

Productization of Business Models by Adding Situational Knowledge

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Abstract. Enterprise models are artifacts and tools that can be used in various kinds of discussions about work and work in an enterprise. This paper introduce a work oriented approach to modelling that treats enterprise models as information products that can be created by experts or professional modelers. The work oriented approach includes analysis of situations, work and work practices. By adding situational and work oriented knowledge, experiences can be leveraged from practices such as product development, design, jobs-to-be-done and business model canvas analysis. The explicit addition of situational knowledge can improve relevance, effectiveness and other qualities of the use of enterprise models and other information products.

Keywords. Enterprise modeling, enterprise architecture, situational knowledge, product design, design thinking, design science research, jobs to be done theory

1 Introduction

Enterprise and business models are artifacts and tools that can be used in various kinds of discussions about work and in actual work in an enterprise. As such, an enterprise model has been designed by someone with a purpose and a target audience in mind, and a focus on a particular aspect of the enterprise, e.g. processes, business rules, concepts/information, vision/goals, and actors {Stirna:2018tu}. A specific enterprise model has usually been designed by researchers and method developers using a scientific or practical method, where the model kind satisfies identified requirements.

This paper introduce a **work oriented approach** to modelling that treats an enterprise model as an **information product** developed similarly to a product that serves an **information need** or satisfies a want. By treating an enterprise model as an information product it becomes possible to incorporate knowledge and experiences from fields such as product development, design and innovation [1], which has a strong focus on aspects such as usefulness and long term viability.

In particular, when treating enterprise models as products, the development process does not stop when the product has been evaluated to satisfy initial requirements. Analogous to product development, the life cycle of a product goes through a **journey** with several segments.

After the product has been developed, **Problem-Solution Fit** is evaluated, followed by a decision to continue, modify the product, do a pivot or discontinue the development. The next stage typically involves an evaluation of the **Product-Market Fit** by asking questions such as, do the users actually use the product and pay for it? If not, then pivot, modify, or discontinue. The journey does not generally stop here.

Subsequent stages often involve **growth hacking** and evaluation of long term **Business Model - Evolution Fit** and subsequently **Production - Quality Fit**.

There are practical reasons for these stages. In today's information age, product ideas are found in abundance and they are shared rapidly across the globe. The saying goes that in Silicon valley the graveyard is full of good products that customers don't want to use and pay for, so surviving products need to travel through a longer journey in order to be proven viable.

A supplied product push out features and possible benefits in use, at the same time customers pull in what they desire and what they consider as useful. For a viable situation to occur the product-push and customer-pull must meet and **fit** over time.

As a consequence, for an information product it is not sufficient that the model developer claims that the purpose and focus are relevant and valuable for a particular person in work they do with others. The intended user is part of the **fit evaluation** and determines if the information product is of value to them in their own work situations.

2 Work oriented approach

2.1 Adding situational knowledge

In the work oriented approach one important piece of knowledge is added in order to explicitly shift enterprise modeling into product development. Here the situation where the enterprise model or rather the information product is intended to be or is actually used is explicitly identified and analysed. This **situational knowledge** includes knowledge about **work, work practices** and **use-requirements**, and can be used to tailor, frame, constrain, contextualise, configure, or regulate the development and use of information products [2]. The term '**Work-to-be-Done**' is used to refer to work that is being done, analogous to jobs-to-be-done theory [3] (see the following section).

The characterisation of a (work) situation includes the following aspects:

- **General Situational aspects:** facts, conditions, circumstances, and events that affect someone or something at a particular time and in a particular place [4].
- **Work aspects** [5] [2] [6] [7]:
 - feeling, thinking, hearing, speaking, seeing, sensing,
 - doings, actual work being conducted, tasks, practices, routines, value activities,
 - ways of working and thinking, tools, deliverables, work products
 - questions asked, decisions made,
 - information needs,
 - objectives, results, outcomes,
 - professions, organisational jobs or positions.
- **Use-requirements:** requirements on the use of participating entities in the situation, such as information products.

In the “A Method for Situating Capability Viewpoints” paper [2], a method is introduced that can be used to tailor and adapt existing models to fit with work people do with others. This method is based on situational method engineering [8] and can be generalised to work involving other aspects than capabilities

This situational knowledge provides a key source for the formulation of **information needs** and use-requirements for information products. Importantly, it serves as an *explicit* source and anchor for the formulation of purpose.

The situational knowledge provides a sound base for the **validation** of user needs and requirements in their work when answering questions, taking actions and making decisions.

The following figure 1 provides an illustration of the key elements of the productization.

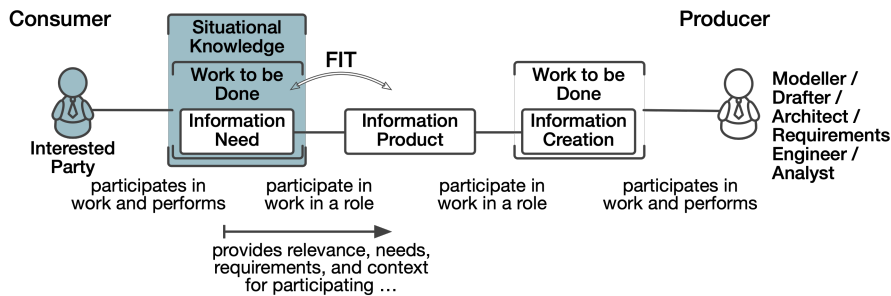


Figure 1: Illustration of the work oriented approach to enterprise modelling

2.2 Jobs-to-Be-Done theory and practices

The work oriented approach is analogous to the contemporary Jobs-to-be-Done theory [3] and practices as described in the HBR article “Know Your Customers’ “Jobs to Be Done”, by Clayton M. Christensen [9]. Here a jobs-to-be-done is characterised by:

- A. “Job is shorthand for what an individual really seeks to accomplish in a given circumstance”
- B. The circumstances are more important than customer characteristics, product attributes, new technologies, or trends.
- C. Good innovations solve problems that formerly had only inadequate solutions— or no solution.
- D. Jobs are never simply about function—they have powerful social and emotional dimensions.”

The jobs-to-be-done theory and practices have made a significant inroad into the innovation, design and product development fields. There they significantly complement or rather **extends traditional practices of stakeholder and persona analysis by adding situational knowledge as a key driver and source** for artifact requirements, use of artifacts and products.

The work oriented approach adopts the general ideas behind the jobs-to-be-done theory and practices.

2.3 Producer vs. Consumer roles

In the work oriented approach both the roles of producer and consumer are recognised as relevant. Together with the explicit inclusion of work-to-be-done the differences between information needs and information products can be analysed analogously to product development, sales and marketing.

When the producer is different from the consumer it becomes important to examine both roles and their work-to-be-done in order to understand if an information product fits with the information needs. Furthermore, when the producer also creates the information product for own information needs or as part of own work flow a question becomes relevant, does the information product satisfy both roles and their information needs?

In sales and marketing, the features and the expected customer values of a product are to a degree self-reported. Such statements and claims are put to the test when Product-Market Fit is evaluated. Analogous to this situation, the fit between information needs and information product should be evaluated both by the consumer and producer. It is not sufficient that a producer self-reports that the information product is useful and of great value. In the work oriented approach a **Work Quality Model** is used as a basis for evaluations.

The Work oriented approach with its Work-do-be-Done provides a sound, detailed and relevant base for formulating information needs and the evaluation of fit. The formulated information needs are more granular and relevant than what basic knowledge about stakeholder and purpose provides.

3 Demonstrations

This section provides two examples of how to add situational knowledge and business thinking to enrich existing frameworks and theories.

3.1 Zachman Framework and Ontology

In the first example the Zachman Framework [10] is enriched by adding situational knowledge to the rows.

The Zachman Framework, or the Zachman Enterprise Ontology, is part of the enterprise architecture heritage. It was invented in the late 1980s by John Zachman [4] and addresses information systems architecture (ISA).

The ontology consists mainly of a matrix that organises architecturally relevant knowledge. The matrix is a classification ontology and claims to represent anything in an enterprise. A cell in the matrix represents the semantical intersection of a column and row. The columns represent linguistic interrogatives (when, why, who, where, how, what), i.e. different ways to describe the world. The rows represent different audiences and perspectives on an ISA [4].

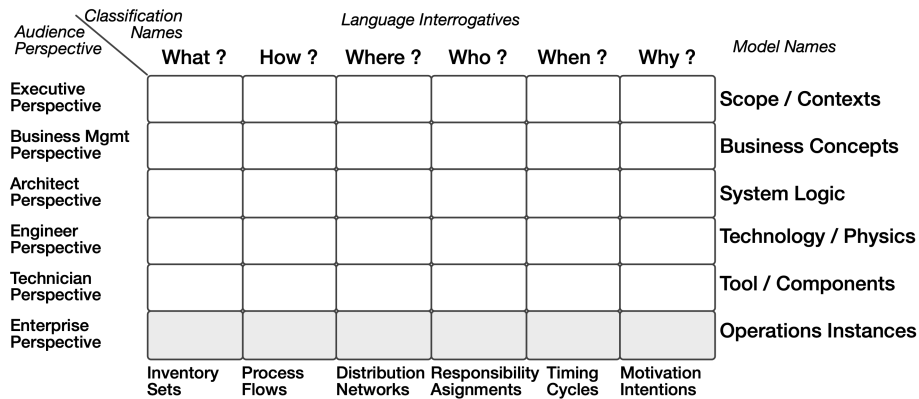


Figure 2: Illustration of the Zachman Framework v3.

The Zachman Framework and its rows, columns, and cells are open to criticisms regarding its population. This criticism can be addressed by transforming the framework using the work oriented approach.

The language interrogatives are problematic since they are polysynonymous and flexible. The what-how does not provide unambiguous semantic definitional power and pragmatic aid for practitioners [11]. Secondly, the interrogatives are defined at the highest and general level of an ontology, which are at a distance from the daily and domain specific languages used by practitioners. Thus, creating problems when selecting what goes into the cells. Thirdly, it can be argued that the chosen interrogatives are not sufficient. This can be illustrated by the omission of 'With', or 'With Whom'. The relevance of the 'With' comes from the importance of business aspects such as relationships, value exchanges, collaborations, partners, learning spaces, culture, etc.

A more serious critique is that interrogatives are general and all encompassing. They ask questions at the level of a high-level-ontology with a focus on anything that exists or has existed or will exist [12, 13]. As such the interrogatives does not provide a sufficiently detailed criteria that identify and select only architectural elements [14].

The rows represent different audiences, however it can be argued that the 6 audiences do not sufficiently match modern organisations. Secondly, the Zachman Framework is static and the rows cannot be changed and reorganised. Thirdly, the selection of audiences represents an idealistic stratification of the work people do in an organisation. It is unclear if this particular ideal stratification is usable in an actual organisation. An example of organisational mismatch can be found by looking at the how-cells for each audience and asking the question, is it not the case that everybody in an enterprise are interested in who does what with whom?

The problems for the cells are inherited from the problems of the rows and columns, thus generating questions about the relevance of the content of the cells. As will be described the work-oriented approach can be applied to transform the framework, thereby alleviating some of the shortcomings.

Adding situational knowledge

Situational knowledge and business thinking can be added to the Zachman framework by transforming it into a **Work-Question matrix** in the following way.

- The interrogatives columns are generalised to represent a set of interrelated inquiries or questions, grouped in themes.
- The audience rows are generalised to represent a chosen selection of Interested parties and work they do. For each audience the audience is replaced with an Interested Party and their work-to-be-done. In the figure 3 the original Zachman audiences are kept a reference, although other selections of perspectives are possible depending on an actual organisation.
- The difference between producers and consumers are introduced by adding a Producer role with its own work-to-be-done. The Interested Parties are treated as consumers.

These adjustment enables enriched and analogous reasoning about consumption, relevance, quality, production and fit between information needs and information products.

By directly linking the cells to interested parties work, the relevance and intention to use [15] is likely to be higher than using a theoretical stratification. The work-to-be-done encourages a dialog between the producer and the consumers with actual work-oriented information needs as a basis for the content and structure of the information product.

One important possibility is to choose the Interested parties and their work along an **actual work flow** where each work adds somethings of value. The columns offer a possibility to address traceability and cohesion across actual work perspectives with respect to a specific question.

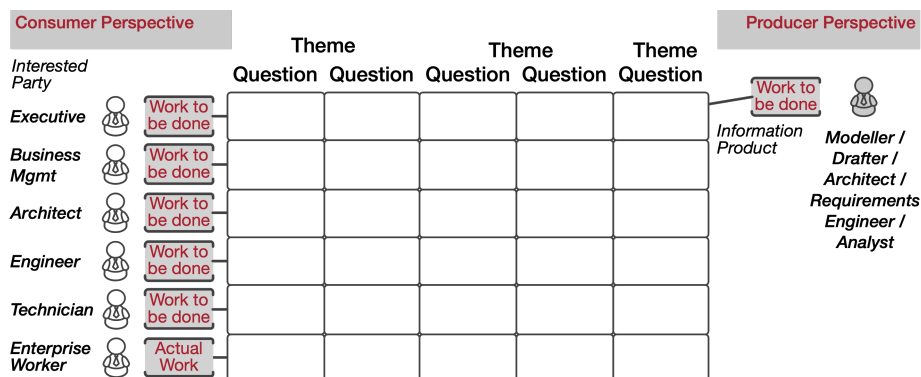


Figure 3: Illustration of Work-Question generalisation of the Zachman Framework

The architectural critique can be addressed by posing questions that are central to a specific architectural approach and style, such as: What are the fundamental entities? [14] What are the most important (salient) to people in work they do with others? How do people and things fit, act, and evolve together across socially and technically constructed and natural boundaries? What are the means for peoples shared orientations? How do we know what we know?

3.2 Enriching the e3Value ontology

The second example illustrates enrichment of the e3Value ontology [16], which provides means to model exchange of values such as when actors trade goods and services for money. The e3Value ontology can be aligned with the work oriented approach in a few steps.

- The information product is viewed as a specific Value Object.
- Introduction of work-to-be-done to the e3Value ontology that represents a context wherein Value Activities are performed.
- The information needs are derived from both the work-to-be-done and the Value Activity.

The e3Value ontology already provides support for both the consumer (requester) and producers (offerer) roles in value exchanges. In the figure 4 the double line represents 3 (three) omitted intermediary concepts from the e3Value ontology. The concepts of Value Interface, Value Offering, and Value Port have been omitted for brevity.

The alignment with the work oriented approach creates a bridge between Jobs-to-be-done theory and enables the e3Value to be used as a tool for identification and analysis of work practices [5] .

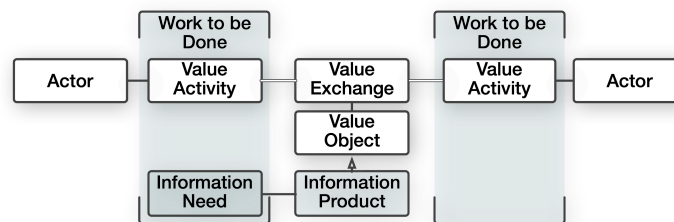


Figure 4: Illustration of the enrichment of e3Value with work-to-be-done.

4 Discussion

The inclusion of situational (work) knowledge has the potential to increase the value of information products and artifacts such as enterprise models by improving relevance, intention to use and by providing a better fit between information needs, information products in actual use.

This is achieved through being explicit about jobs and work being done, questions asked, decisions being made and other information needs relevant to an interested party. Furthermore, the fit is improved due to that the linkage between information product and use is established at a later time than when the information product was designed by researchers or methods developers. Information product developers are typically

aware of general usage situations, although actual (work) situations may be different from later and more specific and local situations.

In the “Capabilities and Work Practices” [17] empirical study questions were asked to participants in different work practices about their use and utility of the concept of capability. The answers revealed differences in opinions between the enterprise architect producers and the other consumer perspectives leading to the observation that producers and consumers not always view the world with the same lenses.

The **behind-the-curtain vs. in-front-of-the-curtain problem** occurs when an information product is developed by an expert *behind-the-curtain*, possibly for their own use, is directed or advised by the expert to be used by business people *in-front-of-the-curtain*. In this case, the expert expects the information product to be relevant to and used by the user, but the user may perceive low relevance, understanding, and interest in the use of the information product.

The productization of enterprise models creates a **dynamic relation between developers of information products and the users**. The developers of enterprise models and information products must be careful to supply a beneficial artifact and establish to fit, and users become empowered to demand artifacts and products that does the job for them.

The Work oriented approach **empowers and encourages users of information products** by enabling them to specific about and take responsibility for their needs in work they do with others. It becomes ok to say that an information product is not understandable, cannot be used to solve a particular problem, cannot answer specific questions or does not satisfy the information needs.

The situational (work) knowledge provides an base and anchor for **work quality models** that can be used in validations where users participate directly without a mediation through experts that may self-report success or fulfilment of requirements.

On a side note, the work oriented approach with its triple <information need, fit, information product> raise a question whether Design Thinking [1] and Design Science Research [18] should explicitly include consideration of fit in their theories and methods?

Both **Design Thinking** and **Design Science Research** involves the exploration of both the problem and solution spaces in an iterative manner. However, the final problem is typically not the same as the initial problem formulation with requirements. Furthermore, an exploration can start with either a problem or a solution. This means that the process is not strictly a feed-forward process from problem to solution, leading to the question whether fit is a key consideration that needs to complement or even supersede the specification and fulfilment of requirements?

The addition of situational and work-oriented knowledge has the potential to increase the efficiency and value of enterprise models and other information products.

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