Journal of Business Models (2019), Vol. 7, No. 2, pp. 1-13

JOBM
Journal of Business Models

Business Model Innovation with Platform Canvas

Krista Sorri[1], Marko Seppänen[2]*, Kaisa Still[3], Katri Valkokari[4]

Abstract

Purpose: This paper offers a literature review and explores a business model innovation for platform business. It also suggests a practical tool, Platform Canvas, to support implementation activities.

Design/Methodology/Approach: A literature review was conducted in fall 2016 that resulted in the tentative canvas approach, which was evaluated in seven real company cases.

Findings: The study identified the eight most important characteristics of a platform business model innovation. To support the innovation and development of successful business models in a platform ecosystem, the Platform Canvas tool was created. With guiding questions, Platform Canvas allows for an ecosystemic approach to business model innovation: it helps to understand the value creation and capture for multiple actors.

Originality/Value: The unique result is a practical tool, Platform Canvas, which facilitates business model creation in platform ecosystems.

Keywords: Platform, ecosystem, business model, Platform Canvas, literature review

Please cite this paper as: Sorri, Seppänen, Still and Valkokari (2019), Business Model Innovation with Platform Canvas, Vol. 7, No. 2, pp. 1-13

1-2 Tampere University

3-4 VTT Technical Research Centre of Finland

*Corresponding author

Acknowledgements: This research has been conducted as part of the Design for Value research programme focusing on the autonomous shipping ecosystem and the Integrating Platform Competences Toward Network Effects research programme. Both programmes have been funded by Business Finland – the Finnish Funding Agency for Technology and Innovation.

Introduction

Google, Facebook, Amazon, and Apple—these and many other platforms are disrupting traditional businesses as they transform the existing value creation processes and customer behavior (e.g., Miguel & Casado, 2016; Simon, 2013). By doing so, they are transforming the structure of major industries and forcing traditional incumbent companies to re-evaluate their current business models, simultaneously allowing opportunities for new entrants. Participating in platform ecosystems is becoming an important way for companies to gain more revenues and profits, as platforms with their inherent network effects enable exponential growth. Platforms, especially digital platforms, are used as a business model; examples are Alibaba and General Electric's Predix.

The success of platforms is explained by sustainable and repeatable interactions (Choudary, 2015) that breed the growth or emergence of an ecosystem. Our emphasis on the platform ecosystem uses a novel theoretical framework by Jacobides *et al.* (2018), which argues that ecosystem emergence is enabled by modularity and complementarities. As they emphasize, *"allow a set of distinct yet interdependent organizations to coordinate without full hierarchical fiat*", hence seeing the ecosystem as "*a set of actors with varying degrees of multilateral, non-generic complementarities that are not fully hierarchically controlled*" (Jacobides et al., 2018, p.2264). According to them, the core of ecosystems lies in combinations of modular complementarities and similarity of shared rules of operation.

Digital technology expands reach, convenience, speed, and efficiency tremendously compared with the traditional way (Parker *et al.*, 2016). Although we are concentrating on digital platforms, the platform ecosystem is considered from the business perspective rather than as a technical issue (Iivari *et al.*, 2016). Hence, for the purposes of the use of technology, we agree with Chesbrough (2010, p. 354): "*Technology by itself has no single objective value. The economic value of a technology remains latent until it is commercialized in some way via a business model.*"

In this study, we explore business model innovation with the overall objective of value creation and/or capture (Wirtz and Daiser, 2017; Clauss, 2016) in the context of platform ecosystems. Accordingly, we employ the old but still valid definition by Weill & Vitale (2001) , which says that a business model is "a description of the roles and relationships among a firm's consumers, customers, allies, and suppliers that identifies the major flows of product, information, and money, and the major benefits to participants." With this ecosystemic approach, we proceeded to develop a tool – Platform Canvas—and a supporting set of questions to help management and scholars to innovate their business models in platform ecosystems.

The paper is structured as follows: first, we present the main characteristics of a platform ecosystem. Second, we introduce the research design and data. Third, we represent the results and the developed tool, Platform Canvas. Finally, we discuss the challenges of the platform creation process and how the Platform Canvas tool can help facilitate this process, and conclude by summarizing avenues for further research.

Platform Ecosystems for Novel Value

Business model innovation considers the business model rather than products or processes as the subject of innovation (Baden-Fuller & Haefliger, 2013). In more detail, business model innovation can cover various aspects: (1) a value creation innovation, like new capabilities, new technology/equipment, new partnerships, new processes – or (2) a new proposition innovation, consisting of a new offering, new customers and markets, new channels, and new customer relationships – or (3) a value capture innovation, that could include new revenue models and value cost structures (Clauss, 2016).

Platforms with modularity and complementarity

Platforms give companies new opportunities by changing the traditional business rules and how companies interact with each other (Vazquez, 2016). Their purpose is to facilitate the multi-party exchange of products, which can be goods, services, or even social currency, creating novel value and at the same time allowing value capture. Platforms can also be considered matchmakers that bring members of different groups together. They sell access to the target group(s)

(Evans and Schmalensee, 2016). In one way or another, platforms provide more value for customers by helping companies to create new integrated services (Ju, Kim and Ahn, 2016).

Digital platforms are "*software-based external platforms consisting of the extensible codebase of a software-based system that provides core functionality shared by the modules that interoperate with it and the interfaces through which they interoperate*" (Ghazawneh and Henfridsson, 2015, p.199). The digital platform can, therefore, be described as the technical infrastructure to which the ecosystem participants integrate (Iivari *et al.*, 2016).

A platform ecosystem can be seen as a collection of firms interacting with a contribution to the complements (de Reuver *et al.,* 2016). An interactive platform ecosystem is created using technology to connect ecosystem members, such as people, organizations, and their resources. Hence, the platform ecosystem is oftentimes seen as a two- or multisided marketplace where value is created for all members of the network (Parker *et al.*, 2016)

To succeed in digital platforms and the larger entity of the platform economy, participants need to recognize their roles in the platform ecosystem. Platforms leverage the ability to create and scale value outside the organization in an ecosystem (Choudary, 2015). Platform ecosystems are clearly business ecosystems. According to Rong *et al.* (2015), an ecosystem can be considered to be an established value network where the roles are fixedly interconnected and where the interconnected stakeholders have a shared faith and in which they co-evolve. Therefore, companies need to understand that they cannot provide the value alone and that their actions have an impact on the overall ecosystem in which they operate. Thus, for the ecosystem members to co-evolve, their capabilities need to be linked with the actions of the other participants (Moore, 1996).

Platform as a business model innovation

The platform has been presented as a business model innovation that enables external producers and consumers to create value together by interacting with each other (Choudary, 2015). Its ecosystem comprises the platform's sponsor plus providers of complements that make the platform more valuable for the customers, considering how the actors—including users—are organized around a platform (Jacobides *et al.,* 2018).

What is the new business model innovation when technical modularity allows all these independent components of a system to be produced by different producers (Jacobides *et al.,* 2018)? The opportunity for a platform often arises when there is too much friction in the market, which hinders the different user groups from dealing with each other (Evans and Schmalensee, 2016). The aim of the platform is then to reduce barriers to participation—that is, to reduce friction in order to get new participants to join both sides of the market. By doing so, the platform enables sustainable and repeatable interactions by balancing their quality and quantity (Choudary, 2015). Platforms provide opportunities to tackle the innovation management challenge of allowing value co-creation with users (or consumers). They allow for innovation to take place beyond the province of in-house experts and research and development laboratories; when customers start to engage and be more interactive, new forms of value appear (Parker *et al.*, 2016). In other words, a platform as a business model innovation requires ecosystem level considerations in order to explore value co-creation and capture innovations (Clauss, 2016).

Research Design

There is a demand for research into the transformative and disruptive impact of digital platforms on organizations and their business models (Parker *et al.,* 2016), for more research exploring digital platform innovation (de Reuver *et al.,* 2017) as well as for research on ecosystem value creation/capture (Jacobides *et al.,* 2018). The purpose of our study is to solve this need for supporting business model innovation in the context of platform ecosystems. An extensive literature review allowed us to break down and identify the critical characteristics of platform ecosystems. We then proceeded to formulate the most important criteria in an easy-to-use format with a construct of Platform Canvas.

Literature Review

We first identified the relevant characteristics, frameworks, and models in the extant platform literature to obtain a pre-understanding of the field, following

a similar procedure to that of Wirtz and Daiser (2017). This was done with a comprehensive literature review, conducted in fall 2016, combining the keywords "digital," "platform," "characteristic," "ecosystem," "element," "disruption," and "value." The review process included an iterative search of references and citations available in research papers in the Web of Science database. This snowballing methodology complemented the search results by identifying original books and articles (Wohlin, 2014).

During the comprehensive literature review, 16 sources—journal articles and books—were identified as original sources. The original sources were published between 2002 and 2016. From these original sources, we identified and grouped the characteristics that were presented as essential to the meaning described in the source. This grouping resulted in 18 critical characteristics for establishing a platform ecosystem (see Table 1). The descriptive names of these were derived and synthesized from the terms used in the original sources with broad synonyms.

Crafting the Platform Canvas tool

As the Business Model Canvas (Osterwalder and Pigneur, 2010), complemented by the book *Value Proposition Design* (evaluated in the recent study by Kyhnau and Nielsen, 2015), has become the de facto diagnostic tool for understanding the value creation potential of businesses, our goal was to develop a similar construct that is easy to use and emphasizes the special characteristics of platform ecosystems. We are aware of multiple other constructs that attempt to do this (for example, digital platform canvas[1]; the platform design canvas[2]; and Platform Canvas[3]. However, they are not research-based.

The previously described literature search offered 18 critical characteristics. For a more manageable number of characteristics to be included in the canvas, these were then arranged according to their prevalence in the sources. In the first list of characteristics, the prevalence varied between 3 and 15; the mean was 6.8 and the median was 5. The second list was compiled based on the three most cited sources and the characteristics emphasized by these sources. The first six characteristics were the same in both lists. The seventh was different, and by accepting both of these, we ended up with the eight most essential characteristics.

Accordingly, we created a first version of the template, which was Microsoft Excel-based and had a cell for each of the eight characteristics. Each of the cells also included a couple of questions to clarify the meaning of the terms used.

The first version was tested by using it as a supporting tool for interviewing companies about their platform ecosystem activities and business model innovation. The canvas template was first separately filled by representatives of seven Finnish manufacturing companies with their in-house knowledge and by a researcher using publicly available data. Then, the researcher interviewed the company representatives for 1-2 hours. At the end of each interview, the company representatives were asked to give feedback on the canvas itself.

During this initial use, it became clear that the platform participants have to have a deep and detailed knowledge of the market in which they are participating before they can benefit from Platform Canvas. It should be noted that all of the companies had created the platform based on their own needs. Only one company mentioned that they had been obliged to re-visit their platform strategy since they had noticed the platform did not respond to the needs of the presumed participants.

These eight characteristics seemed to bring structure to the interviews, for both the interviewer as well as the interviewees. With this validation of the canvas content, the eight characteristics were developed into the Platform Canvas tool. However, as some of the terms needed clarification in order for the company representatives to be able to answer, those changes were incorporated into the Platform Canvas. The visual elements and their positions were also added based on insights from the research. For example, an image of a group was placed to highlight the fact that platforms are about groups of people; both a heart and a dollar sign were added to emphasize different types of value.

[1] http://icsb.nl/artikelen/new-business-model-canvas-for-digital-platforms/
[2] https://platformdesigntoolkit.com/toolkit/
[3] https://www.slideshare.net/YearOfTheGoat/the-platform-canvas-learn-how-to-build-platform-business-models-in-45min);

PLATFORM KEY CHARACTERISTICS																	
Core interaction	Simplicity	Maintainability	Tools for consumption	Metrics	Filtering	Facilitate	Creation Tools	Traction	Cost of multihoming	Matching	Monetizing	Change tolerance	Value	Producers	Consumers	Governance	Network effects	Source reference
3	3	3	2	3	4	4	4	5	5	6	7	9	11	12	12	13	15	
x				x	x	x		x		x	x	x	x	x	x	x	x	Bonchek M., Choudary, S. P. (2013) Three elements of a Successful Platform Strategy
						x			x	x	x	x	x	x	x	x	x	Moazed, A. (2016) What is a Platform?
			x				x	x		x	x		x	x	x	x	x	Simon, P. (2011) The Age of the Platform
	x	x		x					x			x		x	x	x	x	Abeysinghe A. (2016) Building a digital enterprise-learning from experience
								x		x	x	x	x	x	x	x	x	Boudreau, K. J., Jeppesen, L. B. (2014) Unpaid crowd complementors: The platform network effect mirage
	x				x	x		x			x	x	x			x	x	Choudary, S.P. (2015) Platform Scale
		x		x		x	x	x		x		x	x				x	Cusumano, M. A., Gawer, A. (2002) The Elements of Platform Leadership
		x	x		x		x						x	x	x	x		Westhead, M. (2014) Platforms - Two/multi-sided markets
									x		x		x	x	x	x	x	Edelman, B. (2015) How to Launch Your Digital Platform
									x			x	x	x	x	x	x	Abeysinghe A. (2015) Platform for digital transformation
x									x		x			x	x		x	Hyatt, M. (2016) Why you need a platform to succeed
x					x		x						x			x	x	Tiwana, A. (2013) Platform ecosystems
	x											x			x	x	x	Evans, D., S., Schmalensee R. (2016) Matchmakers
										x				x	x	x	x	Evans, D., S., Hagiu, A., Schmalensee R. (2006) Invisible Engines- How Software Platforms Drive Innovation and Transform Industries
												x		x		x	x	Parker,G et al (2016) Platform Revolution
													x	x	x		x	Kouris, I., Kleer, R. (2012) Business models in two-sided markets: an assessment of strategies for app platforms

Table 1: Summary of key platform elements identified in the literature review

Platform Canvas

Platform Canvas operationalizes the eight key characteristics of business model innovation for a platform ecosystem identified by the literature review. These characteristics are presented here to understand the main issues that companies need to consider when planning their activities in the platform ecosystem. Hence, the presentation order does not reflect the popularity of the characteristic in the literature. In addition, the questions developed to guide the use of Platform Canvas are explained.

Eight key characteristics

The core interaction of the platform, which refers to the exchange of value, is the single most important type of activity in the platform ecosystem (Parker *et al.*, 2016)

and is accordingly central in the canvas. First, it brings forth the characteristics of **(1) value**, describing the value creation potential of the platform, and **(2) monetizing,** as capturing the value. The literature refers to this for example by creating feasible pricing models that maintain or even increase the traction toward the platform (Parker *et al.*, 2016, pp. 106–110).

The core interaction also introduces the two sides of the platform: **(3) producers** and **(4) users**. This emphasis on at least two sides has also been addressed by the term "bilateral market power of the platform" (Kouris and Kleer, 2012); although with added participants the term "multi-sided markets" is also used (Evans and Schmalensee, 2016). Different scholars refer to the *producer* of the value using different terms such as "*complementors*" and "market side 1"; some even combine all sides and refer to them only as participants. Researchers often refer to the value *user* side as consumers, customers, and end users. All of these terms are also used in traditional pipeline businesses, although the roles do not mix in such businesses as they do in platform ecosystems.

(5) Filtering *(including matching)* allows for making the value exchange efficient, simultaneously allowing the platform to attract participants (Parket *et al.,* 2016, pp. 296-297), and is considered crucial for all participants in the platform ecosystem. It describes the algorithm's ability to filter a massive amount of data in a way that enables the quick and precise matching of the value producer and the value user. Hence, these software-based tools enable the exchange of value between the right producers and appropriate consumers. Accordingly, the platform owner aims to build and maintain an ecosystem where the platform will continue to attract participants; this is partly ensured by providing the desired match easily.

"The platform rules" for all participants are addressed with **(6) governance**. The literature describes governance with several terms such as control, rules, access control, and trust. With an elaborate governance system of laws, enforcement, and penalties (Evans and Schmalensee, 2016), the platform can facilitate value co-creation and match the most compatible users with each other.

Resilience (7) (including change tolerance and maintainability) describes the platform's ability to adapt to a changing environment. It has also been referred to as modular, evolvable, durable, and plug-n-play. All of these emphasize the importance of being adaptive to change. However, a company which is highly adaptive to change can even cause market turbulence for its own benefit (Simon, 2013). Maintainability of the system can also be considered to be part of resilience. It includes three perspectives: a) maintaining compatibility with future complementary products (i.e., platform integrity) when new technologies arise, b) developing the platform while maintaining compatibility with past complements, and c) maintaining platform leadership despite changes (Cusumano and Gawer, 2002). With this goal, aspects of boundary resources (both technical and co-operative) need to be addressed.

The final and most crucial characteristic of a platform is the **(8) network effect.** This refers to the ability to increase the scale of business significantly with minimal investment (Choudary, 2015, pp. 74–75). Utilizing the network effects is essential for the platform ecosystem to exploit its full potential.

Process with guiding questions

As with the business model canvas, a list of questions to explore the main characteristics (called "blocks" in Osterwalder and Pigneur, 2010) was developed. The questions are intended to help companies to innovate and evaluate their platform business models from different perspectives, thus addressing the ecosystemic nature of platforms. Each characteristic can be defined by answering the facilitative questions (see Table 2). We propose that these questions may also help platform ecosystem participants consider their positions and prospects in the platform: they may find these beneficial due to the differences in platform thinking versus traditional business thinking. We further propose that Platform Canvas and the guiding questions can lead the participants through the whole innovation process, or can be used to explore certain aspects of the platform.

To address the core interaction, both the value for producer and value for users need to be described in detail and understood thoroughly. It is also important to understand that the role of the user may vary in different interactions. Hence, with regard to *value,* it is not enough to think which friction the platform reduces;

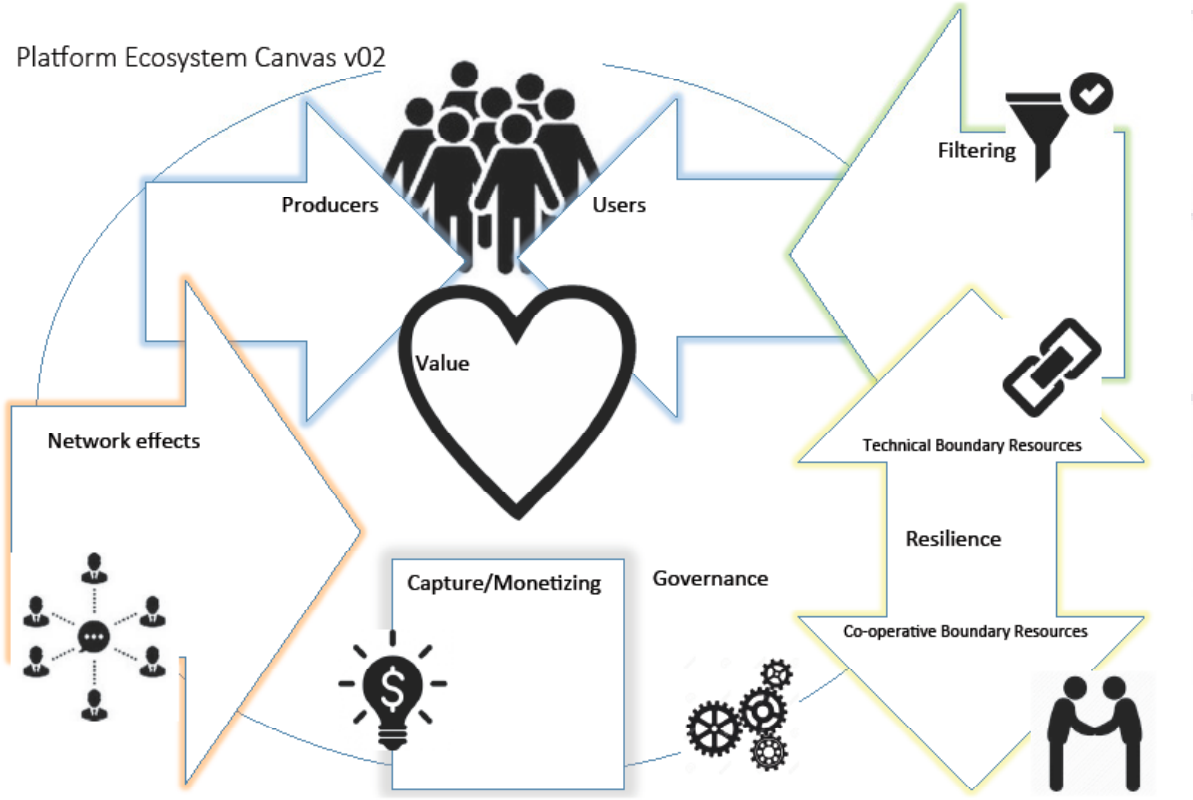

Figure 1: Platform Canvas

it is equally important to identify all the different values created by the interaction and how the platform attracts users on all sides. It should be remembered that the value may be monetary, but in many cases, it is something completely different (like information).

Second, the opportunities related to the network effects must be understood. Whether the effects are direct, indirect, or both, and what kinds of scalability requirements the platform faces because of this, must be addressed. The platform owner must have an idea of how the tools

Characteristics	Questions
Value producers	Who are the value producers and what motivates them to create the value? Through which channels do they produce the value?
Value users	Who are the value users, and what motivates them to consume the value? Through which channels do they consume the value?
Value	What are the different values that are created? How does the platform attract participants? How is the chicken-and-egg problem solved? Which friction does the platform reduce?
Filters	What data are acquired to match producer and user? Which filters does the platform need to serve the relevant content to consumers and connect them to the relevant value producer?
Network effects	Which types of network effects are achieved?
Value capture	What currency does the user provide to the producer in exchange for value? How does the platform capture some portion of this currency?
Governance	What are the tools for lowering the barriers to entering the platform? Which creation/curation/ customization/ consumption tools does the platform provide?
Resilience	To what extent are the boundary resources defined?

Table 2: Guiding questions

and services in the platform solve the chicken-and-egg problem (attracting participants on all sides of the market to the platform) and how the platform keeps the interest of the users. This affects the requirements for the filtering abilities of the platform.

After these aspects have been reviewed and planned, the system side of the canvas can be completed. The management first needs to define the governance and curation aspects. The final phase of the design is to ensure the resilience of the platform. This is done by opening up both the technical and co-operative boundary resources. The platform owner should have a clear picture of how the tools and services provided help facilitate the interactions, value creation, and value exchange, which can then guide the finding of appropriate technology partners for the platform.

Discussion and Conclusions

Platform Canvas is intended to guide the platform ecosystem participants—platform sponsors or owners, platform complementors, and other service providers—in their business model innovation. One could describe Platform Canvas as a *"poka-yoke type"* (Shingo, 1986) error-proofing tool for organizations planning their activities in a platform ecosystem. As poka-yoke aims to eliminate the possibilities of causing a defect to a product or process by offering a method for involving members of the production or process, for example, the canvas aims to offer a method to explore business model innovation in a platform ecosystem by offering a template for involving ecosystem participants. Overall, we propose that with its eight key characteristics it can be used to support innovation in a similar manner to the Business Model Canvas when establishing a platform ecosystem or evaluating possible needs in re-thinking the ecosystem (Osterwalder and Pigneur, 2010).

The contribution of the canvas

The canvas helps challenge the platform participants to open up their thinking. It provides the possibility to see the big picture and simultaneously drill down to a more detailed level. Hence, the canvas provides an understanding of the complexity related to platform ecosystems. Platform participants need to understand the dual role of individuals (one can represent both value producer and value user—i.e., one can be a value prosumer). Especially in cases where participants are seeking to understand the impacts and possibilities of business model innovation in an ecosystem, Platform Canvas can help them find new perspectives for understanding the possibilities of the platform ecosystem (for API economy, see e.g., Huhtamäki *et al.*, 2016). The initial use of the eight characteristics in the manufacturing industry validated this (Sorri, 2016). As the emphasis was on re-evaluating business models, the importance of prior market knowledge was noted.

The canvas has also been used to study the expectations that startups have in relation to their platform-based business models and their abilities to support the core interaction and capture value from it (Korhonen *et al.,* 2017). This study showed that many startups see themselves as connectors of users and producers, and hence confirmed the importance of ecosystem thinking in a platform-based business (Parker *et al.,* 2016).

From the business model perspective, according to Chesbrough (2010), the most important functions that a platform ecosystem should fulfill are to articulate the value proposition, detail the revenue mechanism, and describe the value network. These have been included in Platform Canvas, which also addresses the ecosystemic nature of platforms—the fact that in ecosystems there are multiple business models in play that need to be considered. Furthermore, we claim that the canvas contributes to the business model literature with the inclusion of network effects, which are presented as necessary and specific to platform ecosystems. For example, a comprehensive literature review on business models by Zott *et al.* (2011) listed the components of e-business models found in the existing research at that time, and none of the scholars considered the network effects to be important.

Limitations of the canvas

The eight critical characteristics of a platform ecosystem were identified through an inclusive literature review and based on how they often they appeared in the literature. As digital platforms are becoming increasingly complex research objects (Evans and Basole, 2016), their research is also becoming complex and takes place within information systems, innovation management, and economics (de Reuver *et al.,* 2017). Accordingly, there is also a great deal of variation within the sources regarding

which characteristics are considered important when developing successful digital platforms. This stems for example from the bias towards successful cases, which are studied ex-post (de Reuver *et al.,* 2017).

The canvas has been mostly used internally, which alleviates the challenges with disclosure issues between various organizations. However, for an even better grasp of the complexities related to the platform and also for a better in-depth analysis of the possibilities of novel value creation, additional research on canvas utilization at the ecosystem level could increase, for example, understanding of the emergence and resilience of an ecosystem.

The cases of this research are all from the manufacturing industry as well as from startups. Our assumption was that the utilization of the canvas is not limited by the domain. However, more research needs to be conducted to examine this in more detail. While the aim of Platform Canvas is to help business managers, managers must still familiarize themselves with the basic theories and fundamental differences of the platform business model compared with the traditional ones.

References

Chesbrough, H. (2010) 'Business model innovation: Opportunities and barriers', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 354–363. doi: 10.1016/j.lrp.2009.07.010.

Choudary, S. P. (2015) *Platform Scale: How an emerging business model helps startups build large empires with minimum investment*. 1st edn. Edited by Evelyn Shilpa. Platform Thinking Labs Pte. Ltd.

de Reuver, M., Sørensen, C., & Basole, R. C. (2018). The digital platform: a research agenda. *Journal of Information Technology*, *33*(2), 124-135.

Evans, P. C., & Basole, R. C. (2016). Revealing the API ecosystem and enterprise strategy via visual analytics. *Communications of the ACM*, *59*(2), 26-28.

Evans D. and Schmalensee, R. (2016) *Matchmakers: The New Economics of Multisided Platforms*. 1st edn. Boston, MA: Harvard Business Review Press.

Ghazawneh, A., & Henfridsson, O. (2015). A paradigmatic analysis of digital application marketplaces. *Journal of Information Technology*, *30*(3), 198-208.

Huhtamäki, J. *et al.* (2016) *Visualizing the Geography of Platform Boundary Resources : The Case of the Global API Ecosystem Abstract*.

Iivari, M. *et al.* (2016) 'Toward an ecosystemic business model in the context of industrial internet', *Journal of Business Models*, 4(2), pp. 42–59.

Ju, J., Kim, M. S. and Ahn, J. H. (2016) 'Prototyping Business Models for IoT Service', in *Procedia Computer Science*, pp. 882–890. doi: 10.1016/j.procs.2016.07.106.

Korhonen, H. M., Still, K., Seppänen, M., Kumpulainen, M., Suominen, A., & Valkokari, K. (2017). The Core Interaction of Platforms: How Startups Connect Users and Producers. *Technology Innovation Management Review*, *7*(9), 17-29.

Kouris, I., & Kleer, R. (2012). Business Models in Two-sided Markets: an Assessment of Strategies for App Platforms. In *ICMB* (p. 22).

Kyhnau, J. and Nielsen, C. (2015) 'How to create products and services customers want', *Journal of Business Models*, 3(1), pp. 81–92.

Moore, J. F. (1996) *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*, *Leadership*. John Wiley & Sons, Ltd. doi: 10.1017/CBO9781107415324.004.

Osterwalder, A. and Pigneur, Y. (2010) *Business model generation : a handbook for visionaries, game changers, and challengers*. John Wiley & Sons, Ltd.

Parker, G., Van Alstyne, M. and Choudary, S. P. (2016) *Platform revolution : how networked markets are transforming the economy and how to make them work for you*. 1st edn. W. W. Norton & Company, Inc.

Rong, K. *et al.* (2015) 'Understanding business ecosystem using a 6C framework in Internet-of-Things-based sectors', *International Journal of Production Economics*, 159, pp. 41–55. doi: 10.1016/j.ijpe.2014.09.003.

Shingo, S. (1986) *Zero Quality Control: Source Inspection and the Poka-Yoke System*. Edited by A. P. Dillon. Productivity Press.

Sorri, K. (2017). *Establishing a platform ecosystem: Case study on early adopters*. Thesis. Tampere University of Technology.

Simon, P. (2013) *The Age of the Platform How Amazon, Apple, Facebook, and Google Have Redefined Business*. 2nd edn. Motion Publishing LLC.

Vazquez, P. (2016) 'Why Platform Disruption Is So Much Bigger than Product Disruption', *Harvard Business Review*, (April).

Wirtz, B. and Daiser, P. (2017) 'Business Model Innovation: An Integrative Conceptual Framework', *Journal of Business Models*, 5(1). Available at: https://journals.aau.dk/index.php/JOBM/article/view/1923.

Wohlin, C. (2014) 'Guidelines for snowballing in systematic literature studies and a replication in software engineering', in *Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering - EASE '14*, pp. 1–10. doi: 10.1145/2601248.2601268.

Zott, C., Amit, R. and Massa, L. (2011) 'The Business Model: Recent Developments and Future Research', *Journal of Management*, 37(4), pp. 1019–1042. doi: 10.1177/0149206311406265.

About the Authors

Krista Sorri, MSc (Tech), is a doctoral student in the field of industrial management at the Tampere University, Finland. Her research interests are business model creation and development in relation to digital platform ecosystems. She recently joined academia after a long career in industrial management.

Dr. Marko Seppänen, PhD, is a full professor in the field of industrial management at the Tampere University, Finland. Prof. Seppänen is an expert in managing value creation in business ecosystems, business concept development, and innovation management. In his latest research, for example, he has examined platform-based competition in business ecosystems and innovation management in business networks. His research has appeared in high-quality peer-reviewed journals such as the Journal of Product Innovation Management, Technological Forecasting and Social Change, the Journal of Systems and Software, and the International Journal of Physical Distribution & Logistics Management..

About the Authors

Dr. Kaisa Still is a Senior Scientist at VTT, providing research and service for ecosystems in their quest for supporting technology innovations. She is an active member of international research networks and publishes frequently about innovation ecosystems and platforms in publications such as The Technology Innovation Management Review. She has a M. Sc. in Industrial Engineering (1993) and a Ph.D. in Information Systems Sciences (2010). She was a visiting scholar at mediaX, Stanford (2013-2016). Dr. Still has an extensive background in industry in Finland, US and China.

Dr. Katri Valkokari has over 15 years' experience on both research and practical development work regarding business networks, ecosystems and networked business operations. Currently, she works as a Research Manager at VTT within the research area of Business, Innovation and Foresight. In 2009, Katri completed her doctoral thesis on business network development. She published several articles, managerial guidebooks and other publications related to collaboration models, innovation, and knowledge management as well as sustainability. She has executed over 20 customer (mainly company) projects and 23 research projects concerning different business and network development aspects during the years 2001 - 2018.