

Productization of Business Models by Affordance

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Abstract. Business and enterprise models are information products that people use in work they do with each other. Information products satisfy workers information needs during their deliberations and decision making. This paper continues to build on a work oriented approach to modelling where business models are treated as products created by producers, such as experts or professional modelers, and consumed by workers. In this paper the idea of affordance of products is introduced to enrich discussions about the range of possibilities that products can provide to workers. The addition of affordance, situational knowledge and work practices can improve relevance, effectiveness and other qualities of products. The productization of business and enterprise models enables knowledge and experiences from fields such as new product development, design, and startup to be used in the practices of enterprise and business modeling. The work oriented approach provides a sound basis for evaluations of the use of information products.

Keywords. Enterprise modeling, affordance, situational knowledge, product design, design thinking, design science research, practice

1 Introduction

Business and enterprise models are artifacts used by people in work they do with each other. These models are typically designed and developed 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, information, vision/goals, and actors [24].

This paper continues to build on the work oriented approach to modeling as introduced at VMBO 2019 [1] by introducing the idea of ‘affordance’.

In the work oriented approach business and enterprise models are treated as (information-) products developed to serve (information-) needs. This enables the incorporation of knowledge and experiences from fields such as product development, design and innovation [2].

In particular, when treating enterprise models as products the development process can be seen as going through a journey, from conceptualization and development to evaluation of problem-solution fit and onwards. At each stage there is often a decision to continue, modify the product, do a pivot or discontinue the journey. In the stage of Product-Market Fit questions are asked such as, do the users actually use the product and pay for it? If not, then pivot, modify, or discontinue. A supplied product push out possibilities, features and benefits in use. At the same time customers pull in what they desire and what they consider as useful.

This suggests that for a viable situation to occur the product-push and customer-pull must meet, align and fit over time.

The affordance of a product represents the set of possibilities made available by something (artifact, feature, product, solution, etcetera). The affordance enriches the product side of the consumer-producer duality and can be used to evaluate the fit between consumers' needs and the possibilities offered by the producer's product.

The idea of affordance together with the other aspects of the work-oriented approach provides a sound basis for the definition of a balanced evaluation model of use of information products. Affordance adds a key consideration that is particularly important in today's digital world where digital products provide new and disruptive possibilities.

2 The work oriented productization approach

2.1 Producer, Consumer and the Change space in between

The work-oriented approach introduces the traditional duality and bifocality between the consumer (buyer) and the producer (seller) of (information-) products. This duality enables analysis and theorizing of both sides as well as of the differences or fit between needs and products analogously to new product development, sales and marketing.

The productization forms a structure of three spaces that all need to be considered when buying, using or developing (information-) products. The *work space* (or problem space) (see sections 2.2, 2.3) represents aspects of the consumer side and contains work situations with derived needs and requirements. The *product space* (or solution space) (see section 2.4) represents the producer side and contains products with their affordance. The *change space* (see sections 2.5, 2.6) represents links and relationships between work situations and products, and contains differences, fit, and changes between the work situations and products.

In design and development all three spaces must be explored and searched to find an overall situation that is suitable, viable and desirable by participants (see section 2.6).

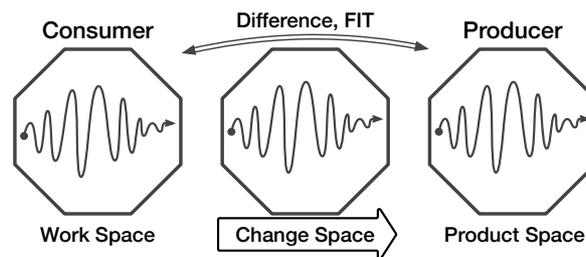


Figure 1 Illustration of the three key spaces

In many methods the focus is on addressing the two sides of a duality such as produce-consume, and problem-solution in design [3] [2] [4]. However the change space is also important to consider since it has a material impact on the development and choice of both products and work-to-be-done.

Benefit realization, change management, and impact analysis [5] are domains and practices that specifically address the change space.

The work oriented approach facilitates analysis of asymmetrical cases where modelers (producers) develop (information-) products for their own needs but where the products may not fit with the needs of the intended consumer or audience. Another asymmetrical case is when a producer (seller) self-report features and expected customer values of a product, hoping that consumer will buy and use it.

2.2 Consumer anchoring: Situational knowledge

The first part of the work oriented approach is the work situation where (information-) products are intended to be used or are actually used by consumers, the Interested Parties [1]

In the “Capabilities and Work Practices” [6] empirical study, questions were asked to participants from different work practices about their use and utility of the concept of capability. The answers revealed differences in opinions between the enterprise architecture model producers and the consumers leading to the observation that producers and consumers not always view the world with the same lenses.

The situational knowledge incorporates knowledge about work people perform with each other and subsequently *anchors* use of (information-) products.

The characterization of a (work) situation includes the following aspects [1]:

- General Situational aspects [7],
- Work oriented aspects [8] [9] [10] [11]
 - feelings, thinking, hearing, speaking, seeing, sensing,
 - doings, actual work, tasks, practices, routines, value activities,
 - work flows, work journeys,
 - objectives, results, outcomes,
 - ways of working, ways of thinking,
 - questions asked, decisions made,
 - techniques, tools, deliverables, work products,
 - professions, organisational jobs, positions.

This *work-to-be-done* knowledge can be used to tailor, frame, constrain, contextualise, configure, or regulate the development and use of (information-) products [9]. In the “A Method for Situating Capability Viewpoints” paper [9], a method is introduced that can be used to tailor and adapt existing (information-) products to fit with work people do with others. This method is based on situational method engineering [12].

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

The work oriented approach share characteristics with the Jobs-to-be-Done theory [13, 14], which have made a significant inroad into the innovation, design and product development fields.

The following figure 2 provides an illustration of the key elements of the work oriented approach and productization of (information-) products. See following sections for information about each part.

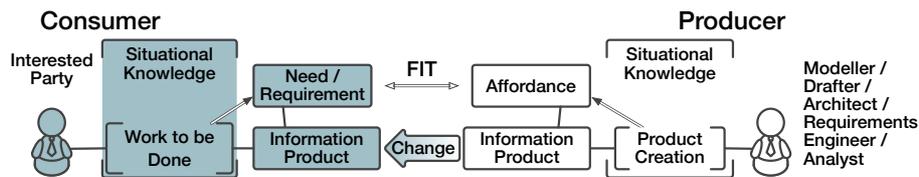


Figure 2 Illustration of the work oriented approach to modelling

2.3 Consumer: Situational knowledge as source for needs, insights and requirements

The work oriented approach complements or rather extends traditional practices of stakeholder and persona analysis by adding granular situational (work) knowledge as a key *driver and source* for needs, insights, requirements and goals for (information-) products that can participate in work.

This situational knowledge provides an enriched base for the *validation* of (information-) products with respect to user’s needs in their work answering questions, acting and making decisions.

2.4 Producer: Affordance as a representation of possibilities

In this section we introduce and add the idea of product ‘affordance’ to the work oriented approach. The affordance of a product or solution represents “the quality or property of an object that defines its possible uses or makes clear how it can or should be used” [15].

The word ‘affordance’ is fairly new. It was initially coined by the American psychologist James J. Gibson in 1966 [16] [17]. It was later adopted and adapted by Donald Norman in 1988, in the context of human–machine interaction [18] [19].

In this paper we use a more general version of affordance. Here affordance represents *the set of possibilities made available by something (artifact, feature, product, solution, etcetera)*. An example is the artifact and product “hammer” that offers a very large set of possibilities for use and participation in work or solution. A hammer can be used for building houses, digging, stabilizing bookcases, etcetera.

The known and intended affordance defined by the creator of a particular type of product is likely to differ and smaller than the actual affordance. Knowledge about actual affordance can be developed by reflection-in-action [20] through explorative and prototyping activities, as well as through actual use.

In most cases an (information-) product has been developed with a purpose in mind. However, this purpose as defined by the producer may or may not be aligned with the actual affordance, and may or may not fit with consumers actual needs.

Knowledge about affordance provides a mechanism for evaluating and also challenging the perceptions of work-to-be-done and what the real problem or challenge is. Maybe the affordance points to another set of needs or problem that is better solved, or points to a particular combination of work needs and product that is more valuable than others. An example is the development of deep learning algorithms that generate new kinds of knowledge and challenges traditional work. In design thinking this is called ‘(re-)framing’ [20] and is essential to design. Although, sometimes it makes sense to be careful reframing a problem. “If you have a hammer then every problem looks like a nail”.

The affordance of a product provides a valuable source for developing value propositions of (information-) products. Although, a common problem is that the corporate graveyard is full of companies that have had great ideas but customers were not ready, willing or able to buy their products.

2.5 Change space and Fit

Between producers and consumers there is a third space, the change space. This space, in between, represents links and relationships between work situations and products, and contains differences, fit, and changes between the work situations and products.

Different changes or transformations have different rationale and implications. An example from Sweden is the creation of a sustainable transport system (the solution). The government wants to start a high speed train project, but some transport researchers suggest to electrify the road system in support for electric vehicles [21].

From the *consumer point-of-view*, the work-to-be-done, derived needs and requirements points towards a set of products in the product/solution space. How well a particular product fits with the work-to-be-done and needs can be evaluated by considering the product, its features and affordance, and a change that transforms the product into the situation of work. To be considered is that produced products are not automatically bought and used by consumers. Even if a customer has bought a product they may not be happy with it or how it fits with their needs.

From the *producers point-of-view*, the product, its features and affordance points towards a set of work situations or problems in the work space. How well a particular work situation fits with the product can be evaluated by considering the work-to-be-done, needs, and requirements and a change that transforms the product into the situation of work.

Startup practices [22], design thinking [4] and design science research [3] 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. This process is called framing in design thinking [20] and ends up with a “Point-of-view” of the problem to be addressed and “How might we?” statements[4]. Furthermore, an exploration can start with either a problem or a solution. This means that these processes are not strictly feed-forward from problem to solution.

An optimal overall situation can be found by analyzing all three spaces together. See following section for information on how to evaluate Fit.

It should be *noted* that neither design thinking and design science research incorporate the third change space in that same prominent way as they treat problem and solution.

2.6 Evaluating Fit

The consumers work-to-be-done, derived needs and requirements point to possible products, and the producers product with affordance point to possible work and needs that fit. There are many combinations of work situations, needs, products, affordance and change that Fit with each other, but which combination is the best or most valuable, to whom?

The best-fit question can be represented and codified using an objective function with a set of decision variables that contribute to a certain value that is being sought to be optimized. The objective function is used to find an optimal best-fit (maximum or minimum) by varying the decision variables. This codification is analogous to " A Fitness-Utility Model for Design Science Research" [23], which is used evaluate design fitness and design utility.

The work oriented approach provides the following categories of decision variables:

- a) Situational aspects (space 1 variables)
- b) Interested parties (space 1 variables)
- c) Work oriented aspect (space 1 variables)
- d) Information needs, insights and requirements (space 1 variables)
- e) Product and affordance (space 2 variables)
- f) Change (space 3 variables)

The best-fit objective function provides one example of a model that can be used to evaluate the use of business and enterprise models in the context of work people do with each other's.

For brevity, we have only schematically presented one possible representation of the best-fit question.

3 Discussion

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 beneficial products that fits, and users become empowered to demand products that does the job for them.

The inclusion of affordance enrich discussions about what products can provide to interested parties in work they do. Affordance provides an important characterization of products that can be used to "reframe" problems and interested party's needs.

Furthermore, affordance provides an important decision variable in Best-Fit objective functions where it enables and facilitates the search for an optimal Fit between needs and a product that utilizes the most of a products possibilities.

In the age of information, digital technologies and algorithms provide many disruptive possibilities (affordance) that both producers and consumers benefit to be aware of. In adjacent areas such as nanomaterial, robotics, analytical chemistry etcetera, the affordance can be vital in solving modern environmental problems.

The three spaces structure provides a novel contribution to design thinking and also design science research. These spaces will be the subject of further research and presented in upcoming papers.

The work oriented approach together with affordance and the three spaces structure provides the basis for the definition of a balanced evaluation model of the intentions to use and actual use of information products.

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

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