Business Model Tooling: Where research and practice meet

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Abstract

This special issue bundles a series of papers on business model tooling. Business model tools are methods, frameworks or templates to facilitate, communication and collaboration regarding Business Model (re-)design and analysis, adoption, implementation and exploitation. In this introduction to the special issue, we position business model tooling in the broader literature, going beyond the mere use of tooling to disseminate academic knowledge. We point out the unique contributions on business model tooling that information systems scholars can bring. After giving an overview of business model tools and ontologies, we sketch a brief research agenda comprising seven research directions: (1) design of tooling; (2) interfaces and usability; (3) evaluation and testing; (4) adoption, diffusion and commercialization of tooling; (5) privacy and security of tool users; (6) the use of tooling in business model education; and (7) future tooling enabled by big data and machine learning.

Introduction

Over the years, Electronic Markets has built a tradition of high-impact research on Business Models (BM hereafter). A specific hallmark was the 1998 publication of the seminal paper by Timmers on Business Models for Electronic Markets (Timmers, 1998). Since then, Electronic Markets has been at the forefront of BM research. In 2001, a timely special section was dedicated to BMs (Alt & Zimmerman, 2001). In 2014, some of the key thought leaders on BM thinking were interviewed. Furthermore, publications regularly featured research and conceptual work on BM ontologies, patterns, and support systems. Also, papers were published on BMs for specific technologies, such as mobile applications, platforms and blockchain. As Electronic Markets contributed significantly to developing BM thinking, we are glad that, in this tradition, we can bundle papers on a specifically relevant topic: tooling for BMs.

Positioning BM tooling in literature

Business model tools can be seen as `boundary objects' that facilitate exchanging business model ideas between stakeholders (Bouwman et al 2018). We define BM tooling here as “use of methods, frameworks or templates (here referred as tools) to facilitate, communication and collaboration regarding Business Model (re-) design and analysis, adoption, implementation and exploitation”. In this section, we position BM tooling in the broader literature on BMs.

In general, BM research features in academic schools of strategic management (Zott, Amit, Massa, Teece, Wirtz[1]), entrepreneurship research (Morris, Sosna, Onetti, George & Bock), innovation management (Chesbrough; Christensen) and information systems (Timmers, Osterwalder, El Sawy). Strategic management and entrepreneurship have a strong orientation to developing theories that explain how BMs contribute to competitive advantage. In more theory-oriented streams of strategic management, practical recommendations are lacking (Zott& Amit, 2007; 2008) or remain mostly on a generic level. For instance, scholars recommend to conduct environmental scanning and create and implement action plans (Wirtz et al, 2010) or to consult colleagues to assess BMs and strengthen the

[1] For well-known publications we refrain from providing detailed references.

BM to stay flexible (Weill & Woerner, 2013). Others recommend experimenting, learning and keeping financial resources at hand to redefine BMs (Teece, 2010). However, actionable answers to how-to questions are often lacking.

The main assumption in strategic management appears that a theory in itself suffices to help managers to understand what to do in practice. However, managers often have a hard time translating knowledge from theories to their daily activities. Ironically, although BM thinking once originated from practice, current academic discourse in strategic management and entrepreneurship research on BMs is thus largely abstract, repetitive, and conceptually focussed, as reflected by the many states of the art, bibliometric studies and research agendas. The dominance of theory over practice reflects broader concerns on strategic management literature on its inward-looking nature and pre-occupation with rankings, impact and academic careers as recently addressed in the 2019-book by Tourish titled `Management Studies in Crisis'.

Information systems (IS) and innovation management literature, in turn, take a more pragmatic approach on BMs. In these fields, scholars do not merely treat BMs as a strategic device, but also as a construct that is related to the business logic and business processes of organizations (Al Debei & Davidson, 2010). In addition to contributing to the scientific debate, scholars in these fields also aim at providing means for managers to apply ideas from BM research in practice. For example, many articles discuss (re)design of BMs, and its implications on applications, databases and IT infrastructure of (networked) businesses.

Within IS, a notable research stream develops BM tooling that makes BM research practically usable, while going beyond templates or canvases based on BM ontologies. For instance, visual templates make ontologies like Canvas practically understandable. Similarly, card games with BM patterns help to bring alive the taxonomies and classifications from BM research in a specific domain.

In our view, however, BM tooling is not only a way to utilize scientific knowledge on BMs. BM tooling is also a research area in itself.

BM tooling in IS literature

In this section, we discuss two specific uses of BMs in IS research. For this, we build on ideas by Veit et al. (2013) who distinguish three streams of BM research in IS: (1) BMs for the ICT industry, (2) BMs and digital transformation, and (3) IT support for developing and managing BMs (Veit et al, 2013). The first mentioned research stream is a specific application domain of generic BM thinking and outside of the scope of this paper. Hence, we focus on the two latter streams.

BM tooling and digital transformation In a digital economy, hardly any company can escape using IT in creating, delivering and capturing value. Moreover, due to digitalization, firms are embedded in increasingly complex networks or ecosystems, which requires analysing BMs of networks rather than individual organizations. Digitalization changes how incumbent firms operate with partners, even more so due to emerging technologies which span the boundaries of a single firm, such as Industry 4.0, IoT and blockchain.

Consequently, understanding how digitalization affects BMs requires an understanding of Enterprise Architectures (EA) (Lankhorst , 2009; Jonkeres et al, 2006; Versteeg & Bouwman, 2006) both by incumbent firms as well as start ups that are connected with these incumbents, which model

business processes, applications and IT infrastructure beyond the single firm. In turn, EA-thinking would benefit from more BM-oriented research on value and information exchange within eco-systems to enable aligning processes in a networked enterprise. Although EA tools are extensive and some intermediate conceptualizations bridge the gap between BM and EA thinking (e.g. Solaimani et al, 2015; 2018), more work needs to be done to connect BMs with business modelling as practised in the EA domain. This is necessary to properly analyse and understand the interrelatedness of BMs and EA in networked businesses that operate in a digitalized world.

IT support for developing and managing BMs

To formalize business model representations and visualizations, various ontologies and decision-making tools are available. Multiple BM ontologies exist, which describe the core components or building blocks of a BM. Some ontologies describe the BM of a single organization, while others focus on a network or ecosystem of partners. The scope of ontologies differs as well, as some describe only the BM, while others also cover the technological architecture.

Given the plurality of existing BM ontologies, meta-models are increasingly needed. Meta-models describe the components as well as the architecture of a BM (Foss & Saebi, 2017). Meta-models are helpful to (1) communicate, analyse and make decisions about BMs, (2) clarify which BM components to focus on, (3) develop and use BM tools to support BM design or BM innovation, (4) communicate about and integrate BM ontologies and (5) to describe specific BM archetypes or patterns (Fielt, 2013). Ontologies as developed in the past, such as the Business Model Ontology (Osterwalder, 2004), the STOF model (Bouwman et al., 2008), VISOR (El Sawy & Pereira, 2013) and BM Cube (Lindgren & Rasmussen, 2013), offer insights in what these components entails and how these are interrelated. There are also taxonomies, or frameworks for many classifications of components (e.g. Dubusson et al, 2002, Morris et al, 2002; Onetti et al, 2012; Demil & Lecocq, 2010; Lambert & Davidson, 2013).

BM tools, ontologies and meta-models

Components are the building blocks for designing and innovating a BM. Given the various ontologies that exist, there is no agreement on the conceptual meaning of specific components or on which components are core and critical. Tooling that visualizes the components of BMs benefits both cognitive as well as experimental approaches, which can be real experiments or thought experiments on parallel business models. In both cognitive and experimental approaches to BM innovation, managers need to be aware that BM Innovation is an iterative and dynamic process, sometimes even following agile principals as known from IS research, and that BMs themselves are never static. Design or redesign steps are followed by implementation and management of the new or innovated BM.

Managing BMs in organizations requires visualisations of the BM across the business model lifecycle (from strategy conception to technical implementation) and requires that they are shared with a diverse set of stakeholders. After the exploration phase that encompasses both (re-) design and implementation, the phase of exploitation or “use of the BM” follows (Terrenghi et al, 2017; Wirtz and Daiser, 2018). While transitioning from one phase to the next, minor (component-based) or major (architectural) changes are still possible. An overview of visual representations of BM ontologies is provided by Tauscher & Abdelkafi (2016). Although these representations are in general

static, in the field of BM and System Dynamics more dynamic models can be found (Abdelkafi, N., & Täuscher, 2016; Cosenz & Noto 2018).

In all phases of the use of BM ontologies, graphical (visual) or textual representations are helpful. In the paper of Johannes Schwarz in this issue, he discusses how BM ontologies can function as boundary objects in overcoming knowledge boundaries between communities of practice. These community of practice are, for instance, the decision board, BM experts, including academics, business owners and other stakeholders being actively involved in BM design and innovation. Shared use of common syntax, as well as common understanding on a semantical level, are key to make the right decision on a pragmatic level.

Foci of BM tooling

To position tools and their utility, it is important to note that different tools can be a) applied in different phases of designing and or innovating BMs, b) directed towards different stakeholder groups, c) based on different unit of analysis, and d) considering economic values and/or alternative values.

Tools can be applicable in all phases as is typical for BM ontologies promoting a common language or focus. Alternatively, tools can focus on a specific phase in the design or innovation process, like experimentation, implementation and management.

Furthermore, it is important to realize who the targeted audience is. For example, users of the tools can be communities of practice or functional teams active in operations, finance, or practitioners working in large enterprises or SMEs, incumbent or start-up firms. Moreover, nowadays, business models are also used by government organizations (e.g. Kuk & Janssen, 2013). An important consideration is whether the BM tool is intended to serve a broader audience or if it is tailored to a specific research domain, for instance, BMs for sustainability, Smart Cities BMs, or Data-driven BMs.

Also, the unit of analysis plays a role in establishing how a tool can be used. In the CANVAs ontology, the firm is the initial unit of analysis, while in for instance the STOF ontology the starting point is the product-market combination, e.g. a product, service, service bundle or even unbundling of services, as reflected in the core value proposition. Similarly as in the STOF model, other BM ontologies, like VISOR or BM Cube, have a value network or business eco-system perspective. In these ontologies, it is assumed that BMs from multiple actors have to work out in concert with the core BM under study.

The unit of analysis relates also to a multi-level problem. BMs in a networked business environment, value network or ecosystem have to work out positively, not only for the focal firm but also for all involved actors, leading to additional requirements to the ontology or toolset. This is a common challenge in business networks, ecosystems and platform BMs. Another example of challenges regarding the unit of analysis is related to a firm that manages multiple alternative BMs. Reasons for multiple BMs are diversification (from a corporate perspective) and renewal (having established and new business models). This requires BM tools to support portfolio management of BMs, which is a still unexplored domain of research.

Last, we would like to draw attention to the forms of value BM creates, delivers and captures. Even though the value to the customer is characterised by how well the product helps to solve the customer's pains and gains, the value captured by the company is often assumed to be in the form of

economic value. Yet, a recent and steady growing stream of literature focuses on ecological and sustainability as a value (Boons & Lüdeke-Freund, 2013). This broadening of the scope of BM research towards sustainability draws attention to what we would label as multi-value BMs that pay attention to other values than economical, for instance, social innovations, in- and exclusion, privacy and security.

Other BM tools

The use of tools is not straightforward. Practitioners often work on their BMs with tools that are not specifically designed for creating BMs. For instance, in our empirical research, we saw that the most often mentioned tools in BM Innovation processes were SWOT analysis and other strategy tools (Heikkilä & Bouwman, 2018). SWOT, like PESTEL, originates from strategy design thinking. Also, scenario analysis, 5-forces (Porter, 1980), partner selection (Cummins & Holmberg, 2012) and Balanced Score Card (Kaplan and Norton, 2008) have their roots in strategic management (see also Vuorinen et al., 2017 for an extensive overview of strategy tools). These tools are well known and broadly accepted but in essence not geared to BMs or BM Innovation per se.

Next to strategy focussed tools, there are tools specifically developed for BMs. In addition to the already mentioned BM ontologies and their visualizations, specific BM tools have been developed. For instance, BM stress-testing to test the robustness of a BM under different scenarios (Haaker et al., 2017); BM road mapping, to define alternative migration paths from an existing (as-is) to a future (to-be) BM (De Reuver et al. 2013; Hakkarainen & Talonen, 2012); BM Viability radar to assess the viability of a BM by looking into the BM, value network and regulations and standards (Heikkila et al., 2015); or BM patterns (Remane et al., 2017). The latter is expanded into a hierarchical taxonomy as discussed in the contribution of Weking, Hein, Bohm and Krcmar in this issue. They make the overlap and relations between specific BMs explicit so that the patterns can support finding solutions for limitations to existing business models. In that sense, taxonomies enable a more systematic search process for related BM patterns. This approach is comparable to that of Taran et al (2015) who uses BM process configurations to organize BMs and to the work of Chatterjee (2013) that focuses on taxonomies and migration paths. Both approaches are more systematic than, for instance, an alphabetic overview, or BM playing cards proposing BMs with well-known examples as used in brainstorm sessions. However, a more practical tool based on taxonomies (and the BM process configurations for that matter) is still to be developed further.

In general, tooling is used on a tool-by-tool basis rather than as comprehensive solutions addressing the business problems of practitioners. A notable exception is our tooling available from the businessmakeover.eu platform. We developed BM paths, a set of steps that we suggest the companies take when they are facing challenges in designing or innovating their BM. These paths were identified based on an extensive number of case studies (Heikkilä, et al., 2018). Starting from a meta-model covering ideation via BM (re-)design, testing of new BMs, implementation and management of the BM, we developed an appealing user interface, based on what we labelled as “I want to” paths. Four core paths were developed: I want to start a business, to test my business, to grow my business, and to make my business more profitable (Heikkilä et al, 2018). The paths suggest a set of simple tools that can be used as a self-service or with the help of advisors. Of course, there are alternative portfolios of tools, for example, available from strategyzer.com or bmtoolbox.net.

Next to platforms that offer access to sets of tools, there are also dedicated software-based tools. For instance, Szopinski, Schoormann, Thomas, Knackstedt and Kundisch in this issue, discuss the functions of such tools, provide a classification and define a research agenda with a focus on functional requirement and performance of the tools, in combination with user and task characteristics. Daas et al (2013), in an earlier issue of EM, developed a decision support tool for the financial assessment of a BM, based on the design of an integrated marketing research approach making use of conjoint analysis for a pricing model and real market data. Latora et al. (2016) developed a decision support tool for BM selection based on Analytical Hierarchy Process analysis. Ebel et al. (2016) describe how they developed a framework and built a tool for a collaborative BM development tool that support the BM design phases from environmental scanning via BM design, implementation and BM management in a large IT incumbent, making use of action design principals.

From the overview so far, it is clear that there are many tools available and that there is also an increasing number of taxonomies that are helpful for the further development of tools, while also specific tools are developed for collaborative work on BMs.

Open research questions

There are still several academic questions to be dealt with. Some questions worthwhile to study are for instance related to:

- Design questions: How to design tools that are based on sound research and deep insights into issues in BM design and innovation? How does research on tooling fit into (action) design science research? What can design science research offer to BM tooling research in terms of keeping BM tooling practice-oriented, while increasing rigour in the evaluation of meeting user requirements, efficiency and applicability?
- The interface of the tools: How easy are BM tools to use and how can relevant data on the BM be accessed and stored? As mentioned before, the tools for some target groups need to be very simple. Simplicity is not only relevant from a usability perspective, but also from a pragmatic point of view. For instance, SMEs have limited time to reflect on their daily business and to reflect on their daily business. Using prefilled examples, making secured data storage possible, and offering support tools is key.
- The testing of the quality of tools: How are results validated, does a tool deliver the results as expected, are BM concepts, patterns, taxonomies as used or extracted from tools useful? What lessons can be learned? Which tools are more applicable seen specific seen the problem to be solved? For instance, Athanasopoulou and De Reuver in this issue discuss how the use of a variety of BM tools helps the process of finding a suitable service and market in situations of high uncertainty.
- Adoption and diffusion of tooling, commercialization of tooling: Which tools and ontologies are favoured by advisors, users, experts, decision-makers and stakeholders? How can developed tools make the transition from research to practice? What are viable BMs for the commercialization of BM tooling themselves and how to deal with intellectual property?
- Privacy and security: Are data only accessible to users or are data also accessible, based on informed consent, for tool optimization or BM research? These issues are specifically relevant when online tools and platforms are used and both needs to be guaranteed.

- Using tools in BM education: What can be learned from student users? Does offering of tools, in entrepreneurship courses help students to opt for starting their own business? How can BM tooling be included in curricula, where there is less background knowledge on business topics?
- Future development of tools: How far can we extend the tooling approach? Can developing of business models (or some part of it) be automated - for instance using machine learning with repositories of business models, patterns, metrics, etc.? Or will tooling remain a mere supporting artefact, and the entrepreneur's capabilities for figuring out what opportunity to tackle will continue to be the most essential capability for BM innovation?

Concluding remarks

This special issue brings together several interesting papers on BM. BM tooling represents an increasingly mature research stream within IS. However, many research questions are still to be explored, including but not limited to those mentioned in this paper. At the same time, we strongly believe that tooling is essential to make scholarly BM work practically usable for managers.

Many generic, strategy and marketing tools, as well as BM-specific tools, are already available. To distinguish IS research as more practical and implementation focused in comparison to other disciplines that study BMs, we need to put more effort in (1) bridging the gap between BM thinking and technical implementation towards enabling information technology, and (2) systematically exploring and analysing the contribution that can be made by tooling to BM design and innovation research. At the same time, we are aware that the social side of BM implementation needs to be taken more into account, related to the role of leaders, communication about BMs, innovative culture and so on.

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