On Guidelines for Representing Business Models – A Design Science Approach

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ABSTRACT

Business models describe the modus operandi of a firm and reflect the activities and value streams from an abstract viewpoint. This paper proposes a set of guidelines for the representation of business models. Based on recent conceptualizations of business models and argumentation theory, we develop a comprehensive framework for the representation of a business model's structure and the logic of how the individual parts are assembled. We argue that adhering to these guidelines untangles the visualization of business models. In addition this approach also propels a comprehensible design process since the structure of the argumentation is laid down explicitly, thereby supporting critical reflection. In a similar way, applying our approach to existing business models helps evaluating them critically since new vantage points within the argumentation can be revealed with ease.

Keywords

Conceptual modeling, Business Model, Argumentation Theory, Design Science.

INTRODUCTION

Business models are a powerful tool for organizations to design, understand and manage their strategic orientation as well as to align their information systems with their business (Al-Debei and Avison, 2010). For industries characterized by strong dependencies on developments in information technology business models are especially significant. The World Wide Web, in which information is copied and disseminated at virtually zero cost, has fundamentally changed economic thinking. New business models had to be and still are in development to set up sustainable businesses.

However, the concept of a business model has received much criticism in the past. For instance, (Porter, 2001) states that it is "murky at best", bewailing that its focus on one particular company or a network of those disguises the contextual influence of the environment which is crucial to assess the economic value of its activities. Nevertheless, the business model has also received a lot of popularity from both practitioners as well as the scientific community. As (Hawkins, 2003) said, the concept of the "business model seemed to fill a niche even if no one could explain exactly what it was." Even recent articles struggle with heterogeneous definitions (Al-Debei and Avison, 2010).

As a consequence of the fuzziness of the concept, many articles on business models focus on clarifying the terminology. Relatively little work has yet been published on modeling techniques, possibly due to the lack of consensus on what a business model is. Despite this problem, we investigate the topic of business model diagramming in this paper. To account for the concept's fuzziness, we develop generic guidelines on how a representation should look like instead of a clearly defined notation. However, we illustrate how a notation adhering to our guidelines could be instantiated. Insights from argumentation theory inspire our work.

The paper proceeds as follows. Chapter two discusses definitions of business models from the literature to identify their main characteristics. It also elaborates on previously proposed notations. Chapter three introduces argumentation theory in general and presents the Toulmin scheme as a central element of our guidelines. Chapter four then formulates our four guidelines. Subsequently, an exemplarily notation is derived from them and applied to a business model from the literature in chapter five.

BUSINESS MODEL CONCEPT

Definitions

Reams of definitions on the constitution of business models have been proposed in the past. In this section we therefore must limit ourselves to a small selection of the literature relevant to this paper. Extensive recent literature reviews on such definitions can be found for instance in (Al-Debei and Avison, 2010; Zott, Amit and Massa, 2011).

An early definition describes a business model as architecture of product, service and information flows amongst actors. A business model describes these actors and the potential benefits they have due to their interactions with each other. The most important aspect of such benefits is the generation of revenue since this is the ultimate goal of any economic activity (Timmers, 1998). (Gordijn, Akkermans and van Vliet, 2000) propose the e^3-value ontology. It understands a business model as a network of actors among which values are exchanged and focuses on a rather detailed description of this aspect. Actors perform certain value adding activities and provide created values at so-called value interfaces to the outside. Other actors with corresponding value interfaces are interconnected to exchange value streams such as products, services, information and money.

A business model, being the core logic by which an organization is operating, is defined in (Lindner and Cantrell, 2000). The authors list numerous components including a pricing model, a revenue model, or a channel model, which are parts of business models in their opinion. This adds detail to the connections amongst actors described before, as it explains how they get in touch and what the economic rationale of their relationships is. (Venkatraman and Henderson, 1998) do not only include interactions with customers into their understanding of a business model but also the configuration of assets and the knowledge of an organization. The distinct architecture of the organization that enables provision of value to the customer is a constituent part of the business model. With this argumentation they take a more resource based view on the concept.

The majority of definitions on business models discussed so far were compiled at the beginning of the last decade. Later authors usually collect, review and integrate them to develop their own concept. (Haaker, Faber and Bouwman, 2006) for instance define a business model as a combination of four components: service offerings, the technical architecture, organizational and financial arrangements. Why the business model works is, as for the concepts above, given by the relationships among these components. If it is a good one or not depends on the particular combination of distinctive characteristics, i.e. how the individual parts assemble to a whole. Another component-based approach is proposed by (Osterwalder, 2004; Osterwalder, Pigneur and Tucci, 2005) who define nine ontological concepts categorized into four categories identified in an extensive literature review. Those concepts are value proposition, target customer, distribution channel, relationship (to customer segments), value configuration, core competency, partner network, cost structure and revenue structure. The purpose of this work is to provide clarification and to define a common ground for discussions about business models.

Causal aspects in Business models

The stance of almost all definitions is that business models are defined by a set of different, interconnected components, using varying degrees of granularity. Some focus on a very small number of building blocks while others employ many different ones. However, the underlying "logic" of the business model is always hidden in the relationships of these components. It is this particular combination of aspects or characteristics a business has that allows for very specific ways of delivering value to customers to generate profit. Thus, one can distinguish two basic views on business model. First, a *structural view* describes the set of components and how they are assembled. Second, a *causal view* addresses the reasons why the business model architecture described in the structural view does actually work. This second aspect however is rarely accounted for in the literature. An article dealing explicitly with arguments supporting the logic of value creation is that of (Casadesus-Masanell and Ricart, 2010). They define a business model as a network of choices (configuration of components) and consequences explaining the effects of the choices. They deliberately abstract from any categories such as actors, customers, values or resources and focus on the structure of the arguments alone since they do not want to impose any constraints a priori.

Representations

The network of choices and consequences, as discussed at the end of the previous section, has a graphical representation. Figure 1 depicts a so-called causal loop diagram used to illustrate the overall structure of the arguments. It is an exemplary business model of the airline company Ryanair. Choices are written in bold letters, consequences with normal weight.

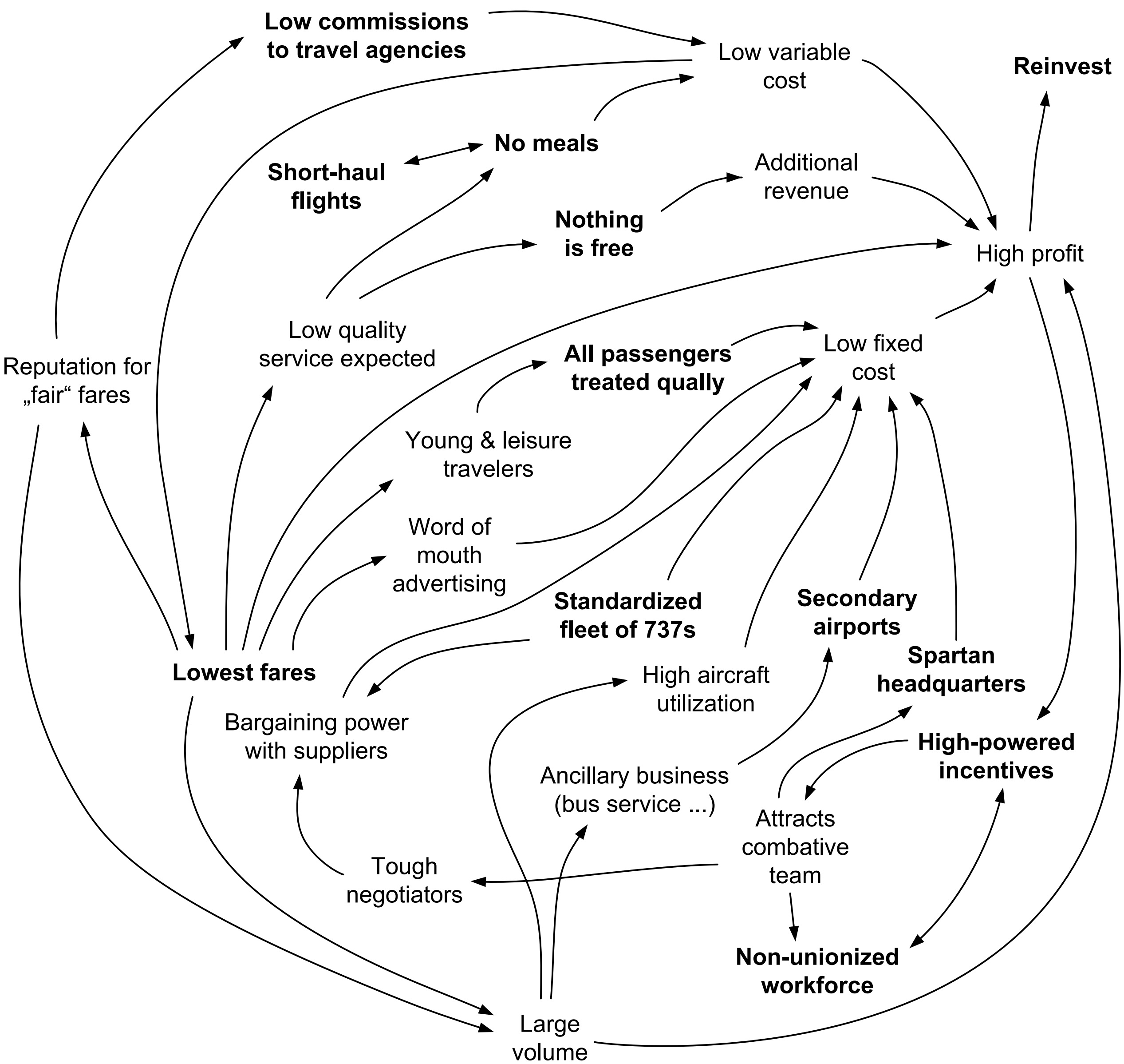

Figure 1. Causal loop diagram of the Ryanair business model as defined in (Casadesus-Masanell and Ricart, 2010)

However, representations following the much more common structural view are also available. (Gordijn and Akkermans, 2001) develop a modeling notation for business models based on the e[3]-value ontology mentioned in the previous section. Hence, this representation focuses only on actors, customers and the values exchanged between them. To capture the dynamics of these relationships, they integrate ideas from use case maps known from software engineering into their approach (Buhr, 1998) . This enables an observer to see which value flows occur together in individual cases. Any reasons why a business models works are not captured in models created with this notation. This is left to textual explanations or to subjective interpretations made by observers based on value relationships.

Another modeling language has been defined by (Osterwalder, 2004) based on his business model ontology. His notation is a direct application of the ontology based on an XML format, thus it comprises a set of components together with descriptions of them. (Tankhiwale, 2009) applied this method to analyze business models of telecommunication providers and how they change over time. An early notation for business model representation is proposed by (Weill and Vitale, 2001). They introduce basic schematics to depict flows of value or money between actors. Actors are categorized as suppliers, customers and the firm of interest. Hence, this approach centers on one single company and the actors it interacts with. Interactions can be exchange of money, delivery of value or transmission of information. Again no explicit information is captured about the reasons why a business model works.

Apart from these few approaches, the representation problem has not received much attention in the literature. Recalling the two aspects identified in the previous section, the structural view and the causal view, one notices that none of the current representation approaches is designed to capture both at the same time. Most address only the structural view only while the only the paper of (Casadesus-Masanell and Ricart, 2010) deals with the causal relationships behind the structure. Consequently, the purpose of this article is to develop theoretically grounded guidelines on how an appropriate notation should be designed to link both concepts.

ARGUMENTATION THEORY

Compared to representing the causal view, graphical illustration of the structural view is straightforward. It constitutes the aspects a business model consists of. Thus, it defines the basis upon which an argumentation can be conducted. The graphical representation merely organizes and structures this basis. Depicting the network of arguments however is far from trivial. Obviously, normal written text can be employed to communicate a line of argument to others. The structure of this argumentation however is highly depended on the abilities of the author, his style of writing and the intentions with which he authors the text. There could be missing links in the line of argument if he forgets certain aspects. Depending on the complexity it might be challenging to detect potential gaps in the chain of reasoning. Even worse, rhetorical tricks could be used to disguise them. Hence, we argue that arguments should be presented in a well-structured manner to make them amenable to criticism and thorough evaluation. Argumentation theory, dealing with informal logic, provides an answer to this problem.

To introduce the topic, we first discuss the difference between formal and informal logic. With informal logic one does not mean logic for the purpose of making inference in an axiomatic system as it would be with formal logic. The latter is usually applied in design of technical system to unambiguously define the rules governing them. Informal logic deals with the study of norms of arguments (Johnson and Blair, 2000). It analyzes how an argument should look like without formally defining its meaning. As a consequence, only formal logic supports rigorous proofs. Formal logic is objective in nature and applying its rules delivers the same results no matter who is using them. Intuition and feeling has no place in it. Informal logic is different as it aims at understanding justificatory reasoning as it is actually used by humans. It deals with rules of how to construct and evaluate arguments appropriately. Hence, it can be perceived as “more an art than a science” (Govier, 1987). Unlike formal logic, it does not merely focus on a set of propositions together with their inherent logical structure (i.e. the question whether they are true or false). It explicitly accounts for the context of the argument. Propositions used in an argument are analyzed with respect to the wider context of a dialog (Walton, 1989).

For these reasons, argumentation theory appears to be a well-suited foundation for our work. Formal proofs and reasoning by means of a rigorously defined set of inference rules appears unsuitable for business models, as it is the very nature of arguments that they are subjective and highly dependent on contextual factors that can never be completely specified in a formal way. Instead of allowing for automatic reasoning given a set of accepted inference rules, an informal representation of an argument explicated the inference laws one assumes to be true and exposes them to critical examination. The purpose of argumentation theory is to facilitate discussions about arguments and to help structuring them in a way that gaps and other weaknesses are immediately visible.

A very popular scheme explicating the anatomy of arguments is that of (Toulmin, 1958), depicted in Figure 2. Toulmin defines three constituent elements an argument must consist of. First, there is *data*. It is the starting point of any argument as it defines the evidence upon which arguments can be made. Data should be generally accepted and therefore must not be subject to discussion or it should be the result of another argument. Second, there is the *claim*, which is the conclusion that is drawn from the data. Unlike data, the claim should be a controversial statement that could or could not be correct. Claims may assume the role of data in another argument which allows creating a chain of arguments. The *warrant*, being the third element of an argument, then delivers the reason why the claim must be true given the data. Without the warrant, a claim would merely be a statement that might or might not be correct. The warrant is what makes up the reason to accept or reject the claim.

Toulmin adds a second set of three optional components. The first one of them is the *backing*. It is used to further justify the warrant, either by an additional statement or by another argument giving reason that the warrant must be correct. This allows a hierarchical nesting of arguments by which one can dig into a topic deeper and deeper. Second, the *rebuttal* defines the exceptions from the rule. It describes specific situations in which the claim will not hold despite the validity of the given warrant. Thus, it encourages to think about potential problems and to explicate them. Third, the *qualifier* is used to express the degree of belief in the claim. Not every argument is in such a way that the one making it is entirely sure that the claim must be true. Using the qualifier, it is possible to further describe confidence in the claim. A more detailed discussion of Toulmin's scheme can be found in (Brockriede and Ehninger, 1960).

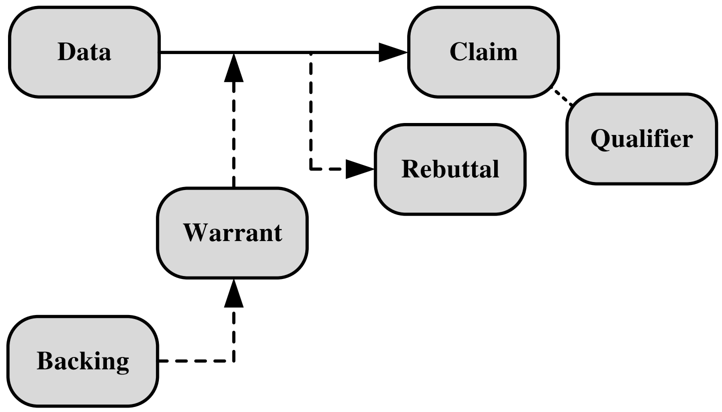

Figure 2. Toulmin's scheme for representing an argument

The Toulmin scheme—though one of the most influential—is not the only method for deconstructing and analyzing arguments. For instance, (Wigmore, 1931) introduced a notation in which various types of statements can be connected by inferences. Statements assume the role of either data or claim while inferences can be backed up with supporting evidence providing the warrant. Originally, this notation has been designed for jurists to analyze legal reasoning and thus has been applied in this domain (Bex, Prakken, Reed and Walton, 2003). Essentially, Wigmore's and Toulmin's scheme are rather similar. For our approach we will rely on the Toulmin scheme due to its popularity in the field and since its six categories converge closely to our concept of an argument. The literature underlines that the Toulmin scheme enforces a thorough organization of an argument which is exactly what we need (Verheij, 2003).

Information systems inspired by Toulmin's scheme have been developed in the past already. For instance, (Verheij, 2003) developed a system supporting the evaluation of arguments in the context of judicial hearings. It may be used by lawyers to set up their pleading in court in a well-structured manner. Another application scenario is the exchange of arguments in academic research. (Reed and Rowe, 2004) developed a system for deconstructing arguments and representing them diagrammatically.

GUIDELINES FOR BUSINESS MODEL REPRESENTATION

In light of the discussion above we are now able to formulate design principles a modeling notation for business models should obey. The first distinction we made was to separate the structural view from the causal view. On the one hand, the structural view specifies the components of a business model and the interactions that take place when business is done. On the other hand, the causal view gives reason to believe that economic value is created, given a particular configuration of components. It connects the individual parts by arguments.

> *G1: Representations of business models should distinguish a structural and a causal view. Both views should be included in the representation explicitly.*

The structural view sets up the ground upon which arguments can be constructed. In accordance with the reviewed business model definitions and representations of those, actors that are interacting with each other and the relationships among them seem most important. This defines the basic skeleton of how a business works and serves as a basis upon which arguments can be made. A comprehensive picture of this provides an easy to grasp overview of the configuration of components.

> *G2: The representation of the structural view should consist of an abstract map of actors together with their relevant characteristics and relations among them such that the interactions are immediately visible.*

Given the structural skeleton, the causal view equips the business model with its flesh. It justifies the individual components and relations with arguments. Based on characteristics of components, it is shown how they work together and why their combination is effective. By means of insights from argumentation theory, arguments can be laid down in a way that makes them easily criticizable. Thereby critical evaluation of business models is facilitated. Furthermore, given a strict argumentation scheme, it is less likely to come up with incomplete lines of arguments.

G3: The representation of the causal view should consist of a theoretically grounded, clearly defined scheme which deconstructs arguments into their components.

As stated above, the structural view shall form the basis for the argumentation. Consequently, integration of both views is necessary. This allows locating a particular argument, which is concerned with a small detail of the overall business logic, within the big picture of the entire configuration of components. Thereby users of the method do not get lost in details.

G4: The structural and causal view should be integrated. An argument of the causal view should be connected to its corresponding components in the causal view.

EXEMPLARY APPLICATION

Having defined our guidelines we will instantiate a concrete modeling notation to apply it to an example. To this end we first provide meta models of notations for both the structural and the causal view. Subsequently, we apply it to the Ryanair business model taken from (Casadesus-Masanell and Ricart, 2010). Their original version is depicted in Figure 2.

Language definition

With respect to the structural view we stick rather close to existing visualizations of business models. The components we consider are model elements which can be connected by flow elements. Model elements may be customers or actors which are organizations performing value adding activities. Resources enabling actors to do so can be attached. Flow elements may either be value flows, financial flows or flows of information. Flow groups assemble individual flows to sets designating that either all of the grouped flows occur in a specific case or none of them. Each model element, flow element and resource is an attributable object. By using attributes a user can specify characteristics that will serve as a basis for the line of argument. Figure 3 depicts the meta model of the structural view notation as an Entity-Relationship Model (ERM) (Chen, 1976). Remember that we do not claim to provide an exhaustive set of model and flow element types. For different scenarios different types might be appropriate.

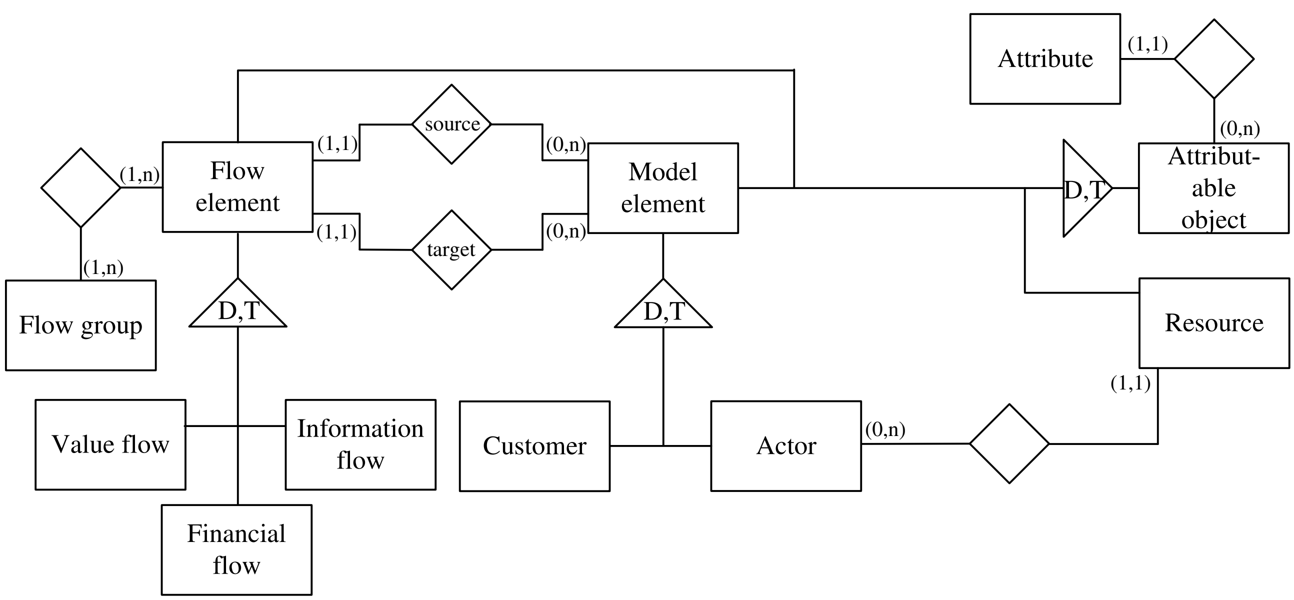

Figure 3. Meta model of the notation for the structural view

To represent arguments the Toulmin scheme as discussed in the previous chapter is employed. It is integrated into the structural view through the usage of attributes as data and claims. Hence, all the factual statements about the business model appear at a certain location in the structural model. Figure 4 provides the meta model of the notation used for the causal view. An argument is composed of its three constituent elements data, claim and warrant. A warrant may have one or more arguments attached to back it up. Qualifiers and Rebuttals are optional. As the classification of an attribute into data and claim is not disjoint it can be a claim of one argument and data of another at the same time. Thereby chaining of arguments is supported.

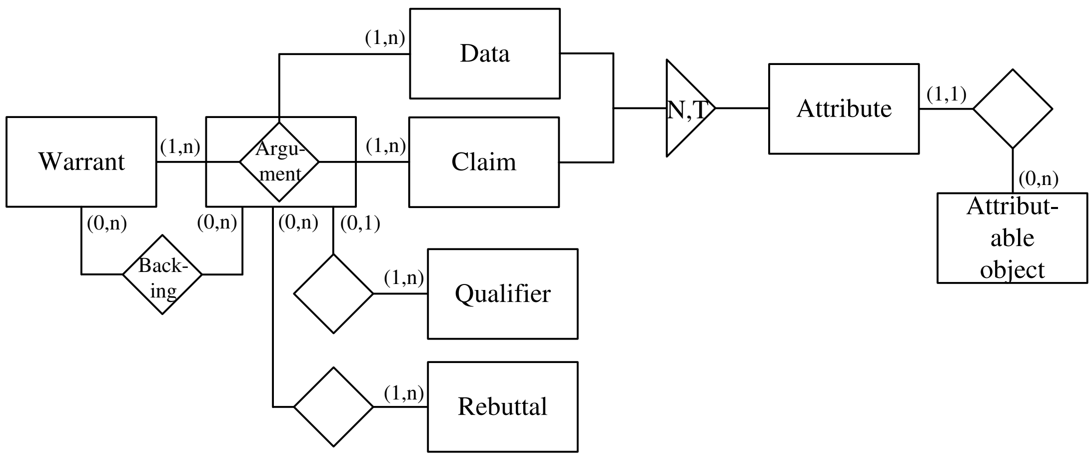

Figure 4. Meta model of the notation for the causal view

Application to Ryanair

To illustrate the notation instantiated from the guidelines we present an exemplarily business model. We base our example on the business model of Ryanair, found in Figure 1, and represent its information using our notation.

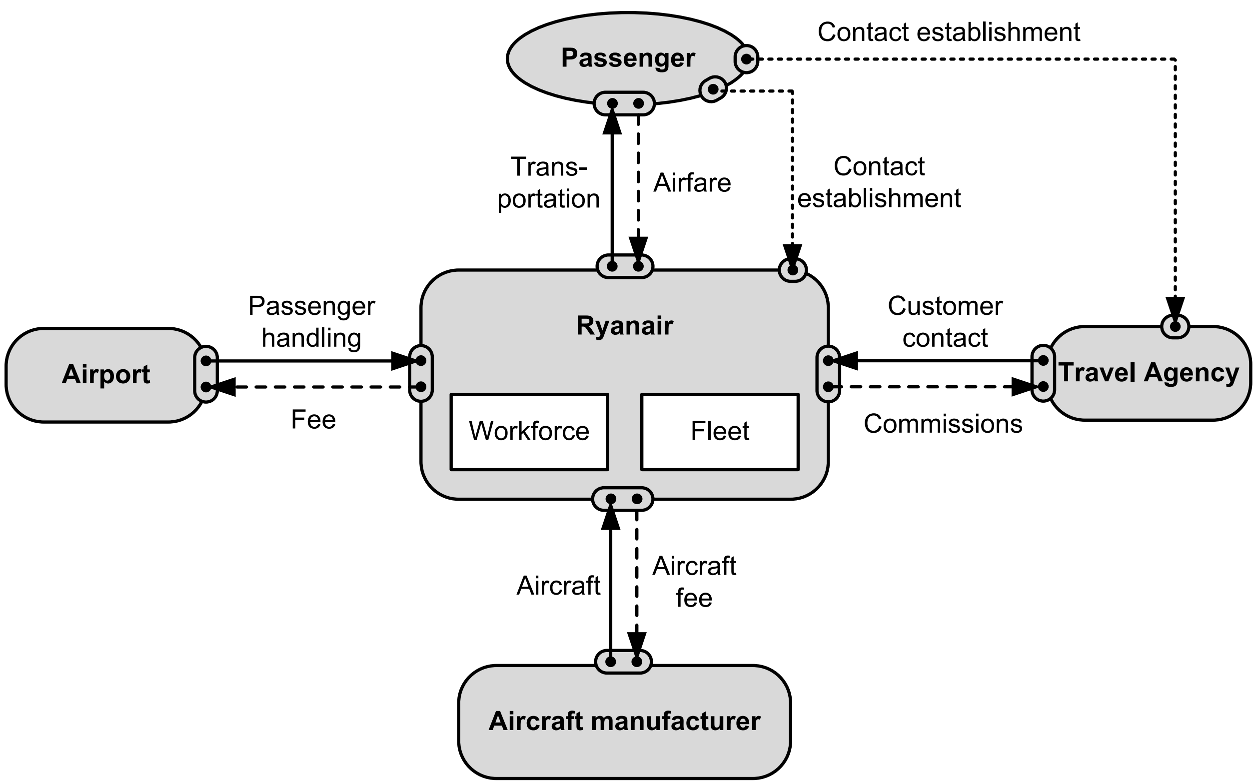

Figure 5. Structural model of Ryanair

The structural view is depicted in Figure 5. Of course, the core element of it is the actor Ryanair itself. Two resources (workforce and fleet) play a central role in the original and are located inside Ryanair within the model. Clearly, the business of Ryanair is to provide transportation to passengers in exchange for airfare. Thus, there is a value flow from Ryanair to the customer type "passenger" which is grouped with a money flow from the passenger back to Ryanair. Thereby it is specified that transportation is only delivered in exchange for airfare and never without. Similar exchange patterns are present in interactions with other actors, namely the airport, the aircraft manufacturer and the travel agency. Information flows from the passenger towards Ryanair or the travel agency indicate that the passenger establishes contact when he is in quest of a suitable flight.

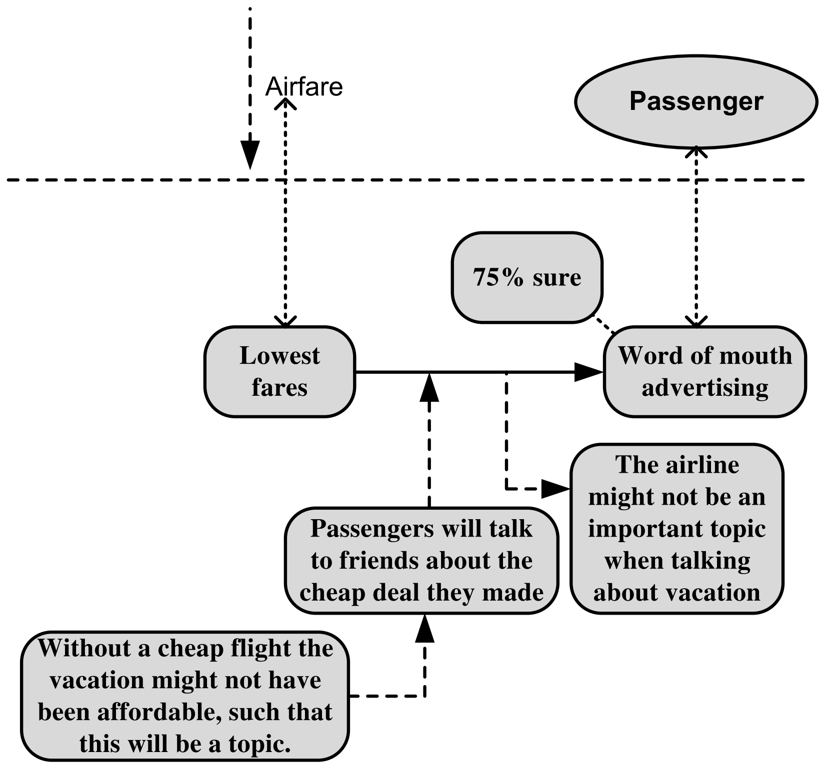

Figure 6. Selected arguments of Ryanair business model represented by means of Toulmin's scheme

Having defined the structure of Ryanair, we can start analyzing its logic. In Figure 6, an exemplarily argument is depicted using Toulmin's scheme. Both data and claim are attributes of the money flow "airfare" and of the customer "passenger" respectively. This way, they are integrated into the structural picture of Ryanair. The argument is that having the lowest fares means that word of mouth advertising will take place. The warrant given for this argument is that passengers will talk to their friends and relatives about cheap deals they make. However, one might object that this is not necessarily true since, when talking about holidays, it is not the airline that is the topic of interest. One would rather talk about impressions of the destination rather than about an unspectacular, low quality flight. These concerns are expressed using the rebuttal. On the other hand, a backing to support the warrant could be that holidays could have been prohibitively expensive without a cheap flight, thus making the airline an important topic. Note that the backing is a complete argument defined elsewhere. Finally, the qualifier can be used to express the belief in the claim. In this case, it is assessed that word of mouth advertising will take place with 75% probability.

However, there also exist other approaches for validating the approach above, preferably in a real-world context. For example, interviewing top-executives or strategy consultants on the validity of our guidelines for business model representation can verify the grounding of our approach. Another way is posed by advising executives of the same firm to use our approach to model their perception of the enterprises strategy. This might be an interesting task on distributed modeling, as the study returns insights for the modelers on different notions of the company and utilization of the causal view during the discussion afterwards. .

CONCLUSION

In this paper we developed four guidelines on how to represent business models in a semi-formal diagrammatic notation. These guidelines are based on literature about business models as well as argumentation theory. Distinctive features of our approach are:

- Business models are understood as a network of components upon which a network of arguments is constructed that explains why economic value is created.
- Arguments are structured according to a scheme taken from argumentation theory. This allows thorough evaluation of each argument and enables an observer to identify gaps in the line of argument.
- We thus argue that our approach can be beneficial in both designing new business models as well as assessing the quality of business models designed by others since it facilitates critical reflection of arguments in favor of a business model.

Being design science researchers, we compare our approach against common standards in this field. (Hevner, March, Park and Ram, 2004) define a set of seven guidelines for design science research we adhere to. The artifact we designed is a set of guidelines on how business models should be represented. Given the current pace of change in economies affected by information technology developments, new business models are of vital importance. Our approach is relevant since it facilitates design and evaluation of those. By employing rigorous insights from argumentation theory, we contribute to the body of knowledge by proposing a well-structured approach to argument analysis, an issue being central to business model development. With formally defining as well as illustrating a notation following our guidelines, we presented our work to both technology- as well as management-oriented audiences.

Apart from our argumentation for the utility of the guidelines, no evaluation has been conducted. Hence, future research must focus on this issue. A prototype implementing a notation following our guidelines must be created. This allows for applying the notation in laboratory experiments, interviews or scenarios in practice. Thereby, further insights could be gained to extent and improve the guidelines.

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