

PLATFORMIZERS, ORCHESTRATORS, AND GUARDIANS: THREE TYPES OF B2B PLATFORM BUSINESS MODELS

Paavo Ritala

Professor of Strategy and Innovation
LUT University, Business School
P.O. Box 20, FI-53851 Lappeenranta
FINLAND
ritala@lut.fi

Marin Jovanovic

Associate Professor of Operations Management and Managerial Economics
Copenhagen Business School, Department of Operations Management
Solbjerg Pl. 3, 2000 Frederiksberg
DENMARK
mjo.om@cbs.dk

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Abstract

This chapter develops a typology of B2B platform business models. B2B platforms can be divided into three types depending on the nature of the platform market structures they enable. (1) *The product-service platformizer* business model creates a platform-like interface on top of a product or service and helps bring in production-side complements to join the focal firm's value proposition. (2) *The platform ecosystem orchestrator* opens a multi-sided market on top of a B2B product-service value proposition and enables customers to select complements from an ecosystem. (3) *The platform market guardian* creates an open or semi-open platform marketplace for other B2B firms to transact products or services. For each type, we discuss and illustrate the B2B firm's value creation and capture logic, platform governance, and platform architecture characteristics.

Preface

The game-changing impact of B2B platform business models cannot be overstated as we approach the next decade. The B2B platform markets are experiencing an unprecedented surge in revenue, transactions, and participation by firms, fuelled by the accelerating digitalization and automation of business processes. B2B platform business models will be the ultimate tool for firms to connect, collaborate, and transact with one another, becoming the cornerstone of future business growth. The emergence of B2B platform ecosystems and B2B marketplaces is a game-changer for many industries as they offer access to a diverse range of complementors and customers – enabling radically new types of modular and connected value propositions. Technological advancements such as data analytics and artificial intelligence will add a new dimension to B2B platform offerings, catering to the ever-evolving customer needs. B2B platform owners are currently in the process of developing specialized ecosystems and marketplaces with the aim of strengthening their competitive position in industries such as healthcare, manufacturing, and logistics. Furthermore, certain B2B platform owners are committed to creating innovative B2B platform ecosystems that surpass the boundaries of specific industries, akin to the highly successful Amazon Marketplace and Google Play models. In light of the transformative potential of B2B platforms, it is imperative that any B2B firm striving to maintain competitiveness in the forthcoming decade to embrace the potential of B2B platforms.

1. INTRODUCTION

Digital technologies, especially digital platforms, have been the main driver of business model innovation in B2C markets for some time (Cennamo, 2021; Zhao et al., 2020). Platform business models¹ are particularly attuned to wide audiences with heterogeneous needs, such as consumers of music (Spotify), mobility (Uber), and entertainment (Netflix). The most iconic examples of platform business models are embedded in the software platform ecosystems of Google and Apple, which serve almost all types of customer needs (Karhu et al., 2020). Such platform ecosystems are characterized by a winner-take-all approach and powerful indirect and direct network effects (Cusumano et al., 2019). Overall, the literature on platforms in the B2C area has started to consolidate and mature across different disciplines (Rietveld and Schilling, 2021). The broad excitement around B2C platforms has, however, led to overlooking another important trend – the increasing emergence of successful platform business models in B2B markets. In fact, various types of platform business models have become of strategic importance to industrial technology providers (e.g., ABB Ability, Siemens’s Mindsphere), construction equipment industry leaders (e.g., Volvo Connect), industrial software providers (e.g., AppExchange by Salesforce), maritime firms (e.g., Kongsberg’s Kognifai), sustainable energy providers (e.g., Vestas’s Covento), and in many other industries.

¹ Throughout this chapter, we refer to “platform business models” when discussing different types of business models that operate on a digital platform. We use this as a generic term that encompasses all B2B models that involve a platform-like feature (we distinguish the three types later in the chapter).

The potential of B2B platform business models is massive (Ziegler et al., 2022). Many industry leaders have realized that even the capital intensive and high-technology firms are no longer best operated in a vertically integrated silo-organizations (Holgersson et al., 2022; Khanagha et al., 2022). Rather, firms are looking for new ways to attract different actors beyond the typical B2B partnerships, and fundamentally “change the game” for industrial incumbents and their business models (Jacobides, 2022). The benefits of platform and ecosystem approaches are increasingly available, as digital technologies and interfaces allow B2B firms engage with larger and more varied number of external actors (Daymond et al., 2022; Gawer, 2021). For instance, many B2B firms are pursuing to emulate the success of consumer platforms such as Apple’s Appstore in the attempt to attract innovative and valuable complementors to their offerings. Interestingly, this approach has started to bear fruit not only with digital-only B2B firms (such as with SaaS providers like Salesforce), but also with firms that develop and deliver tangible offerings. A typical example is a firm that has a competitive customer value proposition in the form of a product-service bundle which involves various sensors and software (Jovanovic et al., 2022b). For instance, Volvo provides construction equipment and Metso Outotec provides mining equipment to large industrial customers. Instead of capitalizing on digital capabilities of such smart products internally, Volvo and Metso Outotec unlocked a platform business model where different complementors may connect to their platforms via APIs and provide new functionalities to their value proposition, also allowing customers to choose from those functionalities. Here, the industrial incumbents would be moving to a fully-fledged platform ecosystem model where complementors unlock innovations and the customer’s value grows as their ability to use the value proposition improves². Some other B2B firms, as we will discuss more in detail later in this chapter, have pursued to build platform marketplaces (Lanzolla and Frankort, 2016) that lead to the elimination of intermediaries from electronic value chains (Giaglis et al., 2002). For instance, Firms such as Vestas and Floow2 have set up multisided platforms for other B2B firms to transact different types of resources and materials in an efficient manner.

Indeed, we are witnessing a surge of new B2B platform business models and the expectation is that this market will grow rapidly in the coming years. A report by Research and Markets estimates that the global business-to-business platform market size is estimated to reach USD 25.65 trillion by 2028, expanding at a CAGR of 18.7% from 2021 to 2028. However, despite the increasing interest in the area and the potential benefits that have already been identified (Anderson et al., 2022; Jovanovic et al., 2022b; Pattinson et al., 2022), the B2B platform literature is still very much in its infancy. On one hand the real-world emergence of platform ecosystems in the B2B context is slow (Jovanovic et al., 2022a), and industrial firms experimenting with platform business models are struggling to build full-fledged platform ecosystems and related growth dynamics (Falk and Riemensperger, 2019). On the other hand, there is significant heterogeneity of B2B industrial relationships, which also implies a narrower

² We use Volvo and Metso Outotec here as an aspirational illustration of the platform trajectory of large B2B firms. However, while both Volvo and Metso Outotec have “smart connected products”, neither of the firms are so far operating in full-fledged platform ecosystem model as envisioned here.

scope of B2B platform ecosystem and platform market dynamics that go beyond the winner-take-all strategies witnessed in the B2C context (McIntyre, 2019; McIntyre et al., 2021). Indeed, building platform business models in B2B entails challenges related to the configuration of value creation, value delivery, and value capture mechanisms, both internally and in relation to the emerging platform ecosystems (Böttcher et al., 2022; Volberda et al., 2021). For instance, there are challenges regarding the role of the prospective platform owner, the ecosystem partnering strategy, platform architecture, platform governance and engagement, and success metrics (Jacobides, 2022). Further challenges include the fact that that complementary firms joining B2B platforms might have a competitive relationship or a major bargaining power in relation to the platform owner (Yrjölä et al., 2023). In general, partnerships in B2B markets are characterized by high capital intensity, heterogeneity, transaction costs, and uncertainty (Kostis and Ritala, 2020), thus reducing the possibilities for quick scaling of platform ecosystems (Jovanovic et al., 2022b). Therefore, the prospective platform owners need to address challenges on both the supply and demand sides of its platform business model that involves substantial amounts of complexity and uncertainty (Bonina et al., 2021; Lanzolla and Markides, 2021).

B2B firms do not often create platforms from the scratch, but build those within or on top of their existing offerings. In other words, “platformization” is taking place in B2B markets with firms engaging in the development of platform-based meta-organizations and other novel organizing forms (Gulati et al., 2012; Kretschmer et al., 2022). Yet, we still know little about how the process of platformization unfolds for B2B firms (Jacobides, 2022). Platformization challenges B2B firms to undertake novel reconfigurations across value creation, value delivery, and value capture (Snihur and Eisenhardt, 2022), leading to multiple and often conflicting business models (Visnjic et al., 2022). Furthermore, it has been shown in practice that B2B platforms are not a “winner-takes-all” game, but rather fragmented, heterogeneous, and organically developing field (Ziegler et al., 2022). Therefore, applying a holistic and evolutionary perspective of B2B platform business models is a major untapped opportunity (Hanelt et al., 2021), given the potential generativity benefits available in the platform markets (Thomas and Tee, 2022).

This chapter develops a framework supported by examples of three types of B2B platform business models with gradually increasing levels of platformization. First, we identify the *product-service platformizer*. This business model involves a platform-like logic on the supply side of the B2B firm, in which different complementors may contribute to the core of the platform owner’s product-service offering (cf. contributors, Bonina et al., 2021). However, this business model does not yet unlock the customer side (e.g., demand side) of a platform market, so the integration of complementors remains the duty of the platform owner firm. An example of a product-service platformizer is the way many industrial firms approach collaboration with complementors. For instance, KONE has an ecosystem model in which complementors can experiment with KONE APIs (Application Programming Interfaces), and work with KONE to find the most feasible solutions that can be offered to the customer base³ (Huikkola et al., 2022).

³ <https://dev.kone.com/api-portal/inspiration/ecosystem>.

Similarly, Volvo Connect allows Volvo to add complementors⁴ like drone manufacturers to improve the functionality of Volvo’s construction equipment in difficult environments like mining and machine fleets optimization (Jovanovic et al., 2022b; Saadatmand et al., 2019). Second, we identify the *platform ecosystem orchestrator* business model, which resembles the archetypal logic used in B2C markets. Here, the incumbent firm opens a platform ecosystem of peripheral complementors by allowing the customer to select from those complementors (Bonina et al., 2021). For instance, Kongsberg’s Kognifai platform helps users of maritime fleets acquire value-added digital complementors like engine propulsion analytics or other vessel and fleet operation management applications. Another example from the software industry is Salesforce AppExchange, which allows users of the Salesforce platform to choose additional applications to complement the core Salesforce B2B software offering. Third, we identify the *platform market guardian* business model, in which the firm creates a separate marketplace in which other B2B can transact (de la Boulaye et al., 2019), and that can involve some products, services, or technologies from the focal firm to support the creation and maintenance of the marketplace. For instance, Floow2⁵ provides sharing marketplaces for matching the supply of and demand for industrial resources (Blackburn et al., 2022).

Our chapter contributes to the nascent B2B platform scholarship and practice. First, we identify different types of B2B platform business models that have fundamentally different logics of value creation and capture, as well as how the platform markets are organized and governed. These results add to the ongoing discussion on value creation and value capture in the business model innovation (Sjödín et al., 2020a) and platform business models (Zhao et al., 2020) in B2B markets by unpacking the evolutionary trajectory of B2B platform development (Bonina et al., 2021). Second, we identify the key differences between B2B and B2C platforms (Jovanovic et al., 2022b), and use these differences to elaborate on how B2B firms – and especially industrial incumbent firms – can extend their existing resources and capabilities to create new types of platform business models. Relatedly, we also provide insights into the emerging literature on generativity that has mostly focused on B2C context (Thomas and Tee, 2022) by distilling the key generativity components at different stages of platform development in B2B markets. Third, in practical terms, the chapter will help B2B firms and platform orchestrators make choices about platform design (Tura et al., 2018), platform market structure (Cennamo, 2021), and the investments they make on the supply and demand sides of platform business model innovation (Bonina et al., 2021; Lanzolla and Markides, 2021).

⁴ Following the typical conceptualization in the platform literature, we refer to “complementors” when discussing the productive inputs to a platform (e.g., software applications or drones), and to “complementors” when discussing the firms providing those complementors.

⁵ <https://www.floow2.com/about-us.html>.

2. PLATFORMS, ECOSYSTEMS, AND BUSINESS MODEL INNOVATION IN B2B MARKETS

Digital transformation touches on organizational processes and structures and enables setting up platforms and ecosystems that reconfigure value creation and capture opportunities (Dąbrowska et al., 2022). The emergence of platforms and ecosystems has resulted in the expansion and dissolution of previously well-delineated supply chain activities, opening up the realm of digital competition (Jacobides, 2022) and expanding B2B collaborations across industry boundaries (Aarikka-Stenroos and Ritala, 2017). Ecosystems and platforms create a loosely coupled logic in which participants are simultaneously interdependent and independent and that challenges existing ideas about what is the best way to organize (Jacobides et al., 2018).

Thus far, the literature on platforms and platform business models has been dominated by B2C examples, so the main theoretical arguments fit best with B2C contexts (Cennamo, 2021; Rietveld and Schilling, 2021). B2B platforms are likely to include some similar features acknowledged in the existing platform literature, such as the existence of network effects in relation to the quality and heterogeneity of complementors (Boudreau et al., 2022; McIntyre and Srinivasan, 2017), the distinctive role of a platform owner (or orchestrator) (Thomas and Ritala, 2022), and the generative value of the B2B platform and associated ecosystem (Thomas and Tee, 2022). However, there are also major differences between the two contexts. First, the platform architecture in B2B markets are often built gradually as B2B actors are well aware of the captive power of the focal platform, which subsequently involves resource intensive orchestration by the platform owner that includes dyadic contracting with a limited number of complementors (Ceccagnoli et al., 2012; Jovanovic et al., 2022b) with potentially large bargaining powers and variety of competitive positions (Yrjölä et al., 2023). Consequently, both direct and indirect network effects are significantly weaker in B2B markets, implying that the rapid platform market growth and winner-take-all platform strategy used in B2C markets are unlikely to occur (McIntyre, 2019; Ziegler et al., 2022). Second, B2B markets often include tangible assets like industrial machinery, industrial sites, and a variety of raw materials and components. As the number of these assets is high and their nature is often capital intensive, they are usually controlled by a few industry-specific players making their mobility less dynamic than in B2C markets. Still, the potential upside is the emergence of sensors and Internet of Things (IoT) technology, which allows for greater connectivity to industrial assets and opens the door to the creation of platform ecosystems in B2B markets (Karttunen et al., 2021; Pushpanathan and Elmquist, 2022).

One unifying foundation that portrays both B2C and B2B platforms is the recognition that digital platforms are essentially meta-organizations (Blackburn et al., 2022; Chen et al., 2022; Kretschmer et al., 2022); that is, organizations comprised of autonomous organizations (Gulati et al., 2012). A meta-organizational structure means that platform owners need to build incentive structures, technological interfaces, and other governance mechanisms to organize the inputs from different complementary actors (Blackburn et al., 2022). In B2B markets, this requires iterative multilateral negotiations, contracting, and a variety of trials to set up platform

ecosystems with valuable complementors. This development can lead to platform ecosystems, in which industrial firms gradually evolve into meta-organizations that “(1) federate and coordinate constitutive agents who can innovate and compete, (2) create value by generating and harnessing economies of scope in supply or/and in demand, and (3) entail a modular technological architecture composed of a core and a periphery” (Gawer, 2014, p. 1240).

The early contributions to B2B platform research provide evidence of how platformization transforms B2B business models in different ways (Benbya et al., 2020). Emerging evidence also shows that B2B firms are struggling to create and scale workable platforms and platform ecosystems (Falk and Riemensperger, 2019). Given the relative novelty of the phenomenon, and the emergent nature of B2B platforms on top of existing businesses, research has often focused on early phases of B2B platform development or to organizational transformations towards platform logics. For instance, the processes of platform and ecosystem emergence, transition, and evolution have garnered significant scholarly attention (Daymond et al., 2022). For instance, Sandberg et al. (2020) conducted a longitudinal case study of digital transitions phases at ABB and argued that different stages have inherently different platform organizing logic, while Jovanovic et al. (2022) demonstrated in a multiple case study that industrial firms move from product platforms toward full-fledged platform ecosystems. Pushpanathan and Elmquist (2022) describe a case where Volvo autonomous driving technology platform started to gradually involve platform ecosystem features. Jääskeläinen et al. (2021) analyzed a longitudinal case in the media industry where an established news agency opened a platform market for one of its products, thus transforming a legacy business model into a platform business model. Khanagha et al. (2022) explored how Cisco simultaneously participated as complementors in the Cloud platform and a platform owner in the Fog platform. Similarly, Tian et al. (2022) present a sequential and simultaneous business model adaptation path for developing a platform business model. Overall, the emerging evidence in the B2B platform literature points out different levels of platformization, a notion that serves as the starting point for the remainder of this chapter, in which we identify different types of B2B platform business models.

3. THREE TYPES OF B2B PLATFORM BUSINESS MODELS

The aforementioned foundations related to meta-organizational features of B2B platforms, specifically platform architecture and platform governance, and the trajectory of platformization, help us to characterize different platform business models in B2B markets. We identify different platform business models in relation to various evolutionary stages of platform ecosystem development (Gawer, 2009, p. 59). Using a number of empirical examples, we expect that many B2B platforms are first trialed as core platform architecture development with various complementors on the production side that is tightly coupled with the platform owner’s value proposition. We call this phase the *product-service platformizer*. The second stage is the *platform ecosystem orchestrator*, in which customers can select peripheral complementors to platform owner’s ecosystem value proposition, orchestrated by the platform owner. Finally, the third stage, the *platform market guardian*, creates a marketplace for B2B firms that is operated by the platform owner, but the added value is generated through the

exchange of supply and demand with other firms in the marketplace, with the focal firm playing a variety of roles. Table 1 summarizes these types; we discuss and provide examples of each in greater detail below.

	Product-Service Platformizer	Platform Ecosystem Orchestrator	Platform Market Guardian
Platform business model transformation	Opening access for complementors to co-create a joint platform value proposition that is tightly coupled by the platform owner	Opening a multisided platform with two ecosystem value propositions: one for complementors and one for customers	Creating an open or semi-open marketplace for B2B actors' transactions, partially or completely disconnected from the platform owner's operations
Platform Business Model			
Value creation	Improved focal firm's B2B offering by integrating core complementors' inputs to existing product-service bundles (e.g., specialized platform services)	Generative ecosystem with peripheral complementary inputs that add to the platform owner's ecosystem offering (e.g., advanced optimization and autonomous solutions)	Open or semi-open marketplace for industry-level competition and collaboration (e.g., an industry materials exchange platform that is neutral and accessible to all participants)
Value capture	Bundling complementary products and services into an integrated B2B offering with different pricing schemes (e.g., tiered pricing, usage-based pricing, dynamic pricing)	Capturing the focal part of ecosystem value via profit split among B2B partners or increasing customer willingness-to-pay for the overall ecosystem value proposition	Charging a fee for the platform marketplace transactions and/or platform use Indirect benefits via future market growth or serving existing business model by bringing in new customers
Platform Ecosystem			
Platform architecture	Core platform architecture Leveraging modularity (e.g., APIs and interfaces)	Core and peripheral platform architecture Open APIs and interfaces Data aggregation (e.g., different complementors' data contributions)	Core, peripheral, and distributed or decentralized platform architecture Ensuring platform data neutrality in relation to efficient search and matchmaking
Platform governance	Accumulating innovative and specialized complementors on the production side and securing or contracting intellectual property rights aligned with the proprietary platform	Accumulating a wide range of complementors while ensuring that platform governance is based on value-adding data-driven contributions	Market-based governance that balance the supply and demand sides of the platform market with additional contractual and relational governance when needed

Table 1. Platform business model archetypes in B2B markets

3.1 Product-Service Platformizer

First, the product-service platformizer describes a model in which a firm focuses on the production side partnerships of the platform business model. Often, this relates to the building of platform-based smart solutions that augment its products and services (Kohtamäki et al., 2022; Raff et al., 2020). In the literature the production- or supply-side partners have been called contributors (Bonina et al., 2021) or complementors (Adner, 2017), with the common feature being that they add value to the focal firm's value proposition in the eyes of the customer.

The product-service platformizer business model typically emerges by increasing possibilities to engage with digital partnerships (Sjödin et al., 2022) on the production side of incumbent firms (Subramaniam, 2022). This development is in line with the more general and well-known multilateral B2B partner engagement process (Reinartz and Berkmann, 2018; Vivek et al., 2022) that includes establishing unique partnerships among different B2B actors in relation to the focal firm's business model (Pauli et al., 2021). In the product-service platformizer business model, the B2B partnerships are plugged in via digital interfaces that resemble the functionality of a platform while retaining the focal firm's governance and control over partner selection and the substance of the collaboration, an approach that is similar to classic B2B partnerships.

Value creation frequently starts with the installation of a wide range of sensors (e.g., motion, environmental, level, optical etc.) that allow the connectivity of industrial assets to the platform (Subramaniam, 2022). Through such sensors, monitoring and visualizing different product- and service-related processes unlock the initial complementary features to existing B2B offerings. As they become more digitally mature, firms often combine different streams of data and identify patterns that allow higher-order value creation to their customers, such as industrial optimization services. The concept of value capture refers to the ability of firms to generate revenue from its products or services. One way that firms can capture additional value is by bundling existing products and services with new offerings. Another strategy for value capture is to offer new services for free, but with the expectation that customers will eventually purchase other products or services from the firm (e.g., free trials). Finally, firms may adopt a subscription-based pricing model for their products and services. In this model, customers pay a recurring fee for access to a product or service over a set period of time (e.g., monthly or annually). By extending the contract timeframe in this way, firms can capture additional value from their customers and build predictable revenue streams (Visnjic et al., 2018).

While it is possible to build a platform architecture from scratch, it is often challenging for a focal firm to develop adequate digital capabilities internally. More frequently, firms seek a partnership among large software providers (such as Microsoft or Amazon cloud services) or specialized technology providers to develop the required level of platform architecture. In either case, the platform architecture focuses on enabling modularity and related scalability (Holgersson et al., 2022) to the core product-service value proposition. In terms of platform governance, the product-service platformizer archetype often emerges as a proprietary platform

(closed) where intellectual property rights are carefully guarded (Eisenmann, 2008). Therefore, a relationship with production-side complementors is often set up under strict non-disclosure and collaboration agreements. Finally, the complementor visibility to customers is limited due to tight coupling with the focal firm's product-service bundles.

A good example of a product-service platformizer is Volvo Connect, a bundle of connected B2B services and technologies offered by Volvo. It allows the firm's customers to access a range of services and dashboards through the Volvo On Call app, including real-time traffic status, remote start, climate control, and the ability to locate and lock a vehicle. The Volvo Connect also includes services for fleet management, such as fuel tracking and maintenance alerts. Moreover, Volvo is engaging with drone manufacturers in mining for a variety of purposes, such as conducting inspections, surveying mine sites, and even remote operation of equipment. Additionally, drones can provide a safer and more efficient way to perform certain tasks in the mining industry. For instance, they can be used in the development of tunnels in mines and in the analysis of conditions and security prior to sending in personnel. By tightly coupling core complementors into the Volvo Connect product-service bundle, the firm is able to effectively use the platform-like complementarities in its value proposition while keeping a close watch on the overall business model and the quality of its products and services.

3.2 Platform Ecosystem Orchestrator

Second, the platform ecosystem orchestrator archetype establishes a platform ecosystem (Kretschmer et al., 2022) via multilateral B2B partnerships (Jovanovic et al., 2022b). Like in the first type, complementor engagement represents a critical activity for the success for the focal firm (Saadatmand et al., 2019). However, here the focal firm uses open APIs or other interfaces to allow peripheral complementors to innovate on top of its existing value proposition; it thus represents the classic understanding of a modular ecosystem (Adner, 2017; Jacobides et al., 2018).

The key value creation challenge for platform ecosystem orchestrators is to establish a double ecosystem value proposition that creates value for customers and for ecosystem complementors (Jacobides, 2022; Jarvi et al., 2010). In B2B markets, the offering is often complex, such as 5G connectivity solutions for various applications, improving the efficiency of people flow, optimizing multi-vendor fleet management, or maximizing materials extraction in mining. In those cases, complementors are specialized industrial or software firms that are certified and visible to customers (Ceccagnoli et al., 2012). Therefore, a complex solution is underpinned by a platform ecosystem. More importantly, expanding the platform ecosystem value to peripheral complementors is as relevant as for customers as the focal solution represent a clear win-win-win for the platform owner, complementors, and customers. The value capture is often resolved as a revenue split between the focal firm and the complementors. However, B2B actors are often aware that their role may change from one project to another, requiring a readjustment of the value capture mechanism for each project (Lingens et al., 2021). Thus, in B2B platforms the value capture logic may not be as standardized as in B2C platforms (such as the typical 30% revenue share model popularized by the Apple app store).

The platform architecture represents a data aggregation from both supply- and demand-side participants that requires a more open platform than the product-service platformizer. Data aggregation includes increased data volume and data variety that may be utilized for developing innovative services (Jovanovic et al., 2022b). Additionally, the focal firm needs to guide and train complementors and customers to integrate specific APIs and co-create platform services. As a result, an agile software engineering approach has become more prominent when developing B2B digital solutions (Sjödín et al., 2020b). Platform governance is extremely important for this archetype, as the focal firm needs the support of a broader range of complementors. Moreover, the focal firm often needs to seek and onboard global or digital-native complementors that may have no connection with the focal firm's experience and knowledge base, requiring the development of mechanisms for knowledge sharing and for contractual and relational governance (Oinonen et al., 2018). Finally, customers often consume products and services from a wide range of vendors, which requires interoperability between and the combination of different platform ecosystems with coopetition-based platform business models (Ritala et al., 2014; Yrjölä et al., 2023).

The platform ecosystem orchestrator archetype is exemplified by Kognifai, an open platform ecosystem developed by Kongsberg, a maritime firm. The purpose of Kognifai is to assist companies in various industries, including maritime, oil and gas, and renewable energy, in collecting, analyzing, and sharing data to enhance their operations and decision-making processes. The platform ecosystem comprises a variety of tools and services for data management, analytics, and collaboration, as well as access to a community of complementors that can assist the platform owner and customers in implementing and realizing the benefits of Kognifai. The Kognifai platform ecosystem operates on top of different vessels and fleets, creating value for a broad range of maritime B2B firms and their customers.

A second example is ABB Ability, which is offered by ABB, a leading technology firm that operates in the fields of energy, automation, and transportation. While ABB Ability represents a proprietary platform (e.g., product-service platformizer), the ABB Ability Building Ecosystem is an open platform ecosystem and is focused on solutions for the building industry, including products and services for building automation, energy management, and other building-related applications. The ABB Ability Building Ecosystem is designed to help building owners and operators improve the performance, efficiency, and sustainability of their buildings by leveraging various complementary applications from the ecosystem.

Finally, B2B software vendors are also increasingly building platform ecosystems on top of their software offerings. Salesforce AppExchange is a typical example of such a model. While Salesforce's enterprise customers enjoy the core software offering, a customer relationship management tool that empowers the support, sales, and marketing teams' operations, AppExchange enables Salesforce to extend its offerings with a large number of complementary applications that enterprise customers can purchase from a dedicated app store. Effectively, Salesforce has turned itself from a software-as-a-service firm into a full-fledged platform ecosystem orchestrator.

3.3 Platform Market Guardian

Finally, the platform market guardian refers to a separate platform market structure (such as a marketplace or decentralized data platform) set up by a focal firm who may be the platform's owner to serve the needs of a whole industry or industry segments (Blackburn et al., 2022; Jovanovic et al., 2022a). In the B2B context, firms are often reluctant to share any sensitive information, especially through technology suggested by a platform owner that may be a potential rival. For instance, due to data security concerns, a centralized database may not be the best approach to building an industry platform. Therefore, we are witnessing an increasing amounts of B2B platform marketplaces that are effectively separated from the platform owner that established them (thus the “guardian” reference) or loosely connected to the platform owner's core technologies, products, or services.

Value creation and value capture are derived from the typical two-sided platform economics comprised of buyers and sellers (Parker et al., 2016). Buyers and sellers gain access to one marketplace, where ideally the products and services are accessible – and neutral in terms of competitive tensions – to an entire industry or beyond. Such platforms increase transparency around terms, products, and services and enhance efficiency across product and services transactions. Value capture is achieved by charging a fixed fee, earning commissions from buyers and sellers on the market, or adopting the “generative appropriability” approach (Ahuja et al., 2013), in which future profits and opportunities for the platform market guardian come indirectly. Examples of such future benefits include increased support for the platform owner's technologies and product-service portfolios or attracting in new customers.

Platform architecture and governance are determined by the platform market guardian, often in collaboration and coordination with other industry players (e.g., consortium). Ensuring platform owner neutrality is the critical aspect and often involves advisory boards representing the major players on such platforms (Jovanovic et al., 2022a). In fact, given the heterogeneity of B2B markets, platform market guardians often need to adopt additional contractual and relational governance processes to ensure the smooth adoption of a platform market and effective matchmaking, which goes well beyond the typical B2C multi-sided platforms. Additionally, platform regulation, standardization and interoperability may enhance the adoption of such platforms (Cusumano et al., 2021; Jacobides and Lianos, 2021).

The aftermarket of the renewable energy sector, comprising of spare parts, components, and consumables, is often fragmented across different vendors and technologies. Vestas Covento aims to address this issue by providing a two-sided platform that facilitates connections and collaborations between buyers and sellers within the renewable energy landscape. The platform aims to increase transparency and efficiency in transactions related to parts and services. By providing a single platform for buyers and sellers, search costs are significantly reduced. Additionally, the platform has the potential to expand to other segments of the renewable energy industry such as solar, storage, and power-to-x technologies, ultimately contributing to the growth of the sustainable energy sector as a whole. It is worth noting that while Vestas

initiated the development of the Covento platform, it also participates as both a buyer and a seller on the platform. This serves as an example of how a company can successfully create a functioning platform marketplace in which it also participates as a customer.

In the context of a circular economy, many interesting B2B platform marketplaces are emerging (Blackburn et al., 2022). For instance, Floow2 involves B2B firms exchanging their industrial (often excess) resources in a platform marketplace that matches supply and demand. Such B2B platforms require substantial amounts of work from platform market guardians and core platform users, given the initially underdeveloped markets for exchange of highly specific industrial resources and materials.

An interesting example is the recently discontinued TradeLens, a global shipping platform developed by IBM and Maersk, aimed to improve the efficiency and transparency of the global supply chain through the integration of blockchain technology (Jovanovic et al., 2022a). The platform sought to digitize and standardize the exchange of shipping data between various stakeholders, including information regarding vessel schedules, among other logistics data. The incorporation of blockchain technology was intended to provide a secure and transparent method for managing and sharing this information. However, despite its ambition to increase collaboration across the global supply chain, the platform faced challenges with regard to industry-wide adoption and trust, ultimately leading to its discontinuation in November 2022. This example highlights the difficulties associated with implementing a winner-take-all approach to B2B platform design, particularly in terms of concerns surrounding open marketplace neutrality and the potential for captive power within a single platform.

4. Implications for research

4.1 Evolutionary model of platform business model innovation in B2B markets

A key question for B2B firms is whether to consider a platform business model in the first place; after that, the type of platform business model to choose is important, given that this selection will resonate at the different evolutionary stages of the platform ecosystem development (Gawer, 2009, p. 59). In this chapter, we have demonstrated how B2B firms can transform their business models from classical value chains into product-service platformizers, platform ecosystems, and finally, platform marketplaces. The business model transformations required at each step are different and revolve mainly around the structure of a platform market, as well as the production- (e.g., supply-) and demand-side choices regarding the platform governance and platform architecture (Jacobides et al., 2018). At each step, the platform and ecosystem logic can be unlocked to different degrees (Jääskeläinen et al., 2021). The trajectory and the key choices along the way are depicted in Figure 1.

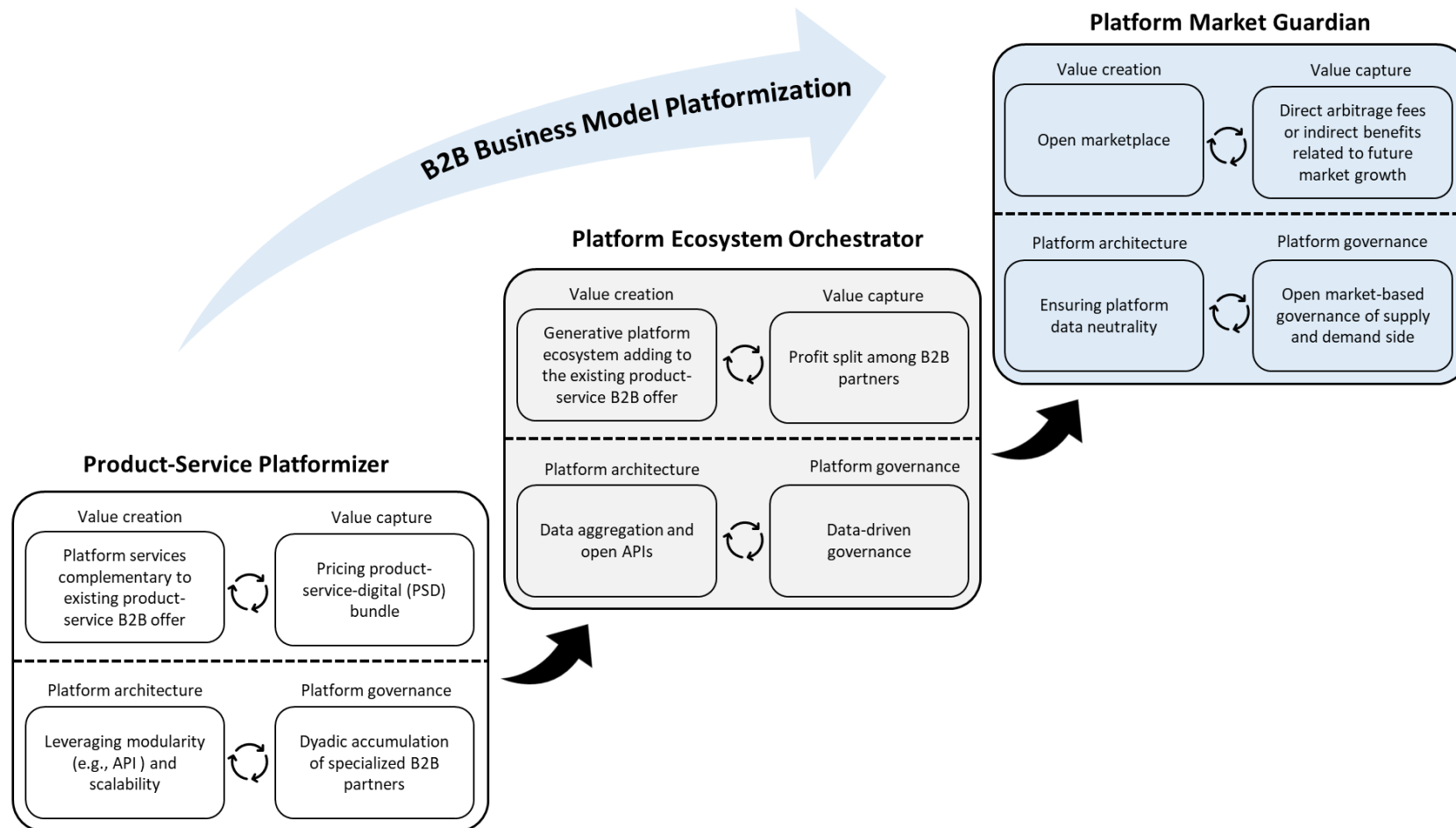


Figure 1. Evolutionary model of platform business model innovation

The product-service platformizer model necessitates the provision of access to production-side complementors. However, this modification alone does not comprise a platform ecosystem, as the various components of the product-service offering are consolidated by the platform owner, and the complementors do not function autonomously (Williamson and De Meyer, 2012). However, the platform owner exhibits characteristics akin to a platform ecosystem in its approach towards engaging with its complementors. The utilization of open and connected APIs, as demonstrated by car manufacturers like Volvo (Pushpanathan and Elmquist, 2022), allows for industrial firms to engage with various complementors and facilitate collaboration, effectively mimicking the production-side complementary innovation commonly observed within platform ecosystems. Next, the platform ecosystem orchestrator model subsequently enables the multi-sided platform ecosystem paradigm, allowing the platform owner's customers to independently select and curate from the various complementors offered within the platform ecosystem. This customer-driven complement selection feature also differentiates ecosystems from traditional value chains (Autio, 2022). Finally, the platform market guardian establishes a marketplace in which the supply and demand are matched and coordinated. In this scenario, an autonomous or semi-autonomous platform market is unlocked. In some cases, the marketplace may be overseen by a guardian who assesses the functionality of the market but does not necessarily intervene in transactions or incorporate them within its own business model.

The evolutionary model also provides insights into the emerging literature on generativity by distilling the key generativity components at different stages of platform development in B2B markets (Thomas and Tee, 2022). In particular, we demonstrate the layered nature of generativity in B2B platform business models, including generative architecture, generative community, and generative governance. Initially, B2B firms may rely on the generative architecture of platforms in which the platform owner actively engages with various complementors that aid in the advancement of the platform core and product-service bundles. Herein, the generative governance in relation to the design of the boundary resource is rather securing than resourcing (Ghazawneh and Henfridsson, 2013). Therefore, the choice to open the platform architecture to carefully selected complementors does not necessarily indicate the establishment of a platform ecosystem. More likely, many industrial firms leverage generative governance to invite complementors via APIs and other interfaces, and subsequently collaborate with the most promising complementors to assimilate new components into their product-service offerings, as exemplified in the case of Volvo Connect. We also pinpoint that B2B firms can extend into broader layers of generativity by using the generative community to attract heterogeneous complementors and establish a multi-sided platform ecosystem. This form of generativity is known to optimize customer choice and diversity within platform markets (Cennamo and Santaló, 2019) and is achievable for many B2B firms to different degrees. The concept of generative community is exemplified in its purest form in software firms such as Salesforce and SAP, which have been demonstrated their ability to serve their customers by opening their own app stores. In other, more asset-heavy B2B settings, establishing a generative community is also possible, as discussed with the example of Kongsberg's Kognifai. However, the generative community can extend into an autonomous

platform marketplace, where the B2B transactions are not necessarily bounded to the product and service offerings of the focal firm, as we demonstrated using the example of Floop2.

4.2 Implications to B2B platform literature

In this chapter, we aim to contribute to the emerging body of literature on B2B platforms by highlighting the distinct characteristics of B2B platforms in comparison to B2C platforms. We have demonstrated that platforms in industrial markets are primarily connected to a set of industrial resources, assets, and capabilities, which serve as the foundation for the platform's business model. Given the capital-intensive nature of these operations, B2B platforms tend to have a smaller number of actors, involve more negotiations and contracting, and exhibit slower growth rates than their B2C counterparts.

An interesting and notable characteristic of B2B platforms is that they often incorporate elements from both innovation and transaction platforms (Cusumano et al., 2019; McIntyre et al., 2021). B2B platforms enable interfirm collaboration and complementary innovations in variety of ways that escape simplistic definitions and categories. Indeed, B2B platforms tend to be highly specialized and make use of advanced technologies and methods to attain maximum levels of innovation (thus resembling innovation platforms). On the other hand, they also possess characteristics commonly found in transaction platforms. These “hybrid features” provide the potential for B2B platforms to minimize transaction and search costs, and ideally, maximize innovation and generativity. First, the transaction cost reduction by B2B platforms is potentially meaningful; for instance, by utilizing APIs, firms like Volvo and KONE have significantly reduced integration costs and enabled seamless data sharing. It should be noted, however, that in the context of B2B firms, a greater degree of negotiation, quality assurance, and contracting is typically required when integrating complementary innovations into product-service bundles, in comparison to B2C platform ecosystems. Second, the search costs for both providers and customers of products and services, may be diminished within the context of B2B platform ecosystems and marketplaces. For instance, Floop2 intermediates industrial resources (Blackburn et al., 2022) and thus reduces search costs for firms trying to obtain (or get rid of) a particular type of material. However, it is expected that the market size will be relatively smaller in the B2B context, thus reducing the advantage of lower search costs for B2B platforms. Third, and as mentioned in the previous section, B2B platforms have the potential to facilitate generative contributions from the platform ecosystem participants, and in some cases, support the build-up of a “generative community” (Thomas and Tee, 2022). The aspect of generativity, however, is yet to show its full potential. Beyond many relatively simple B2B marketplaces and B2B software-as-a-service app stores, generative communities of complementors are rather rare to come by. However, we expect that in the future B2B firms will develop new and more flexible ways to reduce search and transaction costs and increase generativity via their platform business models.

Platform architecture and platform governance (Rietveld and Schilling, 2021) are essential aspects of B2B platforms. Platform architecture determines the underlying design of the

platform. A well-designed platform architecture can enhance security, trust, seamless integration between different actors, which are crucial factors for prospective participants in the B2B markets. Furthermore, the utilization of a platform architecture enables scalability and flexibility, as B2B platforms frequently entail complex and high-volume transactions. Platform governance is also a key feature of B2B platforms but also an extremely complex task. Effective platform governance is crucial in ensuring the smooth operation and efficiency of the platform, its ability to adapt to variations in the number of solution-based complementors, the establishment of trust among actors, and fair and non-discriminatory practices.

Given the specific characteristics of B2B platform markets, including the presence of contractual and relational governance challenges, the high capital intensity of economic exchanges, and the limited scope, it is probable that these markets will not exhibit the winner-takes-all dynamics commonly observed in other platform markets (McIntyre, 2019; Ziegler et al., 2022). Furthermore, these markets may be more susceptible to the competitive strategies and tactics employed by other B2B firms (Karhu et al., 2020; Karhu and Ritala, 2021). However, further research is necessary to operationalize and examine the various types of B2B platform business models in greater detail.

5. Managerial implications

B2B firms are grappling with the question of whether to adopt a platform mindset and open their boundaries to complementary players. One potential strategy is to establish a platform ecosystem model, in which customers can choose from a selection of complementary modules and functionalities. Alternatively, firms may choose to establish their own platform marketplace, which serves the needs of the entire industry or even beyond. These questions are both lucrative and challenging, and it is important for firms to carefully consider their options, opportunities, and challenges before making a decision to invest in platform business models.

Not all industrial firms are well-suited for a platform business model. For instance, firms that specialize in highly specialized technology components, which are always integrated and tailored to the customer's systems, may not draw substantial benefit from a platform model. Instead, these firms may be better suited to adopt a "component strategy" (Hannah and Eisenhardt, 2018) and focus on superior modular innovation with high technological novelty (Habib et al., 2020). However, even in these cases, the offerings may still become embedded in other actors' product platforms, making the platformization of the B2B landscape relevant even for component-focused players. In such cases, firms may focus on developing a strong complementor position within established platform ecosystems (Jacobides, 2022).

Firms that operate products that have embedded software or sensors, often referred to as "smart connected products" (Porter and Heppelmann, 2014; Raff et al., 2020), are fitting for developing a platform business model. The data generated by these products is a valuable resource for complementary innovations and functionalities that can be provided by various complementors. These firms may include other technology firms, but more often than not, complementors from other industries such as large software firms or specialized software firms.

A good way to start the platformization journey is to experiment with APIs and "sandboxes" that allow complementors and, for example, individual app developers to test the functionalities of their add-ons on the product portfolio. Depending on the need for quality control, firms may choose to keep a tight leash on which apps and complementors are allowed on the platform (Rietveld et al., 2019), or alternatively, move towards an app store model, where customers have a greater degree of freedom in choosing from a growing number of ecosystem-based "apps".

Finally, setting up a B2B marketplace is a complex task, but may be a worthwhile endeavor. B2B markets are often quite heterogeneous, and there is likely to be a great deal of variation among potential customers and providers. As such, there is a great deal of "fieldwork" that a platform market guardian must do. Additionally, as some recent major failure cases have shown (such as the closure of the Maersk Tradelens platform), building and maintaining industry-wide B2B platforms can face significant competitive and operational hurdles. The less risky marketplaces may be those that can be operated on sufficiently standardized items, goods, materials, or resources, and which are sufficiently neutral to the marketplace participants' competitive strategies.

6. Conclusion

In this chapter, we have presented a typology that aims to convey the choices that B2B firms make when establishing a platform. The typology is based on the platform market structure and differentiates between product-service platformizers, platform ecosystem orchestrators, and platform market guardians. The three types involve distinct logics for creating and capturing value, as well as crafting platform governance and architecture. Our framework is a valuable contribution to the literature on digital business model and business model innovation, as it illustrates how B2B firms can transform and reconfigure their business models using digital platforms. Additionally, our work makes a significant contribution to the nascent field of B2B platforms, which has thus far been highly idiosyncratic and fragmented. We anticipate that future research will reveal additional types and forms of B2B platforms, beyond those we have described in this chapter. Nevertheless, we believe that our conceptualization provides useful initial steps for understanding how B2B firms can innovate and implement platform business models.

References

- Aarikka-Stenroos, L., Ritala, P., 2017. Network management in the era of ecosystems: Systematic review and management framework. *Ind. Mark. Manag.* 67, 23–36. <https://doi.org/10.1016/j.indmarman.2017.08.010>
- Adner, R., 2017. Ecosystem as Structure: An Actionable Construct for Strategy. *J. Manag.* 43, 39–58. <https://doi.org/10.1177/0149206316678451>
- Ahuja, G., Lampert, C.M., Novelli, E., 2013. The Second Face of Appropriability: Generative Appropriability and Its Determinants. *Acad. Manage. Rev.* 38, 248–269. <https://doi.org/10.5465/amr.2010.0290>
- Anderson, E.G., Lopez, J., Parker, G.G., 2022. Leveraging value creation to drive the growth of B2B platforms. *Prod. Oper. Manag.* n/a. <https://doi.org/10.1111/poms.13866>
- Autio, E., 2022. Orchestrating ecosystems: a multi-layered framework. *Innovation* 24, 96–109. <https://doi.org/10.1080/14479338.2021.1919120>
- Benbya, H., Nan, N., Tanriverdi, H., Yoo, Y., 2020. Complexity and information systems research in the emerging digital world. *MIS Q.* 44, 1–17. <https://doi.org/10.25300/MISQ/2020/13304>
- Blackburn, O., Ritala, P., Keränen, J., 2022. Digital Platforms for the Circular Economy: Exploring Meta-Organizational Orchestration Mechanisms. *Organ. Environ.* 108602662211307. <https://doi.org/10.1177/10860266221130717>
- Bonina, C., Koskinen, K., Eaton, B., Gawer, A., 2021. Digital platforms for development: Foundations and research agenda. *Inf. Syst. J.* 31, 869–902. <https://doi.org/10.1111/isj.12326>
- Böttcher, T.P., Weking, J., Hein, A., Böhm, M., Krcmar, H., 2022. Pathways to digital business models: The connection of sensing and seizing in business model innovation. *J. Strateg. Inf. Syst.* 31, 101742. <https://doi.org/10.1016/j.jsis.2022.101742>
- Boudreau, K.J., Jeppesen, L.B., Miric, M., 2022. Competing on freemium: Digital competition with network effects. *Strateg. Manag. J.* 43, 1374–1401. <https://doi.org/10.1002/smj.3366>
- Ceccagnoli, Forman, Huang, Wu, 2012. Cocreation of Value in a Platform Ecosystem! The Case of Enterprise Software. *MIS Q.* 36, 263. <https://doi.org/10.2307/41410417>
- Cennamo, C., 2021. Competing in Digital Markets: A Platform-Based Perspective. *Acad. Manag. Perspect.* 35, 265–291. <https://doi.org/10.5465/amp.2016.0048>
- Cennamo, C., Santaló, J., 2019. Generativity Tension and Value Creation in Platform Ecosystems. *Organ. Sci.* 30, 617–641. <https://doi.org/10.1287/orsc.2018.1270>
- Chen, L., Tong, T.W., Tang, S., Han, N., 2022. Governance and Design of Digital Platforms: A Review and Future Research Directions on a Meta-Organization. *J. Manag.* 48, 147–184. <https://doi.org/10.1177/01492063211045023>
- Cusumano, M.A., Gawer, A., Yoffie, D.B., 2021. Can self-regulation save digital platforms? *Ind. Corp. Change* 30, 1259–1285. <https://doi.org/10.1093/icc/dtab052>
- Cusumano, M.A., Gawer, A., Yoffie, D.B., 2019. *The Business of Platforms: Strategy in the Age of Digital Competition, Innovation, and Power*, Illustrated edition. ed. Harper Business, New York, NY.
- Dąbrowska, J., Almpantopoulou, A., Brem, A., Chesbrough, H., Cucino, V., Di Minin, A., Giones, F., Hakala, H., Marullo, C., Mention, A., Mortara, L., Nørskov, S., Nylund, P.A., Oddo, C.M., Radziwon, A., Ritala, P., 2022. Digital transformation, for better or worse: a critical multi-level research agenda. *RD Manag.* 52, 930–954. <https://doi.org/10.1111/radm.12531>
- Daymond, J., Knight, E., Romyantseva, M., Maguire, S., 2022. Managing ecosystem emergence and evolution: Strategies for ecosystem architects. *Strateg. Manag. J.* smj.3449. <https://doi.org/10.1002/smj.3449>
- de la Boulaye, P., Erriquez, M., Gener Bago, M., Jiménez Iribarren, A., Russo, F., 2019. How B2B online marketplaces could transform indirect procurement. McKinsey & Company.
- Eisenmann, T.R., 2008. Managing Proprietary and Shared Platforms. *Calif. Manage. Rev.* 50, 31–53. <https://doi.org/10.2307/41166455>
- Falk, S., Riemensperger, F., 2019. Three Lessons From Germany's Platform Economy [WWW Document]. *MIT Sloan Manag. Rev.* URL <https://sloanreview.mit.edu/article/three-lessons-from-germanys-platform-economy/> (accessed 3.19.23).

- Gawer, A., 2021. Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. *Long Range Plann.* 54, 102045. <https://doi.org/10.1016/j.lrp.2020.102045>
- Gawer, A., 2014. Bridging differing perspectives on technological platforms: Toward an integrative framework. *Res. Policy* 43, 1239–1249. <https://doi.org/10.1016/j.respol.2014.03.006>
- Gawer, A., 2009. *Platforms, Markets and Innovation*. Edward Elgar Publishing.
- Ghazawneh, A., Henfridsson, O., 2013. Balancing platform control and external contribution in third-party development: the boundary resources model: Control and contribution in third-party development. *Inf. Syst. J.* 23, 173–192. <https://doi.org/10.1111/j.1365-2575.2012.00406.x>
- Giaglis, G.M., Klein, S., O'Keefe, R.M., 2002. The role of intermediaries in electronic marketplaces: developing a contingency model. *Inf. Syst. J.* 12, 231–246. <https://doi.org/10.1046/j.1365-2575.2002.00123.x>
- Gulati, R., Puranam, P., Tushman, M., 2012. Meta-organization design: Rethinking design in interorganizational and community contexts. *Strateg. Manag. J.* 33, 571–586. <https://doi.org/10.1002/smj.1975>
- Habib, T., Kristiansen, J.N., Rana, M.B., Ritala, P., 2020. Revisiting the role of modular innovation in technological radicalness and architectural change of products: The case of Tesla X and Roomba. *Technovation* 98, 102163. <https://doi.org/10.1016/j.technovation.2020.102163>
- Hanelt, A., Bohnsack, R., Marz, D., Antunes Marante, C., 2021. A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *J. Manag. Stud.* 58, 1159–1197. <https://doi.org/10.1111/joms.12639>
- Hannah, D.P., Eisenhardt, K.M., 2018. How firms navigate cooperation and competition in nascent ecosystems. *Strateg. Manag. J.* 39, 3163–3192. <https://doi.org/10.1002/smj.2750>
- Holgersson, M., Baldwin, C.Y., Chesbrough, H., M. Bogers, M.L.A., 2022. The Forces of Ecosystem Evolution. *Calif. Manage. Rev.* 64, 5–23. <https://doi.org/10.1177/00081256221086038>
- Huikkola, T., Kohtamäki, M., Rabetino, R., Makkonen, H., Holtkamp, P., 2022. Overcoming the challenges of smart solution development: Co-alignment of processes, routines, and practices to manage product, service, and software integration. *Technovation* 118, 102382. <https://doi.org/10.1016/j.technovation.2021.102382>
- Jääskeläinen, A., Yanatma, S., Ritala, P., 2021. How Does an Incumbent News Media Organization Become a Platform? Employing Intra-Firm Synergies to Launch the Platform Business Model in a News Agency. *Journal. Stud.* 22, 2061–2081. <https://doi.org/10.1080/1461670X.2021.1979426>
- Jacobides, M.G., 2022. How to Compete When Industries Digitize and Collide: An Ecosystem Development Framework. *Calif. Manage. Rev.* 64, 99–123. <https://doi.org/10.1177/00081256221083352>
- Jacobides, M.G., Cennamo, C., Gawer, A., 2018. Towards a theory of ecosystems. *Strateg. Manag. J.* 39, 2255–2276. <https://doi.org/10.1002/smj.2904>
- Jacobides, M.G., Lianos, I., 2021. Regulating platforms and ecosystems: an introduction. *Ind. Corp. Change* 30, 1131–1142. <https://doi.org/10.1093/icc/dtab060>
- Jarvi, K., Sainio, L.M., Ritala, P., Pellinen, A., 2010. Building a framework for a partnership business model. *Int. J. Manag. Concepts Philos.* 4, 100. <https://doi.org/10.1504/IJMCP.2010.031305>
- Jovanovic, M., Kostić, N., Sebastian, I.M., Sedej, T., 2022a. Managing a blockchain-based platform ecosystem for industry-wide adoption: The case of TradeLens. *Technol. Forecast. Soc. Change* 184, 121981. <https://doi.org/10.1016/j.techfore.2022.121981>
- Jovanovic, M., Sjödin, D., Parida, V., 2022b. Co-evolution of platform architecture, platform services, and platform governance: Expanding the platform value of industrial digital platforms. *Technovation* 118, 102218. <https://doi.org/10.1016/j.technovation.2020.102218>
- Karhu, K., Gustafsson, R., Eaton, B., Henfridsson, O., Sørensen, C., 2020. Four Tactics for Implementing a Balanced Digital Platform Strategy. *MIS Q. Exec.* 19, 105–120. <https://doi.org/10.17705/2msqe.00027>
- Karhu, K., Ritala, P., 2021. Slicing the cake without baking it: Opportunistic platform entry strategies in digital markets. *Long Range Plann.* 54, 101988. <https://doi.org/10.1016/j.lrp.2020.101988>

- Karttunen, E., Pynnönen, M., Treves, L., Hallikas, J., 2021. Capabilities for the internet of things enabled product-service system business models. *Technol. Anal. Strateg. Manag.* 1–17. <https://doi.org/10.1080/09537325.2021.2012143>
- Khanagha, S., Ansari, S. (Shaz), Paroutis, S., Oviedo, L., 2022. Mutualism and the dynamics of new platform creation: A study of Cisco and fog computing. *Strateg. Manag. J.* 43, 476–506. <https://doi.org/10.1002/smj.3147>
- Kohtamäki, M., Rabetino, R., Parida, V., Sjödin, D., Henneberg, S., 2022. Managing digital servitization toward smart solutions: Framing the connections between technologies, business models, and ecosystems. *Ind. Mark. Manag.* 105, 253–267. <https://doi.org/10.1016/j.indmarman.2022.06.010>
- Kostis, A., Ritala, P., 2020. Digital Artifacts in Industrial Co-creation: How to Use VR Technology to Bridge the Provider-Customer Boundary. *Calif. Manage. Rev.* 62, 125–147. <https://doi.org/10.1177/0008125620931859>
- Kretschmer, T., Leiponen, A., Schilling, M., Vasudeva, G., 2022. Platform ecosystems as meta-organizations: Implications for platform strategies. *Strateg. Manag. J.* 43, 405–424. <https://doi.org/10.1002/smj.3250>
- Lanzolla, G., Frankort, H.T.W., 2016. The Online Shadow of Offline Signals: Which Sellers Get Contacted in Online B2B Marketplaces? *Acad. Manage. J.* 59, 207–231. <https://doi.org/10.5465/amj.2014.0051>
- Lanzolla, G., Markides, C., 2021. A Business Model View of Strategy. *J. Manag. Stud.* 58, 540–553. <https://doi.org/10.1111/joms.12580>
- Lingens, B., Miehé, L., Gassmann, O., 2021. The ecosystem blueprint: How firms shape the design of an ecosystem according to the surrounding conditions. *Long Range Plann.* 54, 102043. <https://doi.org/10.1016/j.lrp.2020.102043>
- McIntyre, D., 2019. Beyond a ‘winner-takes-all’ strategy for platforms. *Harv. Bus. Rev.*
- McIntyre, D., Srinivasan, A., Afuah, A., Gawer, A., Kretschmer, T., 2021. Multisided Platforms as New Organizational Forms. *Acad. Manag. Perspect.* 35, 566–583. <https://doi.org/10.5465/amp.2018.0018>
- McIntyre, D.P., Srinivasan, A., 2017. Networks, platforms, and strategy: Emerging views and next steps: Networks, Platforms, and Strategy. *Strateg. Manag. J.* 38, 141–160. <https://doi.org/10.1002/smj.2596>
- Oinonen, M., Ritala, P., Jalkala, A., Blomqvist, K., 2018. In search of paradox management capability in supplier–customer co-development. *Ind. Mark. Manag.* 74, 102–114. <https://doi.org/10.1016/j.indmarman.2017.09.021>
- Parker, G., Alstyne, M.V., Choudary, S.P., 2016. *Platform Revolution*, W.W. Norton & Company.
- Pattinson, S., Nicholson, J.D., Ehret, M., Velu, C., Ryan, P., 2022. Innovation ecosystems in B2B contexts: Owning the space. *Ind. Mark. Manag.* S0019850122002693. <https://doi.org/10.1016/j.indmarman.2022.11.004>
- Pauli, T., Fiet, E., Matzner, M., 2021. Digital Industrial Platforms. *Bus. Inf. Syst. Eng.* 63, 181–190. <https://doi.org/10.1007/s12599-020-00681-w>
- Porter, M.E., Heppelmann, J.E., 2014. How Smart, Connected Products Are Transforming Competition. *Harv. Bus. Rev.* 92, 64–88.
- Pushpanathan, G., Elmquist, M., 2022. Joining forces to create value: The emergence of an innovation ecosystem. *Technovation* 115, 102453. <https://doi.org/10.1016/j.technovation.2021.102453>
- Raff, S., Wentzel, D., Obwegeser, N., 2020. Smart Products: Conceptual Review, Synthesis, and Research Directions*. *J. Prod. Innov. Manag.* 37, 379–404. <https://doi.org/10.1111/jpim.12544>
- Reinartz, W.J., Berkman, M., 2018. From Customer to Partner Engagement: A Conceptualization and Typology of Engagement in B2B, in: Palmatier, R.W., Kumar, V., Harmeling, C.M. (Eds.), *Customer Engagement Marketing*. Springer International Publishing, Cham, pp. 243–268. https://doi.org/10.1007/978-3-319-61985-9_11
- Rietveld, J., Schilling, M.A., 2021. Platform Competition: A Systematic and Interdisciplinary Review of the Literature. *J. Manag.* 47, 1528–1563. <https://doi.org/10.1177/0149206320969791>

- Rietveld, J., Schilling, M.A., Bellavitis, C., 2019. Platform Strategy: Managing Ecosystem Value Through Selective Promotion of Complements. *Organ. Sci.* 30, 1232–1251. <https://doi.org/10.1287/orsc.2019.1290>
- Ritala, P., Golnam, A., Wegmann, A., 2014. Coopetition-based business models: The case of Amazon.com. *Ind. Mark. Manag.* 43, 236–249. <https://doi.org/10.1016/j.indmarman.2013.11.005>
- Saadatmand, F., Lindgren, R., Schultze, U., 2019. Configurations of platform organizations: Implications for complementor engagement. *Res. Policy, The Digital Transformation of Innovation and Entrepreneurship* 48, 103770. <https://doi.org/10.1016/j.respol.2019.03.015>
- Sandberg, J., Holmstrom, J., Lyytinen, K., 2020. Digitization and Phase Transitions in Platform Organizing Logics: Evidence from the Process Automation Industry. *MIS Q.* 44, 129–153. <https://doi.org/10.25300/MISQ/2020/14520>
- Sjödin, D., Parida, V., Jovanovic, M., Visnjic, I., 2020a. Value Creation and Value Capture Alignment in Business Model Innovation: A Process View on Outcome-Based Business Models. *J. Prod. Innov. Manag.* 37, 158–183. <https://doi.org/10.1111/jpim.12516>
- Sjödin, D., Parida, V., Kohtamäki, M., Wincent, J., 2020b. An agile co-creation process for digital servitization: A micro-service innovation approach. *J. Bus. Res.* 112, 478–491. <https://doi.org/10.1016/j.jbusres.2020.01.009>
- Sjödin, D., Parida, V., Visnjic, I., 2022. How Can Large Manufacturers Digitalize Their Business Models? A Framework for Orchestrating Industrial Ecosystems. *Calif. Manage. Rev.* 64, 49–77. <https://doi.org/10.1177/00081256211059140>
- Snihur, Y., Eisenhardt, K.M., 2022. Looking forward, looking back: Strategic organization and the business model concept. *Strateg. Organ.* 14761270221122442. <https://doi.org/10.1177/14761270221122442>
- Subramaniam, M., 2022. The future of competitive strategy: Unleashing the power of data and digital ecosystem. MIT Press.
- Thomas, L.D.W., Ritala, P., 2022. Ecosystem Legitimacy Emergence: A Collective Action View. *J. Manag.* 48, 515–541. <https://doi.org/10.1177/0149206320986617>
- Thomas, L.D.W., Tee, R., 2022. Generativity: A systematic review and conceptual framework. *Int. J. Manag. Rev.* 24, 255–278. <https://doi.org/10.1111/ijmr.12277>
- Tian, J., Coreynen, W., Matthyssens, P., Shen, L., 2022. Platform-based servitization and business model adaptation by established manufacturers. *Technovation* 118, 102222. <https://doi.org/10.1016/j.technovation.2021.102222>
- Tura, N., Kutvonen, A., Ritala, P., 2018. Platform design framework: conceptualisation and application. *Technol. Anal. Strateg. Manag.* 30, 881–894. <https://doi.org/10.1080/09537325.2017.1390220>
- Visnjic, I., Jovanovic, M., Raisch, S., 2022. Managing the Transition to a Dual Business Model: Tradeoff, Paradox, and Routinized Practices. *Organ. Sci.* 33, 1964–1989. <https://doi.org/10.1287/orsc.2021.1519>
- Visnjic, I., Neely, A., Jovanovic, M., 2018. The path to outcome delivery: Interplay of service market strategy and open business models. *Technovation* 72–73, 46–59. <https://doi.org/10.1016/j.technovation.2018.02.003>
- Vivek, S.D., Dalela, V., Ahmed, M.S., 2022. A framework for partner engagement: Episodes in the life of interorganizational partnerships. *J. Mark. Theory Pract.* 30, 476–493. <https://doi.org/10.1080/10696679.2021.1916398>
- Volberda, H.W., Khanagha, S., Baden-Fuller, C., Mihalache, O.R., Birkinshaw, J., 2021. Strategizing in a digital world: Overcoming cognitive barriers, reconfiguring routines and introducing new organizational forms. *Long Range Plann., Strategizing in a digital world: Overcoming cognitive barriers, reconfiguring routines and introducing new organizational forms* 54, 102110. <https://doi.org/10.1016/j.lrp.2021.102110>
- Williamson, P.J., De Meyer, A., 2012. Ecosystem Advantage: How to Successfully Harness the Power of Partners. *Calif. Manage. Rev.* 55, 24–46. <https://doi.org/10.1525/cmr.2012.55.1.24>
- Yrjölä, M., Mattila, M., Mikkonen, M., 2023. Value-creating and Value-eroding Decoupling in B2B Platforms – A Multiple Case Study, in: *Reconfiguration of Business Models and Ecosystems*. Routledge, New York, pp. 98–117. <https://doi.org/10.4324/9781003326731-7>

- Zhao, Y., von Delft, S., Morgan-Thomas, A., Buck, T., 2020. The evolution of platform business models: Exploring competitive battles in the world of platforms. *Long Range Plann.* 53, 101892. <https://doi.org/10.1016/j.lrp.2019.101892>
- Ziegler, M., Steer, A., van Dijk, L., Schreiber, J., 2022. B2B Platform Play Revolutionizing the rules of B2B industries with platform business models. Porsche Consulting.