

Power dynamics in software platform ecosystems

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Abstract

In software platform ecosystems, the technological and structural peculiarities vest the platform owner with an extremely powerful position that puts any complementor at the mercy of the platform owner's actions. Paradoxically, it is the self-determination and proactivity of the complementors that determine the ecosystem's success through their surprising outside innovations. This study addresses this power paradox by unpacking the power dynamics between platform owners and complementors. Based on an exploratory multiple-case study of six platform partnerships, we find that power in platform ecosystems unfolds as a reciprocal process of three interlocking cycles, in which both the platform owner and the complementors take an active role. The modus operandi of power in platform ecosystems is a "central power cycle" in which the complementors repeatedly evaluate whether to accept or reject the platform owner's domination power. Thriving partnerships sustain this central power cycle over time, which requires that the platform owner and the complementors dynamically adapt their wielding of power to the changing needs of the partnership (partnership adaptation cycle) or the ecosystem (ecosystem redefinition cycle). For the platform owner, this entails the occasional use of manipulation to favour a particular partnership or redefining the ecosystem's framework

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and sporadically wielding coercion in favour of the broader ecosystem. For the complementor, this entails over-subjectification to entice the platform owner to wield its power in favour of their partnership. Our findings have important implications for platform ecosystem and power theory, as well as managerial practice.

KEYWORDS

episodic power, platform ecosystem, power dynamics, power paradox, systemic power, value co-creation

1 | INTRODUCTION

Partnerships between platform owners and complementors harbour a power paradox: The technological and structural characteristics of platform ecosystems constitute an extremely powerful position of the platform owner, such that each complementor is at the mercy of the actions taken by the platform owner (Huang, Ceccagnoli, Forman, & Wu, 2013; Kude, Dibbern, & Heinzl, 2012). However, despite this powerful position of the platform owner, complementors are not powerless, as the success of the ecosystem depends on their self-determination and proactivity as drivers of often unforeseen and surprising outside innovation (Foerderer, Kude, Mithas, & Heinzl, 2018; Ghazawneh & Henfridsson, 2013; Tiwana, Konsynski, & Bush, 2010). Specifically, complementors make a wide variety of autonomous decisions that directly and significantly affect the value co-created in platform partnerships. These include decisions about the type of software and specific features to offer (Sarker, Sarker, Sahaym, & Bjørn-Andersen, 2012; Wareham, Fox, & Giner, 2014), as well as what innovative solutions to develop (Ceccagnoli, Forman, Huang, & Wu, 2012; Grover & Kohli, 2012) and how to market and sell them (Huber, Kude, & Dibbern, 2017; Kude et al., 2012). While the literature on platform ecosystems has acknowledged the importance of power in general (Cusumano, Gawer, & Yoffie, 2019; Hinings, Gegenhuber, & Greenwood, 2018) and advocated for careful consideration of paradoxical tensions (Huber et al., 2017; Hurni, Huber, Dibbern, & Krancher, 2020; Sarker et al., 2012; Wareham et al., 2014), we lack a systematic understanding of how this power paradox is addressed.

Prior IS research has predominantly investigated the power issues that occur in organisations with hierarchical command-and-control structures (eg, Azad & Faraj, 2011; Dhillon, Caldeira, & Wenger, 2011; Doolin, 2004; Markus, 1983) during the implementation and use of information systems (see Jasperson et al., 2002 for an overview). In such contexts, power processes are typically unidirectional, that is, the actor higher up in the hierarchy imposes its will upon the actor lower down. In contrast, complementors in platform partnerships assume a far more self-determined and proactive role. Consequently, power in platform ecosystems is likely to be a reciprocal process shaped by both the powerful platform owner and the seemingly powerless complementors. However, how exactly the platform owner may wield and adapt its power in a way that is acceptable to the complementors, and how these complementors may accept or reject and actively shape it, remains unclear. Moreover, these reciprocal power dynamics are likely to be multi-level, as effective management of platform partnerships requires platform owners to respond to the (changing) needs of the ecosystem and individual partnerships (Sarker et al., 2012). For example, by setting a standard, the platform owner can wield power at the ecosystem level (Boudreau & Hagiu, 2009; Wareham et al., 2014), while its discretion in enforcing such standards allows for flexibility in tailoring its exercise of power to individual platform partnerships (Huber et al., 2017; Hurni et al., 2020). Therefore, studying power in platform ecosystems promises unique empirical and theoretical insights into how power is wielded in modern contexts of innovation co-creation and how the power moves of platform owners and complementors interact over time and across levels. Accordingly, our goal is to answer the following research question divided into three parts: *How does power*

manifest itself in platform partnerships, how do the power moves of platform owners and complementors interact, and how do the resulting power dynamics relate to the value co-created in platform partnerships?

We conducted an in-depth, retrospective multiple-case study of six platform owner–complementor partnerships to address this research question (Klein & Myers, 1999; Walsham, 1995). Drawing on the comprehensive, multi-level power conceptualization of Fleming and Spicer (2014), our analysis shows how and why power dynamics in platform ecosystems unfold as three interlocking cycles, in which both the platform owner and the complementor take an active role. Furthermore, our analysis shows how alternative power dynamics lead to platform partnerships that (continue to) thrive or (begin to) wither. Our findings contribute novel insights into the nature of power processes in platform partnerships, the active role that seemingly powerless complementors take in this process, and the importance of these power dynamics for co-creation processes and outcomes. These findings have significant implications for platform ecosystem and power theory, as well as managerial practice.

Next, we elaborate on the power paradox in platform ecosystems. Then, we outline the theoretical evolution of power research, which we use as a basis to develop the conceptual foundations of this study. Following this, we present our method and our findings and discuss the contributions, implications and limitations of our research.

2 | THE POWER PARADOX IN SOFTWARE PLATFORM ECOSYSTEMS

Software platform ecosystems are complex inter-organisational settings for relationships between an independent platform owner that provides and controls a platform with core functionality and the many independent complementors that use standardised interfaces to develop innovative complements and extend this platform (Tiwana et al., 2010). This setting harbours a power paradox, which we will discuss below.

2.1 | Co-creation through self-determined and proactive complementors

The co-creation logic that underlies platform ecosystems requires complementors to assume a far more self-determined and proactive role than in traditional technology-creation contexts. Such traditional contexts build on hierarchical command-and-control structures through which power is wielded (Marabelli & Galliers, 2017; Reed, 2012). However, in platform ecosystems, the platform owner needs to coax rather than coerce (Parker & van Alstyne, 2017), since the complementors are legally independent companies and thus not part of a traditional command-and-control structure (Huber et al., 2017; Wareham et al., 2014). This lack of a command-and-control structure is not a mere anomaly, but one of the defining characteristics of platform-based co-creation (Ceccagnoli et al., 2012; Sarker et al., 2012). It rests on the premise of surprising outside innovation that emerges—not because the platform owner hired someone to create it, but through the actions of self-determined and proactive complementors (Foerderer et al., 2018; Ghazawneh & Henfridsson, 2013; Tiwana et al., 2010). This characteristic distinguishes co-creation in platform ecosystems from asymmetric buyer–supplier relationships, such as those found in the retail or automotive sectors. In asymmetric buyer–supplier relationships, dominant actors (such as Walmart or Volkswagen) contract suppliers to deliver finished (pre-)products according to predefined specifications, to sell these products in their stores directly or indirectly as components of their final products (eg, a car) (Dyer, Singh, & Hesterly, 2018). In contrast, in platform-based co-creation, the complementors take a much more self-determined and proactive role: the complementors decide what types of software and specific feature sets to offer (Sarker et al., 2012; Wareham et al., 2014), what innovative solutions to develop (Ceccagnoli et al., 2012; Grover & Kohli, 2012), and how to market and sell these solutions (Huber et al., 2017; Kude et al., 2012). Such autonomous complementor decisions are a vital driver of different co-creation outcomes in platform partnerships because they

directly translate into discernible instances of co-created value, such as additional joint revenues, customers, or markets (Schrieck, Wiesche, & Krcmar, 2017).

2.2 | Technological and structural conditions lend power to the platform owner

In platform ecosystems, complementors are, to a certain extent, at the platform owner's mercy, as their products and services are inextricably linked to the software platform developed and controlled by the platform owner. Specifically, the platform serves as the technological base for complementary products and services offered by the complementors (Tiwana et al., 2010). The complementors access the platform via application programming interfaces (APIs) and extend it using software development kits (SDKs) and native code for satisfying user needs beyond the platform's core functionality (Ceccagnoli et al., 2012; Ghazawneh & Henfridsson, 2013; Sarker et al., 2012). Furthermore, the platform owner unilaterally determines how fast and in which direction the platform will evolve (Boudreau, 2010, 2012), thereby shaping the direction that complementors take for their product and service offerings. For example, the nature of novel features that complementors can offer and the markets they can penetrate or must abandon depend on changes in the underlying platform (Foerderer et al., 2018).

Apart from these technological conditions, the unique one-to-many structure of platform ecosystems harbours asymmetric resource dependencies that lend the platform owner power over both the ecosystem as a whole and each complementor (Kude et al., 2012). In particular, the platform owner makes ecosystem-specific investments to create and maintain valuable resources for many, if not all, of its complementors (Boudreau & Hagiu, 2009). Such resources include the software platform, standardised APIs, SDKs and code repositories (Ghazawneh & Henfridsson, 2013; Kude et al., 2012). In contrast, complementors make platform-specific investments by creating and maintaining resources that are significantly more valuable within their partnership with the platform owner than outside of it (Dyer et al., 2018). For example, the complementors acquire platform-specific technological knowledge and certifications (Kude et al., 2012; Wareham et al., 2014). Because of these asymmetric resource investments, the platform owner hardly depends on individual complementors, but rather the entire ecosystem, whereas the complementors heavily depend on the platform owner.

2.3 | The power paradox and prior IS research

Prior IS research has provided little insight into how to address the unique power paradox in platform ecosystems. Instead, it has focused primarily on power processes in contexts where the main goal is *not* the co-creation of value and power asymmetries are not an issue. This includes research on power processes during the implementation and use of IS in traditional intra-organisational contexts (Jaspersen et al., 2002), such as firms (Dhillon et al., 2011; Howcroft & Light, 2006; Markus, 1983) or healthcare facilities (Cendon & Jarvenpaa, 2001; Doolin, 2004) and research on power in more transactional client-vendor relationships (eg, Heiskanen, Newman, & Eklin, 2008; Levina & Orlikowski, 2009; Pozzebon & Pinsonneault, 2012).

The few studies that have investigated power in co-creation contexts focused on partnerships between equals, which are not characterised by the uniquely asymmetric resource dependencies that plague platform ecosystems (eg, Hart & Saunders, 1997; Valença & Alves, 2017; Valença, Alves, & Jansen, 2018). Moreover, prior IS research on platform ecosystems, while acknowledging the importance of both power (Cusumano et al., 2019; Hinings et al., 2018) and the balancing of paradoxical tensions (Huber et al., 2017; Hurni et al., 2020; Sarker et al., 2012; Wareham et al., 2014), has merely considered power and paradoxes in isolation, with little or no cross-pollination.

Given this void about the role of power in the co-creation of digital innovation, in general, and specifically about how to address the unique power paradox in platform ecosystems, this study aims to provide vital theoretical and empirical insights into the critical, yet somewhat marginalised (Marabelli & Galliers, 2017; Silva, 2007; Simeonova,

Gaillers, & Karanasios, 2020), issue of power dynamics in IS (Hurni & Huber, 2014; Valença et al., 2018; Valença & Alves, 2017). To sensitise the reader to these insights and create a solid foundation for our power conceptualization, the following outlines the theoretical evolution of power research.

3 | THE EVOLUTION OF THE CONCEPT OF POWER

In the past, multiple views have emerged on what constitutes power and which overt and covert characteristics it possesses (Jasperson et al., 2002). In other words, power is “not [one] Thing at all but many Things” (Dahl, 1957, p. 201). This section outlines the historical development of the power concept across different stages.

Early work considers power to be a powerful actor's capacity to press other actors to do something against their will (Polsby, 1963; Weber, 1947). The most influential advocate of this view is Dahl (1957, pp. 202–203), who defined power as something actor A has over actor B “to the extent that he [or she] can get B to do something that B would not otherwise do”. Underlying this view is the idea of an overt conflict of interest between A and B that is “resolved” through enforcing A's interest by mobilising A's power (Hardy & Leiba-O'Sullivan, 1998). According to this view, the power of A over B builds on a particular basis (French Jr & Raven, 1959; Mechanic, 1962), such as a formal position (Hickson, Hinings, Lee, Schneck, & Pennings, 1971), command structure (Thompson, 1956), or the control over valuable resources (Pettigrew, 1973; Salancik & Pfeffer, 1974).

This coercive view of power was soon seen as too narrow, which is why researchers who advocated for opening the concept of power became increasingly vocal (Gouldner, 1970). The most prominent advocates were Bachrach and Baratz (1962), who argued that power is about coercing B to do something he or she would not otherwise do and preventing B from doing something he or she would like to do. The underlying conflict of interest thus remains covert. Therefore, research began to recognise more subtle behaviours as expressions of power, such as excluding B from decision-making processes and the repurposing, inventive use, and even misuse of existing rules (Bachrach & Baratz, 1970; Ranson, Hinings, & Greenwood, 1980).

As broader social sciences refocused their interests on how institutional forces channel social behaviour (DiMaggio & Powell, 1983; Meyer & Rowan, 1977), power research moved on from purely action-oriented views to systemic views (Digeser, 1992). For example, Luke's (1974) radical view understands power as inscribed and embedded in the existing, unquestioned order of things that continually shape behaviours and appear natural and unchangeable. Accordingly, power is located in organisational and societal institutions (Hardy & Leiba-O'Sullivan, 1998), including ideologies (Alvesson, 1984), (organisational) cultures, and “deep structures” (Ranson et al., 1980; Willmott, 1993). The underlying idea is that institutions are not power-neutral. Instead, institutions embody the power imbalances between different actors that can make B act against his or her own interest and instead favour A's interest—even if A does not show any direct behavioural expressions of power (Clegg, 1989).

Later work on systemic and institution-based power emphasised the active role of seemingly powerless actors vis-à-vis impersonal institutions (Hardy, 1994; Hayward, 1998). Much of this work was inspired by Foucault (1977, 1982), who stressed that the subjects, that is, A and B, should be understood as socially constructed entities, whose sense of self is shaped by broader societal role expectations (Knights & Willmott, 1989; Townley, 1993). The underlying notion of subjectification views even less powerful actors as active subjects of power (Hayward, 1998)—actors that construct their own identities and realities (du Gay, 1996) and make their own decisions about their behaviour (Grant, Hardy, Oswick, & Putnam, 2004). In this sense, neither A nor B holds power; instead, power resides in the social construction processes between them (Hardy & Leiba-O'Sullivan, 1998).

This historical outline reveals two key developments: first, action-oriented power views became increasingly integrative, incorporating behaviours beyond coercion. Second, power views developed from a purely action-oriented to an institution-based understanding, mirrored by the widely established distinction between episodic (or direct) and systemic (or indirect) forms of power (Clegg, 1989; Lawrence, Malhotra, & Morris, 2012). This distinction is also at the heart of Fleming and Spicer's (2014) recent integrative power

conceptualization. Next, we outline this conceptualization and utilise it as a basis for understanding power in platform ecosystems.

4 | TOWARD A CONTEXTUALISED POWER CONCEPT FOR PLATFORM ECOSYSTEMS

This section first highlights the merits of Fleming and Spicer's (2014) power conceptualization in terms of understanding the power paradox in platform ecosystems. It then develops a contextualised understanding of its key concepts.

4.1 | The unique strengths of Fleming and Spicer's power conceptualization

Three key features make Fleming and Spicer's (2014) power conceptualization particularly useful for advancing our understanding of the power paradox in platform ecosystems. First, Fleming and Spicer (2014) converge with prior power conceptualizations by distinguishing between episodic power (ie, the direct exercise of power) and systemic power (ie, the more indirect institutional power structures). This distinction frames power as a multi-dimensional phenomenon with different forms situated at different levels. This feature is particularly relevant in the context of platform ecosystems, where platform owners are powerful at both the ecosystem and partnership (ie, dyadic) levels (Wareham et al., 2014).

Second, by decomposing episodic and systemic power into four different "faces", Fleming and Spicer (2014) establish a finer-grained distinction that enables more granular insights into dynamic power processes. Beyond that, they also provide a conceptual tool to advance the tradition of studying power as an emergent and reciprocal process that unfolds as interactions between different power types. This finer-grained distinction broadly reflects the evolutionary stages outlined above (Fleming & Spicer, 2014, pp. 240–245), with *coercion* and *manipulation* as episodic and *domination* and *subjectification* as systemic faces of power (Fleming & Spicer, 2014).

Third, by incorporating subjectification into their conceptualization, Fleming and Spicer (2014) acknowledge the critical roles of both the (in-principle) powerful and the (seemingly) powerless actor. Thus, different from prior conceptualizations, power is not seen as primarily negative and imposed upon the powerless (Fleming & Spicer, 2014; Simeonova et al., 2020). This feature allows us to emphasise how both the platform owner and the complementors shape power processes.

4.2 | The four faces of power in the context of platform ecosystems

Domination refers to the power rooted in hegemonic institutions that appear inevitable and natural (Fleming & Spicer, 2014). In platform ecosystems, the platform owner's domination power rests on its capacity to act as the regulator or social planner of its ecosystem (Boudreau & Hagiu, 2009; Parker & van Alstyne, 2017, p. 3015). Although platform ecosystem research has not yet explicitly investigated power issues, it suggests that the platform owner's domination power finds its expression in a hegemonic ecosystem framework that applies to all complementors. Such a hegemonic ecosystem framework entails ecosystem-wide strategies (Anderson Jr., Parker, & Tan, 2014; Cennamo & Santalo, 2013), technologies (Kapoor & Agarwal, 2017; Song, Xue, Rai, & Zhang, 2017), standards, rules, and regulations (Huber et al., 2017; Scholten & Scholten, 2012; Wareham et al., 2014). The fact that the hegemonic framework applies to the entire ecosystem and must be accepted by the complementors as given and unchanging reflects the systemic nature of the platform owner's domination power.

Coercion refers to the direct mobilisation of power by a powerful actor to persuade or even press another actor to do something “or else” (Fleming & Spicer, 2007, p. 14). In platform ecosystems, coercion describes the platform owner’s capacity to press or push particular complementors to do something they would not have otherwise done. Coercion thus operates at the partnership level. Although prior research argued that the platform owner “can coax, but it cannot coerce” (Parker & van Alstyne, 2017, p. 3015), it maintains some coercive power. Specifically, some resources it controls are central to the complementors’ products, services and strategy (see above). For example, platform owners have been shown to use the threat of withdrawing access to valuable resources to press particular complementors to integrate their product more closely with the platform (Ozalp, Cennamo, & Gawer, 2018). Likewise, platform owners may offer incentives to push particular complementors to act in their platform’s interest (Rietveld, Schilling, & Bellavitis, 2019).

Manipulation refers to the active wielding of existing institutional rules to ensure that actions occur within desired boundaries (Fleming & Spicer, 2014). In platform ecosystems, manipulation entails the repurposing and even misuse of the hegemonic ecosystem framework so that the actions of particular complementors remain within desired boundaries. Manipulation thus operates at the partnership level. In support of this idea, prior research has shown that platform owners can bend ecosystem rules and standards to achieve desirable partnership-level results (Lueker, Foerderer, & Heinzl, 2018). For example, a platform owner can repurpose its partner program to grant specific complementors preferential access to resources (Huber et al., 2017).

Subjectification refers to the self-subjugation toward predefined roles or identities. In platform ecosystems, subjectification describes the subjugation to different identity templates and role expectations. For the complementors, such identity templates and role expectations typically build on the hegemonic ecosystem framework (see above), which stipulates stratified partner programs with rights, duties, and responsibilities at different partner levels (Wareham et al., 2014). The notion of subjectification also foregrounds the possibility of power processes requiring active conformance acts with predefined identity templates on the part of only seemingly powerless actors (Lindgren, Eriksson, & Lyytinen, 2015). The platform owner can also choose to subjectify itself to different roles associated with competing role expectations (Sarker et al., 2012; Wareham et al., 2014). On one hand, platform owners may face the expectation to act in the best interest of the ecosystem as a whole (Kude et al., 2012; Wareham et al., 2014), that is, to take on an ecosystem mindset. To conform with this expectation, the platform owner may redefine the hegemonic ecosystem framework (and thus the basis of its domination power). On the other hand, platform owners may have to respond flexibly to specific needs of particular complementors (Huber et al., 2017; Hurni et al., 2020), that is, take on a partnership mindset. Such flexible responses may result in power being wielded at the partnership level rather than the ecosystem level.

According to Fleming and Spicer (2014), actors may wield the four power faces depending on the situation and moment. They also point out that the power faces are not independent, acknowledging that their interdependencies’ exact nature is unexplored. Our study attempts to get to the bottom of these particular interdependencies by examining the power dynamics in platform partnerships. In particular, we aim to gain a more detailed understanding of the potentially reciprocal and multi-level nature of power in the platform ecosystem, given the unique power paradox. From this, we expect to understand better how power dynamics in platform ecosystems are associated with different co-creation outcomes, as well as how platform owners and complementors can effectively respond to the power paradox.

5 | METHOD

We conducted an in-depth, retrospective multiple-case study of six purposefully sampled platform owner–complementor partnerships from three different platform ecosystems (Klein & Myers, 1999; Walsham, 1995). Initially, we approached four major platform owners, all of which offer various enterprise software platforms, ranging from business applications to middleware and databases. Each of the four platform owners is among the top 10 software companies worldwide (PwC, 2019) and maintains an ecosystem with thousands of complementors, divided into

different partner levels. To fathom the possibility of a longitudinal study, we then approached the local heads of each platform owner's partner programs. Three of the four platform owners (referred to as Mars, Jupiter and Uranus) gave their commitment and allowed us to select two partnerships from their ecosystem for in-depth study. To be considered for our study, a partnership had to be at least 5 years old, to ensure that the study timeframe would be sufficiently long for power dynamics to emerge. We made sure that the partnerships had already ascended or were likely to ascend from lower to higher partner levels, which increased the probability of observing variations in and changes of power. Moreover, to ensure that the studied complementors would be in a structural power imbalance position, all selected complementors were small-to-medium-sized, focused on providing a few specialised software complements, and lacking any intention to launch a competing platform.

5.1 | Data collection

We collected two types of qualitative data. First, we conducted in-depth, semi-structured interviews at both the ecosystem and partnership levels. At the ecosystem level, we interviewed the three ecosystem managers responsible for managing the entire network of complementors in Switzerland. At the partnership level, we interviewed the individuals who are acknowledged as the critical representatives of platform owners and complementors in platform partnerships, that is, the partner managers from both sides (Foerderer, Kude, Schuetz, & Heinzl, 2019; Huber et al., 2017; Hurni et al., 2020). To identify the developments over time, we interviewed every partner manager in two separate rounds (ie, in 2013 and 2015), resulting in 24 additional interviews. The interviews lasted from 40 minutes to 2 hours, with an average duration of 75 minutes. Following the recommendations of Myers and Newman (2007), all interviews were conducted in the interviewees' native language (ie, German) using a semi-structured interview guide, took place on-site (except for two Skype interviews), and were recorded and transcribed. Second, we gathered archival data, including ecosystem-wide documents (ie, the standardised partner contracts, partner program guidelines and codes of conduct) and partnership-level documents (ie, company websites and newspaper articles). Table 1 shows our final sample of six partnerships with the interviews conducted at the partnership level.

5.2 | Data analysis

Our data collection and analysis approach were iterative, allowing us to respond to novel insights by continually refining our data collection instruments. Throughout the analysis process, the collected data from multiple levels, sides and points in time offered various triangulation opportunities (Charmaz, 2006). For the coding of our data, we used NVivo 11 and followed an iterative bipartite approach, as suggested by Charmaz (2006). First, we coded each piece of data line by line and in extensive detail using the four faces of power as starting points for process codes (Miles, Huberman, & Saldaña, 2013). This line-by-line analysis allowed us to curb the human tendency to make conceptual leaps and orient the coding along extant theory, rather than having to develop entirely new categories from the ground up (Charmaz, 2006). However, to ensure that our codes fully and incisively captured our context's specificities, we developed a set of highly contextualised second-order indicators (Miles et al., 2013). This coding approach enabled us to reconstruct how the four faces of power manifested throughout the six analysed partnerships. Table 2 provides the definitions and indicators of the four faces of power in platform ecosystems.

To grasp whether and how different power dynamics are associated with different outcomes, we followed the notion of partnership-level co-created value (Huber et al., 2017; Sarker et al., 2012; Schrieck et al., 2017). This notion is recognised as a critical outcome variable in digital co-innovation (Kohli & Grover, 2008). The key idea is that co-created value manifests in platform ecosystems in the form of discernible instances. Accordingly, we carefully traced the instances of co-created value that manifested in each partnership over time. In this process, the distinction between thriving and withering partnerships emerged. In a thriving partnership, co-created value is growing, that

TABLE 1 Studied cases and case-level interviews

Platform owners	Complementors	Description	t	Interviewees
Mars	Deimos ^a	Medium-sized company (Headcount: <250); Partnership since 2001; Core products: complementary management solutions (customer relationship, case, and more) for Mars's middleware platform	t1	<ul style="list-style-type: none"> • Mars A t1 • Deimos t1
			t2	<ul style="list-style-type: none"> • PM Mars A t2 • Deimos t2
	Phobos ^a	Small company (Headcount: <50); Partnership since 1998; Core product: complementary enterprise document creation tool for Mars's business productivity platform	t1	<ul style="list-style-type: none"> • Mars B t1 • Phobos t1
			t2	<ul style="list-style-type: none"> • Mars B t2 • Phobos t2
Jupiter	Callisto ^a	Medium-sized company; Partnership since 1999; Core product: complementary energy-trading and accounting tool for Jupiter's database management platform	t1	<ul style="list-style-type: none"> • Jupiter A t1 • Callisto t1
			t2	<ul style="list-style-type: none"> • Jupiter A t2 • Callisto t2
	Themisto ^a	Medium-sized company; Partnership since 1996—an erstwhile subsidiary of Jupiter; Core product: heavily customised solution for public companies and governments that complements a variety of Jupiter's platforms on multiple layers	t1	<ul style="list-style-type: none"> • Jupiter B t1 • Themisto t1
			t2	<ul style="list-style-type: none"> • Jupiter B t2 • Themisto t2
Uranus	Ariel ^a	Small company; Partnership since 2007; Core product: complementary, hard- and software-based point of sales solution for Uranus's enterprise resource-planning platform	t1	<ul style="list-style-type: none"> • Uranus t1^b • Ariel t1
			t2	<ul style="list-style-type: none"> • Uranus t2^b • Ariel t2
	Umbriel ^a	Medium-sized company; Partnership since 2004; Core product: complementary field service management solution for Uranus's enterprise resource-planning platform	t1	<ul style="list-style-type: none"> • Uranus t1^b • Umbriel t1
			t2	<ul style="list-style-type: none"> • Uranus t2^b • Umbriel t2

^aThe complementor names match the moons' names of the planets Mars, Jupiter and Uranus (ie, the platform owners).

^bAriel and Umbriel were managed by the same partner manager, with whom we conducted two interviews on the same day (one for Ariel and one for Umbriel).

is, different co-created value instances manifest frequently and continuously (eg, the parties jointly conquer new markets and tap into new customer segments). In a withering partnership, co-created value is diminishing, that is, instances of co-created value manifest less frequently and more sparsely (eg, the partnering companies create less joint revenue and fail to maintain attraction among existing customers). Table 3 provides formal definitions and coding examples for these outcomes.

Next, we focused on exploring relationships between our core concepts to identify general patterns across the six partnerships. For this purpose, we engaged in axial coding and systematically compared the dynamics within and across cases using replication logic, memo writing and tables (Charmaz, 2006; Miles et al., 2013). This analysis step led to identifying three different cycles and their underlying theoretical mechanisms (Charmaz, 2006). We synthesised these cycles in a final step and integrated them into our final process model of reciprocal and multi-level power dynamics in platform ecosystems.

6 | CASE NARRATIVES

The next two sections present rich narratives of how power processes unfolded in two of our six analysed partnerships. These two narratives serve to illustrate alternative power dynamics that we observed across our cases. The

TABLE 2 The four faces of power in platform ecosystems—definitions and indicators

Power face	Definition	Example indicators
Platform owner domination	The imposition of a hegemonic ecosystem framework that appears inevitable and natural to the complementors (Fleming & Spicer, 2014)	<ul style="list-style-type: none"> • The platform owner imposes ecosystem-wide strategies, standards and regulations that all complementors must follow. • The platform owner imposes platform technologies to which all complementors must adhere.
Platform owner coercion	The platform owner directly persuades or even presses a specific complementor to do something “or else” (Fleming & Spicer, 2014, p. 242)	<ul style="list-style-type: none"> • The platform owner persuades a complementor to follow suit by providing (dis-) incentives. • The platform owner presses a complementor to follow suit “or else”.
Platform owner manipulation	The platform owner actively repurposes and even misuses the hegemonic ecosystem framework to ensure that actions occur within desired boundaries (Fleming & Spicer, 2014)	<ul style="list-style-type: none"> • The platform owner repurposes the rules of the partner program to provide a complementor preferred access to resources. • The platform owner (mis)uses existing incentive schemes to enable a complementor to develop a new or improved feature.
Platform owner subjectification	The subjugation to different identity templates and role expectations pertinent in platform ecosystems (Fleming & Spicer, 2014)	<ul style="list-style-type: none"> • The platform owner adheres to the ecosystem mindset and redefines the hegemonic ecosystem framework. • The platform owner adheres to the partnership mindset.
Complementor subjectification		<ul style="list-style-type: none"> • The complementor conforms to the responsibilities and duties associated with different partner levels. • The complementor fully commits to platform-exclusivity.

first narrative stands for cases in which power dynamics unfolded in ways that led to the partnership's continued thriving (ie, Deimos and Ariel). The second narrative stands for cases in which power dynamics unfolded in ways that led the partnership to thrive initially but wither over time (ie, Deimos, Callisto, Themisto and Umbriel). Two figures complement the narratives (see Figures 1 and 2). These Figures, as well as the four figures in the appendix (see Figures A1-A4), visualise the observed power processes and their relationship with long-term movements in co-created value (ie, toward thriving or withering). Building on the narratives, the case drawings and the systematic analysis of power dynamics across all cases, we developed our final model, which explains reciprocal and multi-level power dynamics in platform ecosystems.

6.1 | Deimos—The complementor that excelled

Since 1998, Deimos has focused on enterprise document creation add-ons for the productivity platform of Mars:

“Mars always focuses on the masses when it comes to its products. Their productivity platform, for example, is great for a single user, but not for corporate purposes. That is where we come into play”. (Deimos t1)

TABLE 3 Coding scheme for partnership health

Thriving	Formal definitions	Sample quotes	Codes
Growing co-created value in platform owner/complementor partnerships	<p>“One should not forget that Jupiter generates about 50% of its revenue with partners. [...] With Callisto, for example, we have a partner in the energy sector that enables us to develop this market segment better. [...] Soon, in October, to be precise, Callisto plans a big launch to present its new energy-trading complement for a Jupiter platform. Jupiter supports Callisto up to this launch that, of course, also includes a joint event.” (Jupiter A t1)</p> <p>“Uranus recently launched its new database platform, and our first project [complements for this new database platform] are well underway [...] we are now in a market with Uranus that guarantees us to generate sales in the future”. (Ariel t2)</p> <p>“For us [Mars], Phobos is one of the top partners in Switzerland. That does not necessarily mean that Phobos has the most users or the highest revenue, but that Phobos is important to achieving our own goals [...] [Deimos] is highly devoted and perfectly conforms to our strategy, which is focusing on the cloud. There it [Deimos] invests a lot [...] The app that they sell in our app store for our new cloud platform belongs to the top two worldwide [...] they can benefit from the partnership with Mars, and thanks to the app store, they can now work the global market. This case is a true win-win situation”. (Mars A t2)</p>	<p>⇒ Additional joint markets ⇒ Additional joint projects</p> <p>⇒ Additional complements ⇒ Additional joint markets</p> <p>⇒ Additional complements ⇒ Additional joint customers</p>	
Diminishing co-created value in platform owner-complementor partnerships	<p>“It is always difficult, given that the global focus of Jupiter does not necessarily always match with what we do and need locally. For example, while today the cloud is a big thing globally, we know that in the local energy industry, nobody would store data in a Jupiter cloud in Ireland, the US, or elsewhere. It would work best if the data centers were located in Switzerland or Norway; they are not yet in the EU. Even with Ireland, the energy industry would say, ‘We are not going to do that!’” (Callisto t2)</p> <p>“We are planning a joint event for start-ups. There we are working together to show that the Umbriel complement is well-suited for smaller companies [...] [for this event]; we asked Uranus for support, but their marketing department let us know that we could get anything but the platform. You have to imagine that! What else should they want to show? [...] In a way, we are dependent on Uranus. However, there are efforts to reduce this dependency”. (Umbriel t1)</p>	<p>⇒ Stagnating complementarity</p> <p>⇒ Less joint revenues</p>	

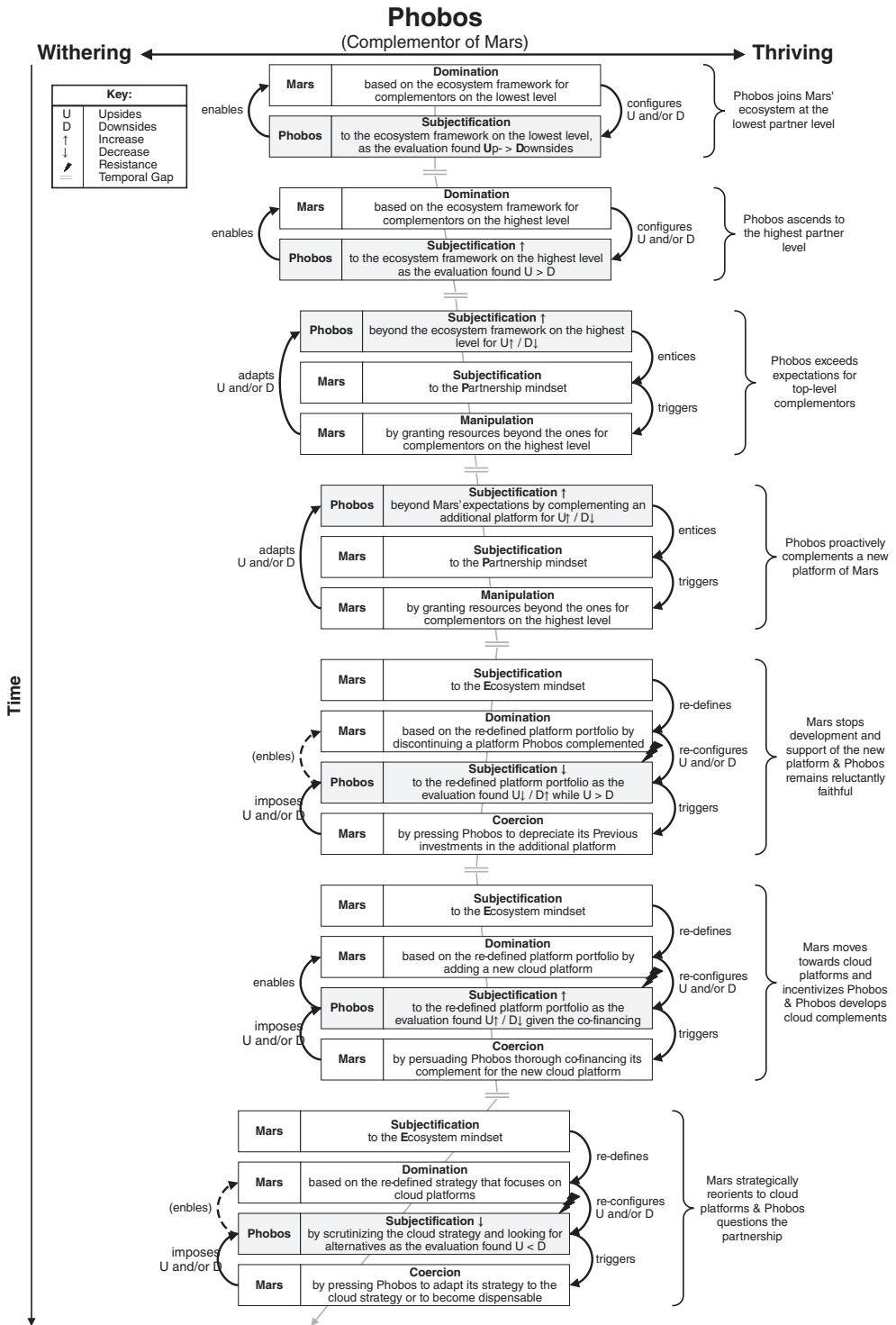


FIGURE 2 Case drawing Phobos

In 2010, Deimos considered it necessary to deepen its relationship with Mars by ascending the partner levels to satisfy its customers better. While such an ascent came with the promise of more rights and benefits, including access to additional resources and better technical support, it also came with additional duties, such as investments in certifications (*Mars: Domination*):

“We now need to pay the partner fee, and we must acquire certifications. Besides, we also need to have a certain number of satisfied customers, and we must certify our products”. (Deimos t1)

Again, Deimos weighed the upsides against the downsides and decided to ascend to the highest partner level (*Deimos: Subjectification*): “I have been with [Deimos] for 2.5 years, and it was my first activity to bring the partnership to a higher level, more specifically, to the highest level”. (Deimos t1). After its ascent, Deimos continued to acquire new customers while improving its software and services for existing customers.

Although the partnership was already thriving, Deimos had the ambition to stand out and began to distinguish itself beyond Mars' expectations of top-level complementors (*Deimos: Over-Subjectification*). For example, although the partner program did not prohibit a diversification to other platforms, Deimos devoted itself exclusively to Mars:

“We are a 100% partner of Mars. In the end, Mars is the market leader in that specific area, and we do not want to scatter our resources on other platforms”. (Deimos t1)

Mars took note of this exceptional devotion and began recognising Deimos as one of its most critical complementors in Switzerland:

“In the specific area of our productivity platform, they [Deimos] certainly are among the most important partners. On the one hand, they indirectly promote our sales with their complement. On the other hand, it is their enormous devotion to the partnership and Mars”. (Mars A t1)

Mars' recognition of Deimos' exceptional devotion and faithfulness became particularly important in situations where the parties faced dyadic constraints. Specifically, when Deimos faced joint business opportunities that could only be leveraged with some flexibility, this devotion enticed Mars to act in the partnership's interest (*Mars: Subjectification to the partnership mindset*) and grant flexibility beyond the standard partner program (*Mars: Manipulation*). For example, while the partner program stipulates standard information channels, Deimos received access to additional information, including earlier and deeper insights into Mars' development division:

“We get in touch with the developers at the headquarters of Mars at a very early stage. Today, they directly inform us about the developments of their productivity platform, which is why we even have a more comprehensive understanding of this platform than the average Swiss employee of Mars”. (Deimos t1)

Mars also enabled Deimos to present its add-ons on national and international stages and ensured that it received various partner awards. These measures made Deimos better known to potential customers and was indeed crucial in winning Deimos' largest international customer at the time:

“I believe it [the devotion and the partner level] is fundamental because it makes us more visible to Mars on a European level. Not least because of that, we were able to acquire one of our largest customers in the Netherlands, which became aware of our solution thanks to a Mars forum”. (Deimos t1)

The give and take between Deimos' exceptional devotion and faithfulness (*Deimos: Over-Subjectification*) and Mars' flexible and benevolent response (*Subjectification to the partnership mindset* and *Manipulation*) meant that the partnership continued to thrive, and more and more value was co-created:

“The closer we collaborate with Mars, and the more we devote ourselves to Mars, the more we are trusted. It is the same for us; it strengthens our trust when we see the way Mars gives us a treat”.
(Deimos t1)

When Mars decided to streamline the ecosystem's internationalisation strategy, the give and take became endangered. At that point, Mars realised that the unclear responsibilities between its national subsidiaries plagued international projects. Hence, Mars decided to meet the ecosystem's needs and make international projects run more smoothly (*Mars: Subjectification to the ecosystem mindset*) by redefining the ecosystem framework (*Mars: Domination*). Specifically, Mars used its right to unilaterally change ecosystem rules by introducing a further differentiation among top-level complementors. These new partner levels imposed a more structured and demanding process for managing international projects on the complementors. However, Mars also ensured that the new partner levels came with valuable benefits, especially the reduction of obstructive competition between its national subsidiaries:

“Well, [before] the Germans were not interested, as it was just a Swiss company and not one of their partners. However, they have foreseen this issue, and as of July 1, they [Mars] have employees, I would say, with a European focus”. (Deimos t2)

Since this obstructive competition had troubled Deimos for years, it gladly chose to comply with the redefined ecosystem framework (*Deimos: Subjectification*), allowing the partnership to continue on its thriving trajectory.

The partnership was again put to the test when the industry shifted toward cloud-based delivery models. During this time, Mars again decided in the strategic interest of the ecosystem by deploying its platforms in the cloud (*Mars: Subjectification to the ecosystem mindset*), redefining the ecosystem framework (*Mars: Domination*):

“At the moment, an obvious switch toward the cloud is happening. This concerns not only us, but also the entire industry. Mars, our most important partner, makes us feel that quite plainly. Currently, many things are happening on the way to the cloud, and that is where we are challenged”.
(Deimos t2)

This strategic reorientation directly played into the hands of Deimos, which conceived it as an opportunity to make global product offerings:

“[...] the whole market will change. In the future, apps will replace the [local] applications known today [...] One will inevitably become international – except for the ones that isolate themselves, but we do not want that, right?” (Deimos t2)

Deimos voluntarily complied with the modified ecosystem framework by being one of the first complementors to make its solutions cloud-ready (*Deimos: Subjectification*):

“[Deimos] is highly devoted and perfectly conforms to our cloud-focused strategy. There it [Deimos] invests a lot, and in December, it is going to launch two critical apps that will complement our cloud-based productivity platform”. (Mars A t2)

However, Deimos encountered difficulties in migrating to the cloud, which could only be addressed with additional support from Mars, beyond the standardised partner program. In these situations, Mars continued to acknowledge Deimos' exceptional devotion (*Deimos: Over-Subjectification*) and acted in the partnership's interest (*Mars: Subjectification to the partnership mindset*) by granting Deimos additional support (*Mars: Manipulation*):

“There, we were heavily supported by Mars, as we already had the first apps running on the cloud-based productivity platform. Mars took these apps and presented them during their developers' conference as a paradigm for how they expect to work in the future”. (Deimos t2)

In yet another instance, Mars responded to Deimos' ongoing devotion (*Deimos: Subjectification*) by acting in the partnership's interest (*Mars: Subjectification to the partnership mindset*) and admitting it on an exclusive advisory board of partners (*Mars: Manipulation*). This act enabled Deimos to satisfy customer needs better:

“We are now part of an [international] advisory board of leading partners. That is what we like to do, and this increased our impact. We always try to bring in our customers' opinions to present them to Mars. As our CEO advises Mars in cloud applications for their cloud-based productivity platform, we can currently do this very intensively. In other words, to highlight customer needs”. (Deimos t2)

6.2 | Phobos—The flagship complementor that sank to insignificance

Founded in 1998, Phobos focuses on management solutions (customer relationship, case, and more) for small- to medium-sized enterprises and the public administration.

Although Phobos was already building its solutions on Mars' middleware platform from 1998 to 2001, it was not until 2001 that it began thinking about joining the ecosystem. However, to become a partner at the lowest level, Phobos had to comply with the hegemonic ecosystem framework (*Mars: Domination*). Specifically, this required the signing of the partner contract that configured the duties and limitations, as well as access to exclusive resources. Since access to these exclusive resources outweighed the partnership's downsides, Phobos decided to sign (*Phobos: Subjectification*): “*The rules are there and are accepted*” (*Phobos t1*). This decision quickly paid off, as the formal partner status served as a quality seal, resulting in a significant sales increase.

After some years, Phobos voluntarily ascended to the highest partner level (*Phobos: Subjectification*) to gain access to increasingly valuable resources in return for accepting additional duties (*Mars: Domination*). For example, the ascent to the highest partner level implied a dedicated partner manager's assignment, which allowed Phobos to access more information that helped improve its solution significantly.

Interestingly, Phobos continued to devote itself even beyond Mars' expectations of top-level complementors (*Phobos: Over-Subjectification*). For example, Phobos abandoned a competing platform in favour of offering its solution exclusively for Mars' platform:

“Because of our devotion, we became a sort of a Mars “joint”. In other words, we use its products as best and as often as possible”. (Phobos t1)

Noting Phobos' exceptional devotion, Mars acted in the partnership's interest (*Mars: Subjectification to the partnership mindset*) and became more flexible to Phobos' needs (*Mars: Manipulation*). For example, Mars gave Phobos preferred access to valuable resources, such as high-quality technical support and exclusive information:

“When I was visiting their headquarters, they even granted me a glimpse into their future productivity platform and showed me their release plan, [...]” (Phobos t1)

For years, Phobos continued to devote itself beyond its duties, which Mars episodically reciprocated with extra support. For example, Phobos proactively adopted a new front-end platform heavily promoted by Mars (*Phobos: Over-Subjectification*). This devotion, in turn, enticed Mars to act in the partnership's interest (*Mars: Subjectification to the partnership mindset*) and grant Phobos extra support (*Mars: Manipulation*):

“We supported each other [...] [Mars] even helped us dispelling our customer's concerns when we tried to introduce the new front-end platform”. (Phobos t2)

Initially, adopting the new front-end platform let the partnership thrive; Phobos attracted new customers and contributed to the ecosystem's growth. However, in an unexpected strategic turn triggered by bleak market prospects, Mars halted development of the platform and announced that it would discontinue support (*Mars: Subjectification to the ecosystem mindset*): “One year later, there was the change, with the division head declaring the death of the new front-end platform”. (Phobos t2). This turn redefined the hegemonic ecosystem framework and took away a critical foundation of Phobos' relationship management solution (*Mars: Domination*), leaving Phobos with no “alternative” (Phobos t2) than to depreciate all its investments into the new platform and recall the solution (*Mars: Coercion*):

“At that time, we already had about twelve to fourteen instances of our solution running on the front-end platform. We now have to call them back”. (Phobos t2)

The severe financial damage gravely damaged the partnership and made Phobos more cautious. Specifically, Phobos began to question the redefined hegemonic ecosystem framework and reduce its excessive devotion (*Phobos: Subjectification*):

“It was one of the most distinctive events, and it is because of this event that we no longer trust their strategy”. (Phobos t2)

Driven by an emerging market shift in the software industry, Mars shifted its focus in 2013 from traditional on-premises to cloud-based delivery models in the ecosystem's interest (*Mars: Subjectification to the ecosystem mindset*). This strategic shift resulted in a partially redefined platform portfolio and ecosystem framework (*Mars: Domination*)—see Deimos for details. However, for the new cloud platforms to gain a foothold in the market, Mars aimed to ensure that a broad set of complements were already available on the date the platform was brought to market. To achieve this, Mars persuaded select partners to go along with the strategic reorientation by co-funding their developments (*Mars: Coercion*):

“Currently, we are developing apps for the new middleware platform, and Mars supports us by taking over some of our development costs”. (Phobos t1)

Although Phobos' concerns persisted, Mars' financial support convinced it to go along with this strategic reorientation (*Phobos: Subjectification*). Interestingly, Phobos was even able to attract some additional customers.

Over the years, and to remain competitive, Mars shifted its entire strategic focus to the cloud (*Mars: Subjectification to the ecosystem mindset*). To this end, Mars has fundamentally redefined its platform portfolio and ecosystem framework (*Mars: Domination*). This redefinition caused Phobos to question the partnership again (*Phobos: Subjectification*). Although Phobos had been exceptionally fast in embracing “the cloud” (*Mars A t2*), its core customer group—the public sector—turned out to be incredibly slow in adopting it: “The cloud tends to be adopted a bit slower in the public sector than in other sectors” (*Mars A t2*). Mars' continued attempts to push Phobos toward the cloud (*Mars: Coercion*) started to increase the conflict with Phobos' strategic focus on the public sector. Mars noted that

Phobos was “not quite as dynamic” (Mars A t2) anymore, while Phobos felt that they were “no longer at the heart of [Mars] strategic investment focus” (Phobos t2). Although Phobos was still on the highest partner level and still received all the standard benefits of that level, Mars no longer considered Phobos as a priority partner and consequently stopped providing Phobos with preferential treatment:

“We are still a gold partner of Mars, but with the general cloud and app focus at Mars, we are no longer at the heart of [Mars's] strategic investment focus. [...] it is obvious that their goals and ours no longer match perfectly [...] currently, we tend to feel that our partnership at the highest level is going south”. (Phobos t2)

Mars' indifference caused Phobos great concern. Trapped in a situation where the needs of its customer base conflicted with Mars's new strategy, Phobos began to re-evaluate the partnership and questioned whether the benefits of the highest partner level still outweighed the associated duties:

“We asked ourselves what exactly the benefits of our partner level are. Just this week, we discussed if it is still necessary [...] no, it is not. In the end, other labels are much more valuable”. (Phobos t2)

Eventually, Phobos decided that it was time to make provisions for descending the partner level and offering its solutions to other platforms (*Phobos: Subjectification*). This made the partnership with Mars wither; rather than offering platform-exclusive solutions tailored to its customer base's specific needs, Phobos started to act as a platform-agnostic software services company that was open to many competing platforms.

7 | TOWARD A MODEL OF POWER DYNAMICS IN PLATFORM ECOSYSTEMS

The six analysed platform owner–complementor partnerships differed in the value they co-created over time. Some partnerships thrived throughout the entire relationship and continuously produced co-created value instances (see Deimos & Mars and Ariel & Uranus in Table 4). Other partnerships thrived for some time, but then began to wither (see Phobos & Mars, Callisto & Jupiter, Themisto & Jupiter and Umbriel & Uranus in Table 4), that is, after some time of continuously producing instances of co-created value, these instances began to occur less regularly. These outcome dynamics were systematically associated with different long-term power dynamics.

Next, we synthesise the power dynamics observed across our six cases in three power cycles before integrating them into a model that explains how and why power in platform ecosystems evolves and how such dynamics translate into outcome differences.

TABLE 4 Cross-case analysis

Partnership:	Identified cycle sequence:							Outcomes:
Deimos – Mars	CC	CC	PC	EC	EC	PC	PC	Thriving
Phobos – Mars	CC	CC	PC	PC	EC $\not\wedge$	EC	EC $\not\wedge$	Thriving then Withering
Callisto – Jupiter	CC	CC	PC	PC	EC	EC $\not\wedge$		Thriving then Withering
Themisto – Jupiter	CC	CC	EC	PC	EC	EC	EC $\not\wedge$	Thriving then Withering
Ariel – Uranus	CC	CC	PC	EC	PC	EC		Thriving
Umbriel – Uranus	PC	CC	PC $\not\wedge$	EC	PC $\not\wedge$			Thriving then Withering

Abbreviations: CC, Central power cycle; EC, Ecosystem redefinition cycle (if $\not\wedge$: Complementor resists); PC, Partnership accommodation cycle (if $\not\wedge$: Platform owner resists).

7.1 | The central power cycle

At the heart of our cases is a cyclical process in which complementors agree to subjectify themselves to the platform owner's domination power in return for anticipated benefits. The basis for the platform owner's domination is the hegemonic ecosystem framework that defines strategies, technologies, standards, rules and regulations. Complementors must accept this hegemonic ecosystem framework to become a member of the ecosystem. The complementors' decision to initially subjectify themselves to the ecosystem framework resulted from an evaluation process in which they weighed the associated upsides against the downsides. The upsides entailed the eligibility to complement a software platform and access valuable resources, including SDKs, market reports, sales support, or the right to act as an official partner. The downsides entailed the duties and restrictions of being part of the ecosystem, including the need to make platform-specific investments, adhere to APIs and design standards, or comply with licensing policies and sales targets. Provided a complementor found that the upsides outweighed the downsides, it subjectified itself, thereby enabling the platform owner to wield its domination power (see $U > D$ in Figure 3).

As the partnerships progressed, this cyclical process, in which platform owner and complementor traded domination and subjectification occurred repeatedly. Specifically, whenever complementors considered ascending to higher partner levels, they faced the characteristics of the corresponding tier of the ecosystem framework, which promised access to increasingly valuable resources and implied increasingly demanding duties and restrictions. Accordingly, the complementors evaluated these reconfigured upsides and downsides. As with the initial decision to join the ecosystem, a complementor subjectified itself if the associated upsides outweighed the downsides (see $U > D$ in Figure 3). In every analysed partnership, the complementors voluntarily ascended to the highest partner level, so this process unfolded as repeated cycles of complementor subjectification and platform owner domination.

As long as this central power cycle was sustained, the partnerships continued to thrive, that is, they experienced systematic increases in co-created value. However, in all six partnerships, the hegemonic ecosystem frameworks reached their adaptive limits in the face of internal and external events that put a strain on the central power cycle.

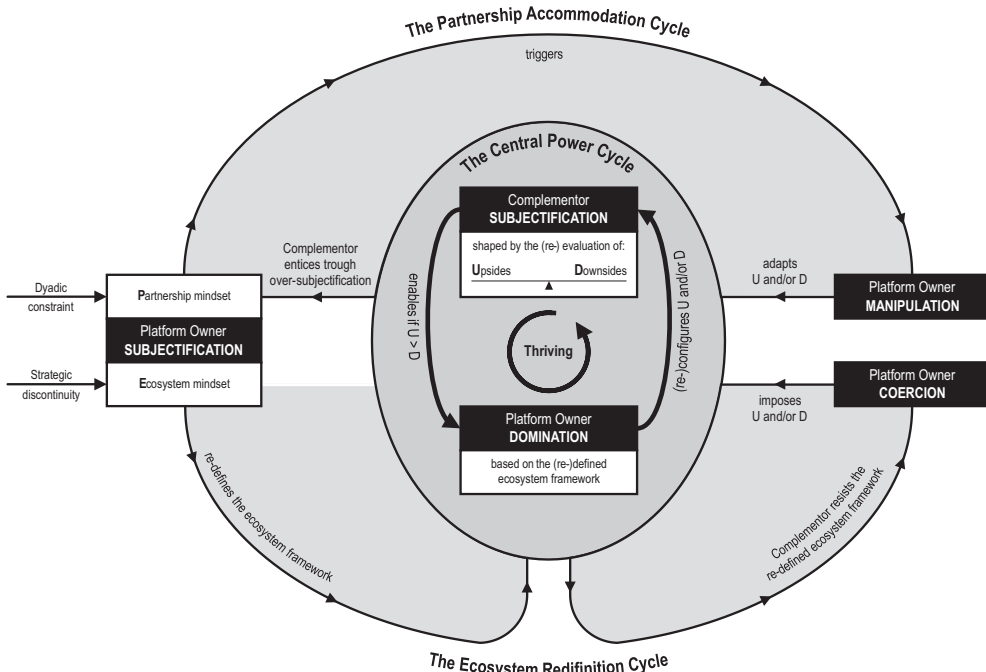


FIGURE 3 Process model of power in platform ecosystems

To sustain the central cycle in the face of such events, both parties had to alter their use of power. We capture these responses in two additional power cycles (ie, the partnership accommodation cycle and the ecosystems redefinition cycle), explained below.

7.2 | The partnership accommodation cycle

The partnership accommodation cycle is triggered by dyadic constraints that prevent platform partnerships from responding appropriately to specific situational needs, including business opportunities or evolving customer needs. Such dyadic constraints became increasingly salient across all our cases once complementors had ascended to the highest partner level. They became salient because complementors at this level already had access to the most valuable resources. Thus, in the event of a dyadic constraint, the problem could not be resolved by further ascension. Frequently, dyadic constraints tilted the platform owner toward the partnership mindset, creating a willingness to wield power to benefit a particular partnership with a particular complementor (see platform owner subjectification on the left in Figure 3). However, while dyadic constraints created awareness among platform owners that a subjectification to the partnership mindset was warranted, they carefully evaluated whether the specific situation and complementor deserved such a move. If the platform owners concluded that the subjectification to the partnership mindset was justified, they resorted episodically to dyadic-level manipulation, that is, they adapted the upsides and downsides by providing additional resources tailored to the needs of the specific partnership and complementor. In doing so, the platform owners went well beyond what the ecosystem framework promised. The complementors noted and appreciated such flexible use of manipulation in their favour. Specifically, whenever the platform owner wielded manipulation, it lured complementors into continued subjectification by increasing the upsides of partnering with the platform owner and relaxing some of the restrictions that had inhibited the partners from appropriately responding to situational needs. Hence, the partnership accommodation cycle helps sustain the central power cycle by adapting upsides and downsides, which contributes to continued thriving.

Complementors can actively entice the platform owner to tilt to a partnership mindset by voluntarily subjectifying themselves above and beyond their partner level's role template. In doing so, the complementors could signal their continued devotion and faithfulness to the platform owner and the partnership (see top left in Figure 3). Such over-subjectification seemed to act as an advance payment across the six cases, which platform owners reciprocated by subjectifying themselves to the partnership mindset and wielding manipulation power for the complementors' benefit. The resulting closer and more intense cooperation enabled the partners to coordinate their development and innovation efforts better and approach customers with more sophisticated offers, such that the partnership continued to thrive. Conversely, if the platform owners concluded that a specific situation and complementor was not worthy of adopting a partnership mindset and wielding manipulation power, the partnership became less effective in leveraging joint business opportunities and began to wither.

7.3 | The ecosystem redefinition cycle

The ecosystem redefinition cycle is triggered by strategic discontinuities, that is, unforeseen changes that alter the competitive landscape of the platform owner and its ecosystem. In our cases, new technologies were the primary source of strategic discontinuities. For example, all three-platform owners responded to the rise of cloud computing by phasing out their traditional on-premises software systems and transitioning toward cloud-based delivery models. Because such strategic discontinuities invited fundamental and far-reaching adaptations, platform owners conducted them with an eye on the ecosystem as a whole, rather than on individual partnerships. Accordingly, strategic discontinuities tilted the platform owners' subjectification toward the ecosystem mindset (see platform owner

subjectification in Figure 3). Specifically, the platform owners unilaterally redefined the ecosystem framework, thus changing the basis of their domination.

The redefined ecosystem frameworks implied a redefined basis of the platform owner's domination, thus reconfiguring complementors' rights and duties. In these cases, the complementors revisited their subjectification and re-evaluated the reconfigured upsides and downsides. If complementors concluded that the reconfigured upsides outweighed the downsides, they decided to subjectify themselves ($U > D$), thereby sustaining the central power cycle and allowing the partnership to thrive. However, if the complementors concluded that the reconfigured downsides outweighed the upsides ($U < D$), they developed a critical stance toward their subjectification and offered resistance (see bottom right in Figure 3). In this case, the platform owners tried to coerce unruly complementors into subjectification and imposed the reconfigured upsides and downsides. For example, platform owners stressed that complementors that did not follow a new strategy would risk losing their partner status and associated resource access. Interestingly, if the platform owner's coercive efforts broke the resistance of unruly complementors, this also helped sustain the cyclical process, such that partnerships continued to thrive. In contrast, if platform owners failed to coerce complementors into continued subjectification, the cyclical power process could not be sustained, and the partnership began to wither.

7.4 | A model of power dynamics in platform ecosystems

We observed all three cycles at least once in every case. Table 4 summarises the sequence of the power cycles and links these power dynamics to changes in outcomes. Figure 3 integrates the three cycles in our process model of power in platform ecosystems. At the centre of our model is the central power cycle, in which complementors repeatedly evaluate whether to accept or reject the platform owner's domination power in return for certain benefits. Partnerships that thrive sustain this central power cycle over time (see the first sequences of the power cycles in Table 4). To this end, platform owners and complementors must dynamically adapt their wielding of power to the changing needs of the partnership (partnership accommodation cycle) or the ecosystem (ecosystem redefinition cycle).

The partnership accommodation cycle, shown in the upper half of Figure 3, allows for overcoming dyadic constraints. This cycle entails that the platform owner tilts toward a partnership mindset and wields manipulation power in favour of a specific partnership. From the complementor's perspective, such accommodation results in tangible and beneficial adaptations of the upsides and downsides associated with the platform partnership to sustain the central power cycle. Moreover, complementors can entice the platform owner to tilt toward the partnership mindset by over-subjectifying themselves.

The ecosystem redefinition cycle, shown in the lower half of Figure 3, allows for a response to strategic discontinuities. This cycle entails that the platform owner tilts to an ecosystem mindset and redefines the ecosystem framework, and thus the basis of its domination power. As long as the complementors subjectify themselves to the redefined domination power and the reconfigured upsides and downsides, the central power cycle is sustained. In these cases, the partnerships can continue to thrive. However, if the complementors show resistance and reject the redefined domination power, the central power cycle may no longer be sustained. In these cases, partnerships can only continue to thrive if the platform owner successfully wields coercive power and imposes the reconfigured upsides and downsides on the complementor. If a coercion attempt fails, the central power cycle breaks down, and the partnership begins to wither.

8 | DISCUSSION

This study aimed to answer the following research questions: *How does power manifest itself in platform partnerships, how do the power moves of platform owners and complementors interact, and how do the resulting power dynamics relate*

to the value co-created in platform partnerships? To this end, we conducted an in-depth, multiple-case study of six platform owner–complementor partnerships (Klein & Myers, 1999; Walsham, 1995). We used our cases to build a process model that unpacks how and why power unfolds in platform ecosystems as three interlocking cycles, in which both the platform owner and the complementor take an active role. Furthermore, our model shows how alternative power dynamics lead to platform partnerships that (continue to) thrive or (begin to) wither. Our findings contribute novel insights into how the unique power paradox can be addressed through reciprocal power dynamics. In addition, they highlight the active role that seemingly powerless complementors take within power processes and stress the importance of the multi-level nature of power dynamics for co-creation processes and outcomes. Next, we discuss the three key insights of our findings and their implications for platform ecosystem theory, power theory and managerial practice.

8.1 | Theoretical Implications

8.1.1 | Addressing the power paradox through reciprocal power dynamics

Our study is the first to uncover how to address the unique power paradox in platform ecosystems. As such, it goes beyond prior IS research on power, which is limited to contexts without a comparable power paradox. These contexts include traditional intra-organisational (Jaspersen et al., 2002) or more transactional client–vendor relationships (eg, Heiskanen et al., 2008; Levina & Orlikowski, 2009; Pozzebon & Pinsonneault, 2012), where the co-creation of value between independent parties is not the prime objective. Moreover, prior studies on value co-creation focus on relationships between equals, where power asymmetries are negligible (eg, Hart & Saunders, 1997; Valença et al., 2018; Valença & Alves, 2017). Our study also considerably extends IS research on platform ecosystems, which has previously approached power issues (Cusumano et al., 2019; Hinings et al., 2018) and the balancing of paradoxical tensions (Huber et al., 2017; Hurni et al., 2020; Sarker et al., 2012; Wareham et al., 2014), but that examined these issues in isolation rather than interwoven.

Our study reveals that the power paradox in platform ecosystems can be addressed through a reciprocal and dynamic process shaped by both the platform owner and the complementors. For its part, the platform owner mainly wields domination power. This domination builds on an institutionalised, hegemonic ecosystem framework in which the platform owner defines different partner levels with distinct upsides and downsides for the complementors. For their part, the complementors have the right to self-select into different partner levels and, in return, to accept and comply with the strategies, technologies, standards, rules, and regulations of that partner level, that is, subjectify themselves. As long as the complementors do so and thus deem the platform owner's domination to be in their partnership's best interest, the power paradox remains latent, and the partnership continues to thrive.

However, the emergence of two events makes the power paradox salient, jeopardising the platform partnership's continued thriving. First, in the event of dyadic constraints, the hegemonic framework is not sufficient to fully respond to a partnership's specific situational needs, thus threatening to curtail the proactiveness and self-determination of the complementors. To cushion tensions made salient by dyadic constraints, the platform owner can episodically wield manipulation power in favour of the complementor, thereby luring it into continued subjectification. Interestingly, complementors can increase the platform owner's proclivity to wield manipulation power in their favour by engaging in over-subjectification. Second, in the event of strategic discontinuities, the platform owner is forced to make unilateral decisions with an eye on the ecosystem as a whole rather than on individual partnerships. Accordingly, the platform owner unilaterally redefines the hegemonic framework, leaving the complementors with no other choice than to endorse the new strategic direction and accept the redefined framework or else abandon the ecosystem by rejecting it. In these situations, the sporadic wielding of coercion to force complementors into continued subjectification can stabilise a partnership and ensure its continued thriving.

Hence, our insights suggest two basic processes for addressing the power paradox. First, the power paradox can be kept latent by the platform owner defining and redefining a hegemonic ecosystem framework with multiple partner levels, each with its specific upsides and downsides for the complementors. In doing so, the platform owner must show sensitivity to the diverse and changing needs of the complementors to prevent undue suppression. For their part, the self-determined complementors select a suitable partner-level—that is, decide independently to accept or reject the platform owner's domination. Second, when the power paradox becomes salient, it can be managed by the platform owner's episodic switch to manipulation power (in the event of dyadic constraints) or by redefining the hegemonic ecosystem framework and even the sporadic wielding of coercion (in the event of strategic discontinuities).

By unpacking how the unique power paradox in platform ecosystems can be addressed, our research also builds a bridge between research focused on managing paradoxical tensions (but with no interest in power issues) and research focused on power issues (but with no interest in paradox). More specifically, we can refine a widely held assumption in ecosystem research. In particular, a fundamental tenet of this research is that the platform owner acts “like a social planner [that] can coax, but [...] cannot coerce third parties into innovation behavior that enhances the welfare of the ecosystem” (Parker & van Alstyne, 2017, p. 3015). The key idea behind this assumption is that platform owners influence the behaviour of complementors through incentives, guidelines, and general rules rather than brute force (Rietveld et al., 2019; Rochet & Tirole, 2003). The platform owner's heavy reliance on domination power, based on a general ecosystem framework with multiple power offers, appears to be in the spirit of such softer forms of influencing behaviours. However, our study also points to the incompleteness of the widely held “coaxing only” assumption. Specifically, our findings show that platform owners can wield more coercive power forms, above and beyond coaxing, that force complementors into continued subjectification. Such occasional use of coercion proved critical in sustaining the central power cycle in the event of strategic discontinuities. Thus, we show that combining coaxing and coercion is not only possible but can be critical in enabling the (continued) thriving of partnerships.

8.1.2 | The active role of seemingly powerless actors

Our study unveils that the seemingly powerless complementors are not passive recipients but active and decisive drivers of the power dynamics. Specifically, we unveil two novel ways through which complementors actively shape power processes. First, the platform owner can only make use of its domination power if the complementor subjectifies itself. Second, complementors can entice the platform owner to wield power in their favour by over-subjectifying themselves.

These insights go beyond prior research on platform ecosystems. In platform ecosystem theory, a pivotal tenet states that it is primarily the platform owner determining its ecosystem's fate (Gulati, Puranam, & Tushman, 2012). This tenet has led to a dearth of research on the critical role that complementors play in achieving desirable outcomes (McIntyre & Srinivasan, 2017). Platform governance, in particular, has thus far been seen as a standardisation problem that platform owners solve unilaterally by designing (Baldwin & Clark, 2000; Boudreau, 2010, 2012; Gulati et al., 2012; Parker & Van Alstyne, 2005) and practicing ecosystem-wide rules (Foerderer et al., 2019; Ghazawneh & Henfridsson, 2013; Huber et al., 2017; Hurni et al., 2020; Wareham et al., 2014). We extend this research by showing that behind the curtain of standardised platform governance, complementors take an active and vital role in ensuring that their specific partnership's needs are not lost in the platform owner's governance standardisation efforts. First, complementors base their independent decisions of whether to accept or reject the platform owner's domination power on a careful evaluation of upsides and downsides for the partner dyad. Second, by engaging in over-subjectification, complementors can deliberately create the precondition that makes the platform owner more willing to respond to partnership-specific needs. This active shaping of power dynamics by complementors is essential for sustaining the co-creation process between them and the platform owner—it enables the accommodation of specific and ever-changing local needs in a governance environment driven by the platform owner's standardisation impetus. By showing that standardised platform governance does not

solely determine an ecosystem's fate but also requires active shaping by complementors, our findings shed light on the understudied role of complementors (McIntyre & Srinivasan, 2017).

Our findings on the active role of complementors also contribute to IS research on power. Prior IS research on power has investigated power processes during the implementation and use of information systems in traditional intra-organisational contexts (Jasperson et al., 2002), such as firms (Dhillon et al., 2011; Howcroft & Light, 2006; Markus, 1983) or healthcare facilities (Cendon & Jarvenpaa, 2001; Doolin, 2004). In these contexts, power processes are usually unidirectional, that is, the actor higher up in the hierarchy imposes its will upon the actor lower down. By unpacking the active role of the seemingly powerless complementors, we show that whether the platform owner can wield its domination power hinges on the complementors' acceptance/rejection of the ecosystem framework. Moreover, by engaging in over-subjectification, complementors can entice the platform owner to wield manipulation power in their favour. Thus, the complementors' power moves will co-determine future power moves of the platform owner. Thus, in modern co-creation contexts such as platform ecosystems, power does not unfold as a unilateral imposition by a single powerful actor but is also shaped bottom-up by seemingly powerless complementors.

8.1.3 | The multi-level nature of power processes

Our study identifies three interlocking power cycles that provide highly granular insights into how power processes unfold across multiple levels. Overall, the three cycles show that how power is wielded at the ecosystem level (through domination) is not independent of how it is wielded at the partnership level (ie, through manipulation and coercion) and vice versa. While the central power cycle exclusively operates at the ecosystem level, the partnership accommodation and the ecosystem redefinition cycles cause the platform owner to switch to the dyadic level (ie, manipulation and coercion, respectively) based on each situation. Two pathways connect the central with the peripheral cycles: First, the peripheral cycles can shape the central cycle from the bottom up, that is, the peripheral cycles sustain the central cycle when faced with changing needs of a partnership or strategic discontinuities. Second, the central cycle can shape the peripheral cycle from the top-down, that is, by engaging in over-subjectification, complementors create a precondition for complementors to become willing to switch to the partnership accommodation cycle.

These insights have two important implications for power research. First, our study is among the first to use Fleming and Spicer's (2014) finer-grained conceptualization of power to explore how power processes unfold across multiple levels. While Fleming and Spicer's (2014) conceptual work indicates that such interactions might exist, our study is the first to provide fine-grained empirical insights into how different power faces interact across levels. Second, our study suggests that domination and subjectification, the two systemic faces of power, exhibit episodic properties. Domination, for its part, has hitherto been understood as systemic in that it is inscribed and embedded in the existing, unquestioned order of things that continually shape behaviours and appear natural and unchangeable (Lukes, 1974). Our finding that the platform owner's domination builds on the hegemonic ecosystem framework resonates with its purported systemic nature. However, we also find that external events trigger the platform owner to redefine this ecosystem framework. Hence, although domination is systemic, these infrequent redefinitions point to additional episodic properties of domination power. The systemic nature of subjectification is commonly seen to be rooted in its orientation, along with predefined, institutional role templates (Foucault, 1977, 1982). Our finding that platform owners define various role templates for complementors and are themselves confronted with two different sets of role expectations echoes the purported systemic nature of subjectification. However, we also find that complementors adopt the different identity templates defined in the partner program and that platform owners switch between the ecosystem and the partnership mindsets situationally. Notwithstanding the systemic nature of institutionalised role expectations, the dynamic alternation between them points to important episodic properties of subjectification. Our findings indicate that domination and subjectification may be better understood as dual forms of power that are simultaneously systemic and episodic.

8.2 | Managerial implications

Our findings translate into managerial advice for platform owners acting from extreme power positions, while providing considerable freedom to complementors. Specifically, our findings unveil two strategies of wielding power with a restraint that effectively addresses this paradox. The first strategy entails defining and adapting ecosystem frameworks with an eye on complementor needs. The second strategy entails the dynamic transition to manipulation power to respond to dyadic constraints and lure complementors into continued subjectification. Moreover, we advise platform owners to resort to coercion only in exceptional situations. Specifically, when complementors hesitate to follow suit with a strategic reorientation, coercion can help sustain the central power cycle and thus the continued thriving of the partnership.

Our findings are also of considerable relevance for managers of complementor companies. Specifically, we advise these managers to accept that platform owners possess considerable power and that they will inevitably wield this power. Therefore, rather than resist this power, complementors should embrace their subjectification to that power as an opportunity to actively shape how the platform owner enacts its power. Complementors should actively sense whether the partnership's continued thriving will require additional support from the platform owner. If this is the case, they should prepare for such situations by strategically engaging in over-subjectification and making this over-subjectification visible to the platform owner. This behaviour will make the platform owner more willing to use its manipulation power to benefit the complementor when and if it requires additional support.

8.3 | Limitations and future research

Our research is not without limitations. First, all three platform owners in our sample are major enterprise software companies with considerable market power. In contrast, all complementors in our sample are small- to medium-sized niche players. This theoretical sampling ensured that we only investigated partnerships characterised by extreme resource and power asymmetries. However, a platform owner does not start in a dominant role and may not stay in that role forever. Likewise, complementors may grow over time and even decide to become platform owners themselves. Whether and how such changes in the partnering companies' market position will affect power dynamics was beyond this study's scope. Therefore, future research should investigate partnerships in which the platform owner and/or the complementor experience considerable changes in their market position to understand power dynamics when the resource asymmetries begin to vanish. Second, there is some risk that precisely these resource and power asymmetries may have influenced the responses of the complementors. Although we have taken multiple precautions against such bias, some subtleties of power dynamics may have remained hidden but not absent of effect. Therefore, future research should further refine our findings by building on data sources that are less likely to be biased or influenced by power asymmetries or systematically integrate the perspective of complementors that decided to abandon the ecosystem. Third, while our study focused on providing rich and deep insights into power dynamics in ecosystems, another valuable avenue for future research would be to investigate how different faces of power combine to drive outcomes, such as joint partnership success. Such a study could build on the conceptual foundations developed in this study while collecting data from many cases, which could then be analysed using qualitative comparative analysis.

9 | CONCLUSION

Platform ecosystems have become the dominant arrangement through which innovative software products and services are co-created, marketed and distributed. Therefore, it is essential to understand how platform owners and complementors can effectively respond to the unique power paradox in their partnerships—which is rooted in the

necessity for complementors to be highly self-determined and proactive in the face of an extremely powerful platform owner. To understand how this power paradox can be addressed, we investigate the power dynamics that unfolded in six platform partnerships. Our findings reveal that power in platform ecosystems unfolds in cycles (ie, through a central power cycle, a partnership accommodation cycle and an ecosystem redefinition cycle), that these cycles are intertwined, and that dyadic constraints and strategic discontinuities drive the dynamic transitions between these cycles. Moreover, our findings reveal how the resulting power dynamics influence the continued thriving of platform partnerships. Together, our findings suggest that the power paradox in platform ecosystems can be addressed through a reciprocal process in which both the platform owner and the complementors take an active role and dynamically respond to the changing needs of the ecosystem and the partnership. By drawing attention to the active role of seemingly powerless complementors, our results shed light on an essential but understudied driver of value co-creation, allowing us to refine multiple fundamental tenets of ecosystem theory. In addition, our findings uncover how different faces of power interact with each other, offering unique insights into how power dynamics play out across multiple interconnected levels. These insights allow us to challenge the notion of strictly separate systemic and episodic forms of power. We hope that the findings of this study will stimulate further research on this topic.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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How to cite this article: Hurni, T., Huber, T. L., & Dibbern, J. (2021). Power dynamics in software platform ecosystems. *Information Systems Journal*, 1–34. <https://doi.org/10.1111/isj.12356>

APPENDIX: SUPPLEMENTARY CASE DRAWINGS

A1 Callisto—The flagship complemator that merged to average

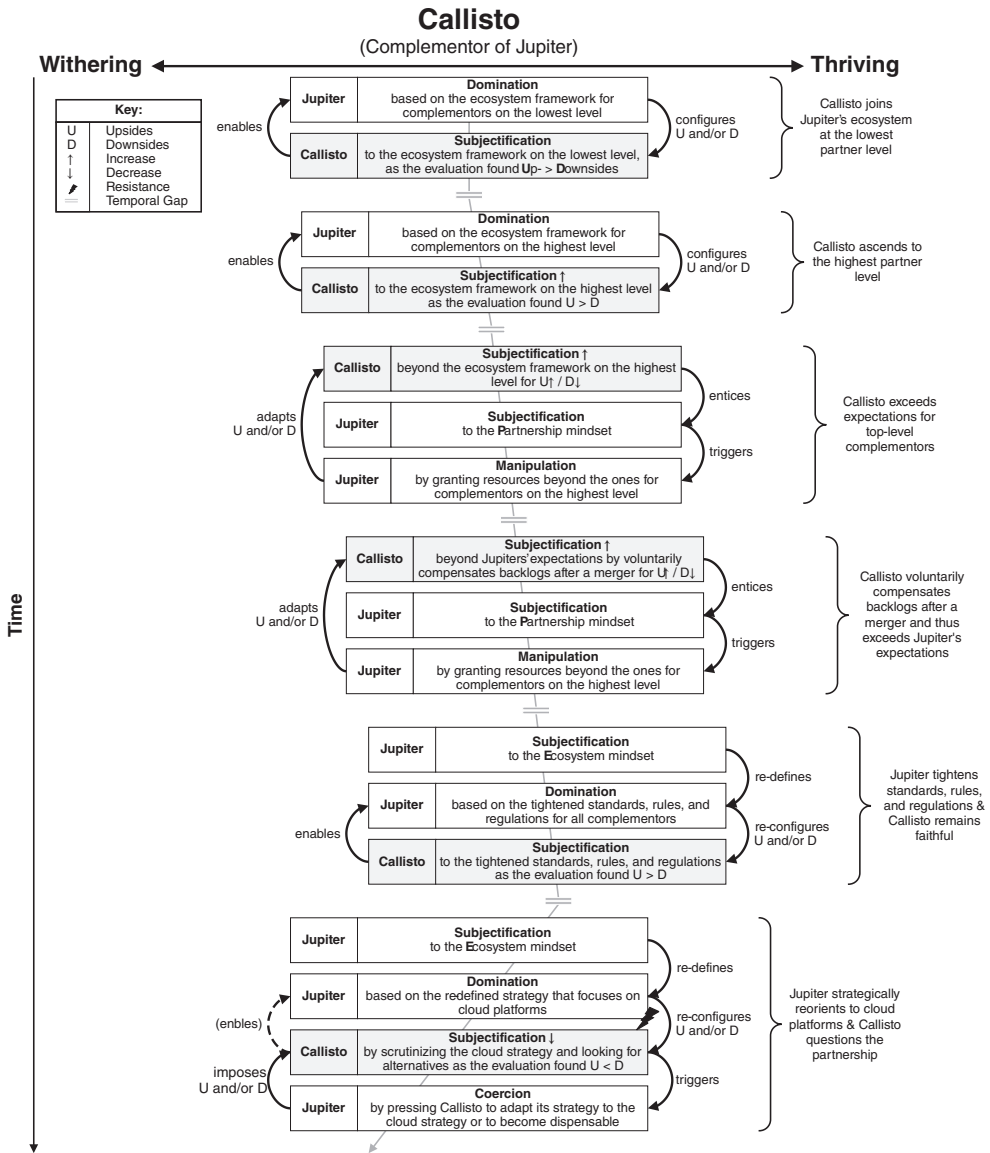


FIGURE A1 Case drawing Callisto

A2 Themisto—The former subsidiary that alienated

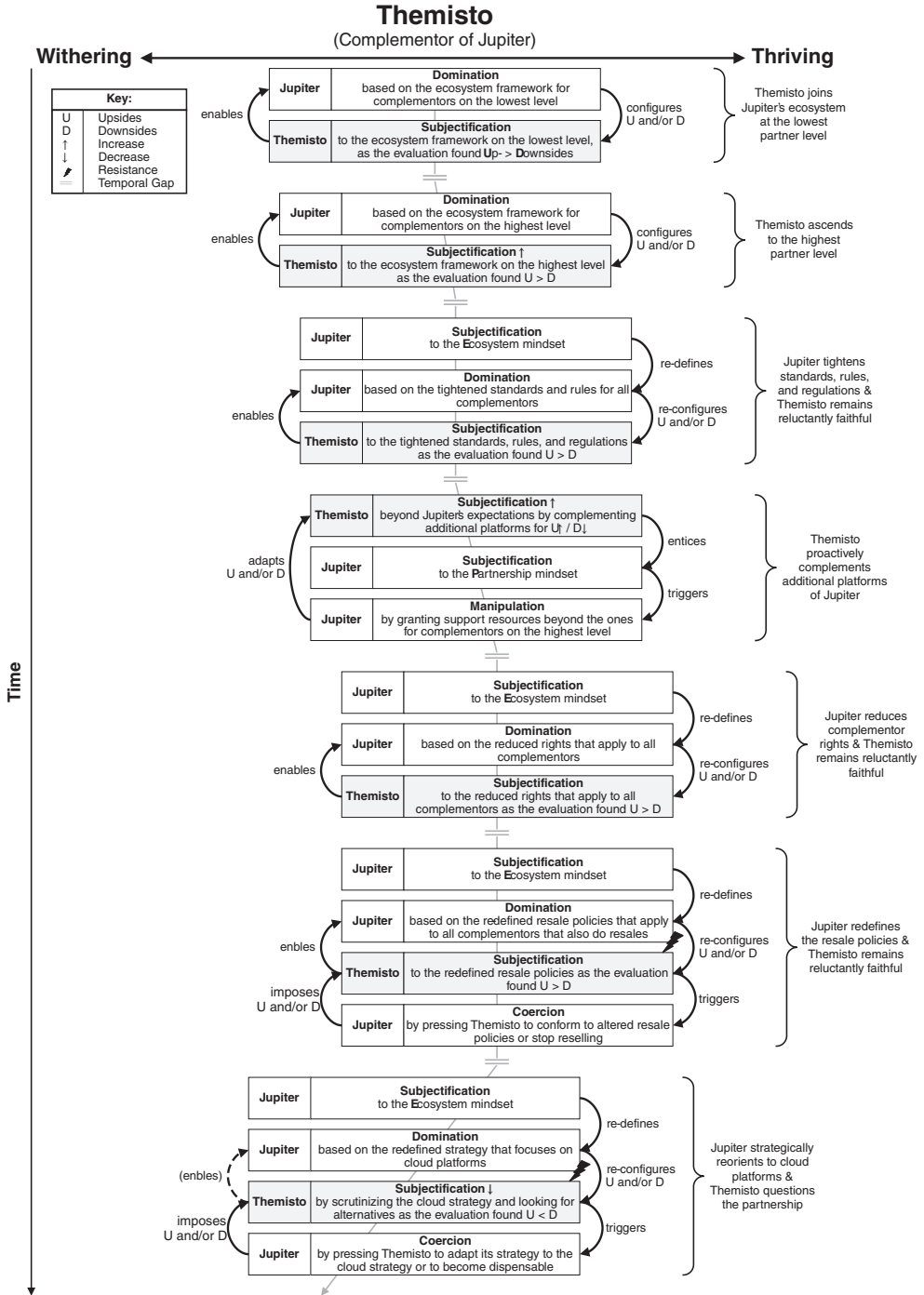


FIGURE A2 Case drawing Themisto

A4 Umbriel—The co-financed complementor that alienated

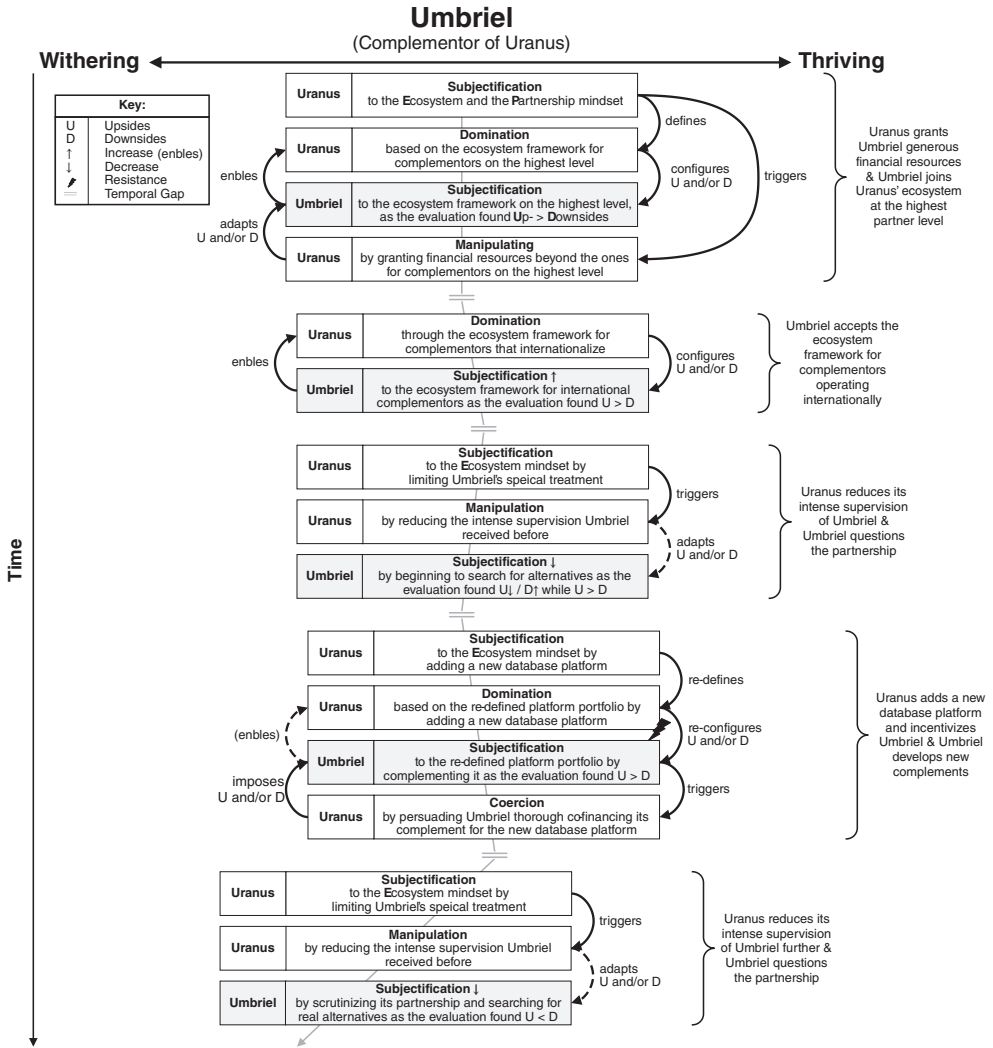


FIGURE A4 Case drawing Umbriel