A Business Model Construction Kit for Platform Business Models - Research Preview

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Abstract. [**Context and motivation**] In recent years, the Internet has led to new ways of doing business and has spawned new, platform-based business models. For example, Uber and Airbnb offer platforms that enable *broker/mediation* services between parties organized in two-sided markets. [**Question/problem**] To be financially sustainable, platform-specific revenue models are needed to generate cash flows from these intermediation services. Moreover, these revenue models should be revisited over and over again, due to continuous changes in a competitive environment. To a large extent, it is unknown how to continuously (re)design revenue models for platforms efficiently. [**Principal ideas/results**] We propose three research streams with outcomes that should support continuous and efficient platform design: (1) formalization of known platform revenue models, (2) the organization of known platform revenue models into design patterns such that existing knowledge can be reused efficiently, and (3) support for the dynamics of these models, e.g., how they evolve over time. [**Contribution**] In the long term, we propose a novel and tractable approach called the *Business Model Construction Kit* for the continuous and efficient design of platform business models, including the selection of appropriate revenue model(s). The kit will provide a variety of methodologically well-integrated *design*-oriented tools and *accepted knowledge* to quickly (re)design a platform business model with a focus on revenue models. The result is a method aimed at helping practitioners design platform business models.

Keywords: Platform Business Models · Revenue Model · Construction Kit · Digital Platform

1 Introduction

In this research preview, we consider the problem of how to efficiently and continuously (re)design *revenue models* for IT-enabled *platforms* in a dynamic, and changing business environment. We view the design of revenue models as a form of *early* requirements engineering, e.g., regarding the elicitation of business requirements, and similar to other contextual RE-methods such as i^* [23] and

e^3*value* [11]. We argue that for platforms with IT as an intrinsic part of their value proposition, it is important to have an *inclusive* requirements engineering process, that is, not restricted to information system requirements only, but also taking into account business, financial and market requirements. Platforms such as those offered by Uber, Spotify, Airbnb etc. are more than just IT systems and are able to create digital markets for various stakeholders in dynamic business contexts. As a consequence of this observation, understanding the business context is a prerequisite for finding requirements of the information system that will enable the platform, which should therefore be part of the overall requirements engineering process.

The business context is expressed by means of a *business model*, which explains what kind of value is offered, how this offered value is created, and how the created value is captured through a revenue model. According to [18], a revenue model is part of a business model and describes the mechanism by which a company makes a profit from its value-creating activities. A business model represents the underlying logic of a business, with a focus on how economic value is created, distributed, and consumed in a network of actors that are (non-for-profit) organizations. When a business model bundles several actors via a platform, we consider this kind of a business model a platform business model. A platform business model enables and supports transactions between supply- and demand-side participants [21]. We advocate the logic that, e.g., Uber Ride (platform provider) brokers rides (assets) provided by drivers (provider-side) for passengers (consumer-side) on its platform [22]. Here, the revenue model must clarify which monetization mechanisms are used to generate revenue from the platform's mediation activities. In addition to Uber, there are a number of other platform business models that are established in different domains, including the business models of eBay Marketplace, Spotify Music, or Airbnb Lodging. As each of these platform business models creates value differently, various revenue models are needed to capture value. A revenue model should define appropriate revenue sources and revenue streams to transform the value delivered [21]. Finding a suitable revenue model that contains ideal revenue mechanisms is challenging, as each platform business model deals with its own requirements. Based on this, our research preview is motivated by answering the following questions:

RQ1: How can we formalize and transfer knowledge about the revenue models of existing platform business models?, *RQ2*: How can we formalize accepted, well-known design knowledge with respect to platform business models as patterns, so that they can be used by practitioners in the field?, *RQ3*: How can we provide support for the inherent dynamic nature of business models?.

This paper does not yet present any findings regarding these three research topics; rather, it provides a research preview and lays our plans with respect to these topics. In brief, we plan to develop a Business Model Construction Kit for platform business model that addresses the three above-mentioned directions. This paper is structured as follows. In Sec. 2, we introduce *platform business models* and describe the linkage to *revenue models*. This is followed by a discussion in Sec. 3 about the challenges posed by *business model dynamics* and their

significance for platform business models. Sec. 4 outlines our proposed approach and the importance of *design patterns* for our Business Model Construction Kit. Our next steps are presented through a roadmap in Sec. 5. Based on this, Sec. 6 summarizes our concluding remarks.

2 Revenue model as a part of a platform business model

A shared understanding and consent are argued by [13] regarding three core business model dimensions: value creation, value delivery, and value capture. A revenue model is a part of the business model's value capture, and therefore it illustrates how (economic) value is generated. We consider revenue models for platforms as a concept that shows the monetization mechanisms used to capture value from the platform's mediation activities between its two-sided markets. A digital platform is able to connect the supply side and the demand side of a market through an intermediary called the platform provider, which enables the brokering of the core asset under consideration [22, 21]. Consequently, the composition of the revenue streams between (1) platform provider, (2) asset providers, and (3) asset consumers is highly important for shaping a comprehensive revenue model. A platform can be monetized focusing on supply-side participants, demand-side participants, third parties [21], or both market sides. In addition, [5] formulates two monetization references that can be used to place payments: (1) platform participants have to pay fees for participating in a platform or (2) platform participants have to pay fees per transaction. As shown in Table 1 different variants can be used to shape a platform revenue model.

Table 1: Descriptions of revenue models for selected platform business models

Platform business model	**Used revenue mechanisms**
Uber Ride (brokers rides between drivers and passengers)	Uber generates revenue by charging drivers a 20-25% fee on the total price for each trip performed (monetization of supply-side participants)
eBay Marketplace (brokers items between sellers and buyers)	eBay generates revenue by charging the sellers a 2-13% fee on the total price for each item sold (monetization of supply-side participants)
Spotify Music (brokers music songs between artists and listeners)	Spotify generates revenue by offering an advertising-free platform access for a monthly subscription of $4-11 (monetization of demand-side participants)
Airbnb Lodging (brokers accommodations between hosts and travellers)	Airbnb combines a transaction-based fee and charges, guests a service fee of 5-15%, and hosts a commission fee of 3-5% of the total price for each reservation (monetization of both market-sides)

These different types of revenue models lead to the assumption that monetization mechanisms could be combined to formalize business model patterns. To pursue this, we will conduct a first SLR regarding the notation of 'platform business models' and a second SLR regarding revenue models that currently exist for platforms. Using the SLRs and a series of workshops to be held with parties developing and maintaining platform business models, we will draft a Business Model Construction Kit (a preliminary version for non-platform based business models already exists: see [4]).

3 Dynamics of evolving platform business models

In recent years, we have seen an increase in the number of digital platforms, e.g., *Salesforce AppExchange* (marketplace for B2B applications) as a redesign and expansion of an already existing service, while others create new platforms by disrupting existing markets (e.g., Spotify or Airbnb). These evolutions and innovations towards platform-oriented business models can be considered as *business model dynamics*, which show the firms' adaptation to a turbulent and changing environment [20]. However, many studies and development approaches look at business models from a static perspective, as snapshots in time [19], and ignore the dynamic evolution of business models [7].

We consider a business model not as a static construct, but as a dynamic concept that evolves over time. For example, as a matching service, Uber initially heavily subsidized taxi rides to create the market, both from a customer and a supplier perspective [8]. Moreover, we argue that we can also take a design perspective on the evolution of the business model *itself*; we can think about how to launch a particular business platform and what that business model should look like a few years after the initial deployment. In fact, this is precisely what Uber (and other platform providers) did to overcome the problem also known as the *chicken-egg problem*. The provider platform must therefore think about how to address both market sides and how to reach a critical mass when setting up a platform business model [17].

Another example of business model dynamics can be seen in the revenue model of Airbnb. Listing a room on Airbnb is free. When a guest rents a room, that person then pays the renter through Airbnb, which takes a fee from both sides [8]. This revenue model has been implemented since August 2008, following the launch of Airbnb's own payment infrastructure [2]. Before that, when Airbnb was called AirBed&Breakfast and fees were only charged if a host charged more than $300/night, a $30 fee was charged by AirBed&Breakfast to list the accommodation [1]. This led to a different revenue stream, without involving the consumer side (or travelers), and thus to a different revenue model.

These dynamics between business model changes should be understood to provide a starting point to raise business model requirements. Designing business models is a continuous task, in the same sense as in agile software development and continuous delivery and integration of software. We argue that this is not only the case for software development, but also for the business models of platforms enabled by such software. Based on the assumption that platform business models and their revenue models can be formalized systematically in patterns, we try to understand business model dynamics by the change from one pattern to another pattern (e.g., the change of AirBed&Breakfast's revenue model to today's Airbnb revenue model). Therefore, our proposed construction kit could be used to analyze the intersection between different patterns and their dynamics and changes.

4 Organizing revenue models into patterns

As argued by Jackson in his book 'Problem Frames' [12], most problems that designers have to solve have been solved before, and often many times. In Information Systems and Software Engineering, the approach of patterns for presenting accepted design knowledge is quite popular. Initiated in the area of building construction [3], patterns are often used in Requirements Engineering and Software Design (see, e.g., the Gang of Four book [9], and Interaction Design [6]). Briefly speaking, a pattern comprises *proven* and *accepted solutions* for recurring *problems* in a particular *context*. The selection of a particular solution may be subject to *forces*. The keyword is 'proven'; the solution should be known to be successful. Previously, we successfully defined patterns for interorganizational controls in networks of enterprises [14]. We intend to use a similar approach in terms of best-practice elicitation and use e^3value as (part of) the pattern description language. Our patterns follow a predefined structure and rules. For this reason, the process can be called a language because, like a natural language, it contains elements, namely patterns and rules of application [16]. The *55 business model patterns* identified by [10] are universally applicable business model strategies based on a comprehensive company analysis performed by the authors. Unfortunately, these patterns are poorly formalized (e.g., in terms of conceptual modeling) which may lead to ambiguity, subjective interpretation and hence confusion. However, we will use these patterns as a point of departure to arrive at a more model-based library of patterns specifically for platform business models. The patterns found will be integrated into our Business Model Construction Kit, as introduced in Sec. 2. As for our Business Model Construction Kit, the identified business model dynamics will result in an ongoing, continuous process with respect to business model development. We see that too often, a business model development project is a single-shot effort, whereas it should be a continuous and ongoing process.

5 Roadmap

The next steps in our roadmap towards developing the Business Model Construction Kit are described in the following.

Conducting an SLR. Existing literature about revenue models for platform business models will be systematically reviewed to identify mechanisms for monetizing platform business models (e.g. Subscription, Pay per Use etc.), and revenue streams between platform provider, asset providers and asset consumers.

Formalizing platform revenue model patterns. The collected knowledge about revenue models for platform business models will be aggregated and formalized as generic patterns to ensure reusability. Each formalized pattern will contain a textual description and a model-based component. The model-based component will be enabled with e^3value , because it has already been used successfully, as shown in [15] for the formalization of 'control patterns'. With the formalization we will address *RQ1*.

Developing a pattern-based approach for platform business models. The formalized patterns will first be applied to a sample of existing platform business models in order to check their applicability and, if necessary, make adjustments and extensions. Afterwards, the patterns will be used in various research projects dealing with the development of platform business models. Based on individual interviews and group workshops with industry partners, the formalized patterns will be prioritized and a selection will be made to derive insights into, what requirements need to be met in order to run certain platform business models successfully (e.g, what are the requirements for running a pay-per-use revenue model?). Here, we will address *RQ2*, and prove which requirements have to be fulfilled in order to use specific revenue model patterns for certain value propositions and platform' value creation. The findings will be finalized in our Business Model Construction Kit.

Evaluating the pattern-based approach. The evaluation will test whether control groups are able to develop appropriate revenue models for platform business models. To quantify the results for *RQ3*, if the Business Model Construction Kit supports the development of resilient platform business models, our results will be compared to existing approaches such as the *Business Model Canvas*.

6 Conclusion

This research preview presented the current challenges of business model design and its revenue models for platform business models. We outlined a pattern-based Business Model Construction Kit for platform business models to be implemented as a quantification framework in the e^3value business modeling methodology. The aim of this research is to develop a supporting tool, as kind of a software-based and model-based pattern library for platform business models and their dynamics. We believe that with the proposed framework, we can provide an approach that allows systematic and transparent development of novel platform business models.

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