Platform Ecosystem Orchestration for Efficiency, Development, and Innovation

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Abstract Platform research has expanded its focus from management of technology domains towards the service of a business. Digital service platforms facilitate ecosystems of participants and compete against each other. Platform ecosystems cannot be managed in a goal-oriented fashion because the number of actors, transactions, and relationships increases beyond the ability of what the platform owner can handle. Instead, platform ecosystems can be orchestrated by designing processes taking place among participants. In this conceptual paper, we present four service platform categories and three platform ecosystem orchestration modes for platform owners. In conclusion, we suggest that platform ecosystems around the service platform require simultaneous orchestration of efficiency, development, and innovation in order to attract and lock-in end users, facilitate transactions, and create novel offerings.

Keywords Platform economy · Service platform · Orchestration

Introduction

Companies owning digital service platforms have become the biggest brands and largest corporations in the world over product brands (Desjardins 2017). A digital service platform allows client firms to build their business on top of service modules offered online (Chesbrough 2011). For end users, service platforms integrate as parts of daily life, for example, in shopping, travel, and rental transactions (Smedlund 2012). The service platforms, such as accommodation service Airbnb and transportation service Uber, are easily scalable and aim to create a multisided market

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A. Smedlund et al. (eds.), *Collaborative Value Co-creation in the Platform Economy*, Translational Systems Sciences 11,
https://doi.org/10.1007/978-981-10-8956-5_2

resulting in a platform ecosystem. These types of platforms transform the structures of their respective businesses and drive incumbents out of business as participants join in the platform instead of continuing business in a traditional way (Davies et al. 2005). Service platforms are transforming the way products and services are being consumed and are radically changing economic and social structures. Despite their significance, value-creating processes and orchestration are relatively new research topics.

One important aspect in the platform literature is the variety of characteristics included in the service platform discussion. Depending on the number of participating groups, platforms facilitate one-sided, two-sided, or multisided markets (Evans et al. 2005). And, depending on whether participants are free to integrate their offering into the platform without the platform owner specifically choosing the participant, the platform can be either closed or open (Chesbrough 2011). The common denominator to the kinds of platforms discussed in this chapter (i.e. digital service platforms) is that they all facilitate a multisided market around them allowing the ecosystem to grow with network effects and have invested heavily in information and communication technology (ICT) infrastructure. The ICT allows both flexible front-end interactions with each end user individually (e.g. Amazon.com personalized landing page) and also digital service modules for complementors to base their offering on (e.g. Amazon.com billing system for third-party merchants).

The world's most successful service platforms orchestrate their ecosystems of complementors and end users. These platforms have grown evolutionarily, and expanded horizontally to adjacent businesses, thus connecting participants from different industries. They are bridging traditional industry divides and offer highly desirable novel offerings emerging in between the industries. The platform ecosystems include the platform owner, complementors, and end users (McIntyre and Srinivasan 2016) and in the cases of horizontally integrated service platforms, also competitors that may form secondary or complementary platforms and ecosystems (Hänninen et al. 2017; Thomas et al. 2014).

So far, the literature on platforms lacks theories and empirical studies on platform ecosystem orchestration. In innovation management, orchestration is defined as facilitating the processes that lead to and promote relationships and activities among the participants (Dhanaraj and Parkhe 2006; Teece 2007). In the case of service platforms, orchestration can influence how well actors in the ecosystem innovate novel offerings, develop them incrementally, and organize to execute the transactions.

The purpose of this chapter is to highlight the differences of service platforms and the need for platform ecosystem orchestration. In this paper, we conceptualize four kinds of service platforms and articulate the distinct needs for orchestration of each platform type. Then we present three platform ecosystem orchestration modes the platform owner can pursue in order to improve the efficiency and develop and renew business among participants. It is concluded that successful platforms should engage in orchestration not only for efficiency but also for development and innovation. Our theorizing reveals that each of the orchestration modes is different in terms of goals, value co-creation logic, interdependencies, sources of synergy, and growth patterns. This provides a starting point for designing particular orchestration processes in platform ecosystems.

Platform Ecosystems and Orchestrator Role

Based on a review of the platform literature, we conclude that platform ecosystems have four interrelated commonalities: (1) co-creation of value, (2) interdependency and complementarity of participants, (3) synergy, and (4) evolutionary growth. Firstly, the end user value is a result of value constellation, as several firms and also the end users themselves participate in value co-creation (Ceccagnoli et al. 2012; Normann and Ramirez 1993). Secondly, platform ecosystem participants are in complementary relationship with each other, which is necessary to ensure functionality of the entire offering (Gawer and Cusumano 2008; Gawer and Henderson 2007; Nishino et al. 2012). Thirdly, the platform ecosystem produces surplus value (i.e. synergy) as a result of complementarity and interdependency of components – the value co-created in aggregation of each component as a whole system is more than the sum of values created by each component separately (Armstrong 2006).

Fourthly, platform ecosystems adapt to their environment: they expand by either building upon new components or connecting to other ecosystems. After reaching a tipping point of momentum in the number of participants and relationships between them, ecosystems develop in an evolutionary manner (i.e. random variation, selection, and retention processes). An evolutionary attribute is necessary because it allows the platform to maintain its current participants and simultaneously attract new ones.

The platform owner is the focal point of the platform ecosystem (McIntyre and Srinivasan 2016). Empirical studies of precisely how the platform owner fosters the emergence of the ecosystem are non-existing, but conceptually there are two processes on which ecosystems are formed: goal-directedness and serendipity. In a goal-directed process, the participants see themselves as a part of a network committed to some common goal. The ecosystem is formed to achieve this goal. In the serendipitous process, there is no pre-existing goal, and the network develops in an evolutionary manner (Kilduff and Tsai 2003).

For example, the process by which Apple orchestrated its iPod product and iTunes service is an example of how platform growth changes from a goal-oriented to a serendipitous process – from executing a focal firm's strategy into an inter-industry-wide ecosystem. In the beginning, Apple developed the iPod in collaboration with selected companies: a couple of technology providers and one content provider. A goal was set to bring a new music player to the market. In 2004, the network was expanded with tens of content producers, technology producers, and also producers of peripheral devices. It is notable that several of Apple's competitors joined the network, intermediated by the technology providers.

As a result of serendipitous networking, there are many participants who may have differing business goals with Apple but are complementary to the platform ecosystem. This leads to a decentralized and distributed network structure, as the offerings of multiple firms in the ecosystem are compatible. The network spreads out to include a wide variety of businesses, and the platform ecosystem starts to connect different domains of industries together.

The Apple iPod case illustrates how an ecosystem emerges around the platform owner with a combination of goal-oriented and evolutionary growth. The ecosystem is comprised not only of all the firms that belong to the immediate value chain with Apple but also of firms and other stakeholders that somehow affect the value chain (Iansiti and Levien 2004). Each of the actors in the ecosystem has its own niche that is connected to the ecosystem with complementary products or services.

The platform literature emphasizes that the platform owner is in the position of orchestrating the platform ecosystem. The orchestrator strives to share the standards (Gueguen and Isckia 2011), develops the industry vision (Gueguen and Isckia 2011; Moore 2006, 1996), maintains the integrity of the platform and its evolution (Gawer and Cusumano 2002; Gawer and Henderson 2007), and determines up to a point who may join as a participant in the ecosystem (Eisenmann 2008). The orchestrator role has been referred to by different terms in different studies. Some studies have used 'platform leader' (Cusumano and Gawer 2002; Gawer and Cusumano 2008; Gawer and Henderson 2007; Moore 1996; Tee and Gawer 2009), some have used the term 'platform sponsor' (Alstyne et al. 2011; Eisenmann 2008; Eisenmann et al. 2008; Parker and Van Alstyne 2008), and others have used 'keystone organizations' (Gueguen and Isckia 2011; Hanssen 2012; Iansiti and Levien 2004).

Service Platform Ecosystem Orchestration for Efficiency, Development, and Innovation

In this section, we conceptualize different kinds of service platforms and explain their particular needs for platform ecosystem orchestration. We argue that service platforms differ in terms of focus of ICT investments and openness of the platform for participants. Based on these distinguishing factors and inspired by Gawer and Cusumano (2014), we have labelled the resulting platforms as internal platforms, industry-wide open or closed platforms, and inter-industry platforms.

ICT acts as a multiplier of value in the platform ecosystems because it affects the possibilities of platform participants to co-create value within sides and between sides. Digitalization helps diverse actors collaborate in the ecosystem and support the constant evolution of the actors in the ecosystem (Lusch and Nambisan 2013). In addition to the technological core, ICT investments contribute directly to the applicability of accumulated data used, back-end processes, service modules and boundary resources offered for complementors, and user experience of a flexible front end. A focus on ICT investments, especially in either back-end or front-end ICT, distinguishes platforms from one another (Smedlund 2012). Seemingly, there are service platform owners that consider user experience (UX) of the front-end as a differentiator from other platforms (e.g. Rakuten), while others focus on back-end processes and supplier modules (e.g. Alibaba) (Hänninen et al. 2017).

Another distinguishing factor is open or restricted entry to the platform. Openness goes hand in hand with the assumption of increased amount of participating groups

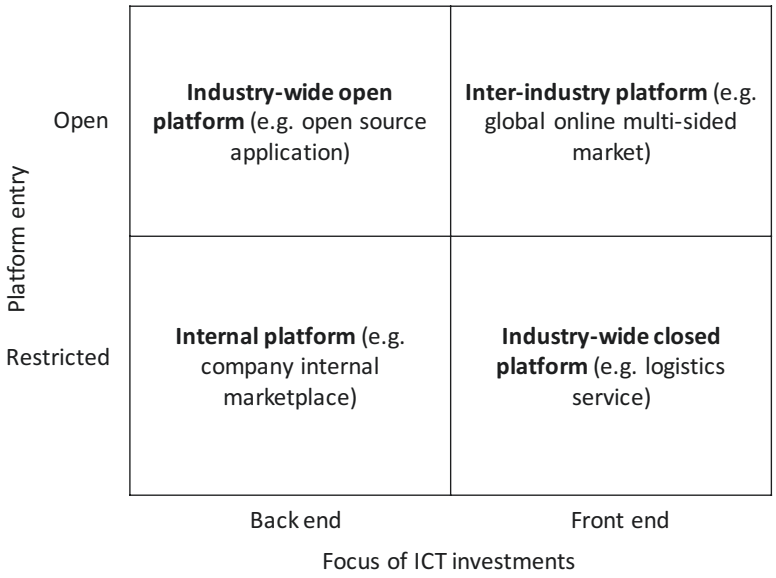

Fig. 1 Four types of service platforms

and segments. If the industry-wide platform is open, then the amount of collaboration (e.g. negotiations, integration, flow of resources and money) between the participants in the platform is likely to be high (Smedlund 2012). When these increase, the complexity of the network of relationships in the platform ecosystem increases. If the platform entry for participants is restricted, the relationship between the platform owner and participants, and among participants, is likely to be more formalized, which lowers the need for communication and coordination. Figure 1 presents the four types of platforms.

The type of service platform determines contingencies on what the platform owner should focus orchestration on. The three modes of orchestration, efficiency, development, and innovation, describe how a platform owner can enhance the ecosystem from different angles. The three modes have roots in management theory, organization theory, and complex systems theories.

In management theory, efficiency is highlighted in theories of scale and scope of production (Chandler 1962), development from the point of view of theories of knowledge accumulation (Nelson and Winter 1982; Penrose 1959), and innovation from the point of view of technological change and entrepreneurship as forces transforming society (Schumpeter 1934, 1942; Smedlund 2009a, b). In organization theories, a rational system point of view denotes efficiency in organizing to achieve a predetermined goal, natural system point of view brings in incremental organizational development in order to adapt to many goals simultaneously, and open system point of view highlights the organization's ability to self-organize in accordance with the environment (Scott 2003). In complex systems theories, the three modes of orchestration are present in the paradigms of systems thinking (Ståhle et al. 2003):

efficiency in the mechanistic Newtonian and classical physics paradigm, development in general systems theory (Bertalanffy 1969) and soft systems methodology (Checkland and Scholes 1990), and innovation in self-organizing systems (Prigogine 1976) and in autopoietic systems (Maturana and Varela 1980).

Next, each of the orchestration modes is connected to a platform type, and interrelations between (1) co-creation of value, (2) interdependency and complementarity of components, (3) synergy, and (4) evolutionary growth pattern are theorized. After this, concrete orchestration processes can be suggested.

In internal platforms (e.g. company internal marketplace in a multinational corporation), the participants are well known and specified, making collaboration predictable and ICT systems workable with minimum requirements. Flexible front-end UX is not a top priority when the participants are known because organizational boundaries restrict participation making the payoff for any additional investments in front-end UX low.

This type of platform ecosystem requires orchestration focusing on efficiency. The goal is predetermined as in a rational system (Scott 2003) to make transactions as efficient as possible – the more transactions there are, the more efficient the platform should become. This makes possible synergies from bundling complementor offerings by lowering the transaction costs of end users. The interdependencies among participants are transaction based. The value co-creation logic is Newtonian mechanistic (Ståhle et al. 2003), machine-like, and is based on deals between participants that take place in the platform. In an internal platform, the offering and the value constellation are known, and value is co-produced with a known set of network actors (c.f. Ramirez 1999). Concrete orchestration processes for efficiency are, for example, facilitation of transactions, managing reliability of participants, and transactions and processes that make efficient use of existing explicit knowledge possible (Smedlund 2009a, b).

In closed industry-wide platforms (e.g. logistics service provider's web service for tracking parcels), the participants are also well known because the platform owner decides whether the participant can join the platform or not. There are only selected external participants who are related to the business of the platform owner (e.g. in the case of parcel delivery tracking system), but they do not belong to the same organization. The participants' attention is directed towards the specific transaction making requirements for ICT straightforward and predictable. Front-end ICT is important in closed platforms, as the differing end user needs have to be served well with the combination of the capabilities and assets of the participants. Front-end design enables end users serving themselves instead of the platform owner having to target customer service resources for end users.

The participant of an industry-wide open platform (e.g. end user of a snippet of code for software in open source code repository) may be not specified at all but is likely to belong to a predefined group. This is because the participants are more bound towards collaboration in a specific substance area – the participants are looking for some existing solutions to complement their own offering or add their solution to an existing offering. Here the platform owner does not restrict participants' options of joining the platform but does not invest heavily in front-end ICT either.

The participants assemble their own user-specific combinations of the ecosystem offerings by using a front-end ICT system that requires skills and dedication to use, but is also flexible to serve different needs.

Open and closed industry platforms are depicted here as facing similar kinds of orchestration modes. In an industry-wide open or closed platform, interactions among or between participants require more tailoring than in an internal platform. In industry-wide platforms, the participants are more or less predictable, but do not reside inside a shared organizational boundary. In other words, many other goals in addition to the goals of the platform owner exist simultaneously, similar to organization as a natural system (Scott 2003). Knowledge is more complex compared to the internal platform because of the added variety of participants. This affects the value co-creation logic making it organic with ongoing dialogue, soft systems like Ståhle et al. (2003). An industry-wide platform is a venue for co-learning (Ramirez 1999) and co-elevation (Kijima and Arai 2016).

In the industry-wide open or closed platform ecosystem, the participants' capabilities are continuously improved. The management of interdependencies should be directed towards facilitating reciprocal interactions among participants. Sources of synergy come from co-learning and co-elevation of capabilities of participants. The offering is incrementally improved thus making the offering more than just a bundle of existing modules. In these platforms participants gain tacit, experience-based knowledge (Smedlund 2009a, b). Thus industry-wide platforms require orchestration of processes to facilitate long-term reciprocal interactions and processes of retention and refining experience-based knowledge. When engaged in such activities, the participants are being locked into the platform, which leads to increased robustness.

Inter-industry platforms (e.g. global online multi-sided market) attract and connect a wide variety of participants thus setting high requirements for both collaboration and ICT. Because openness leads to increased variety, inter-industry platform ecosystems are highly complex compared to other types. UX on the front end is crucial; otherwise the varieties of participants are not able to connect themselves fully to the platform, but so are the back-end processes and handling of accumulated participant-specific data. Orchestration in inter-industry platforms should be focused on creating novel offerings with platform participants. The value co-creation logic resembles the logic of self-organizing (Prigogine 1976), and novel offerings emerge in the boundaries between different industrial domains. Novel value constellations are co-invented in a loosely coupled interaction between the participants (Ramirez 1999). The competencies are created and renewed according to feedback from the ecosystem, as in organizations functioning with open systems logic (Scott 2003). In inter-industry platform, the orchestrator should facilitate processes that result in co-experiencing in ad hoc interactions (Kijima and Arai 2016), emergence of new offerings, and creation of new knowledge. These activities lead to increased diversity and improved reach across industrial domains. Table 1 summarizes orchestration for efficiency, development, and innovation and platform types they are most suitable for.

Table 1 Orchestration of internal, industry-wide, and inter-industry platforms

Orchestration mode	Efficiency	Development	Innovation
Platform type most suitable	Internal platform	Industry-wide platform (open/closed)	Inter-industry platform
Value co-creation logic	Mechanistic, supplier-buyer deals. Value co-production	Organic, ongoing dialogue. Value co-learning and co-elevation	Chaotic, self-organizing. Value co-invention and co-experiencing
Interdependencies	Contractual, transaction-based	Reciprocal	Trust-based
Sources of synergy	Lowering transaction costs, bundling offerings	Incremental improvements, co-elevation of capabilities	Novel offerings
Growth pattern	Repeated transactions leads to platform efficiency	Retention of participants leads to platform robustness	Innovation activities lead to more platform diversity and reach
Orchestration processes (e.g.)	Facilitate transactions, manage reliability, use of existing knowledge	Facilitate long-term reciprocal interactions, retention and refining of knowledge	Emergence of new offerings, facilitate ad hoc interactions, creation of new knowledge

Discussion

Digital service platforms are changing structures of our society and economy. Service platforms are orchestrators of platform ecosystems, and the ecosystems are interconnected as participants contribute to several ecosystems. Platform ecosystems are competing against each other for end users and participants, and today's platform leaders may be quickly dethroned tomorrow (McIntyre and Srinivasan 2016; Suarez and Kirtley 2012). To attract and lock-in end users, platform owner's ability to renew the offering is essential in competition. As soon as the ecosystem stops evolving, the offering becomes static, and the platform becomes a target of envelopment (Tiwana 2014). This distinguished, for example, Myspace from Facebook in the social media industry and Napster from Spotify in the music industry. However, also some core elements are needed for participants to stick with the platform owner: accumulated historical user data and operational efficiency are important in attracting and locking-in end users.

The platform literature up until now is technology oriented and does not fully explain the platform ecosystem phenomenon. Until recently, platforms have been mainly approached from the management of technology point of view, and platform strategies have been studied mainly from the point of view of managing the supply side of the platform (Lusch and Nambisan 2013). In the digital service platforms, many of the value co-creation processes are of a social kind and provide intangible value and experiences for end users instead of technological performance and clearly measurable value for suppliers.

Based on existing definitions of platforms (Gawer and Cusumano 2014), we presented four platform categories, out of which the inter-industry platform, being open for participants to enter and focusing the ICT investments towards front end in addition to back end, is typical for those platforms that integrate horizontally across industry divides and eventually become global successes. One conclusion of this chapter is that the inter-industry platform type should be treated as a separate category in addition to internal and industry-wide open or closed platform categories. It was stated that internal platforms should be orchestrated for efficiency, industry platforms for development, and inter-industry platforms for innovation.

Successful platforms should engage in orchestration processes of all these modes simultaneously in order to renew their offering and maintain their position in the market. Novel offerings are unlikely to emerge without a high amount of inter-participant collaboration that requires a superior front end for the digital platform. Similarly, highly efficient transactions require a known set of participants and attention to back-end processes. Platform system architecture should include elements of all four above-mentioned platform types, internal, industry-wide open and closed, and inter-industry platform, and it should simultaneously orchestrate processes that aim for efficiency, development, and innovation. Figure 2 presents a conceptual model of the platform orchestration loop.

The idea of the platform orchestration loop is that different orchestration processes result as a self-enforcing loop leading to platform evolution and growth. The loop goes from loose coupling between the platform participants to tight coupling and from value constellation creation to executing the value network (Lusch and Nambisan 2013; Ramirez 1999). Novel offerings for end users emerge or, from the point of view of an outside observer, self-organize in the interfaces between industry domains. These novel offerings attract end users to the platform, and as the end users consume the offerings, transactions are facilitated. Efficient transactions further lock-in end users. As end users are being locked-in, the feedback from the users is likely to set ground for the next round of platform renewal as novel offerings emerge again. In a platform capable of sustaining its market position over time, value constellation that is co-produced in the efficiency orchestration mode is combined and co-elevated in the development orchestration mode and co-invented in the innovation orchestration mode (c.f. Ramirez 1999).

Platform entry affects the amount of ad hoc collaboration between the participants. As ad hoc collaboration activity increases, the complexity of knowledge is also increased. Novel offerings and related value constellation emerge when these two factors are present. Clever investments in ICT supporting this and innovation orchestration result in the highest potential synergies. As soon as the value constellation organizes itself and the end users are attracted to co-produce it, the operating mode of the platform changes to the mode of efficiency, and executing the transaction becomes more or less routine activity for the participants of value constellation. In this case, ICT investments in back-end processes and efficiency orchestration create steady income for the platform.

In this chapter, we theorized four service platform types and three platform ecosystem orchestration modes. It can be concluded that the most successful digital

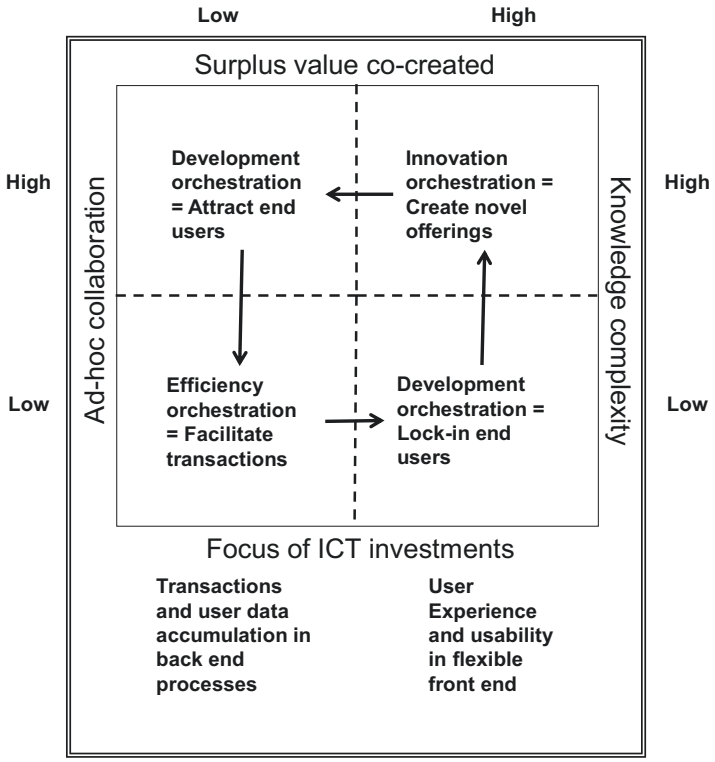

Fig. 2 Platform orchestration loop

service platforms are ambidextrous: they not only manage to empower third parties to innovate novel offerings but also pay attention to efficiency of transactions and incremental development.

Acknowledgement This research has received financial support from the European Union Horizon 2020 Programme under grant agreement no. 688203.

References

Alstyne, V., Eisenmann, T., Parker, G., & Van Alstyne, M. (2011). Platform envelopment. *Strategic Management Journal, 32*(May 2007), 1270–1285.

Armstrong, M. (2006). Competition in two-sided markets. *The Rand Journal of Economics*. http://onlinelibrary.wiley.com/doi/10.1111/j.1756-2171.2006.tb00037.x/abstract

Bertalanffy, L. V. (1969). *General system theory; Foundations, development, applications*. New York: G. Braziller.

Ceccagnoli, M., Forman, C., Huang, P., & Wu, D. J. (2012). Cocreation of value in a platform ecosystem: The case of enterprise software. *MIS Quarterly, 36*(1), 263–290.

Chandler, A. D. (1962). *Strategy and structure: Chapters in the history of the industrial enterprise*. Cambridge: MIT Press.
Checkland, P., & Scholes, J. (1990). *Soft systems methodology in action*. New York: Wiley.
Chesbrough, H. (2011). *Open services innovation*. San Francisco: Jossey-Brass.
Cusumano, M. A., & Gawer, A. (2002). The elements of platform leadership. *MIT Sloan Management Review, 43*(3), 51–58.
Davies, M., Pitt, L., Shapiro, D., & Watson, R. (2005). Betfair.com: Five technology forces revolutionize worldwide wagering. *European Management Journal, 23*(5), 533–541.
Desjardins, J. (2017). RANKED: The most valuable brands in the world. *Business Insider.com*. http://www.businessinsider.com/most-valuable-brands-ranked?r=US&IR=T&IR=T
Dhanaraj, C., & Parkhe, A. (2006). Orchestrating innovation networks. *Academy of Management Review, 31*(3), 659–669.
Eisenmann, T. R. (2008). Managing proprietary and shared platforms. *California Management Review, 50*(4), 31–54.
Eisenmann, T. R., Parker, G., & Van Alstyne, M. (2008). Opening platforms: How, when and why? *Harvard Business School Working Papers*, 09–030.
Evans, D., Hagiu, A., & Schmalensee, R. (2005). A survey of the economic role of software platforms in computer-based industries. *CESifo Economic Studies, 51*(2–3), 189–224.
Gawer, A., & Cusumano, M. A. (2002). *Platform leadership: How Intel, Microsoft, and Cisco drive industry innovation*. Boston: Harvard Business School Press.
Gawer, A., & Cusumano, M. A. (2008). How companies become platform leaders. *MIT Sloan Management Review, 49*(2), 28–35.
Gawer, A., & Cusumano, M. A. (2014). Industry platforms and ecosystem innovation. *Journal of Product Innovation Management, 31*(3), 417–433.
Gawer, A., & Henderson, R. (2007). Platform owner entry and innovation in complementary markets: Evidence from Intel. *Journal of Economics & Management Strategy, 16*(1), 1–34.
Gueguen, G., & Isckia, T. (2011). The borders of mobile handset ecosystems: Is coopetition inevitable? *Telematics and Informatics, 28*(1), 5–11.
Hänninen, M., Smedlund, A., & Mitronen, L. (2017). Digitalization in retailing: Multi-sided platforms as drivers of industry transformation. *Baltic Journal of Management*, BJM-04-2017-0109.
Hanssen, G. K. (2012). A longitudinal case study of an emerging software ecosystem: Implications for practice and theory. *Journal of Systems and Software, 85*(7), 1455–1466.
Iansiti, M., & Levien, R. (2004). Strategy as ecology. *Harvard Business Review, 82*(3), 68–78.
Kijima, K., & Arai, Y. (2016). Value co-creation process and value orchestration platform. In S. Kwan (Ed.), *Global perspectives on service science: Japan*. New York: Springer.
Kilduff, M., & Tsai, W. (2003). *Social networks and organizations*. London/Thousand Oaks: SAGE.
Lusch, R. F., & Nambisan, S. (2013). Service innovation: A service-dominant (S-D) logic perspective service. *MIS Quarterly*. http://air.eller.arizona.edu/docs/papers/2012/Service_Innovation_Lusch_Nambisan.pdf
Maturana, H., & Varela, F. J. (1980). *Autopoiesis and cognition: The realisation of the living*. London: Reidl.
McIntyre, D. P., & Srinivasan, A. (2016). Networks, platforms, and strategy: Emerging views and next steps. *Strategic Management Journal* (in Press).
Moore, J. F. (1996). The death of competition: Leadership and strategy in the age of business ecosystems. *Harper Business*. http://www.getcited.org/pub/100107305
Moore, J. (2006). Business ecosystems and the view from the firm. *Antitrust Bull.* http://heinonlinebackup.com/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/antibull51&section=9
Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Belknap.
Nishino, N., Wang, S., Tsuji, N., Kageyama, K., & Ueda, K. (2012). Categorization and mechanism of platform-type product-service systems in manufacturing. *CIRP Annals – Manufacturing Technology, 61*(1), 391–394.

Normann, R., & Ramirez, R. (1993). From value chain to value constellation: Designing interactive strategy. *Harvard Business Review, 71*(4), 39–51.

Parker, G., & Van Alstyne, M. (2008). Managing platform ecosystems. ICIS 2008 Proceedings. 53. See: http://aisel.aisnet.org/icis2008/53/

Penrose, E. T. (1959). *The theory of the growth of the firm*. New York: Wiley.

Prigogine, I. (1976). Order through fluctuations: Self-organization and social systems. In E. Jantsch & C. H. Waddington (Eds.), *Evolution and eonsciousness: Human systems in transition*. Reading: Addison-Wesley.

Ramirez, R. (1999). Value co-production: Intellectual origins and implications for practice and research. *Strategic Management Journal, 20*, 49–65.

Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest and the business cycle* (2nd ed.). Cambridge, MA: Harvard University Press.

Schumpeter, J. A. (1942). *Capitalism, socialism and democracy*. London: Unwin University Books.

Scott, W. R. (2003). *Rational, natural, and open systems* (5th ed.). Upper Saddle River: Prentice Hall.

Smedlund, A. (2009a). *Network approach to fundamental tasks in knowledge-based organizations.* Dr. Sc. dissertation, Helsinki University of Technology, Faculty of Information and Natural Sciences, Department of Industrial Engineering and Management. http://lib.tkk.fi/Diss/2009/

Smedlund, A. (2009b). Social network structures for explicit, tacit and potential knowledge. *International Journal of Knowledge Management, 5*(1), 78–87.

Smedlund, A. (2012). Value cocreation in service platform business models. *Service Science, 4*(1), 79–88.

Ståhle, P., Ståhle, S., & Pöyhönen, A. (2003). *Analyzing dynamic intellectual capital: System-based theory and application* (Acta Universitatis Lappeenrantaensis 152). Lappeenranta: Lappeenranta University of Technology., http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Lappeenrannan+teknillinen+yliopisto#9

Suarez, F. F., & Kirtley, J. (2012). *Dethroning an established platform dethroning an established platform*, 53(53414).

Tee, R., & Gawer, A. (2009). Industry architecture as a determinant of successful platform strategies: A case study of the i-mode mobile internet service. *European Management Review, 6*(4), 217–232.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. (N. E. Al, Ed.) *Strategic Management Journal, 1350*(August), 1319–1350.

Thomas, L. D., Autio, E., & Gann, D. (2014). Architectural leverage: Putting platforms in context. *The Academy of Management Perspectives, 28*(2), 198–219.

Tiwana, A. (2014). *Platform ecosystems: Aligning architecture, governance, and strategy*. Waltham: Morgan Kaufmann.