Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 2017 Workshops | Special Interest Group on Big Data Proceedings

2017

Business Model Innovation to Support Smart Manufacturing

Tiare-Maria Brasseur
University of Vienna, tiare.brasseur@gmail.com

Christine Strauss
University of Vienna, christine.strauss@univie.ac.at

Andreas Mladenow
University of Vienna, andreas.mladenow@univie.ac.at

Business Model Innovation to Support Smart Manufacturing

Tiare-Maria Brasseur
Department of eBusiness,
University of Vienna,
Vienna, Austria
tiare.brasseur@gmail.com

Andreas Mladenow
Department of eBusiness,
University of Vienna,
Vienna, Austria
andreas.mladenow@univie.ac.at

Christine Strauss
Department of eBusiness,
University of Vienna,
Vienna, Austria
christine.strauss@univie.ac.at

Abstract

In today's fast changing and hyper-competitive business environments such as the automotive industry, Business Modell Innovation (BMI) has emerged as a promising approach to achieve competitive advantage. At the same time, however, BMI entails high levels of uncertainty and financial risk. In order to reduce the cost and risk involved, product and process innovation as well as manufacturing – and particularly smart manufacturing – have become increasingly open and collaborative in the recent past. The aim of this paper is to investigate the role of open and collaborative innovation practices in BMI as basis for competitive manufacturing ecosystems and provide a comprehensive review of available literature in this field. For this purpose a systematic analysis of literature at the intersection of BMI and Open Innovation has been performed. Furthermore, the role of supply chain partners (suppliers, customers and research institutions for manufacturing ecosystems) in open BMI processes has been investigated.

Keywords

Business model innovation, open innovation, collaboration, collaborative infrastructure, manufacturing ecosystems, smart collaborative manufacturing, co-creation, customer innovation, literature analysis.

1. Business Modell Innovation for Smart Manufacturing

Accelerating change, shortening product life cycles and excess supply in most markets put severe economic pressure on today's market players. As a result, firms increasingly use business model differentiation to break out of intense competition, particularly in face of the (higher) imitability of products and processes (Becker et al., 2012; Kopetzky et al., 2013). In fact, business models have become the new basis of competition (Bursuk et al., 2016). Since the dot-com boom and the wave of new information and communication technology-based business models, however, Business Model Innovation (BMI), on the one hand, has received increasing attention from both academia and practice. BMI requires a change in the three primary dimensions of the business model, i.e. value creation, value proposition and value capture. A firm employing BMI has found a way to create value (for its customers) and capture value (for itself) at the same time. Huang et al. (2013) have defined BMI as the process of repositioning the value proposition, including a redesign of the profit formula and the adjustment of other related business model elements (e.g. new key partners or activities). In general, BMI occurs in two forms: it can be the introduction of a new business model or stem from improvements of an existing one.

The goals of smart manufacturing, on the other hand, lie in the recognition of automatable workflows and the improvement of the manufacturing process. It involves logistics, production and the Internet of things (Mladenow et al., 2016). To exploit the full potential of smart manufacturing a fundamental strategic vision needs to be developed. In the mid 1990-ies, first applications of supply chain management have left behind a strictly isolated, enterprise-centered view, which had dominated management decisions. Supply chain management at that time was an important step by linking business functions and business processes within and across firms into enhanced business models. In fact, it was a forerunner of collaborative value-generation. Since co-creation and collaboration as generic organizational types or even paradigms are strong drivers in the design of smart manufacturing systems, in a first step we need to analyze the possible roles, players, and approaches that determine manufacturing ecosystems.

Against this background a systematic literature review has been conducted to provide a comprehensive overview of available literature on BMI to identify the major topics and concepts discussed in this field. Five leading scientific databases (ACM, EBSCO, IEEE, Springer Link, Wiley) were selected for the literature search. The analysis of the literature has revealed that publications within the field of open BMI in manufacturing ecosystems show different thematic priorities as analyzed in the next section.

2. Supply Chain Participation in Manufacturing Ecosystems

The literature analysis showed that publications within BMI used different approaches to integrate supply chain partners in open BMI activities as depicted in Table 1. Envisaging the partners involved in manufacturing ecosystems, it was found that all publications involved customers in the BMI process. This is not surprising, as the keywords used for the systematic literature search aimed for identifying articles exploring target group involvement, i.e. the participation of customers, in open BMI practices. Moreover, 5 out of 9 publications chose to collaborate with both – customers and suppliers – to advance BMI. Additionally, a single study chose to involve customers, suppliers and a research institution in a collaborative setting of open BMI (i.e. Buur and Gudiksen, 2012).

Source	Participation of Supply Chain Partners			BM Co-Creation	Customer-Driven BMI	Early BM Validation	Virtual Collaboration	Design Thinking
	customers	suppliers	research institutions					
Berre *et al.* (2013)	X	X		X		X	X	
Buur and Gudiksen (2012)	X	X	X	X	X			X
Chew (2015)	X	X		X	X	X	X	
Ebel, Bretschneider and Leimeister (2016)	X	X		X	X	X	X	
Gudiksen (2015)	X			X				X
Ogilvie (2015)	X			X		X		X
Pynnönen, Hallikas and Ritala (2012)	X				X	X	X	
Trimi and Berbegal- Mirabent (2012)	X				X	X		
Zolnowski, Weiss and Bohmann (2014)	X	X		X	X			

Table 1. Literature on BMI with Supply Chain Partners

Envisaging the intensity of supply chain partner participation in open BMI activities the International Association for Public Participation (IAP2, 2014) has developed a Stakeholder Participation Spectrum to demonstrate the possible types (i.e. levels) of stakeholder participation. Following this, two forms of participation dominated the literature on open BMI, i.e. "involvement" and "collaboration". The IAP2 (2014) defines the participation level of "involvement" as working "directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered." "Collaboration", on the other hand, allows a higher level of external stakeholder impact. According to the IAP2, to "collaborate" means "to partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.". In literature on open BMI, only 2 out of 9 publications chose an involvement approach, which included the adding to, modifying, or recombining of knowledge contributed by supply chain partners. The majority, i.e. 7 publications, chose to collaborate with supply chain members by allowing them to actively contribute new BM ideas.

3. Emerging Trends of Business Model Innovation

The topic of ***BM co-creation*** was most frequently discussed within available literature on open BMI. A total of 7 of 9 included publications addressed this issue using notions such as BM "co-creation" (Chew, 2015; Ebel et al., 2016; Ogilvie, 2015; Zolnowski et al., 2014) "co-design", "co-innovation" or "co-development" to refer to collaborative methods of BM generation. Ebel et al., (2016, p. 520), defined BM co-creation as the activity of "developing business models together with customers in a collaborative manner". Similarly Lee et al., (2012) argued that in a co-creation setting, value is being created in cooperation with external partners. Co-innovation, on the other hand, was described as a new innovation paradigm, which incorporates collaboration and co-creation in a platform approach (Lee et al., 2012; Trimi and Berbegal-Mirabent, 2012, p. 462). In other words, co-innovation emphasizes on the co-creation of unique value and experience with external stakeholders, rather than merely creating value for them (Lee et al., 2012).

The available literature on open BMI showed that various approaches have been discussed, ranging from theoretical models, to (open) software solutions and playful design thinking methods. Both, software solutions to enable virtual BMI collaboration and game-like innovation activities in the form of design thinking, are further discussed in this section. Overall, the literature showed a trend towards more collaborative forms of BM creation, which encouraged the active participation of supply chain partners in the creation of new BM that might particularly be suitable for smart solutions in manufacturing and manufacturing ecosystems.

The literature analysis we performed revealed that opening up the BMI process to allow BM co-creation enables new business opportunities (Berre et al., 2013, p. 5) and enhances the quality of the developed BMs (Ebel et al., 2016, p. 520). It has been argued that by seeking external feedback and collaborating with customers to share BMs, firms can test the commercial viability of a new BM before implementing it (Chew, 2015; Ebel et al., 2016). Particularly, the role of customers and suppliers as valuable participants in BMI process has been highlighted in the literature. Ogilvie (2015, p. 25) argued that engaging directly with customers and prospective partners helps to co-create solutions that deliver value to all stakeholders involved. This was supported by Buur and Gudiksen (2012, p. 129) who arrived at the conclusion that the "discussion of business models within the company, and with suppliers and customers is necessary to ensure competitive edge". Similarly, Ebel et al., (2016, p. 541) denoted target group involvement as crucial for successful BMI. Looking at co-creation from a customer-perspective, Ogilvie (2015, p. 32) claimed that customers embraced the invitation to participate in BM co-creation sessions and were enthusiastic about the idea to co-create a new solution.

Furthermore, Zolnowski et al., (2014) and Chew (2015) discussed to the role of co- creation in service businesses. Chew (2015, p. 1) put forward the view that "service innovation and business model innovation are the source for business growth." That is why the author introduced the prototype of a new integrated design method, the so-called iSIM (integrated Service Innovation Method), for simultaneous service innovation and BM design. The model is based on the assumption that customer value co-creation is central to BMI. Thus, the iSIM model facilitates the engagement of customers as co-producers of value. Chew (2015, p. 4) put forward the view that a co-creation approach in BMI enhances mutual value

proposition alignment between the customer-side and the supply-side business ecosystem. Similarly, Ebel et al., (2016, p. 534) recommended the discussion and refinement of new BM alternatives with customers and suppliers until mutual agreement among all stakeholders is reached.

To practice co-creation, it has been proposed that firms need an organizational culture of "open leadership" and "organizational learning" (Chew, 2015, p. 6). According to Chew (2015, p. 18), "managers need to be tolerant of experimentation (and therefore failure)" as BMI requires a significant amount of trial-and-error learning. With the use of rapid BM experimentation, firms can test the commercial viability of new BM concepts before committing capital on the design and implementation of the BM (Chew, 2015, p. 18). This is supported by Ebel et al., (2016, p. 535), who point to a certain flexibility in terms of BM resources and capabilities "to ensure that the business models can be adapted to changing market situations." Zolnowski et al., (2014, p. 724) stress the importance of adopting a "value network logic" instead of focusing on a single value chain, to foster the integration of and interaction with external partners. Furthermore, Chew (2015, p. 18) emphasized a combination of resource integration and configuration capabilities (Chew, 2015, p. 18) to be able to leverage externally generated knowledge for internal processes, i.e. so-called "absorptive capacity".

Turning to ***customer-driven BMI***, more than half of the publications, i.e. 6, discussed this customer-focused approach to new BM generation. The available literature highlighted the need for a more "customer-centred model" of BMI (Trimi and Berbegal-Mirabent, 2012, p. 461). As Trimi and Berbegal-Mirabent (2012, p. 461) put it, "innovation needs to be more open and closer to consumers." This was supported by Pynnönen et al., (2012, p. 11) who arrived at the conclusion that when designing new BMs, "it is fruitful to have the customer's voice in the process from the very beginning". Pynnönen et al., (2012, p. 1) further argued that "firms do not necessarily know what the value preferences of their customers are", so they should recognize customers as valuable participants in various roles in the BMI process. Similarly, Zolnowski et al., (2014, p. 724) took the customer as "starting point" of BMI by positioning the customer at the top of the BM. According to their research, visualising all potential interaction points with the customer helps to identified how the customer co-determines and influences other BM dimensions. Moreover, a new BM framework was introduced, the service business model canvas (SBMC), which includes a firm, partner and customer perspective of the BM to allow a holistic view of the business logic (Zolnowski et al., 2014, p. 726).

Similarly, Chew (2015, p. 7) put forward a model of "backward" BM design. He proposed to first envision what the unique customer experience should be and then backward design the BM and service offering accordingly. Equally, Pynnönen et al., (2012, p. 6) suggested to start with mapping initial customer needs and aligning the offering in the BM with its value to the customer. A four-stage Business Mapping Framework has been introduced to analyze the fit between the firm's current BM and customer value. In the course of their analysis, each BM element was weighted according to customer value preferences to identify the core and non-core components of the BM and exclude non-value adding elements (Pynnönen et al., 2012, p. 10).

A similar approach was outlined by Trimi and Berbegal-Mirabent (2012), who stressed the importance of "customer validation" before creation. They seized on the idea of customer development. The main principle of the customer development process is that a new concept or idea, first, needs to be validated by customers to be able to proceed to the creation stage, or otherwise is pivot back to the discovery stage. Regarding BMI, customer validation includes the verification of BM elements such as the perceived value of the offering, or the appropriateness of pricing or distribution channels (Trimi and Berbegal-Mirabent, 2012, pp. 458). Finally, Pynnönen et al., (2012, p. 11) pointed to the importance of continuous involvement of customers in the BMI process to repeatedly align a firm's BM to current and emerging market needs in an iterative manner. To obtain the essential real-time information about changing customer preferences, they proposed the creation of (online) customer communities aligned with social-media.

Envisaging the topic of early BM validation, two thirds of the publications, i.e. 6 of the 9 included articles, addressed this issue. The available literature highlighted the importance of "validation before creation" by seeking external feedback and target group involvement (Ebel et al., 2016) to validate new BM concepts in early stages of development (Trimi and Berbegal-Mirabent, 2012). By using rapid BM

experimentation firms can test the commercial viability of new BM concepts before making investments beyond planning (Chew, 2015; Ogilvie, 2015). This helps to reduce the high level of uncertainty and the risks involved in BMI. According to Trimi and Berbegal-Mirabent (2012, p. 460), a business can increase its chances of success through "early on-going interactions with customers". Ogilvie (2015, p. 24) even denoted the development of early BM validation methods as "key to success". Particularly for early-stage businesses the capability of BM experimentation to rapidly test and validate business hypotheses is vital (Trimi and Berbegal- Mirabent, 2012, p. 452). As Trimi and Berbegal-Mirabent (2012, p. 454) put it, "the ideal business model rarely appears in the early stage of emerging businesses". Therefore, they recommend that BMs should be flexible enough to allow quick iterations and trial-and-error learning (Trimi and Berbegal-Mirabent, 2012, p. 462).

The exploratory work by Ogilvie (2015) showed a new BM concept together with a revenue model at minimal expenses. The use of visualization and design thinking methods to advance BMI turned out very successful for a leading telematics provider in the UK (Ogilvie, 2015, p. 32). In BM co-creation sessions with customers and prospective partners, the firm used visual BM prototypes (i.e. posters) "with just enough information to allow customers to understand how the BM might work" (Ogilvie, 2015, p. 30) but also leaving enough space for comments and ideas by the workshop participants. The industry partner was very satisfied with the outcome of the BM validation process and stated, "If we had explored the pricing in the traditional way, we would have left way too much money on the table." (Ogilvie, 2015, p. 33).

Another major trend in BMI identified in the course of the review is the use of "***virtual collaboration***" to advance open BMI. In total 4 out of the 9 included publications discussed this emerging approach. The available literature highlights the crucial role of IT-tools to support the open process of designing new BMs (Ebel et al., 2016, p. 520). As Ebel et al., (2016, p. 531) put it, "technology can facilitate online collaboration and, as a result, improve the overall quality of knowledge contributed". Thus, all 4 publications within this thematic category presented the prototype of a software or online platform solution for open BMI, which was pilot-tested in the course of the research. The core objective of these open platforms is to provide innovation community support for BMI processes by increasing innovation capacity. According to Berre et al. (2013, p. 5), "The core objective of the innovation community is to increase innovation capacity by bridging the many users that have an innovation challenge with the users that have possible solutions." The principal idea behind virtual collaboration approach for BMI is thus very similar to a crowdsourcing approach, which makes use of collective capacities to solve complex problems. Crowdsourcing approaches tackling applications in the context of manufacturing refer to logistics or new product development (cf. e.g. Mladenow et al., 2016; Bauer et al., 2014; Ernst et al., 2016).

The virtual BMI collaboration tools presented in the literature supported a variety of different features such as voting, evaluations, rating, search and access control, community functions (profile pages, interest groups), messaging, commenting and other collaboration tools such as file sharing (Berre et al., 2013, p. 5; Chew, 2015; Ebel et al., 2016; Pynnönen et al., 2012). Members of the innovation community were allowed to contribute to BM challenges and ideas by creating new BM alternatives or linking to existing ones (Berre et al., 2013, pp. 5–6). "Community sections" which allowed BM development teams to require assistance or feedback from external partners within the (online) innovation community such as suppliers, customers or research institutions. In two cases, innovation communities were additionally aligned with social media (Berre et al., 2013; Pynnönen et al., 2012).

The fifth emerging trend in BMI covered by the literature was ***design thinking***, which was addressed by three of the publications. Design thinking describes different participatory innovation methods involving experimentation, tangible resources and game-like innovation activities to stimulate the creative exploration of innovative solutions (Buur and Gudiksen, 2012, p. 129). Applying design thinking methods for BMI allows participants to "express themselves with their hands" by using "tangible business modelling" (Buur and Gudiksen, 2012, p. 130). The analyzed literature reported the use of tangible resources such as sticky notes (Ogilvie, 2015), balls and bricks (Gudiksen, 2015) and even a pinball machine (Buur and Gudiksen, 2012) to facilitate collaboration among (multi-disciplinary) BM co-creation teams. In an interactive design, Buur and Gudiksen (2012) conducted iterative BM experiments in different settings to trigger new discussions and solution-based thinking. Similarly, Gudiksen (2015).

Buur and Gudiksen (2012, p. 137) arrived at the conclusion that "playfully 'thinking with hands and body' enhances 'the quality of conversations' towards an innovative outcome". Similarly, Gudiksen (2015) chose different BM design games for the playful experimentation with new BM ideas. Gudiksen (2015, p. 308) demonstrated that approaching the BM as a design problem advances new perspectives on BMI initiatives. The use of tangible resources and a randomizer (i.e. a dice) helped to spark new ideas and combinations. Eventually, Gudiksen (2015, p. 310) concluded that BM design games had two major benefits: (1) they imposed clear rules that had to be followed by all participants, and (2) they provided a joyful and engaging atmosphere, which allowed participants to "step out of the real life" ("foolishness") and enjoy the "freedom to play" to stimulate experiential learning. Finally firms, regardless of their size, are forced to experiment with BMs because of rapid changes in business environment (Gudiksen, 2015, p. 308). To successfully practice design thinking for BMI, they need to create a temporary space for imagination, which encourages an experimental, game-oriented culture and the freedom to improvise, play and test BM concepts (Buur and Gudiksen, 2012; Gudiksen, 2015).

4. Conclusion

The presented literature analysis shows that the field of open BMI is still an under-researched area. Eventually, only 9 publications complied with all inclusion criteria. The included publications were found to discuss emerging trends in BMI. The analysis of available literature revealed that open innovation has a direct positive effect on BMI success. It was found that involving supply chain partners in BMI processes may enhance both the quality of developed BMs and firm performance - at least up to a certain level. Furthermore, participation in open BMI processes takes various forms. A variety of different methods for participatory BMI have been proposed. All of them involved customers in the process of BMI, while some chose to also engage suppliers and research institutions. The most frequently discussed topic among analyzed literature on open BMI is BM co-creation, i.e. the collaborative design of new BMs. The results highlight the growing importance of collaborative BM generation. Additionally, the literature review revealed that establishing methods to validate new BM concepts in early stages of development is proposed as key to successful BMI. Firms should seek early target group involvement to achieve BM validation before creation. The literature suggests the use of online collaboration tools or design thinking methods to validate new BM concepts at minimal expenses. It was found that online platforms and (customer) communities can contribute significantly to the success of new BM concepts, which highlights the crucial role if ICT in facilitating open BMI methods. Furthermore, the application of design thinking principles to advance new perspectives on BMI initiatives represents another key finding of this review. It has been demonstrated that approaching the BM as a design problem through the use of tangible or visual BM "mock-ups" in experimental, game-like innovation activities enhances the quality of discussions among participants and increases innovation output.

It can be concluded that open and collaborative BMI represents an important research area, which is still in its infancy. This paper delivers a contribution to the knowledge in this novel field that may contribute to innovative approaches of smart manufacturing. Given the insights on the growing trend of collaboration in BMI, further research will focus on exploring different collaborative approaches in BMI with focus on smart manufacturing. Future work might shed further light on BM co-creation activities regarding e.g. their application in different stages in the innovation process, the direction of information flows or business partners involved in manufacturing ecosystems. Furthermore, as virtual collaboration tools and design thinking methods are both expected to play an increasing role in facilitating BMI in the future, they represent promising areas for further research.

REFERENCES

Bauer, C., Mladenow, A., and Strauss, C. 2014. "Fostering collaboration by location-based crowdsourcing" in *Cooperative Design, Visualization, and Engineering*, Luo, Y. (eds). Lecture Notes in Computer Science, vol. 8683. Springer, Cham, pp. 88-95. doi: 10.1007/978-3-319-10831-5_13.

Becker, A., Mladenow, A., Kryvinska, N., and Strauss, C. 2012. "Evolving taxonomy of business models for mobile service delivery platform" in *Procedia Computer Science* (10), pp. 650-657.

Bernstein, M.S., Tan, D., Smith, G., Czerwinski, M., and Horvitz, E. 2008. „Personalization via Friendsourcing“ in *ACM Trans. Comput.-Hum. Interact.* (17:2), p. 6. doi: 10.1145/1746259.1746260.

Berre, A.J., Man, H.d., Lew, Y., Elvesæter, B., and Ursin-Holm, B.M. 2013. “Open Business Model, Process and Service Innovation with VDML and ServiceML” in *5th Int. IFIP Working Conference on Enterprise Interoperability (IWEI 2013)*, Enschede, The Netherlands, March 27-28, pp. 1-14.

Burr, J., and Guriksen, S. 2012. “Interactive Pinball Business” in *Proceedings of the 7th Nordic Conf. on Human-Computer Interaction: Making Sense Through Design*. New York, USA: ACM, pp. 129-138.

Bursuk, I., Mladenow, A., Novak, N.M., and Strauss C. 2016. “Online Cofounder Search in Tech Startups” in *Proceedings of the 18th International Conference on Information Integration and Web-based Applications & Services (iiWas'16)*. New York: ACM, pp. 482-488. doi: 10.1145/3011141.3011221.

Chew, E.K. 2015. “iSIM: An integrated design method for commercializing service innovation” in Information Systems Frontiers, pp. 1-22. doi: 10.1007/s10796-015-9605-y.

Ebel, P., Bretschneider, U., and Leimeister, J.M. 2016. “Leveraging virtual business model innovation” in *Information Systems Journal*, pp. 519-550.

Ernst, C., Mladenow, A., and Strauss, C. 2017. “Collaboration and crowdsourcing in emergency management” in *Int. Journal of Pervasive Computing and Communications* (13:2), pp. 176-193.

Gudiksen, S. 2015. “Business Model Design Games: Rules and Procedures to Challenge Assumptions and Elicit Surprises” in *Creativity and Innovation Management* (24:2), pp. 307-322.

Huang, H.-C., Lai, M.-C., Lin, L.-H. and Chen, C.-T. (2013) “Overcoming organizational inertia to strengthen business model innovation: An open innovation perspective”, Journal of Organizational Change Management, 26(6), pp. 977–1002.

IAP2 2014. IAP2's Public Participation Spectrum. Available at: http://c.ymcdn.com/sites/www.iap2.org/resource/resmgr/Foundations_Course/IAP2_P2 Spectrum.pdf?hhSearchTerms=%22participation+and+spectrum%22 (Accessed: 1 March 2017)

Kopetzky, R., Günther, M., Kryvinska, N., Mladenow, A., Strauss, C., and Stummer, C. 2013. „Strategic management of disruptive technologies: a practical framework in the context of voice services and of computing towards the cloud” in *International Journal of Grid and Utility Computing* (4:1), pp. 47-59. doi: 10.1504/IJGUC.2013.054490.

Mladenow, A., Bauer, C., and Strauss, C. 2016. „Crowd logistics: the contribution of social crowds in logistics activities“ in International Journal of Web Information Systems (12:3), pp. 379-396. doi: 10.1108/IJWIS-04-2016-0020.

Mladenow, A., Kryvinska, N., and Strauss, C. 2012. “Towards cloud-centric service environments” in *Journal of Service Science Research* (4:2), p. 213-234. doi: 10.1007/s12927-012-0009-y.

Mladenow, A., Novak, N.M., and Strauss, C. 2016. “Internet of Things Integration in Supply Chains – An Austrian Business Case of a Collaborative Closed-Loop Implementation” in *Research and Practical Issues of Enterprise Informations Systems*, Tjoa A., Xu L., Raffai M., Novak N. (eds). Lecture Notes in Business Information Processing, vol. 268. Springer, pp. 166-176. doi: 10.1007/978-3-319-49944-4_13.

Ogilvie, T. 2015. “How to Thrive in the Era of Collaborative Services Entrepreneurship” in *Research Technology Management* (58:5), pp. 24-33.

Pynnönen, M., Hallikas, J., and Ritala, P. 2012. “Managing Customer-Driven Business Model Innovation” in *International Journal of Innovation Management* (16:4), pp. 1-13.

Trimi, S., and Berbegal-Mirabent, J. 2012. “Business model innovation in entrepreneurship“ in *International Entrepreneurship and Management Journal* (8:4) pp. 449-465.

Zolnowski, A., Weiss, C., and Bohmann, T. 2014. “Representing Service Business Models with the Service Business Model Canvas - The Case of a Mobile Payment Service in the Retail Industry” in *47th Hawaii International Conference on System Science*, pp. 718-727.