appropriate course of action.

The business model concept embraced by CBMP is inspired by Lindgren's Business Model Cube [27]. CBMP's business model cube concept provides a 'canonical' form of business model representation that is adequate for an unambiguous description of business models that live in an ecosystem of interacting business models. Using this representation, all ecosystem business models can be balanced in terms of customer and partner relationships and exchanges of value between all participants in all directions, following a universal concept of value that is adequate for simulation and calculation. The conceptualization of a business model as a cube implies that there are six faces:

— *Value propositions* offered and received, including *my propositions* (i.e., results of the business model as captured by the owning enterprise, also known as 'the business');
— *Customers* as business ecosystem participants that are served by the business – this determines the main purpose of the business model;
— *Partners* as business ecosystem participants that are involved in the business model to help creating the values to be delivered to the customers;
— *Activities* as work performed by participants in a role (i.e., partner roles, customer roles, roles of the business) and part of value streams[5] that pursue value propositions;
— *Competencies* as capabilities and resources that the business has and applies in order to perform the work represented by activities;[6]
— *Values* as benefits or interests to customers and partners (in value propositions offered), as captured by the business (in my propositions), as qualifying customer rewards or partner offerings (in value propositions received), and as internal (created by activities).

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[5] Currently, VDML value streams have no direct representation in the VMP, but based on the information provided by the tool, value stream maps can be constructed that are consistent with VDML activity network diagrams.
[6] In VMP's business model framework, the competencies of customers and partners, if needed to model, can be described in the business models owned by them.

For all these business model components, the VMP uses definitions that can be traced back to the VDML meta-model. Value proposition, value (in a value proposition), activity, capability and resource are VDML constructs. Customers, partners and the business itself are VDML participants in VDML business networks, while 'the business', 'customer' and 'partner' are business model cube manifestations of generic VDML roles. An activity value is a VDML value add (representing a value contribution of the activity). Competency is a generalization of VDML capability and VDML resource. The invisible seventh dimension of Lindgren's Business Model Cube (i.e., the interior of the cube) that refers to the 'wiring' (i.e., relationships) of the business model components on the visible faces [27], is formalized in the VMP through the relationships between constructs in the VDML meta-model. Fig. 6 shows a VMP screenshot of the business model cube visualization of the LCC's 'shops' business model.
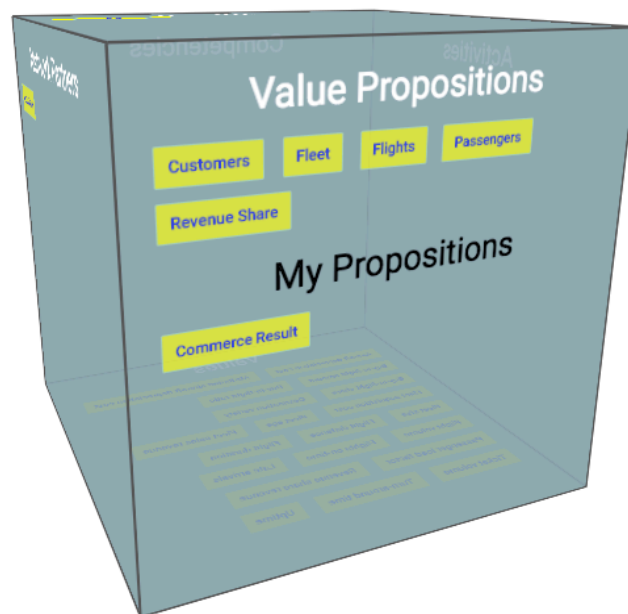


**Fig. 6.** VMP screenshot showing the 'shops' business model cube visualization.

In the case-study, prototyping the discovered business models for all phases and alternatives of the plan involved four steps:

1. *Value network design*: Designing participant networks by defining participants, their roles, value propositions exchanged (i.e., offered and received) and their values – pertaining to value propositions, customers, partners and values faces of the business model cubes;
2. *Value stream design*: Designing value streams by defining activities that pursue value propositions, the participant roles that perform those activities, the values they

create, and the values of value propositions and my propositions they contribute to – pertaining to activities and value faces of the business model cubes;

3. *Competency design*: Identifying the capabilities and resources that are needed to perform the work represented by the activities – pertaining to the competencies face of the business model cubes;

4. *Value impact design & measurement*: Designing the value aggregation structure by entering value measurements[7] and value formulas that relate business model values (i.e., activity values, value proposition values and my proposition values) and plan values, within and if relevant across plan phases – pertaining to value propositions, activities, and values faces of the business model cubes and to plan values.

As shown in Fig. 4, the Prototype stage is performed using an agile approach in two or three weekly sprints. The prototyping is done by the value management analyst, based on the input received during the Discover stage. At the end of each sprint, feedback is obtained from the stakeholders of the involved organizations. This cycle continues until these stakeholders are satisfied with the results and are able to make decisions in the Adopt stage.

**Adopt Stage.** The purpose of this stage is to present the prototyping results to strategic decision-makers, allowing them to decide on adoption and initiation of the required changes. Value management professionals support the decision-making process by using the built-in dashboard, reporting, and what-if scenario analysis techniques of the VMP (see next subsection).

### 3.2 Techniques of Continuous Business Model Planning

The techniques used in the CBMP activities are demonstrated for the LCC case-study in the order of the process stages presented in the previous subsection.

**Discover Stage.** The sketching of the business ecosystem and the identification of key participants is supported by the VMP through the *business ecosystem map* (see Fig. 7). This model is essentially the same as the VDML value proposition exchange diagram, though there is an option to include VDML participants (i.e., enterprises (i.e., VDML organization units), market segments (i.e., VDML communities) or individuals (i.e., VDML actors) or VDML business models instead of VDML roles. Fig. 7 illustrates the former option, where participants and exchanged value propositions are given pictorial representations. The business ecosystem map provides a more abstract view of the VDML role collaboration diagram, which shows the flows of tangible and intangible deliverables between participant roles, based on Allee's Value Network concept [1].

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[7] Value measurement in the VMP is fully consistent with the OMG's Structured Metrics Metamodel (SMM) [28].
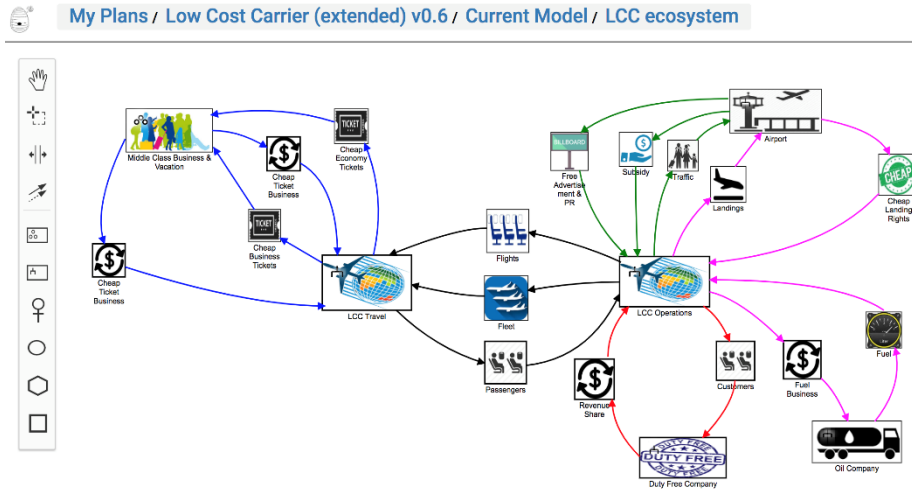
**Fig. 7.** VMP screenshot showing the LCC business ecosystem map

In the LCC case-study, six participants were identified, from whom the LCC Travel and LCC Operations business units are key participants. These participants exchange sixteen value propositions in the ecosystem, based on which the four business models of Fig. 5 were discovered.[8]

The VMP supports the description of the key participants' business models through business canvasing techniques. Although different types of business canvases are supported, in the LCC case-study only use was made of the widely known business model canvas [29], which is based on Osterwalder's Business Model Ontology [30]. Although, there is no VDML diagram equivalent to the business model canvas, the VMP also supports a business model canvas variant called business model innovation canvas. This variant has the six faces of the business model cube as components, which allows direct traceability to the corresponding VDML constructs.

Fig. 8 shows as an example the business model canvas for the 'flights' business model, which is owned by the LCC Operations business unit. Based on the business ecosystem map, which resulted from the first workshop session (see Fig. 7), the value management analyst had pre-filled LCC travel as the customer, airports and oil companies as partners, and fleet and flights as value propositions offered to the customer. In the second workshop session, workshop participants used the canvas to systematically think about key activities and resources required to pursue the value propositions, their costs, and the revenue streams that will be generated.

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[8] The business ecosystem map also allowed discovering two further business models not owned by key participants: 'LCC hosting' owned by airports and 'LCC customers' owned by duty free companies. These business models were not further elaborated in the case-study.
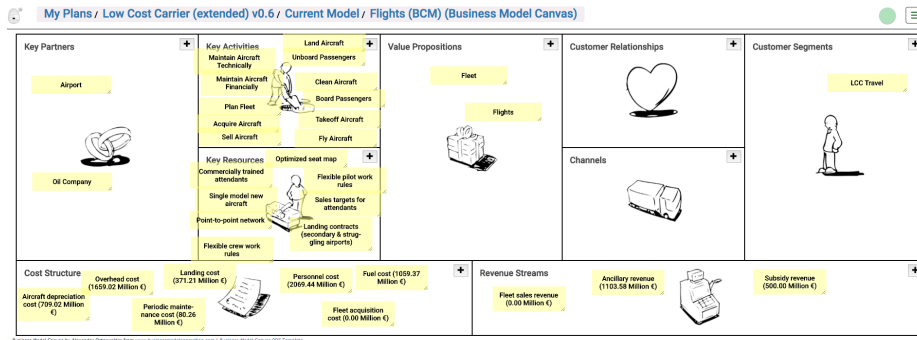
**Fig. 8.** VMP screenshot showing the LCC operation's 'flights' business model canvas.

To support the identification of plan values and business model values and how values influence each other, *strategy maps* are used as a storyboard for cause-and-effect value creation. This technique is based on the homonymous technique presented by Kaplan and Norton [31].

An example strategy map, from the case-study, is shown in Fig. 9. It shows how competencies and activities influence values for the LCC (e.g., low overhead, low maintenance costs, low aircraft acquisition costs) and for its customers (e.g., high promptness).
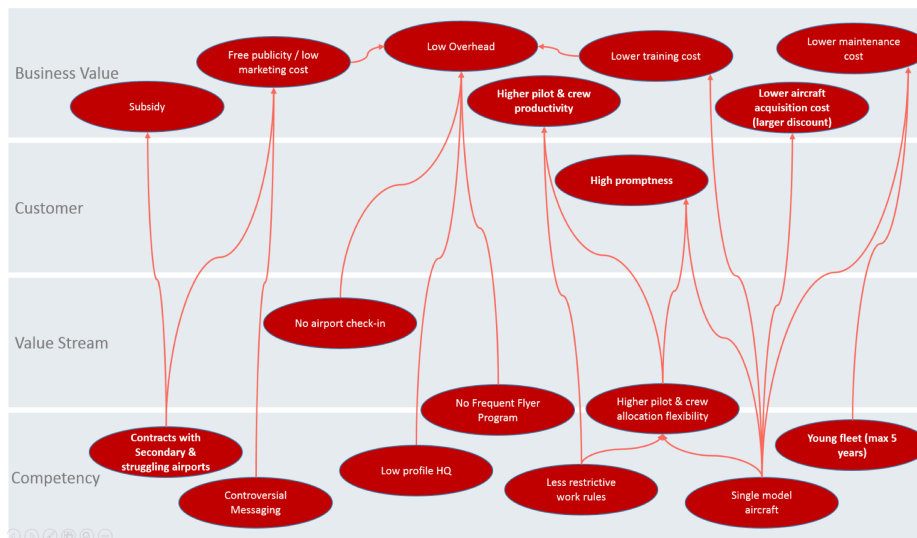


**Fig. 9.** One of the strategy maps used in the LCC case-study.

Finally, the last workshop session is supported through the VMP's functionality to model phases and alternatives (see Fig. 2) and to enter plan values (which can for large part be derived from the strategy maps and business canvases).

**Fig. 10.** VMP screenshot showing the filled story-telling form for the 'flights' value proposition in the 'flights' business model.

**Prototype Stage.** The VMP provides business-friendly interfaces that employ story-telling as a technique to fill the business model cubes throughout the activities of value network design, value stream design, competencies design, and value impact design. Fig. 10 (on the previous page) shows an example of a story-telling form for the 'flights' value proposition in the 'flights' business model cube, asking for who (and in what role) offers this value proposition to whom (and in what role), delivering what values.

**Table 1.** Construct mappings supported by the VMP

| BM canvas | BM cube | Business ecosystem map | VDML |
|---|---|---|---|
| Key partners | Partners | Enterprises, market segments, individuals | Participant (partner role) |
| Key activities | Activities | | Activities |
| Key resources | Competencies | | Resources |
| Value propositions[9] | Value propositions | Value propositions | Value propositions |
| Customer segments | Customers | Enterprises, market segments, individuals | Participants (customer role) |
| Cost structures | Values[10] | | Value Elements |
| Revenue streams | Values[10] | | Value Elements |

The analysis of the LCC case-study taught us that in reality much of the data in the business model cubes was already filled by the value management analyst in between and after the Discovery stage workshop sessions. Based on the business ecosystem map

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[9] Limited to value propositions offered to customers. The business model canvas does not allow including other value propositions (e.g., those received from customers and those offered to and received from partners).

[10] Also plan values (i.e., not part of a particular business model in the mission plan).

(see Fig. 7), the analyst created business models, identified participant networks (see the different colors of the value proposition provide and receive arrows in Fig. 7), and filled in customers, partners and value propositions in the business model cubes. Based on the business model canvases (see Fig. 8), the analyst then started to fill the remaining gaps in the cubes.

To facilitate this process, the VMP includes a mapping wizard, which provides the user an interactive mapping functionality back and forth between business ecosystem map elements and business model cube elements and between the slips on a business canvas (shown as post-it notes in Fig. 8) and business model cube elements (see Table 1 for a mapping that holds for the business model canvas)[11]. Using this mapping functionality, the structured models used in the Prototype stage can largely be generated from the graphical models used in the Discover stage. Vice-versa, a large amount of the data in the business model cubes can be visually represented in the business ecosystem map and business canvases. The mapping thus affords a great deal of flexibility in CBMP process, providing two-way traceability and allowing to move back and forth between Discover and Prototype stages, and choosing between top-down, bottom-up or hybrid approaches to strategic planning.

Finally, the competencies, activities and values in the strategy map and the information on plan phases and alternatives were used by the analyst in the Prototyping sprints to further elaborate the business model cubes (e.g., entering value formulas and other measurement-related detail to complete their value aggregation structures).

**Adopt Stage.** The VMP offers 'dashboarding' functionality for comparing values across plan phases and alternatives. First, a report, as another type of model in the VMP, can be created to tell the story of the plan. The reporting functionality comes with an embedded rich text editor and supports the direct incorporation of Discover stage diagrams such as business ecosystem maps and business canvases. Second, interactive dashboards can be generated from the information in the mission plan presenting comparisons of values using tables and various types of charts (see Fig. 1 for an example of a bar chart). Dashboards can be extended with the creation of scenarios for what-if analyses and simulation, by entering different sets of measurements for selected input values. Scenario results can then be presented in the dashboard, for comparison reasons, as well. It is also possible to promote a 'best' scenario to update the plan. Value measurements can be imported from csv-files and exported as csv-files or as xlsx-files (for further analysis in Excel). Using the import functionality, actual values can also be compared with values in the plan, typically based on a time line view in the dashboards. This functionality is essential for monitoring plan implementation, as part of the 'continuous' strategic planning process of the CBMP method.

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[11] For other types of business canvas supported by the VMP, other mappings exist. The mapping from the business model innovation canvas to the business model cubes is the most straightforward.

# 4 Discussion

The analysis of the LCC case-study taught us that the approach to value modeling with VDML using the VMP has some distinctive features, which might not be shared with other value modeling approaches and applications. Probably the most distinctive feature is that CBMP is highly business-oriented in the sense that value models are constructed through a transparent use of VDML. Value management professionals and other strategic planning stakeholders are offered business-friendly interfaces (e.g., business canvases, business ecosystem maps, strategy maps, business model cubes, interactive dashboards), without ever having to work directly with VDML. In other words, no VDML knowledge is required to use the method. Nevertheless, all business model packages stored in the VMP are valid VDML value delivery models.[12] Hence, all VMP model contents are instantiations of the VDML and SMM meta-models.

Another distinctive feature is that value modeling is used for strategic planning. Specifically, CBMP regards the business model as the unit for strategic planning, employing a business model framework that is multi-perspective (resulting in an ecosystem of interrelated business models), considers structured relationships in terms of value proposition exchanges between all ecosystem participants (and not just customer value propositions and customer relationships), uses a uniform, unambiguous concept of value (for all participants), and is highly dynamic (allows for a continuous process of strategic planning). Based on the review of strategic planning theories and models in [32], we can characterize the CBMP approach to strategic planning as assuming a *goal-based strategic model* (i.e., setting value objectives aligned with mission and vision, and phased over time) and to some extent also a *scenario planning model* (i.e., exploring different alternatives per phase in the strategic plan to cope with external forces). The goal-based model is the most adopted model of strategic planning [32], which provides some justification to the design rationale of the CBMP method.

Of course, more research is needed on the design of the CBMP method. Our current client/context-initiated design-based research is not without limitations. First, the method as presented in this paper was the result of the analysis of a single case-study. Furthermore, this case did not result from a real-life application of the CBMP, but was developed for training value management professionals in the use of the VMP. To mitigate the threat that our analysis is not valid or generalizable, the two value architects from VDMbee who developed the case-study, were involved in the research and helped the researchers to interpret the case-study data. These value management experts have applied CBMP using the VMP in numerous real-life projects and used this experience to develop the case-study, which is not fictional but based on real data about Ryanair that is publicly available on the Internet. Nevertheless, we acknowledge that to raise the level of knowledge of CBMP to that of a design theory, we need to investigate more in-depth its theoretical underpinning and also evaluate the method.

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[12] Allowing entire plans (with all data) to be imported and exported to facilitate collaboration, but also 'downstream development' using a model-driven approach (e.g., derive business process skeletons, software skeletons).

Further plans for developing the CBMP method as supported by the VMP tool include (but are not limited to) providing explicit visualization of value streams and competencies (e.g., value stream maps based on VDML activity network diagrams), incorporating and visualizing libraries[13] (e.g., VDML role libraries, VDML capability library diagrams, VDML capability heatmaps), and automated monitoring of strategy plan implementation. In the near future, VDMbee also intends to add views for showing differences between As-Is and To-Be in a user-friendly way, such that specific differences between previous and next phases can be framed into requirements for projects to implement the plan. To support this development, we plan to conduct research on the integration of CBMP with methods of capability-based planning, portfolio management, enterprise architecture management, business process management, and change management. Given the raising importance of capability-based enterprise modeling in the field, we also plan to investigate the integration of CBMP's multi-perspective business model ecosystem with the service ecosystem view for strategic sourcing of capabilities developed in [33].

## 5      Conclusion

This paper presents an account of the industrial practice of value modeling with VDML by means of the specific approach taken by value management analysts when using the *Value Management Platform* (VMP) tool of the company VDMbee. The contribution of this paper is to make the tacit knowledge of this approach, called *continuous business model planning* (CBMP) and currently only described at an introductory level [6], explicit by identifying and extracting the method underlying the use of the VMP for CBMP. By analyzing the CBMP case-study of a low-cost carrier, we were able to describe a 'situated implementation' of the CBMP method artifact, in terms of purpose, process, activities, organization, participants, models, and techniques used.

Our research addresses the knowledge gap of 'how' to apply VDML as currently only anecdotic evidence is publicly available. We hope this paper helps furthering the understanding of value modeling with VDML of both value management professionals and value modeling researchers. By presenting the specific tool-supported method of CBMP, we intend to increase the maturity level of value modeling and raise the interest of practitioners and researchers in further exploring and researching this method.

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[13] The VMP already allows for the creation, import and export of vocabulary libraries such that users can label model elements with terms that are common to their community.

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