How B2B Platforms Evolve Differently: Value Creation, Platform Architecture, and Integration Cost Sharing

Boyoon Chang[*], Georgios Petropoulos[†],
Didier Bonnet[‡], Geoffrey G. Parker[§]

April 17, 2026

Abstract

B2B platforms exhibit significant heterogeneous functionalities and growth paths, yet studies examining the nature of these differences remain scarce. We develop a typological and analytical framework to examine the evolutionary dynamics of B2B platforms. We classify B2B platforms into four types–marketplace (MP), data aggregator (DA), intelligent product and service provider (IP&S), and IoT enabler (IoT)–and construct a model to explain the business models of B2B platforms. The propositions are made on their logics of creating value, platform architecture, and integration cost sharing and are empirically examined using a structured profiling framework applied to 196 B2B platform cases. Our findings reveal systematic differences between the types of B2B platforms. MP platforms rely predominantly on cross-side value creation, whereas DA, IP&S, and IoT platforms emphasize standalone value creation logic. The strategies exhibit strong persistence over time. The architecture of the platform also varies significantly between types: MP platforms tend to adopt open architectures, while IoT platforms are more likely to employ closed architectures, representing the most striking contrast among the four types. The hypothesis that up-front integration costs are borne less by participants in MP and more in IoT platforms–conditional on the elasticity of participants' cost sharing–receives partial empirical support. Further analysis suggests compatibility between the MP-DA, IoT-DA, and IoT-IP &S combinations. These patterns lead to propositions on business model extension across B2B platform types. We conclude by outlining implications for future research on the evolutionary dynamics of emerging B2B platform ecosystem.

Keywords: Strategic Positioning, Evolutionary Dynamics, B2B Platform Types

---

[*] Dartmouth College, Hanover, NH, USA

[†] University of Southern California, Los Angeles, CA, USA

[‡] IMD Business School, Lausanne, Switzerland

[§] Dartmouth College, Hanover, NH, USA

1 Introduction

Our knowledge around digital platform businesses and ecosystems has established a set of dominant theoretical insights: that platforms thrive by leveraging strong cross-side network effects (Dou and Wu, 2021; Lee and Mendelson, 2007; Parker and Van Alstyne, 2005), that openness is a key driver of growth and innovation (Bourreau and De Streel, 2020; Parker et al., 2017; Yoo et al., 2010), and that once scale is achieved, platforms tend toward winner-takes-all dynamics (Armstrong, 2006). Key contributions have elaborated, for example, on how asymmetric subsidization can ignite feedback loops (Bolt and Tieman, 2008; Parker and Van Alstyne, 2005; Rochet and Tirole, 2003), how the variety and quality of products and services offered through the platform can be a key complementary parameter that amplifies platform's market potential and success (Gallaugher and Wang, 2002), as well as, how a governance framework that increases the elasticity of the cross-side response (e.g., well-designed APIs, IP policies) can lead to an optimal level of platform openness with more growth potential (Parker et al., 2017; Uotila et al., 2017).

Much of this knowledge, however, has emerged from the study of business-to-consumer (B2C) contexts such as e-commerce, ride-hailing, and app ecosystems. In these environments, large homogeneous user bases and relatively low integration frictions have enabled platforms to reap exponential growth from self-reinforcing network effects (Jacobides et al., 2018; Parker et al., 2016). In contrast, business-to-business (B2B) platforms operate under different conditions and face a unique set of challenges that are not so relevant for B2C platforms (Bonnet et al., 2025): limited network effects (Anderson et al., 2022; Meier et al., 2024), stronger requirements for openness (Hasler et al., 2022) and integrations (Springer et al., 2025). In other words, B2B platforms often serve heterogeneous industries, where integration requirements are complex, switching costs are high, and network effects are fragmented rather than universal and of high magnitude.

This in turn raises distinct sets of questions that are unique to B2B platforms or results in different answers to these questions; 1) how to strike a balance between standalone versus cross-side value, 2) how much and at what stage the platform opens to optimize value co-creation amongst complementors, and 3) who to charge for upfront integration costs. An additional layer of complexity can arise from how the answers to these questions may be impacted by the functionalities that B2B platforms provide (namely, the platform type); openness may be more critical for B2B marketplaces compared to other types of B2B platform, for example (Ritala and Jovanovic, 2024). This entails that one strategic decision that may work in one type might not work well in others.

Despite the fast-paced growth of the B2B market, with a 17.5% annual growth rate until 2027 (Shankar, 2022), the literature on B2B platforms remain still at its infancy. Existing literature on the typologies of B2B platforms, especially on the comparison among these types on key platform characteristics, are still largely unexplored and understudied. The conventional classification of digital platforms into innovation (Cusumano, 2022; Gawer and Cusumano, 2014)) and transaction platforms (Cusumano, 2022) may not be sufficiently granular to adequately capture the diverse functionalities of B2B platforms. While studies focusing on specific types of B2B platforms – digital industrial platforms (Pauli et al., 2020), IoT platforms (Hodapp et al., 2019), marketplaces (Täuscher and Laudien, 2018) –

provide insights into individual segments of the landscape, they often offer a fragmented perspective that fails to capture a holistic and comprehensive comparison between these types. This lack of comprehensive research poses challenges to businesses, policymakers, and scholars aiming to navigate the evolving B2B market landscape.

Several studies have proposed taxonomies to classify these platforms. The classification of B2B platforms can vary significantly based on the standard chosen for categorization; some studies propose classifications based on business models (Bartels et al., 2023; Ritala and Jovanovic, 2024), whereas others incorporate multiple dimensions, including business models, governance, strategy, and environmental factors (Feike and Rösch, 2024). These taxonomies are often developed through systematic literature reviews and case studies (Bartels et al., 2023; Feike and Rösch, 2024; Millan et al., 2024; Täuscher and Laudien, 2018). While this methodology provides insights to summarize B2B platform characterization, it lacks the ability to analyze correlations between different elements within a specific type of platform or quantitatively compare these measures across various platform types. More importantly, three key gaps remain. First, prior studies have not systematically examined how strategic orientations evolve across the life cycle of B2B platforms. Second, little is known about the persistence of strategic choices made at the early stages of platform development: do early commitments to standalone versus cross-side value, or to openness versus closure, lock platforms into enduring trajectories? Third, governance issue related with the integration cost sharing has not been much studied at the B2B platform context.

This paper addresses these gaps by developing a formal model of evolutionary dynamics that conceptualizes B2B platforms as configuration-dependent systems and derives testable propositions that are empirically examined. The goal of this paper is to develop new insights into the evolution of network effects, the persistence of strategic orientation, and upfront integration cost sharing in B2B platforms by addressing the following research questions:

- How do network effects emerge and evolve across different stages of maturity and different types of B2B platforms?
- To what extent do initial strategic orientations (e.g., standalone vs. cross-side value, open vs. closed architecture) persist, and what mechanisms explain this persistence?
- What factors determine the allocation of up-front integration costs between a platform and its participants, and how do these cost-sharing structures differ across platform types?

Our work is structured as follows: Section 2 offers an overview of the existing literature surrounding B2B platform taxonomy. Section 3 develops a model of evolutionary dynamics and derives a set of theoretically grounded research propositions. Section 4 empirically validates these propositions through the so-called “structured profiling analysis." Lastly, Section 5 concludes by discussing potential avenues for future research.

2 Literature Review

B2B platforms are referred to by a variety of terms such as digital industrial platforms (Pauli et al. 2021) and electronic marketplaces (Geske et al., 2021), Internet of Things platforms (Hodapp et al., 2019; Mineraud et al., 2016), Industrial Internet of Things platforms (Falck and Koenen, 2020; Petrik and Herzwurm, 2019). This variation in terminology is partially attributed to the wide range of services that B2B platforms offer, largely grouped into two: 1) matching services, which encompass mechanisms to facilitate interactions between businesses, and 2) supporting functions for traders on the platform, including billing services and e-procurement solutions (Jullien, 2012).

When their primary services or functionalities lie in facilitating the connection between the supply side and demand side, i.e., matching, they are commonly referred to as digital marketplaces (Derave et al., 2024; Täuscher and Laudien, 2018). In other literature, they can be considered "matchmaker platforms", where the core function of the platform is to connect B2B actors and facilitate the exchange of physical and digital assets (Springer et al., 2025). Examples of these platforms include CheMondis, which connects buyers and sellers in the chemical industry, and Klockner XOM Materials & CO, which connects supply and demand sides in the steel sector (Springer et al., 2025). The platform reduces search and transaction costs (Zhu, 2004), thereby alleviating market failures that arise from mismatching (Bonnet et al., 2025). They tend to benefit from large network effects as large numbers of one side drive higher participation of the other, generating cross-side network effects (Liu et al., 2020). Integration processes are less critical for this type of platform, as their focus is to optimize digital transactions without extensive integration of physical systems (Springer et al., 2025). In some instances however, matchmaking platforms may require integrating data for "improving recommendations, reducing transaction costs, and enhancing user experience" (Chakravarty et al., 2014).

In contrast, IIoT or IoT platforms are typically used to denote the "the middleware and infrastructure" aspect of the platform that facilitates interactions between smart devices and enables them to connect to end-users (Mineraud et al., 2016). These types of platforms connect sensor data collected from the Internet of Things (IoT) to business applications (Hein et al., 2019). Due to the asset-specific nature of investments in these platforms, the number of customers on the network is often limited, which in turn constrains scalability and the strength of network effects (Cennamo and Santalo, 2013; Millan et al., 2024; Parker and Van Alstyne, 2005; Zhu and Iansiti, 2019). Additionally, the multi-layered architecture of the Industrial Internet of Things (Millan et al., 2024; Yoo et al., 2010) is considered a distinct feature of IoT platforms. This distinct feature enables complementors to be located at different layers within the system. Complementors may also work alongside legacy structures with existing supply chains and business relationships (Millan et al., 2024), which can limit this type of platform's decisions opening interfaces or sharing resources due to potential strategic resource exposure by competitors (Baldwin, 2015).

While relatively less explored yet closely related to IIoT platforms are the intelligent products and services provider platforms, whose definitions are often grouped together with IoT platforms or considered a subgroup thereof. Alternatively, they are described as "digital solution providers", "product-service-software system providers" or "digital servitization" providers (Huikkola et al., 2022), or referred to as "service platforms" (Struwe and Slepniov, 2023). These platforms leverage platform architectures to capture value created through the transformative process of existing products and services using information technologies, known as "digital servitization" (Paschou et al., 2020; Struwe and Slepniov, 2023). Ritala and Jovanovic (2024) identified the evolutionary stages of the development of the ecosystem of the platform by their transformation of the business model and have classified these types as the first-stage "product-service platformizer." This stage involves "building smart platform-based solutions that enhance its products and services (Huikkola et al., 2022; Raff et al., 2020). The business model at this stage involves the establishment and maintenance of digital partnerships (Rietveld et al., 2019; Sjödin et al., 2022), especially within the production side of incumbent firms (Rietveld et al., 2019; Subramaniam, 2022).

Other studies focus on data-centric features of B2B platforms (Agrawal et al., 2019a; Berente et al., 2021; Colombo et al., 2017; Filosa et al., 2025; Mancuso et al., 2024), highlighting the role of B2B platforms in facilitating data sharing and aggregation. In such platforms, issues related to data security, data ownership, trust, and privacy often arise (Agrawal et al., 2019a; Berente et al., 2021; Filosa et al., 2025). The success of data aggregating B2B platforms often depends on effective governance and the platform's ability to set and enforce rules that ensure safe data handling and transactions, while transforming data into meaningful insights (Agrawal et al., 2019b; Filosa et al., 2025). In addition, unlike B2C platforms where user input data is compensated with subsidized services, B2B platforms may face stricter monetary compensation from the participants for their use of data (Anderson et al., 2022).

Prior research has endeavored to systematically distinguish platform types. One notable classification is Cusumano (2022)'s classification of innovation platforms and transaction platforms, or those combining both functionalities (hybrid). In his classification, innovation platforms provide a technological foundation to support the development of complementary innovations on the platform through third-party complementors, often emphasizing the orchestration of ecosystem partners as they derive value from the quality and number of complementors (Springer et al., 2025). Transaction platforms mediate transactions of two or more distinct market sides, where the size of one side attracts the other sides, creating network effects. Hybrid platforms are the combination of the two platforms. This classification, however, is insufficient to capture the industrial environment that B2B platforms operate in, as industrial environments require "extensive contracting, coordination, and bargaining" (Blackburn et al., 2023; Ritala and Jovanovic, 2024; Springer et al., 2025).

Several studies have developed systematic taxonomies that are specific to B2B platforms (Abendroth et al., 2021; Millan et al., 2024). For example, Feike and Rösch (2024) identified five archetypes of B2B platforms–multi-function collaboration networks, integrative transaction and fulfillment platforms, stand-alone matchmaking platforms, intra-organizational efficiency enhancer, and one-side enabler platform–using cluster analysis of 73 characteristics organized under 19 dimensions that stem from four overarching categories, which are (1) business model and value proposition, (2) governance, (3) strategy, and (4) environment. In contrast, Ritala et al. (2024) grouped B2B platforms into three categories based on evolving business models: (1) product-service platformizer, focusing on building production-side partnerships, (2) platform ecosystem orchestrator, focusing on building platform ecosystem, and (3) platform market guardian, supporting the industry at large. These studies are largely grounded on the bottom-up approach, identifying the platform type based on a set of predefined elements, which include business models, value creation, governance, strategy, and environment.

While these studies provide useful insights for contextualizing our findings, our objective is not to construct B2B platform taxonomy. Instead, our aim is to analyze how these features develop over time, explore their roles as strategic decision variables, and investigate whether the trajectories differ by the key functionalities they provide. For this purpose, we use our own definition of typology, which we later explain in detail in Section 3.1. This typology extends to Cusmano's classification of innovation and transaction platform and is similar to Stange (2022)'s classification. We propose a typology largely grounded on their functionalities; the solutions and values it delivers. This approach offers a more focused examination of the primary functions of the platform: whether its main function revolves around transactional efficiency or providing technology blocks for product or service enhancement. By classifying platforms in this manner, we can systematically compare the three features; value creation, openness, and integration as not intrinsic properties defining a platform type but rather how these variables are utilized along their platform journey as strategic variables. In the section that follows, we present operational definitions of the key variables under investigation along with our typology of B2B platforms.

3 Problem Formulation for Theory Building

3.1 Operational Definition of Variables

Platform Type

We define B2B platforms as "digital technology infrastructure that facilitates people, organizations, and their resources" (Parker et al., 2024a). Based on where value is created, we classify them into technology-focused and transaction-focused platforms (see also Stange (2022), who develops a similar typology). Technology-focused platforms generate value either as IoT, providing foundational infrastructure that allows customers to develop their own solutions, or as intelligent products & service providers, adding new features and services to existing customer offerings (Parker et al., 2023, 2024a). Transaction-focused platforms create value through exchange mechanisms and include data aggregators, which derive value from aggregating and exchanging data, and marketplaces that derives value from facilitating matching and transactions across multiple sides (Parker et al., 2024b).

Formerly we adhere to the definitions proposed by (Parker et al., 2023) below and classify the four types based primarily on the functionality they provide:

- Intelligent products & services provider (IP&S): Platforms that augment traditional products and services with connectivity and data, turning the combination into new, value-added products and/or offer completely new digital services. They have been also referred to as "digital solution provider", "product-service-software system provider", “digital servitization” (Huikkola et al., 2022; Raff et al., 2020; Ritala and Jovanovic, 2024),

- Data aggregator (DA): Platforms that combine data from various sources to develop services and enable new ways to exchange and collaborate across company and industry borders,
- IoT enabler (IoT): Platforms that provide technology building blocks and services to enable their clients to develop their own IoT or other solutions, and
- Marketplace (MP): Platforms that provide new innovative ways to bring together offer and demand for traditional products and digital services.

Maturity

While operating years may offer a quantitative metric, we use platform maturity stages for our analysis, as it provides a more informative indicator of development stages that account for platform-specific factors including sector, revenue stability, and financial security.

The different maturity levels of the multi-stage lifecycle are defined as follows:

- Pre-Launch: A planning phase involving platform design and identification of potential use cases, including pilot projects, minimal viable products (MVP), and proofs of concept (PoC),
- Launch: A go-to-market phase characterized by product release, the evaluation of product-market fit, and continued development of the platform,
- Scale: An expansion phase marked by rapid growth and increasing focus on system scalability,
- Maturity: A stabilized phase defined by a deceleration in growth (i.e., negative second derivative), leading to exploration of adjacent markets and introduction of additional functionalities to maintain growth.

Network Effects

Network effects, or network externalities, arise when a user’s utility increases with the number of other users on the same network (Katz and Shapiro, 1985). In subsequent platform literature, these were further broken down into direct network effects (same-side network effects) and indirect network effects (cross-side network effects). Direct network effects refer to the externalities generated by participants on the same side of the platform, while indirect network effects indicate the externalities created by participants on the other side. (Anderson et al., 2022) proposed a value creating framework that breaks down the total user value into three components: (1) standalone value, which is the value of the platform absent any externalities, (2) same-side value, which represents the “value of the other participants on the same side of the platform”, and (3) cross-side value, which refers to the "value of third-party providers on the other side of the market to participants." This framework highlights the close relationship between network effects and platform openness, particularly with regards to cross-side value. Open platforms encourage third-parties or developers to build upon them, potentially attracting engagement from one side that can entice the other side, creating cross-side network effects.

Most B2B platforms initially lack same-side value, instead focusing on delivering cross-side value (Anderson et al., 2022). As a result, cross-side value emerges as the primary driver of B2B platform value creation and fuels network effects (Guggenberger et al., 2021). This development also highlights the complexity of determining which side to develop first, a classic "chicken-and-egg problem" (Guggenberger et al., 2021). In what follows, we focus on two value creations that are especially relevant for B2B platforms, (1) standalone value: value the platform provides through its sole functionality, without mediating different sides, and (2) cross side value: value provided by the platform by connecting two or more sides.

Platform Openness

The definition of openness varies greatly and evolved long throughout IS literature, where previous research (Boudreau, 2010) defined "opening the platform" as "giving up control over the core platform and granting access to the platform for complementary innovation to independent developers" and having fewer restrictions on development, commercialization, or use (Eisenmann et al., 2008; Parker et al., 2024b; Parker and Van Alstyne, 2018; West, 2003). Opening a platform further entails trade-offs between adoption and appropriability (Parker and Van Alstyne, 2018; West, 2003); opening a platform can spur wide adoption, enabling network effects to kick in, while reducing platform sponsor's ability to capture rents as it lowers user switching costs. It can also have implications on innovation level, where empirical estimates show inverted U shape relation between the level of openness and innovation (Bourreau and De Streel, 2020; Laursen and Salter, 2006; Parker and Van Alstyne, 2018), denoting that the openness can accelerate innovations enabling external actors to contribute (Chesbrough, 2003; Gawer, 2014), while it simultaneously implies losing control of the platform and sometimes exposed to platform quality degradation (Boudreau, 2010; Cennamo, 2018). The rule setting for the openness therefore becomes an important strategic decision to balance between minimizing quality degradation while maximizing positive network effects (Van Alstyne et al., 2016) and innovations throughout the ecosystem.

We define platform openness as their degree of openness towards suppliers (Broekhuizen et al., 2021)), i.e., based on whether they offer services or products of the third-party suppliers that are not their own. We define closed platforms as only providing their own products and services while open platforms provide not only their own but also third-party products and services through the platform.

Integration

A platform's integration efforts can signal its willingness to become more open. In fact, the extent to which it invests in integration contributes to the platform's openness strategy (Tan et al., 2020). For example, providing publicly available integration tools, such as APIs can facilitate content provider (or developer) onboarding, opening the platform to new participants (Parker and Van Alstyne, 2009).

Integration process may require initial set up cost that centers around custom coding, middleware, and legacy system adaptation (Markus, 2000; Themistocleous et al., 2002), and data standardization between partners that aligns semantics and data format (Bouwman et al., 2005). Complexity arises with the heterogeneity of the systems across platform participants, industry-specific regulations, and integration architecture. The high cost of integration costs, in turn, can act as a barrier to entry preventing firms from joining the platform, while once integrated yields lock-in dependency to the platform that makes partners harder to switch the platform.

In this setting, eliminating integration costs and/or cost sharing schemes among participants can act as a strategic means to encourage participation of the platform (Gawer, 2014). In our survey, we ask whether they require upfront integration and installation costs and if so, who covers the costs and whether they recoup those costs.

3.2 Research Questions

B2B platforms share characteristics with B2C platforms–such as network effects, integration requirements, and openness (Feike and Rösch, 2024)–but differ in important ways. Compared to B2C counterparts, they exhibit more limited scalability of network effect (Hasler et al., 2022; Riemensperger and Falk, 2020), greater emphasis on integrating established systems (Feike and Rösch, 2024), and stronger value co-creation among complementors (Hein et al., 2019), all of which shape platform openness. Anderson Jr. et al. (2023) model investments in standalone value, same-side network effects, and integration, showing that optimal investment trajectories vary across life-cycle stages and platform types.

Strategic choices evolve over the life-cycle. Pre-Launch platforms pursue objectives distinct from Mature ones, particularly regarding 1) value creations, i.e., stand-alone versus cross-side value, 2) openness, i.e., whether to offer only proprietary products or also third-party offerings. Li and Penard (2014) argue that early stages require prioritizing quantity (e.g., expanding supplier base) to build network effects, while later stages emphasize supplier quality.

Although both B2B and B2C platforms leverage network effects, they operate in different environments. The fragmented and industry-specific nature of B2B markets reduces the likelihood of "winner takes all" phenomenon less likely to occur (Hasler et al., 2022; Riemensperger and Falk, 2020). In contrast to relatively unified B2C customer base, B2B platforms serve heterogeneous industries with distinct needs and complexities (Guggenberger et al., 2021; Schermuly et al., 2019; Staub et al., 2021).

Regarding openness, Filosa et al. (2025) identify a three-phase evolution toward greater

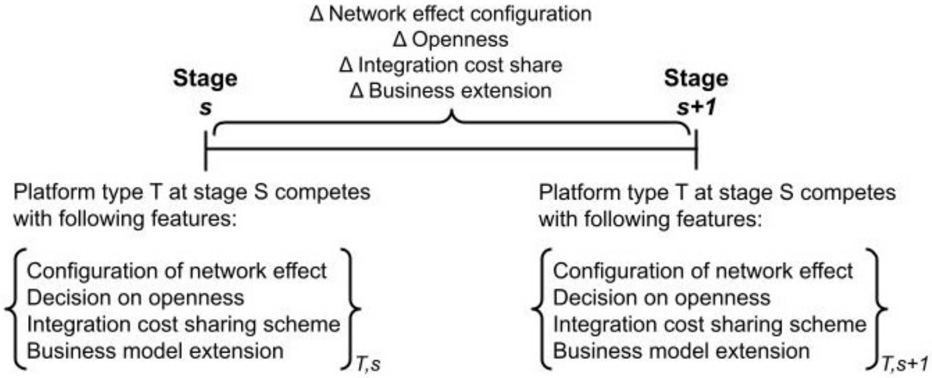


Figure 1: Research Model

openness, while Ofe and de Reuver (2024) emphasize that openness is a strategic choice aligned with platform objectives. Building on these literature, we link platform typology to differences in openness and strategic trajectories across platform types.

Based on the research model represented in Figure 1, we raise research questions regarding the evolutionary dynamics of B2B platforms in four categories:

1. **Configuration of network effect**: How do network effects evolve across B2B platforms as they Mature, and what pattern characterizes these changes? How does the usage of network effects vary by platform type as they progress during the multi-stage life-cycle?
2. **Decision on openness**: Throughout the growth trajectory of B2B platforms, how does platform openness evolve and what patterns characterize this transformation? How does platform openness vary across different types as they develop through various stages of growth?
3. **Integration cost sharing scheme**: What factors determine the allocation of up-front integration costs between a platform and its participants, and how those factors affect the cost-sharing structures across different types? What are the economic motivations underlying those strategic decisions made by different platform types?

3.3 Theoretical Model and Research Propositions

3.3.1 Model Set-Up

Let each maturity stage indexed by $t \in \{0, 1, 2, 3\}$ represent Pre-Launch, Launch, Scale, and Mature stage, respectively. Each platform may be classified into a specific type, $k \in \{MP, IP\&S, DA, IoT\}$. There are two-sides in the market indexed by $s \in \{A, B\}$, with a unit mass of users on each side. Let the total active users on each side denoted by n_{At} and n_{Bt}.

In our model, a platform decides the following strategic variables:

1) $x_{At}, x_{Bt} \geq 0$, which are investments for side A and side B, respectively,

2) p_{At}, p_{Bt} represent the prices the platform charges on side A and side B,

3) the degree of openness ($o_t \in [0,1]$), with higher value associated with more openness,

4) the integration cost share with the participant, represented by $\rho_t \in [0,1]$, which is a fraction of per-participant integration cost c, charged to each on-boarding participant. A larger ρ_t indicates a higher coverage by the participant. This raises friction as the participants need to pay the integration in full before initiating transactions in the market.

Each platform type k is characterized by the following set of parameters:

$$(\alpha_{Ak}, \alpha_{Bk}, \beta_{Ak}, \beta_{Bk}, c_k, \phi_k(\cdot), G_k(\cdot))$$

where

1) α_{Ak}, α_{Bk} are the marginal benefits that a participant on side A and side B derive from the platform with type k respectively,

2) β_{Ak}, β_{Bk} are the cross-side elasticities of the demand on side A and side B to a change on the other side respectively,

3) c_k is the up-front integration cost per participant that varies by platform type k,

4) $\phi_k(\cdot)$ is the openness function in convex form, increasing in o, and

5) $G_k(\cdot)$ is the governance cost associated with the degree of openness that is convex and increasing in o.

3.3.2 Equilibrium in Two-sided Platform Market

Building on Jeitschko and Tremblay (2020), the utility of a representative user on side A is expressed by:

$$u_{Ait} = \alpha_A f(x_{At}) + \beta_{At}\phi(o_t)N_{Bt} - p_{At} - \rho_t c + \varepsilon_{Ait}$$

where $f(x_{At})$ represents the benefit from the investment x_{At}, $N_{Bt}(\equiv \sum_{r \leq t} n_{Br})$ denotes the cumulative number of active users on side B up to stage t, and ε_{Ait} is the error term.

Similarly, the utility derived from participating in side B be expressed as follows:

$$u_{Bit} = \alpha_B f(x_{Bt}) + \beta_{Bt}\phi(o_t)N_{At} - p_{Bt} - \rho_t c + \varepsilon_{Bit}$$

Assuming $\varepsilon \sim U[0,1]$, it can be shown that

$$n^*_{At} = \frac{\alpha_A f(x_{At}) + \beta_A \phi_k(o_t) N_{Bt-1} - p_{At} - \rho_t c + \beta_A \phi(o_t)[\alpha_B f(x_{Bt}) + \beta_{Bt} \phi(o_t) N_{At-1} - p_{Bt} - \rho_t c]}{1 - \beta_A \phi(o_t) \beta_B \phi(o_t)} \tag{1}$$

$$n^*_{Bt} = \frac{\alpha_B f(x_{Bt}) + \beta_B \phi_k(o_t) N_{At-1} - p_{Bt} - \rho_t c + \beta_B \phi_k(o_t)[\alpha_A f(x_{At}) + \beta_{At} \phi(o_t) N_{Bt-1} - p_{At} - \rho_t c]}{1 - \beta_A \phi_k(o_t) \beta_B \phi_k(o_t)} \tag{2}$$

Property 1. *If $f(\cdot)$ and $\phi(\cdot)$ are monotonically increasing functions, then the following holds true:*

$$\frac{\partial n^*_{jt}}{\partial x_{jt}} > 0, \ \frac{\partial n^*_{jt}}{\partial o_t} > 0, \ \frac{\partial n^*_{jt}}{\partial \rho_t} < 0 \ \ \textit{for all } j \in \{A, B\}.$$

3.3.3 Evolutionary Dynamics of B2B Platform

The profit of the platform at stage t is represented by:

$$\Pi_t = R_t(N_{At}, N_{Bt}) - C_A(x_{At}) - C_A(x_{Bt}) - G(o_t) - c(1 - \rho_t)(n_{At} + n_{Bt})$$

with the dynamic payoff over the platform's life-cycle given as:

$$\max_{x_{At}, x_{Bt}, p_{At}, p_{Bt}, o_t, \rho_t} \sum_{t=0}^{3} \delta^t [\Pi_t - \lambda_o \mathbb{1}\{o_t \neq o_{t-1}\}],$$

where δ is a discount factor, $R_t(\cdot)$ is revenue function, $\lambda_o > 0$ represents the switching costs incurred from changes in the mode of openness. More specifically, λ_o captures the costs associated with organizational inertia; the degree to which firms continue their early strategic decisions. In alignment with Reisinger (2014), a general form of the platform's revenue is given by:

$$R_t(N_{At}, N_{Bt}) = \gamma_t N_{At} N_{Bt} + p_{At} N_{At} + p_{Bt} N_{Bt},$$

where the first term captures the value that the platform derives at stage t from participant-tailored added value services including advertisements, per-transaction commissions, etc. The second and third terms represent subscription-based revenues.

The evolutionary dynamics of B2B platforms is a complicated process. We assume for simplicity the following: 1) both sides of the market are symmetrical, so we drop the index A and B from the notation, 2) there are no up-front integration costs, $c = 0$, 3) γ_t is small enough to be negligible. This is true especially at Launch and early Scale stage when participation remains limited. Then we have the revenue given by:

$$R_t(N_{At}, N_{Bt}) = p_{At} N_{At} + p_{Bt} N_{Bt} = 2 p_t N_t.$$

Consider revenue generated from one side, $R_t \equiv p_t N_t$. Equation 1 reduces to

$$n_t = \frac{\alpha f(x_t) + \beta \phi(o_t) N_{t-1} - p_t}{1 - \beta \phi(o_t)},$$

and the revenue becomes

$$R_t = p_t N_t = p_t \left[\frac{\alpha f(x_t) + N_{t-1} - p_t}{1 - \beta\phi(o_t)} \right].$$

Revenue maximizing price and the corresponding R_t are

$$R_t^* = \frac{(\alpha f(x_t) + N_{t-1})^2}{4(1 - \beta\phi(o_t))},$$
$$p_t^* = \frac{\alpha f(x_t) + N_{t-1}}{2}.$$

Note that the maximum revenue R_t^* holds in any side of the market in the symmetrical market. It can be concluded that the evolutionary dynamics of the platform reduces to a sequential decision process to adjust the amounts of investment at each stage t $\{x_t\}$, to maximize the long-term dynamic payoff throughout life-cycle.

3.3.4 Choice between Standalone and Cross-side Value Creation

The strategic choice between creating standalone and cross-side value shapes a platform's evolutionary trajectory. In what follows, we examine the trade-offs associated with this choice. Let $R_t^*(a, b)$ be the maximum revenue achieved by investing a and b to side A and B, respectively at stage t. Let total investments fixed at $2x_t$.

Property 2. *A platform with only stand-alone value invests only one side and not both. It operates under a closed-architecture where a single supplier (or the platform itself) serves all customers on that side. Formally, this is represented by:*

$$\{x_{At} = 0, x_{Bt} > 0\} \cup \{x_{At} > 0, x_{Bt} = 0\} \Rightarrow \phi(\cdot) = 0.$$

We consider 1) a case of cross-side investment, where $a = b = x_t$ with $\phi(o_t) > 0$, and 2) a case of stand-alone investment, where $a = 2x_t,\ b = 0$, with $\phi(o_t) > 0$. The corresponding revenues for each case are:

$$R_t^*(x_t, x_t) = \frac{[\alpha f(x_t) + N_{t-1}]^2}{2(1 - \beta\phi(o_t))},\ R_t^*(2x_t, 0) = \frac{[\alpha f(2x_t)]^2}{4}$$

Then the cross-side value yields greater revenue than the standalone value when

$$\frac{[\alpha f(x_t) + N_{t-1}]^2}{2(1 - \beta\phi(o_t))} > \frac{[\alpha f(2x_t)]^2}{4}.$$

Without loss of generality, we adopt the simplifying assumption $f(x) = x$, which allows us to formally define the *"strength of cross-side value creation"* as

$$\theta(\beta, o_t, N_{t-1}) \equiv \frac{[\alpha x_t + N_{t-1}]^2}{2\alpha^2 x_t^2 (1 - \beta\phi(o_t))}.$$

When $\theta(\beta, o_t, N_{t-1}) > 1$, cross-side value creation dominates standalone value creation, a condition we term *cross-side value creation*. When $\theta(\beta, o_t, N_{t-1}) < 1$, standalone value creation prevails, which we term *standalone value oriented*.

Proposition 1. *(Choice of Value Creation Logics at Launch): At Launch stage ($t = 1$) and $N_0 = 0$,*

$$\theta(\beta, o_t, N_{t-1}) > 1 \text{ is equivalent to } \beta\phi(o_1) > 0.5.$$

When $\hat{\beta}\phi(o_1) > 0.5$, where $\hat{\beta}$ represents the platform's Pre-Launch estimate of β, the plausible strategic choice at Launch is cross-side value orientation. The value orientation of each platform type varies depending on whether this condition is satisfied. Among the four platform types, we posit that MP exhibits the highest degree of cross-side value orientation, while IoT exhibits the lowest.

Proposition 2. *(Increasing Strength of Cross-side Value Orientation): Once the cross-side value creation is adopted at Launch, the tendency to adopt the same logic at later stages becomes stronger as $\theta(\beta, o_t, N_{t-1})$ is quadratic increasing function of N_t and $N_{t-1} \leq N_t$ for $t = 1, 2, 3$.*

3.3.5 Evolving Value Creation Logic and Platform Architecture

A platform may transition from closed to open at stage t, when

$$\begin{aligned} \Delta\Pi(\text{closed} \to \text{open}) &= -\lambda_0 - G(o_t) - c(1-\rho)n_{Bt} + p_{Bt}n_{Bt} + \gamma_t N_{At} N_{Bt} > 0 \\ &\Leftrightarrow (p_{Bt} - c(1-\rho))n_{Bt} + \gamma_t N_{At} N_{Bt} > \lambda_0 + G(o_t) \end{aligned} \tag{3}$$

In contrast, an open platform can transition to open in stage t when

$$\begin{aligned} \Delta\Pi(\text{open} \to \text{closed}) &= -\lambda_0 + G(o_t) - p_B n_B - \gamma_t N_{At} N_{Bt} > 0 \\ &\Leftrightarrow G(o_t) > p_B n_B + \lambda_0 + \gamma_t N_{At} N_{Bt} \end{aligned} \tag{4}$$

where the savings in governance costs exceed the benefits forfeited from the closed side. Note that integration costs are sunk costs; transitioning from an open to a closed environment cannot recover previously incurred integration costs.

Proposition 3. *(Transition in Value Creation Logic):*

1) *Transition into Cross-side Value Creation: If it reaches a critical mass such that the network externalities is sufficiently large to cover the switching cost and the governance cost, then the platform has strong incentives to transition into pursuing cross-side network externalities*
2) *Transition into Stand-alone Value Creation: If additional gain from the cross-side externality is sufficiently low with significant decrease in γ_t and β_t at stage t, then the platform is likely to switch into stand-alone business model.*

Theoretically, Equation 3 governs the transition to cross-side value creation. However, at the onset of this transition, N_{Bt} and n_{Bt} are 0, meaning the theoretical condition cannot be met. Therefore, in practice, the transition relies on a projected value for N_{Bt}. Assuming price rigidity–where $(p_{At}, p_{Bt}) \approx (p_{At-1}, p_{Bt-1})$–and $N_{Bt} = 0$ and given N_{At}, if the total number of participants at stage t is targeted at N_t such that $N_{At} + N_{Bt} = N_t$, then $R_t(N_{At}, N_{Bt})$ is maximized with n_{At} and n_{Bt} satisfying:

$$N_{At} = \frac{\gamma_t N_t + p_{At} - p_{Bt}}{2\gamma_t}$$
$$N_{Bt} = \frac{\gamma_t N_t + p_{Bt} - p_{At}}{2\gamma_t}$$

Achieving balanced participation during this transition requires a disproportionately larger investment in side B. This shift may often complicate adjustments and incur additional switching costs.

Proposition 4. *(Persistence in Value Creation Logic): Once a value creation logic is chosen, it tends to persist throughout the platform's life cycle for the following reasons:*

- *Cross-side Value Creation: If the governance costs associated with open architecture remain low and the switching cost is higher than the revenue gain from being open and the network externalities ($\gamma_t N_{At} N_{Bt}$), the platform remains open. In our data sample, this corresponds to MP.*
- *Stand-alone Value Creation: If switching costs, the share of the integration costs that the platform pays, the governance costs associated with open architecture are high, and $\beta_t \phi(o_t)$ is sufficiently small, then the closed-architecture tends to persist. In our data sample, this corresponds to the IoT.*

If the platform decides to adopt open architecture, it is likely that the platform adopts it early in its growth stages. Otherwise, it pays the switching costs multiple times, which is sub-optimal. Also, once the platform is open, due to the network externalities of ($\gamma_t N_{At} N_{Bt}$), it is less likely that the platform architecture reverts to closed. This leads to

Proposition 5. *(Monotonicity of Open architecture and Early Openness): The openness exhibits monotone property:*

$$o_0 \leq o_1 \leq o_2 \leq o_3$$

This further entails earlier adoption of an open architecture when the cross-side value creation is greater.

3.3.6 Up-Front Integration Cost Sharing

From Equation 1, participation is negatively affected by the increased share that participants cover the costs, ρ_t, and the cross-side participation is even more sensitive to a higher share of integration-cost coverage.

$$\left|\frac{\partial n_{At}^{CR}}{\partial \rho_t}\right| = \frac{c(1+\beta_A\phi(o_t))}{1-\beta_A\phi(o_t)\beta_B\phi(o_t)} > c = \left|\frac{\partial n_{At}^{ST}}{\partial \rho_t}\right|$$

where CR and ST stand for cross-side and standalone, respectively. If integration costs are identical across platform types, the platform that generates cross-side externalities will be less able to pass those costs on to participants because its recursive network effects make user acquisition on each side more cost-sensitive. When, however, the stand-alone-oriented platform faces significantly higher integration costs than the cross-side-value-oriented platform, even after accounting for the extra expense associated with cross-side externalities, then the situation can reverse, as shown below:

$$\frac{c^{ST}}{c^{CR}} > \frac{1+\beta_A\phi(o_t)}{1-\beta_A\phi(o_t)\beta_B\phi(o_t)}$$

In this case, the stand-alone-oriented platform has less flexibility to increase the participants' share of integration-cost coverage, meaning that a larger share of the costs are absorbed by the platform itself.

Proposition 6. *(Contingency in Integration Cost Sharing). The share of integration costs borne by users differs across platform types depending on the relative magnitude of user-side sensitivity and integration costs.*

a) When integration costs are identical across platform types, the cross-side oriented platform assigns a lower share of integration costs to users due to higher user-side sensitivity.

b) When the difference in integration costs between platform types is sufficiently large, the standalone oriented platform assigns a lower share of integration costs to users.

3.4 Empirical Design and Data Collection

Structured Profiling

To validate the research model presented in Figure 1, we develop a novel exploratory-analysis technique that we call the “structured profiling", as illustrated in Figure 2. In this context, “profiling" denotes the systematic examination of a target's behavior through its historical record. Our structured profiling analysis seeks to reveal latent behavioral patterns embedded in strategic choices by tracing the evolutionary trajectories of B2B platforms.

This framework requires two steps: 1) identifying all hypothetical combinations of strategic choices available to platforms at various points in their lifecycle, and 2) tallying the observed frequencies for each choice trajectory in the data. For example, if platforms make binary choices at each stage and are currently in the Mature stage, this yields $2^4 = 16$ possible trajectories. We then employ current-stage-conditioned aggregation to count platforms by choice path. We also count the frequency of choice pairs occurring at each adjacent stage transition.

This method is designed for survey data that rely primarily on categorical response options–like the ones in our study–which enable us to analyze response frequencies. By counting response frequencies by maturity phase and platform type, this method can reveal how behavioral patterns evolve throughout respondents' historical trajectories, transforming the simple categorical survey answers into rich multi-dimensional, longitudinal insights about platform development.

Survey Questions for Profiling

Our survey consists of multiple-choice questions covering areas such as functionality, sector of operation, value creation, platform openness, and integration costs. All surveys were conducted as online interviews with a helper, guiding the participants of each question in case of ambiguities. For some questions, e.g., network effects and openness, we asked respondents to indicate their historic strategic decisions made during all prior maturity stages. Consequently, the following five dimensions guide this research: (1) B2B platform type, (2) network effects, (3) platform openness, (4) integration cost, and (5) maturity. Ta-

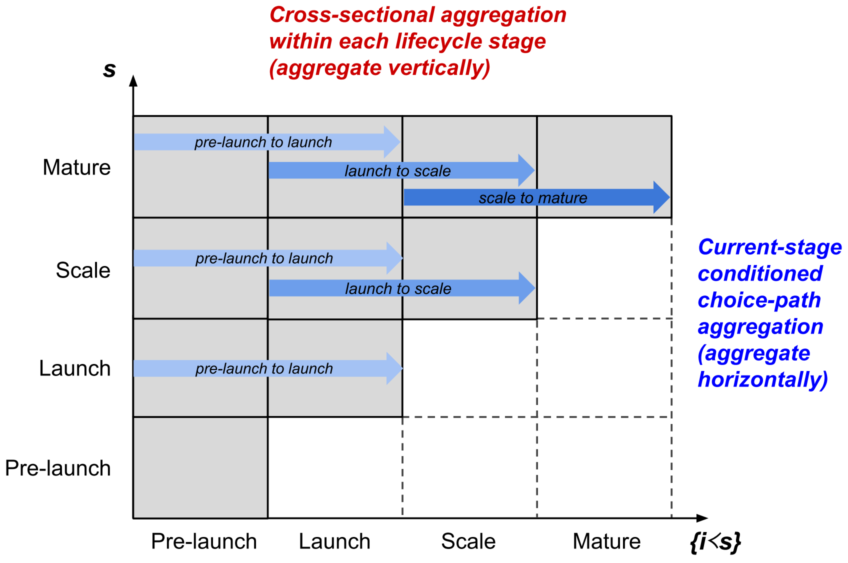


Figure 2: Structured Profiling Framework

Notes: This figure illustrates structured profiling. Let $s \in \{0, 1, 2, 3\}$ denote the current maturity stage of a platform, where $0 =$ Pre-Launch, $1 =$ Launch, $2 =$ Scale, and $3 =$ Mature. For any platform in stage s, the set of preceding stages is represented by $\{i | 0 \leq i < s\}$. The vertical-axis of the figure therefore represents the present stage s, while the horizontal axis lists all the earlier stages i that the platform has already traversed.

ble 1 presents the multi-choice survey items used for measurement.

Table 1: Executive Survey Questions

Construct	Measurement Items
Maturity	Q. Which maturity stage is your platform in? (a) PreLaunch–when you identify potential use cases (pilot, MVP, PoC) (b) Launch–when you first go to market to see if you have product market fit and start building it (c) Scale–when growth accelerates, and you must deal with running the system with many more users/customers (d) Maturity–when growth begins to slow down (second derivative is negative) and you then think about adjacent markets and new functionality to maintain growth
Platform Type	Q. What platform type represents best your platform's functionality? (a) Intelligent Products & Service provider–we augment traditional products with connectivity and data, turning the combination of new, value-added products and/or offer completely new digital services (b) IoT Enabler–we provide technology building blocks and services to enable our clients to develop their own IoT or other solutions (c) Data Aggregator–we aggregate data from various sources to develop services and enable new ways of exchange and collaboration across company and industry borders (d) Marketplace–we provide new innovative ways to bring together offer and demand for traditional products and digital services

Construct	Measurement Items
Network Effects	Q. Is your platform creating stand-alone and/or cross-side value? 1. Stand-alone value–our platform provides already value by itself through its sole functionality, without the involvement or connection of any other sides (e.g., QWS providing infrastructure) 2. Cross-side value–our platform provides value by connecting two or more sides with each other (e.g., Uber connecting drivers & passengers)
Platform Openness	Q. Currently do you provide all products & services on the platform with your own brand (yourself) or with additional 3rd party suppliers? (a) Only your own products & services are provided on the platform (b) In addition to our own, there are also additional 3rd party products & services provided on the platform (e.g., iOS App Store) (c) We do not provide own products & services on our platform, only 3rd party products & services are provided on the platform (e.g., eBay)
Integration	Q. Who pays for upfront required integration & installation costs? (a) There are no upfront integration & installation costs (b) Required integration & installation costs are covered upfront by us, the platform provider, fully (c) Required integration & installation costs are shared between platform participants and platform provider (d) Required integration & installation costs are paid upfront by our platform participants fully

Table 2: Operating Years by Maturity Stage

Maturity Stage	Min	25%	50%	Mean	75%	Max	#Obs
Launch	1	2	4	4.19	5	10	48
Scale	1	5	7	8.30	9	26	119
Mature	3	9	12	12.17	14	23	29
Total							196

3.5 Sample Data

Originally the full sample consists of the responses from 200 respondents, the majority of whom were at the Scale stage at the time of the survey, with 59%. This is followed by Launch (24%) , Mature (14%), and Pre-Launch (2%). Among the 200 platforms, we dropped those in the Pre-Launch due to their limited number of observations, leading to the total number of observations to 196. Implications and/or conclusions drawn from the Scale-stage responses will hold the greatest explanatory power, as these responses constitute 60% of the total sample. We f

In our sample, the operating years span 1 to 26 years. The median operating year is 6 years. More than three-quarters of respondents have been operational for 10 years or less. Longer operating years do not necessarily align with firms' perceived maturity stages. At 10 years of operation, some respondents still identified themselves as being in the Launch phase, and at 20 years or more of operation, some respondents still described themselves in the scaling stage as shown in Table 2.

Table 3 presents the distribution of the platforms in the survey by each functionality type. Some platforms exhibited multiple functionalities; consequently, the total number of observations ($n = 253$) exceeded the number of platform cases (sample size (N)=196). MP comprise 43% out of the total observations, followed by the IoT (23%) and DA (20%), with these categories collectively accounting for 86% of total responses. In later analysis, responses coded as "Other" were removed from the analysis to ensure categorical clarity.

Separately, 54% of the platforms reported creating standalone value, while the remaining create cross-side value. About 46% of the platforms offer solely their own products, while slightly fewer (31%) provide only the third-party products, and a smaller percentage (23%) offer a combination of both. Lastly, in our sample of 196 platforms, upfront integration and installation costs were required for 69% of them, while the remaining 31% did not need initial cost. Among the 69%, various payment modes were used, with the platform provider covering the cost being the most prevalent method.

Table 3: Sample Composition

Construct	Variable				
Maturity	Launch (24%)	Scale (61%)			Maturity (15%)
Platform Type	IP&S (n=31; 12%)	IoT (n=58; 23%)	DA (n=50; 20%)	MP (n=109; 43%)	Other (n=5; 2%)
Network Effect	Stand-alone (54%)		Cross-side (46%)		
Openness	Own-product (46%)		Third-party product (31%)		Mix (23%)
Integration	No upfront integration costs (31%)	Costs covered by the platform provider (45%)		Costs shared between platform participants and platform provider (14%)	Costs paid upfront by platform participants (10%)

Note. The total number of platform types exceeds the sample size of 196 because respondents could select multiple types that demonstrate their functionalities.

4 Research Findings

4.1 Network Effects Developments

Table 4: Value Creation Trajectories of Single Value Platform

Pre-launch	Launch	Scale	Mature	MP	DA	IP&S	IoT
Stand-alone	Stand-alone			7	8	5	18
Stand-alone	Cross-side			2	0	0	0
Cross-side	Cross-side			7	0	0	0
Stand-alone	Stand-alone	Stand-alone		21	17	14	24
Stand-alone	Stand-alone	Cross-side		2	2	0	0
Stand-alone	Cross-side	Stand-alone		7	1	1	1
Cross-side	Stand-alone	Stand-alone		1	0	1	1
Cross-side	Cross-side	Cross-side		19	5	0	0
Stand-alone	Stand-alone	Stand-alone	Stand-alone	1	5	2	2
Stand-alone	Stand-alone	Cross-side	Cross-side	1	0	0	1
Stand-alone	Cross-side	Stand-alone	Stand-alone	1	0	0	0
Stand-alone	Cross-side	Cross-side	Stand-alone	1	1	1	0
Cross-side	Cross-side	Cross-side	Cross-side	13	2	1	0
Total				83	41	25	47

While the technical definition of a network effect emphasizes cross-side value (i.e. the benefit that users on one side derive from the presence of users on the other side), it also includes stand-alone value or the intrinsic utility a platform provides to each side even in the absence of the opposite side. Because stand-alone value is the foundation that attracts traffic and thus enables cross-side effects, we focus on both mechanisms. In our sample of 196 platforms, we observe platforms deriving value through only one logic (either stand-alone or cross-side), or the combination of two logics, making the total number of observations exceeding the 196 platforms in our dataset.

Categorizing the relative frequency of the stand-alone and cross-side value across combinations of value creation logics between stages, we have Table 4 and Table 5. In what follows, we validate the statements specified by Proposition 1, 2, and 3. To validate the Proposition 1, we calculate the proportions of each value creation logic for different platforms, as can be seen in Table 6. The data reveals the proportions of pursuing cross-side value logics were MP (60%), DA (22%), IP&S (12%), and IoT (2%), showing the strength is the highest for MP and lowest for IoT. This shows that the strength of cross-side value creation across platform types are different as proposed.

Table 6 and 7 suggests that the proportion of platforms that adopt a cross-side value creation logic tends to rise unilaterally as the development stage progresses from Launch to Scale and from Scale to Mature across all platform types. This suggests that the cross-side

Table 5: Value Creation Trajectory of Combined Value Platforms

Pre-launch	Launch	Scale	Mature	MP	DA	IP&S	IoT
Combined	Stand-alone			0	1	0	0
Combined	Combined			1	0	0	1
Combined	Cross-side			3	2	2	1
Cross-side	Combined			0	1	0	0
Stand-alone	Combined	Combined		2	0	0	1
Stand-alone	Cross-side	Combined		1	0	0	0
Combined	Combined	Combined		2	1	0	1
Combined	Combined	Cross-side		3	1	0	1
Combined	Cross-side	Cross-side		11	2	2	5
Combined	Cross-side	Cross-side	Combined	1	0	0	0
Combined	Cross-side	Cross-side	Cross-side	2	1	2	1
Total				26	9	6	11

value creation becomes increasingly integral for platform development.

The intensity varies by platform type, however. For MP, IP&S, and IoT, the increments were about 3%-5% while from scale to mature, they were much larger ranging from 10% to 26%. In contrast, DA shows a different trajectory; it experiences a 10% rise from Launch to Scale, but then declines by about 8% when advancing from Scale to Mature. It should be noted, however, that only 29 platforms are classified in the Mature stage, making it difficult to draw statistically significant conclusions on the differences in the growth patterns observed during this stage. Nonetheless, across all platform types, growing proportion of platforms adopting cross-side value creation logic is observed consistently as platforms advance through development stages. This finding suggests that cross-side value orientation becomes an increasingly important strategic logic as platforms mature and grow.

How do Proposition 1 and 2 manifest for combined value platforms? Given the overall sample size of 52 combined value platforms and the particularly small sample sizes for

Table 6: Proportions of Different Value Creation Logics for Single Value Platforms

Value Creation	Stage	MP	DA	IP&S	IoT
Stand-alone	Launch	0.40	0.78	0.88	0.98
	Scale	0.36	0.67	0.85	0.93
	Mature	0.18	0.75	0.75	0.67
Cross-side	Launch	0.60	0.22	0.12	0.02
	Scale	0.64	0.33	0.15	0.07
	Mature	0.82	0.25	0.25	0.33

Table 7: Proportions of Different Value Creation Logic for Combined Value Platforms

Value Creation	Stage	MP	DA	IP&S	IoT
Stand-alone	Launch	0.00	0.11	0.00	0.00
	Scale	0.00	0.00	0.00	0.00
	Mature	0.00	0.00	0.00	0.00
Cross-side	Launch	0.69	0.56	1.00	0.64
	Scale	0.77	0.80	1.00	0.78
	Mature	0.67	1.00	1.00	1.00
Combined	Launch	0.31	0.33	0.00	0.36
	Scale	0.23	0.20	0.00	0.22
	Mature	0.33	1.00	0.00	0.00

DA ($n = 9$), IP&S ($n = 6$) and IoT ($n = 11$), it is difficult to articulate a systematic pattern beyond MP. Nevertheless, we observe a relatively consistent pattern of an increasing proportion of combined value platforms as they grow. However, it warrants discussing Proposition 3 and 4, as MP specifically shows slight decrease in cross-side value creation coupled with a corresponding increase in combined value creation when transitioning from the Scale to Mature stage. In the evolutionary trajectories of B2B platforms, different types of platform exhibit different configurations of persistence and transition. However, conditional on the strength of strategic motivations, persistence is expected to be systematically more prevalent, whereas transition constitutes a comparatively rare outcome.

Table 8 presents stage-by-stage transition probabilities of value creation logic calculated for single value platforms across the four platform types. We examined persistence trends for both stand-alone and cross-side value creation respectively, and transition trends for both standalone-to-cross-side and cross-side-to-standalone transitions respectively. We find that persistence for both standalone value creation and cross-side value creation is uniformly high across all platform types. This appears to be due to the common characteristics inherent in B2B platforms. However, while MP and IoT demonstrate stronger persistence when transitioning from Scale to Mature, DA and IP&S show somewhat weakened per-

Table 8: Value Creation Transition Probabilities for Single Value Platforms

		MP		DA		IP&S		IoT	
		ST	CS	ST	CS	ST	CS	ST	CS
Launch to Scale	ST	0.88	0.12	0.92	0.08	1.00	0.00	0.96	0.04
	CS	0.02	0.98	0.00	1.00	0.00	1.00	0.00	1.00
Scale to Mature	ST	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
	CS	0.07	0.93	0.33	0.67	0.50	0.50	0.00	1.00

Table 9: Value Creation Transition Probabilities for Combined Value Platforms

	ST	*CS*	*CB*
ST	0.00	0.00	0.00
CS	0.00	0.96	0.04
CB	0.00	0.42	0.58

Launch to Scale

	ST	*CS*	*CB*
ST	0.00	0.00	0.00
CS	0.00	0.86	0.14
CB	0.00	0.00	0.00

Scale to Mature

sistence. Additionally, transitions from standalone to cross-side value creation occur only during Launch-to-Scale phase, showing $MP(0.12) > DA(0.08) > IoT(0.04) > IP\&S(0.00)$. Transitions from cross-side to standalone value creation occur only in the Scale-to-Mature phase, with $IP\&S(0.50) > DA(0.33) > MP(0.07) > IoT(0.00)$.

Comparing persistence and transition intensity across platform types yields:

(1) Persistence Strength Comparison:

Launch to Scale CS persistence: $IoT(1.00) = IP\&S(1.00) = DA(1.00) > MP(0.98)$

Scale to Mature ST persistence: $IoT(1.00) = IP\&S(1.00) = DA(1.00) = MP(1.00)$

Scale to Mature CS persistence: $IoT(1.00) > MP(0.93) > DA(0.67) > IP\&S(0.50)$

(2) Transition Strength Comparison:

Launch to Scale ST-CS transition: $MP(0.12) > DA(0.08) > IoT(0.04) > IP\&S(0.00)$

Launch to Scale CS-ST transition: $MP(0.02) > DA(0.00) = IP\&S(0.00) = IoT(0.00)$

Scale to Mature ST-CS transition: $MP(0.00) = DA(0.00) = IP\&S(0.00) = IoT(0.00)$

Scale to Mature CS-ST transition: $IP\&S(0.50) > DA(0.33) > MP(0.07) > IoT(0.00)$

Table 9 presents the stage-by-stage transition probabilities of the value creation logic for combined value platforms. We show the aggregate of all the platform types, as each platform type does not constitute a sufficient number of observations to draw meaningful conclusions. Four key findings emerge from Figure 3: First, exclusive standalone selection is not observed among combined value platforms. Second, exclusive cross-side selection is markedly higher in the Launch-to-Scale phase (95 %) than in the Scale-to-Mature phase (86 %). Third, the transition from cross-side to combined (i.e., adding standalone logic) occurs at 5% during Launch-to-Scale and increases to 14% during Scale-to-Mature. Fourth, the transition from combined to cross-side (i.e., dropping standalone logic) occurs at 42% during Launch-to-Scale but does not occur during Scale-to-Mature.

Synthesizing the analytical results for both single value platforms and combined value platforms demonstrates that Propositions 3 and 4 are empirically well documented. However, it is important to note two critical aspects: First, the heterogeneous persistence and transition intensities observed across platform types warrant careful examination. Second,

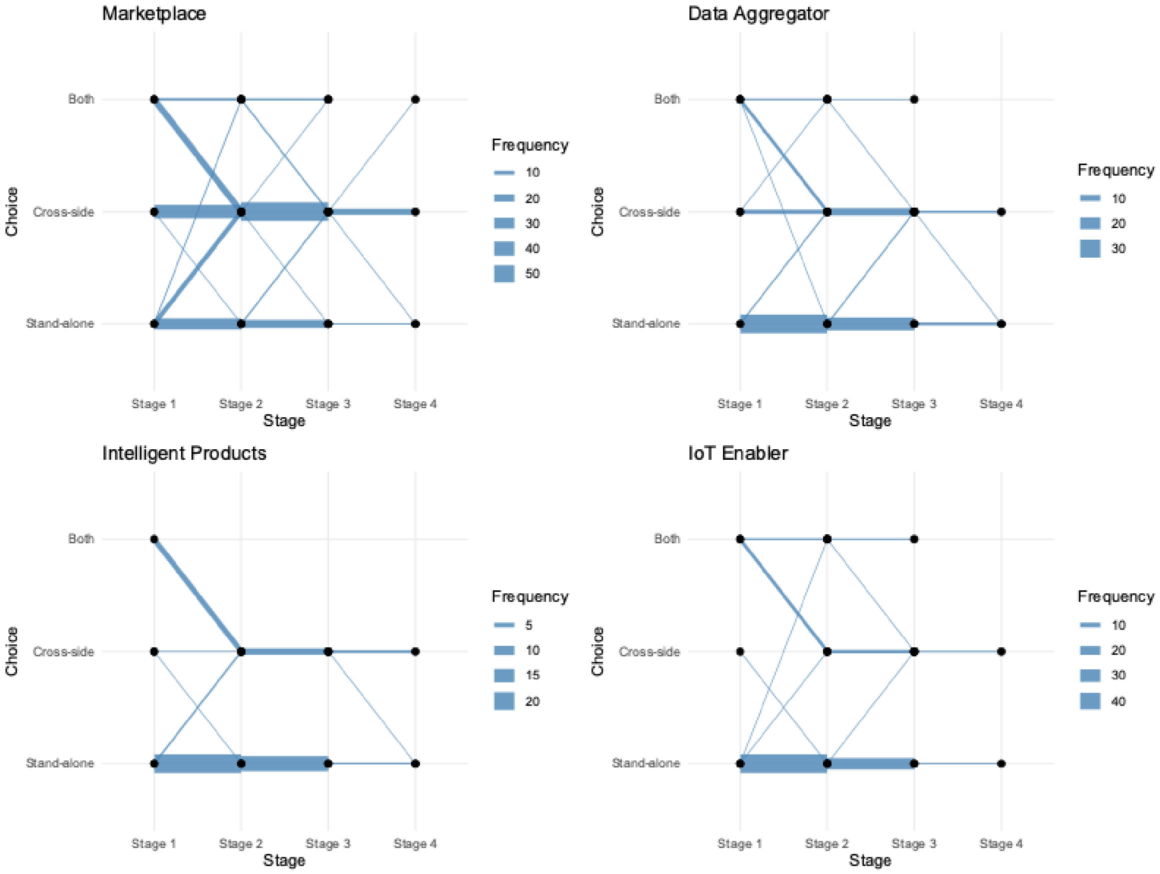


Figure 3: Comprehensive Value Creation Trajectories by Platform Type

the similarities and divergences in persistence and transition patterns between platform types require further investigation into the underlying platform characteristics that drive these differences.

4.2 Dynamics of Open Architecture

B2B platforms are classified as closed architecture when offering only proprietary products and as open architecture when providing third-party products exclusively or in combination with proprietary offerings. Table 10 illustrates the evolutionary trajectory of the platform architecture in all 248 cases.

Examining the stage-by-stage choice probabilities of product offerings across platform types—own products (closed), third-party products (open), and mixed products (open), yields the results shown in Table 11a. The probability of choosing closed architecture (own products) at the Launch stage shows IoT (72%) > DA (54%) > IP&S (52%) > MP (26%). Conversely, the probability of offering third-party products follows the reverse pattern: MP (45%) > DA (26%) > IP&S (23%) > IoT (12%). Meanwhile, the probability of providing mixed products within open architecture exhibits the pattern MP (29%) > IP&S (26%) > DA

Table 10: Evolutionary Trajectories of Platform Architectures

Pre-launch	Launch	Scale	Mature	MP	DA	IP&S	IoT
Own	Own			7	7	4	17
Own	Mixed			1	0	0	0
Mixed	Own			0	1	0	0
Mixed	Mixed			3	1	2	2
Third	Mixed			1	0	0	0
Third	Third			8	3	1	1
Own	Own	Own		18	14	10	23
Own	Own	Mixed		1	0	0	0
Own	Mixed	Mixed		7	1	3	1
Mixed	Mixed	Mixed		13	4	1	4
Third	Mixed	Mixed		1	1	0	1
Third	Third	Mixed		1	1	1	0
Third	Third	Third		28	8	3	5
Own	Own	Own	Own	1	5	2	2
Own	Own	Mixed	Mixed	1	0	0	0
Own	Mixed	Mixed	Mixed	3	1	1	1
Mixed	Mixed	Mixed	Mixed	2	1	1	0
Third	Mixed	Mixed	Mixed	1	1	0	0
Third	Third	Third	Third	12	1	2	1

(20%) > IoT (0.16%), showing relatively modest variation across platform types.

To more clearly contrast these patterns, platform architecture is dichotomized into closed and open architecture and presented in Table 11b. A notable finding is that the adoption probability of open architecture exhibits a general upward trend as platforms progress through developmental stages, regardless of platform type, which supports Proposition 5. However, differences emerge between platform types in both absolute values and proportions. MP increased from 74% to 95%, IP&S from 48% to 67%, and IoT from 28% to 50%, with the most substantial growth occurring during the Scale-to-Mature transition rather than the Launch-to-Scale phase. DA, however, presents an exception, increasing from 46% to 50% before declining to 44% at the Mature stage. While the data reveal suggestive patterns in DA's open architecture adoption, the restricted sample prevents confident inference about adoption mechanisms and their contingencies across implementation stages.

To examine the evolutionary dynamics of platform architecture more systematically, calculating stage-by-stage platform architecture transition probabilities yields the results presented in Table 12. Key findings are as follows:

First, while platform architecture selection exhibits minor variation across platform types, the retention probability of once-chosen architectures is remarkably high, ranging from 83% for IP&S third-party products to nearly 100% across most categories. This empirically demonstrates that persistence in platform architecture selection approaches unity.

Second, transitions between architectural forms occur with considerable rarity. During the Launch-to-Scale phase, only three transitions are observed: MP's own-to-mixed (10%), DA's third-to-mixed (10%), and IP&S's third-to-mixed (17%). Notably, no transitions toward closed architecture occur throughout this process—a finding of particular significance. These two observations provide empirical support for Proposition 4.

Across all groups categorized by their development phase at the time of the survey, a relatively higher proportion of platforms open during the transition from pre-launch to launch, whereas this shift is less pronounced in subsequent evolutionary stages, as shown in Figure 4. Figure 4 reflects the possible categorizations and corresponding response frequencies of different product offering combinations, illustrating how the dynamics of platform openness evolve as platforms mature.

Table 11: Proportions of Different Architectures by Stage

Architecture	Stage	MP	DA	IP&S	IoT
Own	Launch	0.26	0.54	0.52	0.72
	Scale	0.21	0.50	0.50	0.66
	Mature	0.05	0.56	0.33	0.50
Third	Launch	0.45	0.26	0.23	0.12
	Scale	0.45	0.24	0.21	0.16
	Mature	0.60	0.11	0.33	0.25
Mixed	Launch	0.29	0.20	0.26	0.16
	Scale	0.34	0.26	0.29	0.18
	Mature	0.35	0.33	0.33	0.25

(a) Own, Third-Party, and Mixed Products

Architecture	Stage	MP	DA	IP&S	IoT
Closed	Launch	0.26	0.54	0.52	0.72
	Scale	0.21	0.50	0.50	0.66
	Mature	0.05	0.56	0.33	0.50
Open	Launch	0.74	0.46	0.48	0.28
	Scale	0.79	0.50	0.50	0.34
	Mature	0.95	0.44	0.67	0.50

(b) Closed and Open Architecture

Table 12: Transition Probabilities Among Different Platform Architectures

	MP			DA			IP&S			IoT		
	O	M	T	O	M	T	O	M	T	O	M	T
O	0.90	0.12	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
M	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
T	0.00	0.02	0.98	0.00	0.10	0.90	0.00	0.17	0.83	0.00	0.00	1.00

(a) Launch to Scale

O	0.90	0.10	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
M	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
T	0.02	0.02	0.98	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00

(b) Scale to Mature

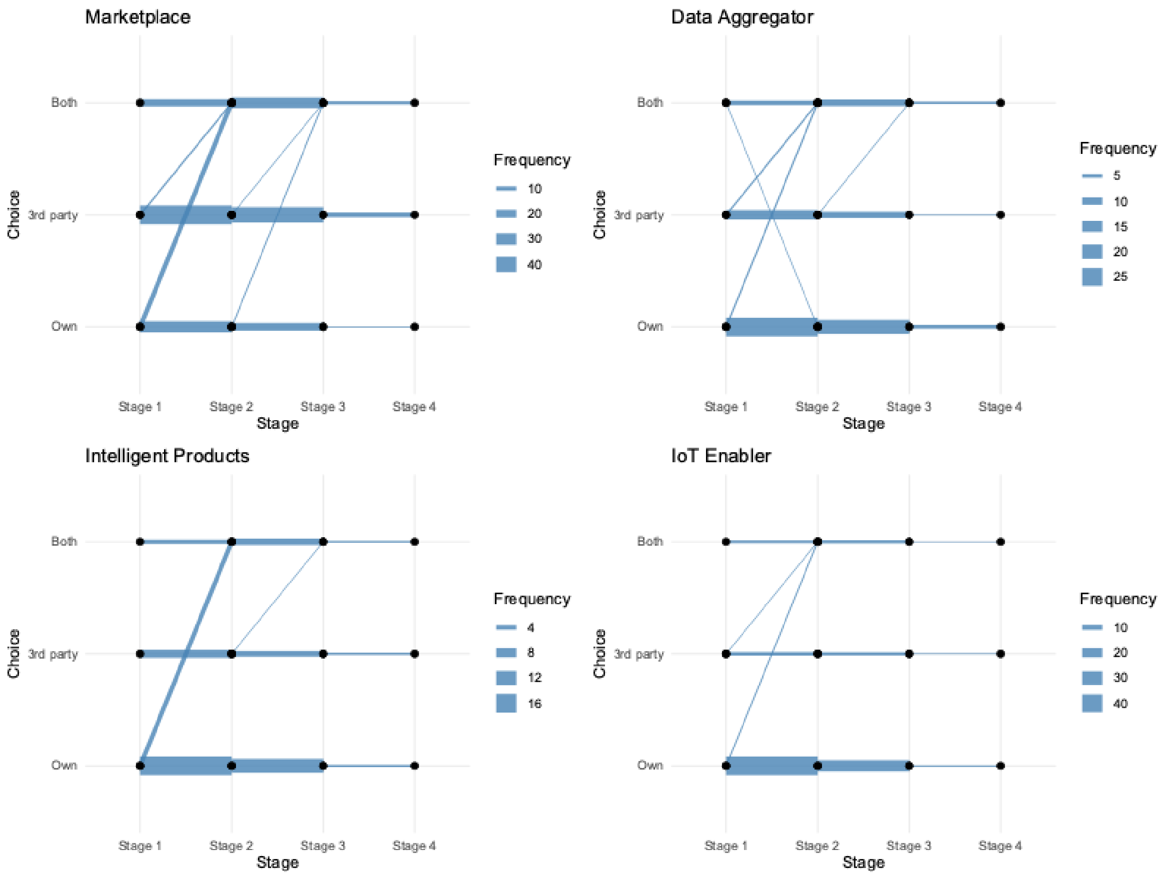
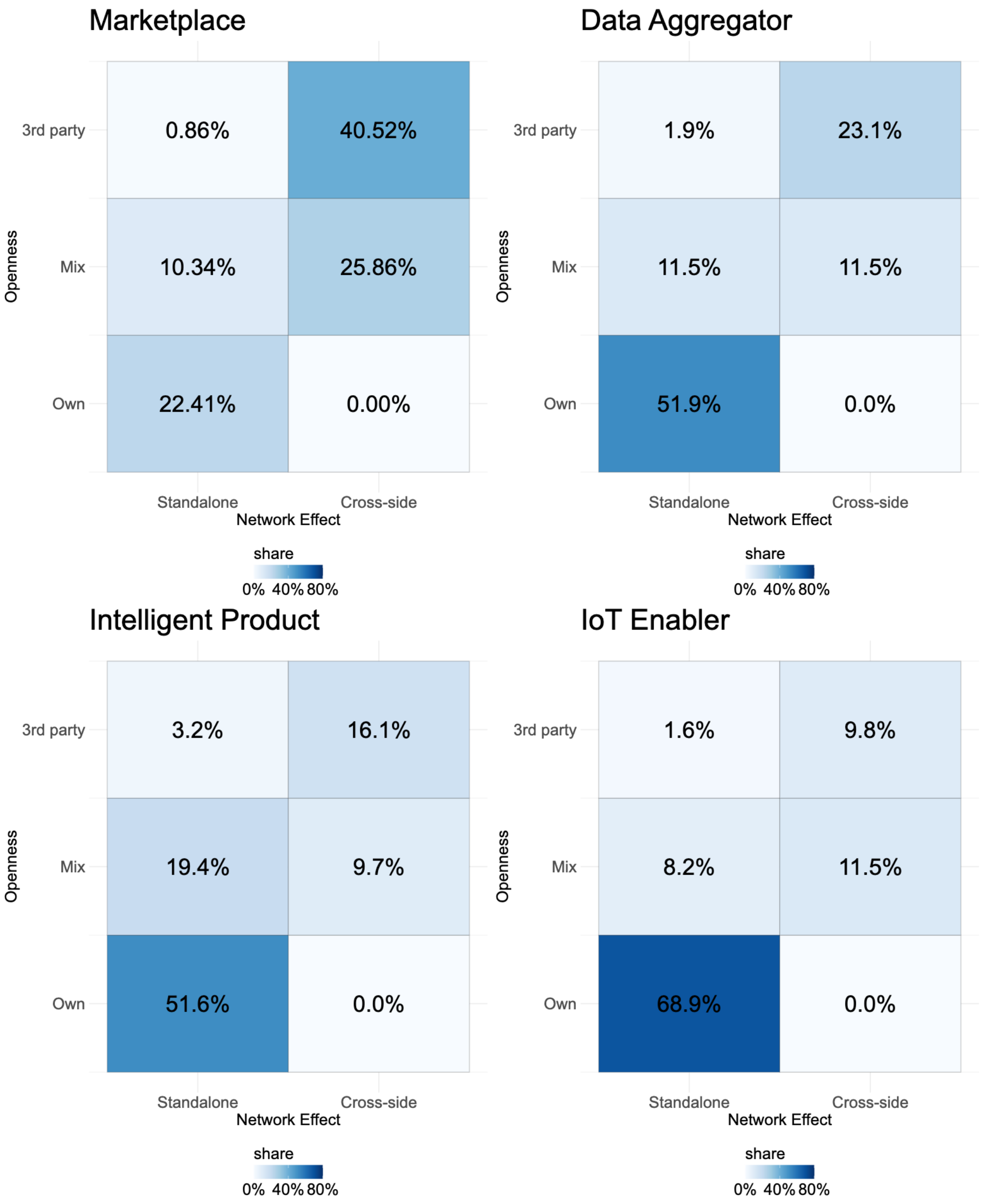


Figure 4: Openness Trajectories by Type

4.3 Interactions between Network Effects and Open Architecture

So far, we have examined the strategic choices of various platform types with respect to network effects and open architecture as separate dimensions. Yet it is not clear whether these strategic variables independent. In other words, do decisions shaping a platform's network effects create complementary synergies with the choice of an open (or closed)



Marketplace	Standalone	Cross-side
3rd party	0.86%	40.52%
Mix	10.34%	25.86%
Own	22.41%	0.00%

Data Aggregator	Standalone	Cross-side
3rd party	1.9%	23.1%
Mix	11.5%	11.5%
Own	51.9%	0.0%

Intelligent Product	Standalone	Cross-side
3rd party	3.2%	16.1%
Mix	19.4%	9.7%
Own	51.6%	0.0%

IoT Enabler	Standalone	Cross-side
3rd party	1.6%	9.8%
Mix	8.2%	11.5%
Own	68.9%	0.0%

Figure 5: Correlation between Network Effect and Openness by Type

architecture, or are the two dimensions mutually exclusive? To explore this question, we present Figure 5, which maps strategic balancing of network effects and open architecture choices across platform types, that allow us to examine how they interact.

We observe that the closed architecture providing only the proprietary products and stand-alone value creation are most strongly coupled for IoT, moderately coupled for IP&S and DA, and most weakly coupled for MP. Meanwhile, the cross-side value is most strongly pursued with providing third-party products by MP, moderately pursued by DA and least pursued by IoT.

The strategic positioning of different platform types is more clearly represented in Figure 6. It shows that open platforms are more likely to create cross-side value across all types, showing positive correlation between the two measures. Features of the closed platforms are similar to “portals", which focus heavily on creating standalone value. In contrast, those that rely on third-party products of their services and products have a higher likelihood of generating cross-side value, with this connection linking back to existing literature emphasizing the implication of platform opening decisions on both value creation and monetization.

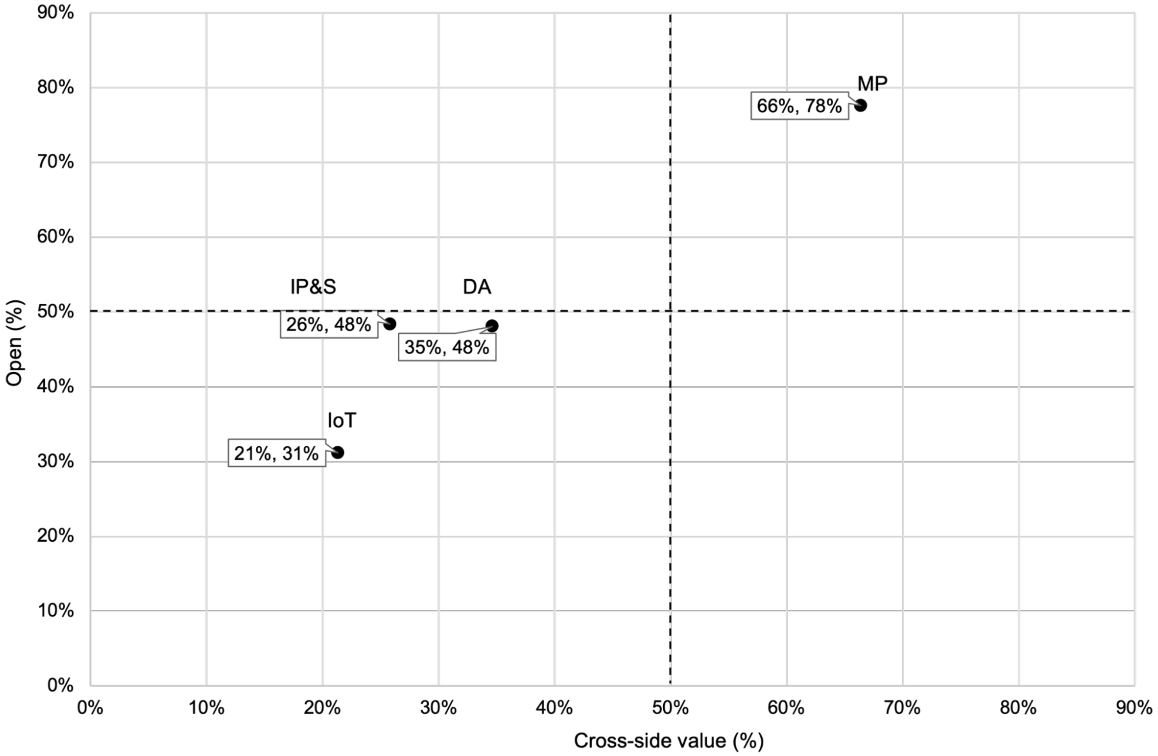


Figure 6: Comparative Positioning of Platform Type:
Cross-Side Value Creation and Openness

In B2B platforms, opening up to offer both their own and third-party brands can be a delicate outcome after examining the trade-offs between adoption and appropriation; while it spreads the adoption, it lowers the rents that the platform can extract by exclusively offering only their own products and services. In that sense, platform openness is a strategic choice, deliberately using it to generate benefits that come along with it, which includes wider adoption, greater innovation, and a new means to generate and capture value, i.e. network effects. However, our finding reveals that its impact on value creation can vary by platform type. By providing the mix of their own and third-party suppliers, MP seems to derive more value from cross-side relative to standalone value relative to other types. But what does it mean for IoT to carry the products of the third party and how do they create cross-side value?

IoT providing the products and services of the third-party may imply that they are acting as a means to connect the demand side with available technology building blocks that the third parties provide. In this way, IoT have similar functionality as MP, which they can benefit from cross-side network effects. Still, it is worth noting that while there are cases of IoT creating cross-side value (21%), this share is significantly lower compared to MP (66%) as shown in Figure 6.

4.4 Interactions with Upfront Integration

Proposition 6 presents two competing hypotheses regarding up-front integration cost sharing. Proposition 6a predicts that when integration costs are equivalent across all platform types, cross-side oriented platforms will exhibit lower user cost-sharing rates due to users' heightened sensitivity to out-of-pocket expenses. Conversely, Proposition 6b predicts that when absolute cost differentials among platform types exceed user sensitivity differentials, standalone oriented platforms will demonstrate lower user cost-sharing rates. While these predictions appear contradictory, the ultimate cost-sharing strategy hinges on how platform operators evaluate user sensitivity to out-of-pocket costs.

Table 13 presents results for 248 platforms, illustrating how integration cost sharing varies across platform types. This enables the following empirical analysis:

First, MP (24%), the most cross-side oriented platform type, exhibits a lower user cost-sharing probability compared to DA (30%) and IP&S (32%). However, IoT (19%),

Table 13: Up-front Integration Cost Sharing Outcome for each Platform Type

	MP	DA	IP&S	IoT
No integration cost occurred (a)	40	12	10	9
Platform pays the cost (b)	43	23	11	38
Platform and user share the cost (c)	16	8	7	6
User pays the cost (d)	10	7	3	5
Total number of platforms for each type (e)	109	50	31	58
Ratio of the platforms where costs occur ($f = (b + c + d)/e$)	0.63	0.76	0.68	0.84
Ratio of the platforms where users pay ($g = (c + d)/(b + c + d)$)	0.38	0.39	0.48	0.22
Ratio that users pay at any rate ($h = f \cdot g$)	0.24	0.30	0.32	0.19

which demonstrates the lowest cross-side value orientation, paradoxically shows an even lower user cost-sharing probability—a finding contrary to expectations. Consequently, Proposition 6a receives partial support or partial rejection.

Second, this divergent pattern between IoT and MP enhances the plausibility of Proposition 6b. Specifically, IoT's lower user cost-sharing rate (19%) relative to MP (24%) suggests that IoT platforms likely bear relatively higher integration costs. Consequently, two interpretations emerge: IoT platforms, characterized by higher user platform dependency, may employ lower cost-sharing rates as part of a lock-in strategy, or alternatively, IoT operators may treat integration costs as preliminary investments, thereby absorbing greater platform burden to incentivize adoption. Proposition 6b is also partially supported.

In conclusion, integration cost-sharing outcomes across platform types vary contingent upon how platform providers assess users' sensitivity to the effective cost burden $\rho_t c$.

5 Concluding Remarks

Our findings can be summarized in Table 14. Our findings reveal strategic orientations vary across platform types, with strong persistence of initial strategic decisions in both value creation and open architecture development. The most stark differences lie between MPs and IoT enablers: MPs remain the most open and derive the greatest benefits from cross-side network effects, while IoT enablers maintain the most closed architectures and benefit primarily from standalone value creation. However, we also observe the possibility for significant complementarity across platform types based on their relative strategic proximity.

For instance, among the pairing of platform functionalities we examined, MP and DA were the most common combination, as illustrated in Figure 7. Mercateo Unite is a representative platform that functions both as a MP and as a data aggregator. It not only facilitates transactions by connecting manufacturers and retailers with business buyers, but also manages and aggregates purchasing and transactional data, ensuring integrated payment processing and providing procurement insights within the platform. This pattern highlights the strategic complementarity of MP and DA across B2B platforms, indicating that firms can view these functionalities as mutually reinforcing. This also suggests that hybrid or multi-functional platforms that integrate diverse capabilities can likely emerge.

We conclude by acknowledging some limitations of our study. We assume that strategy effectiveness is reflected by the most frequently adopted approaches, as we lack performance measures to more precisely assess strategic outcomes. The development of more direct performance measures for each strategic orientation would provide a valuable avenue for future research to better evaluate the effectiveness of strategy across platform types.

Table 14: Strategic Option Profiles by Platform Type

	MP	DA	IP&S	IoT
Network effects development				
Cross-side value orientation at launch	0.60	0.22	0.12	0.02
Cross-side value orientation at mature	0.82	0.25	0.25	0.33
CS persistence from launch to scale	0.98	1.00	1.00	1.00
ST persistence from launch to scale	0.88	0.92	1.00	0.96
ST-CS transition from launch to scale	0.12	0.08	0.00	0.04
CS-ST transition from launch to scale	0.02	0.00	0.00	0.00
Open architecture				
Open architecture at launch	0.74	0.46	0.48	0.28
Open architecture at mature	0.95	0.44	0.67	0.50
Up-front integration cost				
Ratio that user pays integration cost	0.24	0.30	0.32	0.19

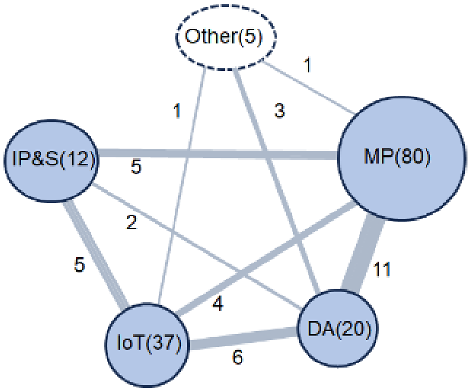


Figure 7: Compatibilities Between Platform Functionalities

References

J. Abendroth, L. Riefle, and C. Benz. Opening the Black Box of Digital B2B Co-creation Platforms: A Taxonomy. In F. Ahlemann, R. Schütte, and S. Stieglitz, editors, *Innovation Through Information Systems*, pages 596–611, Cham, 2021. Springer International Publishing. ISBN 978-3-030-86797-3.

A. Agrawal, J. Gans, and A. Goldfarb. *The economics of artificial intelligence: An agenda*. University of Chicago Press, 2019a.

A. Agrawal, J. S. Gans, and A. Goldfarb. Artificial Intelligence: The Ambiguous Labor Market Impact of Automating Prediction. *Journal of Economic Perspectives*, 33(2):31–50, 2019b.

E. G. Anderson, J. Lopez, and G. G. Parker. Leveraging value creation to drive the growth of B2B platforms. *Production and Operations Management*, 31(12):4501–4514, 2022.

E. G. Anderson Jr., G. G. Parker, and B. Tan. Strategic Investments for Platform Launch and Ecosystem Growth: A Dynamic Analysis. *Journal of Management Information Systems*, 40(3):807–839, 2023.

M. Armstrong. Competition in two-sided markets. *The RAND Journal of Economics*, 37(3): 668–691, 2006.

C. Y. Baldwin. Bottlenecks, Modules, and Dynamic Architectural Capabilities. In D. J. Teece and S. Heaton, editors, *The Oxford Handbook of Dynamic Capabilities*, page 0. Oxford University Press, 2015. ISBN 978-0-19-967891-4.

N. Bartels, M. Koch, A. Schmitt, and J. Gordijn. A taxonomy for platform revenue models: An empirical-to-conceptual development approach. In *International Conference on Enterprise Design, Operations, and Computing*, pages 189–205. Springer, 2023.

N. Berente, B. Gu, J. Recker, and R. Santhanam. Managing artificial intelligence, 2021.

O. Blackburn, P. Ritala, and J. Keränen. Digital Platforms for the Circular Economy: Exploring Meta-Organizational Orchestration Mechanisms. *Organization & Environment*, 36 (2):253–281, 2023.

W. Bolt and A. F. Tieman. Heavily skewed pricing in two-sided markets. *International Journal of Industrial Organization*, 26(5):1250–1255, 2008.

D. Bonnet, B. Chang, G. G. Parker, G. Petropoulos, and L. Serra. Six Strategic Decisions for Every Business-to-Business Marketplace. *Management and business review.*, 5(3), 2025.

K. Boudreau. Open Platform Strategies and Innovation: Granting Access vs. Devolving Control. *Management Science*, 56(10):1849–1872, 2010.

M. Bourreau and A. De Streel. Big tech acquisitions. *Centre on Regulation in Europe*, 2020.

H. Bouwman, B. van den Hooff, L. van de Wijngaert, and J. Dijk. *Information and Communication Technology in Organizations: Adoption, Implementation, Use and Effects*. SAGE Publications Ltd, London, 2005.

T. L. J. Broekhuizen, O. Emrich, M. J. Gijsenberg, M. Broekhuis, B. Donkers, and L. M. Sloot. Digital platform openness: Drivers, dimensions and outcomes. *Journal of Business Research*, 122:902–914, 2021.

C. Cennamo. Building the Value of Next-Generation Platforms: The Paradox of Diminishing Returns. *Journal of Management*, 44(8):3038–3069, 2018.

C. Cennamo and J. Santalo. Platform competition: Strategic trade-offs in platform markets. *Strategic Management Journal*, 34(11):1331–1350, 2013.

A. Chakravarty, A. Kumar, and R. Grewal. Customer Orientation Structure for Internet-Based Business-to-Business Platform Firms. *Journal of Marketing*, 78(5):1–23, 2014.

H. W. Chesbrough. The Era of Open Innovation. *MIT Sloan Management Review*, 2003.

A. W. Colombo, S. Karnouskos, O. Kaynak, Y. Shi, and S. Yin. Industrial Cyberphysical Systems: A Backbone of the Fourth Industrial Revolution. *IEEE Industrial Electronics Magazine*, 11(1):6–16, 2017.

M. A. Cusumano. The Evolution of Research on Industry Platforms. *Academy of Management Discoveries*, 8(1):7–14, 2022.

T. Derave, F. Gailly, T. P. Sales, and G. Poels. A taxonomy and ontology for digital platforms. *Information Systems*, 120:102293, 2024.

Y. Dou and D. J. Wu. Platform Competition Under Network Effects: Piggybacking and Optimal Subsidization. *Information Systems Research*, 32(3):820–835, 2021.

T. R. Eisenmann, G. Parker, and M. W. Van Alstyne. Opening Platforms: How, When and Why?, 2008.

O. Falck and J. Koenen. Industrial digital economy–B2B platforms. *Ifo Study for the BDI*, 2020.

M. Feike and J. Rösch. Nuanced but important: A literature-based comparison between B2B and B2C platforms. *Decision Analytics Journal*, 10:100383, 2024.

C. Filosa, M. Jovanovic, L. Agostini, and A. Nosella. Pivoting B2B platform business models: From platform experimentation to multi-platform integration to ecosystem envelopment. *International Journal of Production Economics*, 280:109466, 2025.

J. M. Gallaugher and Y.-M. Wang. Understanding Network Effects in Software Markets: Evidence from Web Server Pricing. *MIS Quarterly*, 26(4):303–327, 2002.

A. Gawer. Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, 43(7):1239–1249, 2014.

A. Gawer and M. A. Cusumano. Industry Platforms and Ecosystem Innovation. *Journal of Product Innovation Management*, 31(3):417–433, 2014.

F. Geske, P. Hofmann, L. Lämmermann, V. Schlatt, and N. Urbach. Gateways to artificial intelligence: developing a taxonomy for AI service platforms. 2021.

T. M. Guggenberger, F. Hunke, F. Möller, A.-C. Eimer, G. Satzger, and B. Otto. How to Design IIoT-Platforms Your Partners are Eager to Join: Learnings from an Emerging Ecosystem. In F. Ahlemann, R. Schütte, and S. Stieglitz, editors, *Innovation Through Information Systems*, pages 489–504, Cham, 2021. Springer International Publishing. ISBN 978-3-030-86800-0.

D. Hasler, B. Krumay, and D. Schallmo. Characteristics of Digital Platforms from a B2B Perspective – A Systematic Literature Review. 2022.

A. Hein, J. Weking, M. Schreieck, M. Wiesche, M. Böhm, and H. Krcmar. Value co-creation practices in business-to-business platform ecosystems. *Electronic Markets*, 29(3):503–518, 2019.

D. Hodapp, G. Remane, A. Hanelt, and L. M. Kolbe. Business Models for Internet of Things Platforms: Empirical Development of a Taxonomy and Archetypes. 2019.

T. Huikkola, M. Kohtamäki, and J. Ylimäki. Becoming a smart solution provider: Reconfiguring a product manufacturer's strategic capabilities and processes to facilitate business model innovation. *Technovation*, 118:102498, 2022.

M. G. Jacobides, C. Cennamo, and A. Gawer. Towards a theory of ecosystems. *Strategic Management Journal*, 39(8):2255–2276, 2018.

T. D. Jeitschko and M. J. Tremblay. Platform competition with endogenous homing. *International Economic Review*, 61(3):1281–1305, 2020.

B. Jullien. *Two-sided B to B platforms*. Oxford University Press, New York.[1012], 2012.

M. L. Katz and C. Shapiro. Network Externalities, Competition, and Compatibility. *The American Economic Review*, 75(3):424–440, 1985.

K. Laursen and A. Salter. Open for innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms. *Strategic Management Journal*, 27(2): 131–150, 2006.

D. Lee and H. Mendelson. Adoption of Information Technology Under Network Effects. *Information Systems Research*, 18(4):395–413, 2007.

Z. Li and T. Penard. The Role of Quantitative and Qualitative Network Effects in B2B Platform Competition. *Managerial and Decision Economics*, 35(1):1–19, 2014.

Y. Liu, D. Q. Chen, and W. Gao. How does customer orientation (in)congruence affect B2B electronic commerce platform firms' performance? *Industrial Marketing Management*, 87: 18–30, 2020.

I. Mancuso, A. M. Petruzzelli, and U. Panniello. Value creation in data-centric B2B platforms: A model based on multiple case studies. *Industrial Marketing Management*, 119: 1–14, 2024.

M. L. Markus. Paradigm Shifts - E-Business and Business/Systems Integration. *Communications of the Association for Information Systems*, 4, 2000.

P. Meier, N. Friederici, T. Krell-Sun, and D. Trabucchi. Strategies for Designing and Growing Business-to-Business Platforms A Study of Six Cases Across Industrial Sectors in Germany. *Research Technology Management*, 67(2):44–56, 2024.

M. Millan, D. Lüttgens, S. Brenk, and F. Piller. Demystifying the Design of Industrial IoT Platform-Based Business Models – Archetypes and Their Strategic Response to Main Challenges. 2024.

J. Mineraud, O. Mazhelis, X. Su, and S. Tarkoma. A gap analysis of Internet-of-Things platforms. *Computer Communications*, 89-90:5–16, 2016.

H. Ofe and M. de Reuver. Rethinking Openness in Data Platforms: The Impact of Data Artifact Characteristics on Platform Openness. *Business & Information Systems Engineering*, 2024.

G. Parker and M. Van Alstyne. Innovation, Openness, and Platform Control. *Management Science*, 64(7):3015–3032, 2018.

G. Parker and M. W. Van Alstyne. Six Challenges in Platform Licensing and Open Innovation, 2009.

G. Parker, M. Van Alstyne, and X. Jiang. Platform Ecosystems: How Developers Invert the Firm. *MIS Quarterly*, 41(1):255–266, 2017.

G. Parker, D. Bonnet, L. Serra, and L. W. F. Chaves. B2B platforms: Paving the way to success. Technical report, 2023.

G. Parker, D. Bonnet, L. Serra, and E. Farri. The future of B2B: Harnessing platforms for AI, sustainability, and connected value creation. Technical report, 2024a.

G. Parker, G. Petropoulos, M. W. Van Alstyne, and J. West. Driving Open Innovation Through Open Platforms. In *The Oxford Handbook of Open Innovation*. Oxford University Press, 2024b. ISBN 978-0-19-289979-8.

G. G. Parker and M. W. Van Alstyne. Two-Sided Network Effects: A Theory of Information Product Design. *Management Science*, 51(10):1494–1504, 2005.

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

T. Paschou, M. Rapaccini, F. Adrodegari, and N. Saccani. Digital servitization in manufacturing: A systematic literature review and research agenda. *Industrial Marketing Management*, 89:278–292, 2020.

T. Pauli, E. Marx, and M. Matzner. Leveraging industrial IoT platform ecosystems: Insights from the complementors' perspective. In *ECIS*, 2020.

D. Petrik and G. Herzwurm. iIoT ecosystem development through boundary resources: a Siemens MindSphere case study. In *Proceedings of the 2nd ACM SIGSOFT International Workshop on Software-Intensive Business: Start-ups, Platforms, and Ecosystems*, pages 1–6, Tallinn Estonia, 2019. ACM. ISBN 978-1-4503-6854-4.

S. Raff, D. Wentzel, and N. Obwegeser. Smart Products: Conceptual Review, Synthesis, and Research Directions. *Journal of Product Innovation Management*, 37(5):379–404, 2020.

M. Reisinger. Two-part tariff competition between two-sided platforms. *European Economic Review*, 68:168–180, 2014.

F. Riemensperger and S. Falk. How to capture the B2B platform opportunity. *Electronic Markets*, 30(1):61–63, 2020.

J. Rietveld, M. A. Schilling, and C. Bellavitis. Platform Strategy: Managing Ecosystem Value Through Selective Promotion of Complements. *Organization Science*, 30(6):1232–1251, 2019.

P. Ritala and M. Jovanovic. Platformizers, orchestrators, and guardians: three types of B2B platform business models. In *Business model innovation: Game changers and contemporary issues*, pages 91–125. Springer International Publishing Cham, 2024.

P. Ritala, J. Keränen, J. Fishburn, and M. Ruokonen. Selling and monetizing data in B2B markets: Four data-driven value propositions. *Technovation*, 130:102935, 2024.

J.-C. Rochet and J. Tirole. Platform Competition in Two-Sided Markets. *Journal of the European Economic Association*, 1(4):990–1029, 2003.

L. Schermuly, M. Schreieck, M. Wiesche, and H. Krcmar. Developing an Industrial IoT Platform – Trade-off between Horizontal and Vertical Approaches. *Wirtschaftsinformatik 2019 Proceedings*, 2019.

V. Shankar. Business-to-business (B2B) e-commerce. In *Handbook of business-to-business marketing*, pages 562–578. Edward Elgar Publishing, 2022.

D. Sjödin, V. Parida, and I. Visnjic. How Can Large Manufacturers Digitalize Their Business Models? A Framework for Orchestrating Industrial Ecosystems. *California Management Review*, 64(3):49–77, 2022.

V. Springer, K. Randhawa, M. Jovanović, P. Ritala, and F. T. Piller. Platform design and governance in industrial markets: Charting the meta-organizational logic. *Research Policy*, 54(6):105236, 2025.

I. Stange. What Drives the B2B Platform Economy? A Qualitative Examination of Current Trends, Success Factors, and the Road Ahead. *Junior Management Science*, pages 1–31 Seiten, 2022.

N. Staub, K. Haki, S. Aier, R. Winter, and A. Magan. Evolution of B2B Platform Ecosystems: What Can Be Learned from Salesforce? *ECIS 2021 Research Papers*, 2021.

S. Struwe and D. Slepniov. Unlocking digital servitization: A conceptualization of value co-creation capabilities. *Journal of Business Research*, 160:113825, 2023.

M. Subramaniam. *The future of competitive strategy: Unleashing the power of data and digital ecosystems*. MIT Press, 2022.

B. Tan, E. G. Anderson, and G. G. Parker. Platform Pricing and Investment to Drive Third-Party Value Creation in Two-Sided Networks. *Information Systems Research*, 31(1):217–239, 2020.

M. Themistocleous, Z. Irani, and P. E. Love. Enterprise application integration: an emerging technology for integrating ERP and supply chains. *ECIS 2002 Proceedings*, page 88, 2002.

K. Täuscher and S. M. Laudien. Understanding platform business models: A mixed methods study of marketplaces. *European Management Journal*, 36(3):319–329, 2018.

J. Uotila, T. Keil, and M. Maula. Supply-Side Network Effects and the Development of Information Technology Standards. *MIS Quarterly*, 41(4):1207–1226, 2017.

M. W. Van Alstyne, G. G. Parker, and S. P. Choudary. Pipelines, platforms, and the new rules of strategy. *Harvard business review*, 94(4):54–62, 2016.

J. West. How open is open enough?: Melding proprietary and open source platform strategies. *Research Policy*, 32(7):1259–1285, 2003.

Y. Yoo, O. Henfridsson, and K. Lyytinen. Research Commentary: The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research. *Information Systems Research*, 21(4):724–735, 2010.

F. Zhu and M. lansiti. Why Some Platforms Thrive and Others Don't. *Harvard Business Review*, 97(1):118–125, 2019.

K. Zhu. Information Transparency of Business-to-Business Electronic Markets: A Game-Theoretic Analysis. *Management Science*, 50(5):670–685, 2004.