

Strategizing in Platform-based ecosystems: Leveraging Core Processes for Continuous Innovation

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Abstract: Today open innovation strategies are widespread among large companies especially in ICTs. However some companies are experiencing difficulties when it comes to managing the various external partners enrolled on their platforms to co-create new products or services. Platform-based ecosystems support open innovation strategies and are designed in order to achieve continuous innovation. In such a context successful organizations - that is, continually innovative organizations - are distinguished by their ability to implement a strategy that dynamically orchestrates three intertwined central processes: coordination process, platform governance process and capabilities renewal process. This paper discusses each of these processes and then presents rules and guidelines for strategizing in platform-based ecosystems, thus providing clarity and direction to managers and platform leader wannabes.

Key words: platform-based ecosystems, process, continuous innovation, network-centric innovation, strategy.

In order to satisfy a growing demand for new products and services large companies now look for sources of innovation beyond their organizational boundaries (CHESBROUGH, 2003, 2011; ADNER 2006, 2012; DHANARAJ & PARKHE, 2006). In such context platform-based ecosystems appear to be an effective way of managing a portfolio of contributions from varied and independent players for continuous innovation. This network-centric innovation approach (NAMBISAN & SAWHNEY, 2008, 2011) is on the verge of becoming a dominant mode of organization for open innovation. These recent years platform-based ecosystems (ISCKIA, 2011, 2009; LESCOP & ISCKIA, 2010; DE VOGELEER & LESCOP, 2011; ISCKIA & LESCOP, 2013; LESCOP & LESCOP, 2013, 2014) became a "recurrent pattern of behaviour" (ALLEN, 1983) in terms of innovation. Nevertheless achieving continuous innovation within platform-based ecosystems remains challenging and calls for an in-depth understanding of the underlying core processes. This paper adopts a conceptual-analytical perspective (JARVINEN, 2000, 2004, 2008) and is

"value free" - that is, it is interested in "how and why things are" in understanding the phenomenon under scrutiny (continuous innovation in platform-based ecosystems). Two different approaches can be identified in conceptual-analytical studies. First, researchers can start from the assumptions, premises and/or axioms and then derive a theory, a model or a framework. Second, the basic assumptions behind constructs (concepts) in previous studies are analyzed; theories, models and frameworks used in those studies are identified and then researchers integrate them using logical reasoning. Our approach refers to the first case. We shall analyze core processes that participate in continuous innovation in platform-based ecosystems thus providing guidelines for strategizing in such network-centric approach. Those guidelines may provide clarity and guidance to managers and platform leader wannabes.

■ Platforms, ecosystems and continuous innovation

The latest developments in the field of ICTs have led to the increased ability to collaborate and coordinate across organizational boundaries producing deep effects on the way organizations create and leverage innovation. As a consequence, a lot of organizations are now using platforms to orchestrate collaboration with many types of communities including customers, suppliers, external partners, complementors and even competitors.

Platforms: places for interaction

In our paper, a (innovation) platform is a place of interaction in which different user groups are connected and interact to co-create value through innovation. But each group or community also has a relationship with the platform owner or the keystone organization (LANSITI & LEVIEN, 2004). The interactions among one or many groups - known as network effects - are monetized by the platform owner. Monetization in our definition refers to the internalization of network externalities (EVANS 2003; ROCHET & TIROLE, 2003), in that the platform owner extracts a rent for the coordination benefits he provides for its members. Because of their very purpose, innovation platforms are different from traditional platform-based businesses since they are strictly innovation-oriented. Nevertheless, they

share common features with two-sided platforms and multi-sided platforms studied in the economic literature.

There are a large number of platforms with various traits (EVANS, 2003; EVANS *et al.*, 2005; EVANS & SCHMALENSEE, 2007b; EISENMANN, 2007) although they share the same core i.e. a place - a physical or virtual location - of interaction (cf. Table 1). The place can be an exchange platform (exchange between buyers and sellers), a content platform in which users create and share content (discussion, pictures, videos, code, ...), an innovation platform or a social platform. The existing typologies refer to ideal types, but the reality is more nuanced, and hybrid forms are quite common.

Table 1 - Platform examples

<i>Type</i>	<i>Groups involved</i>	<i>Focus of interaction</i>	<i>Example</i>
Exchange platform	Buyers & Sellers	Exchange / transactions	eBay
Content platform	Creators & Consumers of content	Content creation and consumption	Google
Innovation platform	External innovators & In-house teams	Open innovation	Orange Partner
Social platform	Groups of users & Service or App providers	Socialization	Facebook

When platforms act like two-sided markets (ROCHET & TIROLE, 2003), they are generally referred to as two-sided platforms. A two-sided market is a particular market structure where a middleman will connect and coordinate the demands of two distinct, interdependent groups of players. This interdependency is a source of indirect network externalities. The platform owner must therefore make the right choices in order to bring both sides or groups on board. One way to proceed (EVANS, 2011) is to obtain a critical mass of users on one side of the market. This happens when a new video game console is launched. Console manufacturers do not hesitate to lower the selling price of their console, even if that means selling it at a loss, in order to increase the user-base and generate network externalities on the gamer side of the market (DAIDJ & ISCKIA, 2009). Another way to proceed is to invest in one side of the market in order to stimulate its participation. Console-makers also do this, offering SDKs and software libraries to independent developers to encourage them to develop new games and innovative features. The idea is to offer developers more assistance and generate network externalities, this time on the developer side. These two approaches complement each other, and boost console sales. The same mechanisms are at play in innovation platforms, increasing their attractiveness and therefore the value they generate for the members of the

ecosystem they host. This is the case of Innocentive which acts as a broker and allows innovators or experts from many fields (solvers) to combine their forces and expertise to solve problems exposed by applicant organizations (seekers) or TopCoder that brings together buyers of software with thousands of developers.

Pricing policies also play a key role in two-sided markets and are an essential element of the platform business model. In a two-sided market the optimal price-point for both client groups is theoretically that which will balance the demand between both these groups. However, for a given group, the optimal price-point is not proportional to, and is generally lower than the marginal costs (EVANS *et al.*, 2006; EVANS & SCHMALENSSEE, 2007b). One immediate consequence of the two-sided market dynamic is the total disconnect between pricing policies and production costs. It is not only conceivable, but natural, to sponsor the use of the product/platform for some clients as long as their presence en masse increases the value attached to it by other types of economic agents. Consequently, it is recommended that a pricing model be chosen by examining the effect of one pricing component on both sides of the market.

Contrary to two-sided platforms, pricing policies in innovation platforms are not as important as in two-sided platforms since the very purpose of interaction is collaboration and innovation rather than transactions and exchanges. In innovation platforms revenue sharing is generally managed through commercial agreements or contracts. In such a context, contracts are relational in the sense of MacNEIL (1978; 1985) rather than transactional. A transactional approach involves a situation characterized by conflicting goals in which the purchaser's main effort is to contain an opportunistic behaviour of the provider. In contrast, a relational approach is associated with the idea that goals are convergent between the contracting parties which is clearly the case of innovation platforms: members come together to solve problems, identify opportunities and find new ways to achieve their goals together (win-win). This makes innovation platforms a space for experiments, learning and change.

More generally, platform owners have at their disposal two main strategic levers for development of their ecosystems: depth and breadth (EVANS *et al.*, 2005). Increasing the depth of a platform amounts to creating new functionalities, i.e. services or products targeted at already-conquered communities - that is, exploitation. By intensifying and fully capturing existing direct network externalities, the platform can protect itself from the potential intrusion of another platform into its ecosystem. Increasing the breadth of a

platform amounts to searching for new sources of value and creating new indirect externalities by adding new communities to the ecosystem - that is exploration. This mechanism is the basis for digital convergence and for the breakthroughs observed in several industries. Platform strategies open up new competition on new fronts, and widen the concerned players' field of operation. From this point of view, platform leaders or keystone organizations are market creators who exercise control over their partners, capitalizing on the interactions supported by their platforms (LESCOP, 2014).

Ecosystems: unite to innovate

Collective and/or open innovation is the very purpose and the goal of business ecosystems (MOORE, 1996; LANSITI & LEVIEN, 2004). HUANG, CECCAGNOLI, FORMAN & WU (2009) define ecosystems as "communities of innovation networks in which industry leaders coordinate collective efforts of developers and other partners towards shared goals". Within this community, innovation is the key revenue generator and the main leitmotiv. Platforms can promote ecosystem health by facilitating interactions and encouraging innovative activities.

In our view, platforms are the anchoring point of business ecosystems. Following TIWANA (2014):

"The utility of almost any platform is increasingly shaped by the ecosystem that surrounds it".

As a consequence, a platform's success depends not only on the platform owner or the keystone organization, but also on ecosystem members' ability to innovate i.e. relentlessly delivering concrete and viable solutions. CUSUMANO (2010) summarized this position underlying that:

"Competition is about who has the best platform strategy and the best ecosystem to back-it up".

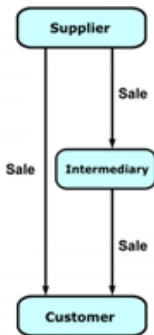
For instance, the iPhone's success has certainly more to do with its ecosystems (content producers, independent developers and consumers) than to its hardware or technical features (BOUDREAU & LAKHANI, 2009; SUAREZ & KIRTLEY, 2012). Apple never ceased to innovate around its core technology offering value to the core platform. Apple's digital platform brings together content and apps accessible via various devices (YOO, BOLAND, LYYTINEN & MAJCHRZAK, 2012; BOUDREAU, 2012). The

platform gives external partners (third-party developers, complementors) an opportunity to create new functionalities by introducing apps and accessories for these devices, resulting in continuous innovation or what BOLAND *et al.* (2007) referred to as "wakes of innovation".

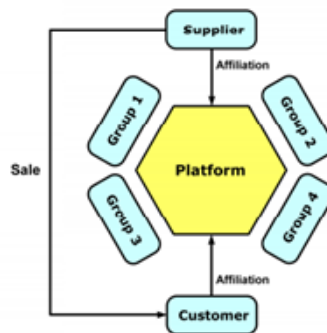
In the traditional approach products and services developed by a supplier are pushed to customers either directly or through intermediaries. Value is essentially produced upstream and consumed downstream. In the ecosystem approach, the supplier uses a platform to interact with customers and members of different groups to develop and market its offers (CHOUDARY, 2013). The platform acts like a magnet that attracts (LESCOP, 2014) the partners the keystone organization needs to develop and market its products. In this approach value is co-created which means that each group enrolled in the platform can create value on the platform for other users (groups) to consume (cf. Figure 1).

Figure 1 - Traditional vs. Business Ecosystem Approaches (adapted from BAILETI, 2010)

Traditional approach (pipes)



Ecosystem approach (platforms)



The ecosystem approach represents a significant shift from the traditional customer-supplier relationship, where the supplier interacts directly with the customer or through an intermediary to make the deal. In a business ecosystem, all communities or groups are affiliated with the platform. The business ecosystem approach takes advantage of shared affiliations to connect different groups via the platform. The existence of the platform creates advantages for all groups over the traditional model and brings players together through their common interest in innovation.

Platform-based ecosystems: engines for continuous innovation

In today's fast moving business world platform-based ecosystems allow organizations to build on the strengths of others i.e. to "run in packs" (VAN DE VEN, 2004). As illustrated by the "Gang of Four" (SIMON, 2011), companies like Google, Amazon, Facebook and Apple are playing a central role within their ecosystems increasing their organizational pace of innovation and the ecosystem clock-speed (MÄKINEN & DEDEHAYIR, 2013). Innovation became a team sport with its own rules and its own market (DIENER & PILLER, 2010).

In such a context, a platform-based ecosystem is defined as a business ecosystem that uses a platform - a place, whether physical or virtual - to build, strengthen and orchestrate voluntary interactions (interdependent links) amongst innovator groups with the aim to stimulate and accelerate the creation of new rounds of innovation (BOLAND *et al.*, 2007) thus creating a virtuous circle that is at the very core of continuous innovation.

In the open innovation era platform-based ecosystems emerge as a space of opportunities that firms can explore and/or exploit for continuous innovation (BOER & GERTSEN, 2003). BOER & GERTSEN define continuous innovation as "the ongoing process of operating and improving existing, and developing and putting into use new configurations of products, market approaches, processes, technologies and competencies, organisation and management systems". In other words, continuous innovation is the ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility, or exploitation and exploration.

Indeed, platform-based ecosystems focus on cultivating continuous innovation. First, they satisfy today's customers in terms of function, price, time, quantity, quality and place, leveraging exploitation capabilities (MARCH, 1991; BOER & GERTSEN, 2003) embedded in the ecosystem. Second, they promote the development of new configurations of products and services, business models and technologies that enable the satisfaction of tomorrow's customers, capitalizing on exploration capabilities embedded within the ecosystem (MARCH, 1991; BOER & GERTSEN, 2003).

As mentioned previously, in platform-based ecosystems the pace of innovation is constantly accelerating, driven by catalytic recombinations of resources and knowledge that flows via the platform (ISCKIA, 2009; ISCKIA

& LESCOP, 2013; LESCOP & LESCOP, 2013). External partners are more innovative when they jump on the platform because ideas, knowledge and technologies can cross-fertilize more easily. The number of possible idea recombinations grows exponentially as new ideas come into the mix, which strengthen continuous innovation throughout a platform's life cycle.

Platform-based ecosystems rely on an original approach of value creation, which is based on multiple processes sequentially and/or simultaneously involving a plurality of actors, activities and resources. As a consequence platform owners or keystone organizations have to manage these processes carefully since they participate in continuous innovation - that is, both exploitation and exploration (BOER & GERTSEN, 2003). In that context, platform owners have to orchestrate three inter-related processes: manage a network of external partners hosted on the platform (coordination process), maintain both the control and cohesion of their platform-based ecosystems (platform governance process), and improve the platform's capabilities (capabilities renewal process). The orchestration of these three core processes is needed for strategizing - that is, elaborating their "today-for-tomorrow" strategy (ABELL, 1993, 2014).

■ Orchestrating platform-based ecosystems

Orchestrating a platform-based ecosystem is a tricky business. Indeed, the management of platform-based ecosystems is not only about building the network of external partners needed for continuous innovation. It's also about designing and managing complex processes so that innovation success with key partners ignites a chain of success that is transmitted to the other partners in the ecosystem, for the ultimate benefit of the innovation and the ecosystem as a whole. These processes deal with the coordination of external innovative partners, platform architecture and capabilities renewal.

The external partners' coordination process

As mentioned previously, platform-based ecosystems are powerful engines for driving continuous innovation. External partners participating in the co-creation process can leverage available resources in order to operate their own business. From this point of view, the choice to join one platform

over another is crucial as it conditions the nature of addressable resources within the ecosystem and potential business opportunities (GHAZAWNEH & HENDFRIDSSON, 2010). External partners must therefore first and foremost assess the risks and opportunities associated with single-homing or multi-homing, i.e. collaborating with a single or with multiple ecosystems, respectively.

For LANSITI & LEVIEN (2004), it is also necessary for these external players to assess the intensity of the coupling strength that links them with the focal firm as it determines the level of integration and the transfer costs of the assets they use. When the coupling strength is high, transfer costs are usually quite high if external players need to collaborate with another platform, leading to a lock-in situation. On the contrary, when the coupling strength is loose, external players can focus more on the creation of specialized modules or technological building blocks without having to invest in costly integration work. The connection between the various modules is ensured by standardized interfaces such as APIs (application programming interfaces). In this case, the modules supplied by external players can be used and reused without any loss of functionality. Loose coupling therefore promotes external players mobility within the platform-based ecosystem and avoids lock-in situations. It also allows to unleash the innovative potential of external developers such as independent developers.

Whether external players adopt a single or multi-homing approach, the success of their strategy lies in continuous innovation and integration of available technology into the platform-based ecosystem. The main challenges facing these companies are therefore to remain visible while constantly innovating and to differentiate themselves in order to claim and capture a part of the co-created value. This approach requires that external players be capable of anticipating and rapidly adapting to platform evolution (agility). For its part, in order to leverage this network of external contributors, the platform owner or keystone organization must implement the appropriate governance structure (SCHOLTEN & SCHOLTEN, 2012) and regulation tools, while clearly communicating its strategic vision (DARKING, 2007). Therefore, shaping a governance structure that cultivates continuous innovation is a significant challenge for platform-leader wannabes.

Platform architecture and governance process

The role of platform architecture is twofold. On the one hand, it must ensure the stability and the control necessary to leverage the common investments in the platform, and on the other hand it must provide the creativity and variety required to satisfy the heterogeneous demands of its users. Architectural choices are complex and must balance the tensions between control and creativity, standardization and variety, the individual and the collective (WAREHAM *et al.*, 2012; 2013). The governance structure resulting from these choices is crucial to the development and health of the platform-based ecosystem (BOUDREAU, 2010; NOORI & WEIS, 2013; BOUDREAU & HAGIU, 2008).

It is also important to keep in mind that an ecosystem is made up of various groups of players or communities, and that their motivations can vary from group to group but also from player to player within the same group. For example, though some independent software developers can be driven by extrinsic motivation, others can be driven by intrinsic motivation. From this point of view, platform-based ecosystems can be likened both to innovation markets and to innovation communities (BOUDREAU & LAKHANI, 2009), and therefore require a hybrid governance process and specific regulatory tools. Be they price-based or not, regulatory tools (BOUDREAU & HAGIU, 2009) can be used as the basis for various governance processes as described by NOORI & WEISS (2013). The interdependency between players makes it all the more necessary to regulate the ecosystem. But this interdependency is also synonymous with externalities, as mentioned previously: the choices and actions of one player impact the choices and actions of others, their earnings and, beyond that, the entire value creation process. The platform owner acts as a regulator in order to internalize these network externalities and thereby capture a part of the net value. In this network-centric perspective, the platform acts as a hub that will increase external partners' willingness to innovate. Ownership and control of this hub grants the platform owner leverage over external partners, and thereby power of exclusion (BOUDREAU, 2010).

Platforms therefore operate as "economic catalysts" (EVANS & SCHMALENSEE, 2007a) and the main challenge they face is to maximize the potential value derived from generativity while maintaining control over the quality of contributions. Generativity is an intrinsic characteristic of ICTs that stimulates continuous innovation. Indeed, certain technological building blocks can be combined (composite applications) in a chaotic or unexpected way into new artifacts to deliver a service which is radically different from

what they were originally designed for (YOO *et al.*, 2010). Concurrently, intellectual property rights must be efficiently managed in order to ensure that co-created value is fairly shared out (HUANG *et al.*, 2013).

Platforms and capabilities renewal process

Platform-based ecosystems can be used as a source of differential performance outcomes in fast changing environments. Platforms allow for dynamic reconfiguration of available resources in an ecosystem and illustrate how the platform owner can transform its resource base to develop and foster new innovations (ISCKIA, 2009). This capabilities renewal process stimulates continuous innovation. From this point of view, platforms are the invisible engines (EVANS *et al.*, 2006) for dynamic capabilities (TEECE *et al.*, 1997). According to THOMAS *et al.* (2011):

"Platforms [...] contribute toward a capability-based re-orientation of the firm's competitive scope through capability build-up, combination, re-orientation and deployment".

In the area of open innovation, this "capability-based re-orientation" clearly refers to external resource acquisition and integration processes rather than internal resource creation and reconfiguration processes, i.e. external dynamic capabilities (RIDDER, 2012). Since platforms emerge as backbones for inter-organizational cooperation and collaboration, they provide insights into the external resource renewal processes; illustrating how platform owners develop new resource positions and how they create competitive advantage in innovation on the basis of external resources and contributors.

This characteristic makes platform-based ecosystems an effective engine for continuous innovation. As a consequence platform owners should not create once-and-for-all solutions for their operations but continually re-configure or reshape the capabilities they have developed in order to extend their market scope (EINSENMANN *et al.*, 2011). Among these capabilities, architectural capabilities are essential and can be defined as a platform owner's ability to create a mutually reinforcing pattern of evolving, tightly aligned platform strategies and platform capabilities. In platform-based ecosystems, architectural choices are therefore of particular importance and condition the three above mentioned processes - that is, potential strategies implemented to nurture continuous innovation. In such a context, the

ultimate source of competitive advantage and value creation rests with the platform itself, which becomes the cornerstone of strategic maneuvering.

■ Strategizing in platform-based ecosystems

Leadership in platform-based ecosystems usually derives from control over a central resource, component or module around which other firms can innovate or elaborate on. As mentioned above, platforms architecture influences the management of the three core processes and then, the platform owners' ability to strategize. Several studies have highlighted the recurring elements of platform strategies (EVANS & SCHMALENSEE, 2007a; EVANS *et al.*, 2008; GAWER & HENDERSON, 2007; GAWER & CUSUMANO, 2002). These elements make up a useful guide for aspiring platform leaders. EVANS & SCHMALENSEE (2007a) list six main steps to developing a platform strategy.

These steps encompass the three core processes analyzed previously to sustain continuous innovation. A community must first be identified and built, and a suitable pricing model established. These first two steps cover what EVANS & SHMALENSEE, (2007a) call the ignition stage. The platform architecture and related governance process must then be decided upon in order to facilitate the interactions between the various groups and improve the platform's profitability. These two steps make up the development stage. Finally, the ability to compete with other platform-based ecosystems must be maintained, and the value promised to external partners effectively delivered. These last two steps make up the renewal stage. In the following sections, we shall go into more detail on what is covered by these various stages.

The ignition stage

Building the community: Many firms find it difficult to attract external partners to their platform-based ecosystem to feed the collective innovation dynamic. After identifying them, the various groups of external partners must be brought on-board the platform by delivering the promised value and an efficient collaborative architecture. This architecture influences platform-based ecosystems core processes. By concentrating on one group of agents and specializing in one type of service, the platform can potentially generate

externalities which will attract another group of players and thus establish the foundations of it ecosystem. This first step therefore consists in granting members of a group access to members of another group. Latent externalities must be identified between the various groups, which potentially need each other, and interactions between them must be facilitated (EVANS, 2011). At this stage, a central question is: Who do I need to innovate? How to attract external partners on the platform?

Establishing a suitable pricing structure: As mentioned previously, pricing plays a key role in platform strategy (HAGIU, 2009) especially for two-sided platforms. Indeed, if the pricing structure is unsuitable, the platform can collapse. This step is therefore critical in order to generate indirect externalities between the two groups of players and feed the collective innovation dynamic. One common practice is to sponsor one group of actors by setting a sufficiently attractive price-point to attract the members of another group, thereby setting off a catalyst reaction. The pricing issue is less sensitive in the case of innovation platforms since the purpose is about innovation rather than transaction. For instance, Orange Partner platform (end-to-en API platform) manages external developers through a simple commercial agreement (Orange APIs General Terms) that clearly specifies the term of service (ToS). An API platform exposes its resources and assets in a machine readable format to other members of the ecosystem allowing third-parties developers to build on the API platform's core value and create new value for their customers. Simple and clear contractual agreements allow independent developers to concentrate on their work while releasing their potential creativity delivering the best app to customers. At this stage, a central question is: How to attract (incentives) external partners on the platform?

The development stage

Stimulating interactions: Market failures explain the profitability of intermediation (LESCOP, 2014). From this point of view, platforms can facilitate the information process. It is therefore necessary, once the first two steps are completed, to supply the groups on-board the platform with efficient search engines, detailed information, scoring or ranking tools... i.e. to offer a range of services aimed at increasing the value proposition for members of the ecosystem and stimulating interactions. The objective here is to find services capable of increasing the depth of the platform and monetizing indirect externalities. The rules of governance must also be

established (TIWANA, 2013; GAWER, 2009). Enforcing these rules builds trust between members of the ecosystem and restrains opportunistic behavior. These rules can also take the form of a standard to harmonize the activities and contributions of various members of the platform. At this stage, central questions are: What kind of resources do I need to provide external innovators? How to provide guidance and support to ecosystem members?

Focusing on profitability: Any platform must estimate the potential profits it can generate for its members. Stimulating interactions between the various groups of players and establishing rules of governance are essential, but not always sufficient, conditions to ensure the development of the platform. It is necessary, for example, to have a clear grasp of the development rate of the various groups of players on the platform and to anticipate the necessary improvements so that the ramp-up does not disrupt the quality of the services delivered by the ecosystem. Platform scalability is therefore an important element of platform development as it can affect the long-term profitability of a platform. The approach that is generally adopted can be compared to technological and economic fine-tuning: on the one hand, technological support of the platform's growth, and, on the other hand, the testing and rapid deployment of new, value-added services that are useful to the members of the ecosystem. This approach reflects the dynamic capabilities of the platform, i.e. its ability to test, assess and rapidly integrate new services while being careful not to alter the levers of interaction between the members of the ecosystem (THOMAS *et al.*, 2011). At this stage, a central question is: how many external innovators do I need? How to assess the quality of their contributions?

The renewal stage

Competing strategically with other platform-based ecosystems: Competition between platform-based ecosystems is common and inevitable. The economic literature distinguishes two cases: multi-homing and intersecting catalysts. Multi-homing is a common situation in the world of platforms. For example, developers using Orange Partner platform can also use competing platform-based ecosystems such as SFR DevZone. These platforms target the same groups of agents as Orange. Though the development of new services increases the platform's profitability and the value proposition delivered to its members, it also ensures their loyalty and discourages them from joining competing platforms. However, this practice is far from neutral, which leads us to intersecting catalysts. EVANS *et al.*

(2006) refer to intersecting catalysts as evolutions of the business models which can open new competitive arenas with already-established players or platforms. Indeed, when searching for new sources of revenue, the platform owner can create a service which will come into direct competition with those offered by another platform. The launch of a new service can therefore be seen as an offensive maneuver by established platforms. As with multi-homing, cases of intersecting catalysts are common in the world of platforms including innovation platforms. Their consequences can prove to be important for the evolutionary dynamic of the platform. In trying to increase the depth, but especially the breadth of its platform, the platform owner can create new indirect externalities by targeting new groups of players, thereby gaining a foothold in related ecosystems. At this stage, a central question is: How to manage competition with other platform-based ecosystems efficiently?

Experimenting and evolving: It is necessary to give oneself the means to evolve, and experiment with new catalytic reactions, identifying for example other groups of agents likely to come aboard the platform. From this perspective, knowing how to evolve is mainly the act of focusing on innovations to the business model and being able to implement them rapidly by deploying new value-added services. This is part and parcel of the firm's nimbleness and covers any and all endeavors which could increase the breadth of the platform. Through this approach, the platform owner's goal is also to redeploy its resource base in related fields, enabling it to capitalize on the indirect externalities already harnessed via its ecosystem. These initiatives reveal in fine the dynamic capabilities of the platform owner, which is one core process participating in continuous innovation. At this stage, a central question is: How to improve the ecosystem's staying power?

These strategic guidelines do not guarantee the success of platform-based ecosystems but provide a simple and clear roadmap of the main stages of such strategies identifying the different challenges faced by keystone organizations at different stages. It is important to keep in mind that timing plays a critical role in these strategic maneuvers, requiring a certain amount of agility on the part of platform owners. Beyond mere platform strategies, successful platform-based ecosystems have in common a clear and shared strategic vision, a particular agility and, finally, sturdy technological competencies that are the foundation of platform capabilities.

■ Conclusion

This paper presents arguments explaining that platform-based ecosystems act as rule-making governance mechanisms or as institutions for continuous innovation. Platform-based ecosystems need to be managed carefully to maintain emulation among contributors while sustaining the platform owner's competitive advantage. In such a context, platform owners whose objective is to tap into the business ecosystem hosted in their platforms need to dynamically shape three core processes for participation in collective innovation. The active orchestration of these processes has the potential to ignite network externalities and boost complementary activities, while catalyzing a virtuous cycle of growth and innovation for the platform owner and ecosystem members.

Strategying in platform-based ecosystems is a complex exercise since the scope of strategy is much wider than for traditional firms (cf. Figure 1). Platform owners have to shape their platform's architecture and orchestrate related core processes (coordination process, platform governance process and capabilities renewal process) in a coherent and dynamic fashion throughout the platform's development in order to strengthen continuous innovation. Strategying in platform-based ecosystems means that these processes are designed so that they can dialogically handle the tensions between the various ago-antagonistic dimensions of platform business models: control/generativity, open/closed, individual/collective... This orchestration process, which refers to platform capability, is closely related to platform leadership in network-centric innovation.

Many of these issues highlight the need to improve our understanding of platform-based ecosystems. For instance, we need to gain further knowledge on innovation platforms, their similarities and differences compared with two-sided or multi-sided platforms. It is only very recently that academics have begun to address the role of platforms in business ecosystems or network-centric innovation. The research in the field of platforms was thus far completely disconnected from the research on business ecosystems. The phenomenon of platform-based ecosystems offers exciting research opportunities to bring together technical, economic and organizational perspectives within an integrative framework for network-centric innovation. This framework, or platform-based view of the firm, should help advance our understanding of collective and continuous innovation, collective strategy, organizational behavior and technological change.

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