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Business Ecosystems Revisited

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Business Ecosystems Revisited

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Abstract

Coined by Tansley in 1935 to designate a basic ecological unit composed of both the environment and the organisms that inhabit it, the term ecosystem was taken up again by Moore (1993) to designate the systems of actors maintaining relationships of cooperation: business ecosystems. Moore's definition is regularly employed in academic literature today, without having been the object of in-depth discussion. With critical intention, the first section of this research note sets out to show the weakness of this ecological metaphor, a metaphor which, without a doubt, contributed to the success of the concept, but which, today, needs to be put aside. It will then be demonstrated that Moore's efforts to define the business ecosystem led to contradictions and, in order to circumvent these contradictions, the second section will distinguish among different types of business ecosystems. Apart from avoiding the wholesale attribution of characteristics to all business ecosystems, when, in fact, they rightly belong to only certain among them, this typology brings our attention to business ecosystems whose composition is more heterogeneous. The last part of this note suggests that a study of these systems should use theories that may shed light on the way in which actors come to agreement even while belonging to different worlds.

Keywords : Business ecosystems, ecology, metaphor, typology, key resources, interdependences

BUSINESS ECOSYSTEMS REVISITED

Coined by Tansley in 1935 to designate a basic ecological unit composed of both the environment and the organisms that inhabit it, the term ecosystem was taken up again by Moore (1993) to designate the systems of actors maintaining relationships of co-competition: business ecosystems. Moore's definition is regularly employed in academic literature today, without having been the object of in-depth discussion. With critical intention, the first section of this research note sets out to show the weakness of this ecological metaphor, a metaphor which, without a doubt, contributed to the success of the concept, but which, today, needs to be put aside. It will then be demonstrated that Moore's efforts to define the business ecosystem led to contradictions and, in order to circumvent these contradictions, the second section will distinguish among different types of business ecosystems. Apart from avoiding the wholesale attribution of characteristics to all business ecosystems, when, in fact, they rightly belong to only certain among them, this typology brings our attention to business ecosystems whose composition is more heterogeneous. The last part of this note suggests that a study of these systems should use theories that may shed light on the way in which actors come to agreement even while belonging to different worlds.

A CRITICAL ANALYSIS OF MOORE'S CONCEPT OF BUSINESS ECOSYSTEMS

The study of Moore's principal work on business ecosystems (1993, 1996 & 2006) reveals two approaches to this phenomenon; one analogical, the other definitional. The objective of this section is to show the contradictions that result as much from the analogy with ecology, as from the various ways Moore defines business ecosystems.

A pernicious analogy

Starting with Bateson's idea that the processes of co-evolution affect both natural and social systems, Moore (1993) concluded that ecology could provide applicable lessons to business ecosystem management. This deduction is nothing less than established. The illustrations proposed, whether they relate to the relationships between predator and prey or even forest and field, certainly furnish examples of the co-evolution process, but are not enough to convince us of the capacity of ecology to usefully stimulate managerial thought. When we see the ease with which Moore presents certain principles of ecology, it becomes even more difficult to view this analogy as nothing more than a clever manner to attract attention. Moore becomes interested in the constitution and the development of communities of populations without making reference to the milieu in which this evolution takes place, while ecology's principal contribution is the fact that it has demonstrated that populations interacting in a same milieu constitute systems whose study can only be global (Duvigneaud & Lamotte, 2009). In the same way, whereas solar energy is an exogenous energy source for biological ecosystems (Tricart, 1975), Moore shows a curious hesitancy in portraying clients as "providers of energy". These "sun equivalents" are,

in effect, found just as much within the business ecosystem (1993, 1996) as externally (2006). Even if it can be said that these are remedial faults, it is no longer possible as soon as Moore (1993) maintains that there is no competition among firms but only among ecosystems, while competition among the latter makes no ecological sense. This is even more the case, as when discussing control of a business ecosystem as a central concern, Moore is, in fact, contradicting ecology specialists who consider that an ecosystem does not possess such a body of control (Duvigneaud & Lamotte, 2009).

Finally, the distance taken from the fundamental concepts and mechanisms of ecology leads one to think that reference to this discipline brings more confusion than value. This conclusion does not mean that the notion of a business ecosystem must be rejected; it implies only that it should be defined without reference to ecology.

Contradictory definitions

The business ecosystem is defined by Moore according to three different procedures: enumeration of its members, a statement of its properties and case presentation. These three methods, with nothing prohibiting them from being complementary, in fact, end up in contradiction.

In 1996 (p. 26), Moore described the business ecosystem as a bipartite system composed of a center and a periphery, and listed its members: "a business ecosystem is made up of customers, market intermediaries (...), suppliers, and, of course, oneself. These might be thought of as the primary species of the ecosystem. But a business ecosystem also includes the owners and other stakeholders of these primary species, as well as powerful species who may be relevant in a given situation, including government agencies and regulators, and associations and standards bodies representing customers or suppliers".

A study of the most frequently cited of Moore's work (1993, 1996 & 2006) complements the enumeration of its members with a statement of the properties of the business ecosystem which can be rendered as follows: Managed by one or more leaders, the ecosystem is a project that is both deliberate and co-evolutive, leading to the value enhancing alignment of actors, through the process of collective innovation. Governed democratically, simultaneously competitive and cooperative, it is a modular layout of firms sharing a community of destiny.

This statement of properties is drawn from Moore's work published in 1993 and 1996. As Table 1 shows, it is similar to what can be inferred from his article of 2006.

Table 1. Business Ecosystems defined by statements of it properties

Moore, 2006	Moore, 1993 & 1996
<p>In a business ecosystem, the leaders of a multitude of firms come together around a broad vision of a future they want to make happen (2006: 73). The ideal business ecosystem has leaders who coenvision and comanage coevolution among members (2006: 55). ...able to achieve interfirm coordination sufficient to justify players' aligning their dreams, plans, and product road maps (2006: 34) (Companies) must dialogue closely with customers so that what is created is what the customer wants and is willing to pay for (2006: 34).</p>	<p>Managed by one or more leaders (1993, 1996: 26), the ecosystem is a project that is both deliberate and co-evolutionary (1993, 1996: 26) that leads to the value enhancing alignment of actors (1993, 1996: 26)</p>
<p>Managers establish business ecosystems to coordinate innovation across complementary contributions arising within multiple markets and hierarchies (2006: 32).</p>	<p>...through a process of collective innovation (1993, 1996: 32).</p>
<p>These leaders establish what might be called «polity» or community governance. The ideal business ecosystem achieves «collective action» in a manner similar to democratic and quasi-democratic communities (2006: 55).</p>	<p>Governed democratically (1996: 53, 127),</p>
<p>A business ecosystem definition is at its core a plan for how the contributions in the proposed system will be modularized, and what sorts of firms will provide which element. (2006: 56). Each of these contributions can be improved somewhat independently (2006: 61). Companies must establish interfaces and protocols for putting together their contributions (2006: 34).</p>	<p>it is a modular layout (1993, 1996: 85, 96-97) of firms,</p>
<p>They understand that establishing this future will require both cooperation and competition among their firms (2006: 73). The term «business ecosystem» and its plural, «business ecosystems,» refer to intentional communities of economic actors whose individual business activities share in some large measure the fate of the whole community (2006: 33).</p>	<p>simultaneously competitive and cooperative (1993, 1996: 24, 35), sharing a community of destiny (1996: 61).</p>

In addition to the enumeration of business ecosystem members and the statement of its properties, Moore also defines business ecosystems through the presentation of exemplary cases. If these three ways of defining a business ecosystem are taken together, several contradictions appear. The first relates to its composition. When he proceeds to enumerate the actors involved, Moore (1996: 26) makes place for all sorts of stakeholders, on the other hand, when he defines the business ecosystem by its properties or by case presentation (Apple, IBM, Wal-Mart ...), his interest is centered uniquely on firms that are partners in a common project. As such, the business ecosystem is reduced to its nucleus and its clients find themselves excluded (2006:34). The literature, itself, is split between those definitions of the business ecosystem that mention peripheral actors (Iansiti & Levien, 2004 a; Teece, 2007; Edouard & Gratacap, 2010) and those that exclude them (Torres-Blay, 2000; Adner, 2006; Pierce, 2009). The discrepancy observed in Moore's work is also found with certain other authors who, after having adopted an extensive definition of business ecosystem (Iansiti & Levien, 2004 a; Edouard & Gratacap, 2010), only study ecosystems constituted exclusively of firms. Upon reflection, this restriction of the business ecosystem to its core is not very surprising; the distinction between center and periphery implicitly invites privileging the first to the detriment of the second, but it leads one to abandon the study of heterogeneous ecosystems.

Another contradiction appears between the statement of properties and the choice of cases. Moore states that one of the essential properties of a business ecosystem is to be democratically governed, but he does not support this empirically. On the one hand, he selects business ecosystems that are not particularly democratic, in which one firm has dominant influence over the business ecosystem's key resources. On the other hand, differing from authors such as Gueguen and Torres (2004), Moore refuses to consider open source communities as true business ecosystems, even though they fit the definition that he uses (1996: 26) and, in addition, benefit from a clearly more democratic governance than the cases he has selected.

The presentation of the properties of business ecosystems harbors a third contradiction that results from the statement that the business ecosystem is, simultaneously, modular and a community of destiny. The latter notion implies the belonging to a category or a system (an industrial district, for example) whose evolution determines the future of its members united by a link that is not theirs to break. If the idea of cooptation, which is the basis of the notion of business ecosystems, truly implies the existence of a common interest, it seems inappropriate to speak of community of destiny in connection with the types of ecosystems that Moore favors. In fact, the modular character that is given to these implies a relative independence of the part from the whole and suggests the possibility that a member can leave a business ecosystem or participate in several. Contrary to what Moore states, modularity and community of destiny are properties whose compatibility is difficult.

In summary, the use of these three different ways in which to define business ecosystem, leaves Moore with contradictory propositions. Given that no type of actor is rejected, the definition using the enumeration of members is the most comprehensive. Yet, the choice of case studies corresponds to a conception of a business ecosystem that is restricted to firms partnering in the same project. The statement of properties also relies on a restrictive definition of business ecosystem, and it includes properties such as the democratic character of governance, which is difficult to associate with the cases that Moore likes to cite. One way to overcome these multiple contradictions is to create a hypothesis stating that there is not one type of business ecosystem, as Moore would have you believe, but several.

THE DIVERSITY OF BUSINESS ECOSYSTEMS: PROPOSAL FOR A TYPOLOGY

A preliminary step in the development of a typology is to identify, from the empirical data found in the literature, the characteristics of an initial framework. Two characteristics appear promising. The first concerns the distinction made by Moore between core and peripheral. If, in certain cases, it seems justifiable to restrict the analysis of the ecosystem to the constellation of partner firms, it is also reasonable to think that this simplification could, in other circumstances, be inappropriate. This idea led to the distinction of ecosystems in function of their degree of heterogeneity. An intriguing observation provided the second principle around which the empirical material is organized: certain "constellations of partner firms" count only a limited number of members, while the population of others seems to have no limit. The hypothesis was

made that these important differences were not by chance. It is on the basis of this, yet rudimentary framework, that research on typological dimensions was conducted. These dimensions will first be presented, followed by the typology that results from their junction.

Control of key resources and mode of interdependence

As the opposition between center and periphery leads us back to the concept of position through the ideas of centrality and of control, it seems prudent to consider, following Fombrun (1982), that as in any system, a business ecosystem can be analyzed as a design of positions and links. The idea of position differentiates between the different enterprise systems which are under the control of a central firm and which are not. Grandori and Soda (1995) speak of symmetrical networks in the first case and of asymmetrical networks in the second. Borrowing from Emerson, Pfeffer and Salancik (1978) assert that power exerted by an actor on another comes from the control that the first has over resources that are indispensable to the second and for which the latter has no satisfactory alternatives available. This idea is taken up by Moore (1993), when he underlines the importance of power in negotiation and attributes this power to being the sole holder of a resource necessary to an ecosystem. This is merely a translation of one of the principles of game theory regarding what individuals bring in added value: "It is difficult to obtain more than you truly bring to the game" (Nalebuff & Brandenburger, 1996: 47-51). The centralized or non-centralized character of control exerted on essential resources thus constitutes a first basis for the typology.

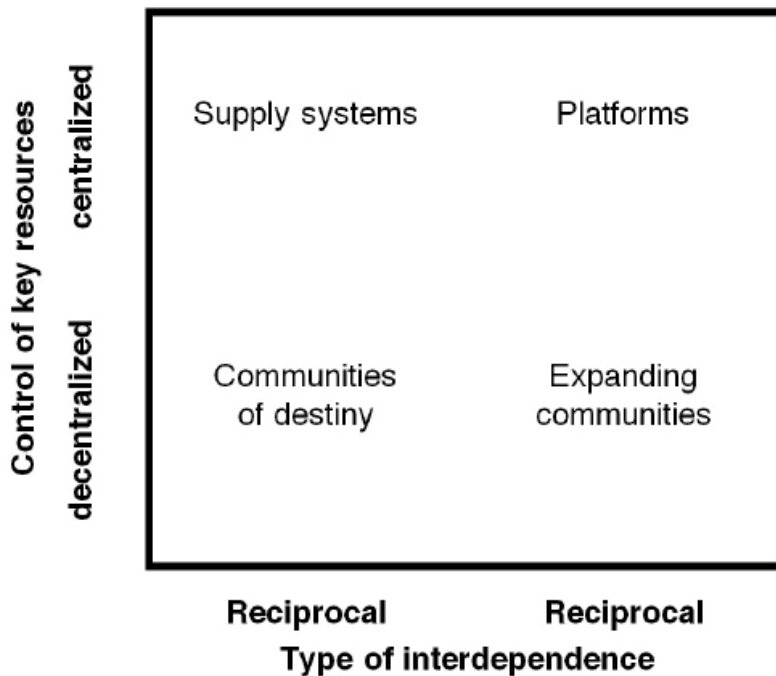
Having the number of members limited in some cases and not in others leads to a second determinant in the functioning of business ecosystems: the type of interdependence that links the members. The establishment of a connection between the number of actors and the type of relations that they may maintain has its precedents in the literature. Astley and Fombrun's (1983) typology of collective strategies is based explicitly on the relationship between the number of members in the collective, and the mode of interaction, direct or indirect, that this number authorizes. Their analysis complements that of Thompson's (1967) with regards to the schemes of reciprocal and pooled interdependence that form the two extremes of this typology: the number of actors prone to interact directly diminishes when you pass from pooled interdependence to reciprocal interdependence and when the demands of communication and coordination increase. It follows that the mode of interdependence among the actors conditions the mode of the ecosystem's development: reciprocal interdependence goes with a more qualitative mode of development based on the deepening of relationships, while the pooled interdependence favors a more quantitative development operating according to a process of expansion.

A proposed typology and analysis of different business ecosystems

In crossing the degree of key resource control and type of member interdependence, Figure 1 distinguishes, based on their organizational design, four types of business ecosystems that will be successively presented and analyzed. Controlled by a central actor, the design of supply systems and platforms is presented first. They take part in long-term evolution as highlighted by lansiti and Levien (2004 b: 1) according to which "the strategy increasingly

becomes the art of managing assets that one does not possess”. It is with good reason that these two authors speak of long-term, as the concept of ‘impartition’ was proposed as early as 1968 by P.-Y. Barreyre, designating the entrepreneurial behavior of entrusting diverse roles to different partner firms within a global system of activity. Communities of destiny and expansion are the two other organizational designs studied in this article. Their mode of governance is characterized by the absence of a central actor capable of controlling the group using essential resources. Their democratic functioning corresponds to that which Moore (2006: 55) attributes to the business ecosystem ideal. As these two types are less frequently studied, the cases chosen to illustrate them are analyzed in more detail. In order to establish that these community ecosystems truly possess the properties that Moore attributes to the business ecosystem (Table 1), they will be highlighted in italics in the case analysis.

Figure 1. Typology of Business Ecosystems



Supply systems

In the first quadrant of Figure 1, the business ecosystem is controlled by a principal who delegates to its constituents certain complementary contributions to achieve the strategic activity. This corresponds to the centralized network of Lorenzoni and Baden-Fuller (1995), where the strategic center unites around it a small number of important partners, or what I call the supply system, defined as the system of resources that a central enterprise can mobilize, design, control and animate in order to propose a competitive offer to its clients (Køenig, 1990: 93 et seq.; 2004: 238 et seq.). The preeminence of this central enterprise stems from its privileged access to one or more key resources.

The term system is employed to highlight the fact that a part of the mobilized resources does not belong to the central enterprise but to the partners that have been enlisted. The system conceived, implemented and controlled by Nike represents a good example of this type of design. Quinn's analysis (1992: 63) emphasizes the partnership character of the relationships that Nike has with its most sophisticated suppliers yet equally stresses the importance of certain measures to prevent the center from losing control of the system (1992: 60, 63, 78). Beyond the application of certain techniques (dual sourcing, expatriate presence by manufacturing partners...), the control exerted by Nike on its ecosystem relies, partly on the value the company brings both before and after production and partly on the competence acquired in the production domain through the management of a small United States-based factory. This competence allows Nike to efficiently manage the integrative function just as well as the distribution function (Dupont, 1994) in negotiations with suppliers. All types of supply system designs do not favor collective innovation. This type of business ecosystem could very well function on the principle of strict separation between conception and execution and, in fact, this separation has, for a long time been, defined the relationships between the principal and the sub-contractor: domain reserved for the premier, and innovation being prohibited to the second. This implies that in terms of innovation this type of design remains ambiguous. The argument, addressed to economic regulators, that business ecosystems are intrinsically factors of innovation (Moore, 2006: 34) must be taken with precaution. The argument is, without a doubt, acceptable for a number of business ecosystems, but obviously not for all.

Platforms

In this second case, the design is controlled by an actor who, according to rules specified *ex ante*, makes a key asset available to other actors, so that these other actors can develop their own activity. While the supply system is designed with its contributions defined in advance through their complementary aspect, as is the case in automobile manufacturing, the platform, organized according to a method of pooled interdependence, favors the multiplication of independent initiatives. This design relies on a systematic application of the principle of modularity as present in Table 1. Within such a design, each contribution can be improved practically independently (Moore, 2006: 61) and "if modules are properly defined and interfaces are well-documented, and business contracts are not restrictive, then the network of niches of the ecosystem can be said to be open to new entrants" (Moore, 2006: 71). Defined as a set of solutions to which the ecosystem members have access in order to develop their own products, the platform (Iansiti & Levien, 2004 b: 148-149) is a typical case of this type of design. Around the key assets composing the platform, the ecosystem develops by the proliferation of initiatives. The IBM 360 is a classic example of platform. More recent examples are provided by the sector of video game consoles, Apple's iPod, or even the Amazon Web Services, which consists of the eponymous firm putting its expertise in electronic business software development at the disposition of its partners (Isckia, 2009). The platform differs from the supply system in that the firm who controls the business ecosystem no longer defines the contributions of the exterior actors, but only specifies the rules the contributor must follow to use the platform. For the owner of the platform, the challenge is attract

contributors while retaining control. This is what Microsoft aims to do when it supports a standard non-proprietary electronic document encoding (XML - Extensible Markup Language) that favors interoperability among members of its ecosystem, all the while developing proprietary applications for XML closely linked to the Windows platform (Iansiti & Levien, 2004 b: 162-166). As the franchising example shows, all designs of the platform type are not supports for innovation. According to this formula, the legally independent actors, the franchisees, are accorded the right, as well as the obligation, to run their business in conformity with the concept as defined by the franchisor. In this type of business ecosystem, the franchisee's action consists essentially in the replication of the formula conceived of, and provided, by the franchisor thanks to the platform (concept, commercial signs and methods) that he has developed. Advantageous because of the economies of scale that it allows, the franchise responds more to the logic of reproduction than to innovation.

Communities of destiny

The third type of design reunites a more heterogeneous group of actors than the two precedent designs. The system is not centralized, even if certain actors contribute more than others to its leadership. Communities of destiny constitute a good example of this type of design. We have seen that the idea of the communities of destiny implies the existence of a link independent of the actors' will, such as that uniting survivors or hostages, and that it also opposes the idea of modularity. Different from supply systems or platforms, the communities of destiny are not organized around an actor holding an essential resource, but around an existential solidarity. Numerous industrial districts correspond to this definition. As the Sematech case analysis shows, a common location is not a necessary condition to the emergence of a business ecosystem. This analysis provides a reflection of the work of Browning, Beyer and Shetler (1995) on the statement of ecosystem properties according to Moore (Table 1); the correspondence between the two is highlighted with italics in the following passage.

Sematech was founded in 1987 with the help of the United States Defense Department, at the moment when the American semiconductor industry was experiencing a disturbing decline in its international competitiveness. As it appeared obvious that an industry-wide revitalization could not be achieved by one company alone, it was necessary to employ the cooperation of American industrialists. Open to all, a consortium was created to this end. Fourteen companies representing 80% of American production accepted to commit to a five-year engagement. At the end of this period, the American ecosystem had begun to regain market share over its Japanese competitor. Several factors intervened in this recovery and even though the role Sematech played in this is difficult to fully and precisely appreciate, two signs testify to its importance. First of all, the sophistication of component graving had progressed according to expectations; secondly, the American government and eleven out of the fourteen enterprises had renewed their involvement for a second five-year period. The *quality of leadership* played an essential role in Sematech's success. Organized by the president of National Semiconductor, Charlie Sporck, the consortium was then under the direction of one of the founders of Intel, Bob Noyce. The admiration that he triggered along with his charisma went far in the project's capacity to enlist much needed individual competences and

to obtain Congressional support. Under his leadership, Sematech functioned in a profoundly *democratic* manner; all members had access to the collective agenda and could contribute to it. In a situation where the sense of the mission and the consciousness of the community of destiny were largely shared, the *alignment* of actors and investments resulted from an *emergent* process. Sematech was certainly not the most peaceful place to work, yet the *rivalries* and the predilection for secrecy did not exclude *collaboration* for development. Before Sematech could see the day, proprietary standards, that play a key role in inter-firm competition, would bring about an expensive fragmentation on the collective level; Sematech facilitated the advent of cooperative standards. However, it is not only the question of essential resource control that distinguishes communities of destiny from centralized ecosystems: while the latter functions in transaction mode, the community of destiny implies a gift. In the case of Sematech, the leaders contributed a great deal of their time and energy. Neither Charlie Sporck who had organized the consortium while directing National Semiconductor, nor Bob Noyce who agreed to come out of a comfortable retirement, had a personal interest in embarking on this adventure. Their altruistic contributions motivated the other members to do the same and had a catalytic effect on the development of a moral community (Browning et al., 1995).

The communities of destiny, where the capacity for innovation was fully demonstrated by the Sematech case, could also very well mobilize against an innovator who is threatening to disturb the community's balance. This was the case at the introduction of the DIVX. This format, allowed users to watch a film recorded digitally during 48 hours without going back to a store and did not directly menace the DVD, as DIVX players can also read the old format. However, fearing that its introduction might upset consumers and jeopardize the industrial rules of the game (alignment of actors on a business model, distribution of roles and the ordered introduction of various versions of the same program on the market), the DVD defenders mobilized to defeat the project (Tellier, 2003). As with the other types of ecosystems, communities of destiny maintain an ambiguous relationship with innovation.

Expanding communities

The fourth case in Figure 1 corresponds to a design that regroups a very large number of members around an essential resource, this resource being a common good. This type of design differs from that of the platform design in its non-proprietary character regarding the key resource; it comes closer to the platform design in its member interdependence - the contribution of each is distinct and isolable. The type of development for this design is expansion, which distinguishes it from the communities of destiny while the two types put a similar importance on social norms. Knowledge intensive communities, in which the free-software community belongs, (Muller 2004) correspond to this type of design. As was done in the Sematech section above, the correspondence between the analysis of the free-software community (Muller, 2004) and the definition of an ecosystem according to Moore (Tableau 1) will be highlighted using italics.

In the free-software community personnel *leadership*, in addition to norms, is the principal means of coordination. By becoming a member of this community, the individual accepts the *essential objective*, which is software development;

achieving *the alignment of individual and collective objectives* does not pose a problem for this type of community. *The clarity of purpose* found here does not necessarily preclude a double *emergence: of innovation*, on the one hand, due to the autonomy of its contributors (Burgelman, 1983) and of community, on the other, due to exchanges among programmers (Muller, 2004). As they expand, the free-software communities tend to become more structured, but continue to involve actors who are fundamentally considered as peers. In addition, their authority structures allow for the smooth circulation of actors whose centrality is a function of the quality and level of their commitment (Muller, 2004). These expanding communities could be qualified as *democratic* in that they are a gathering of peers whose commitment determines their influence. All communities of this type do not have the mission to innovate. Those that are grouped independently around a brand, such as Nikonians®, can be defined as essentially places of sharing, learning and inspiration for its members. An observation, already made for the other designs, can also be found here: business ecosystems are functionally ambiguous. One organizational design can just as well take on the function of innovation or reproduction.

SHEDDING LIGHT ON HOW ACTORS AGREE

Business ecosystems are organizational designs that only hold together on the condition that their members are in agreement about the development of a common project. As Table 1 shows, the construction and maintenance of this agreement is an essential task that Moore imparts to the leader(s). Even if this attribution of competence appears justified, it sheds no light on the nature of the task. The fact that the process of these agreements, which is the basis of business ecosystem, does not attract more attention seems at first glance, paradoxical. To overcome this paradox, we return to the distinction that Moore makes between central and peripheral actors, and also to the observation that the cases privileged in the literature reveal a definition of business ecosystems that is restricted to the central actors only. One could make the hypothesis that the drafting of an agreement among central actors only is less complex than in other cases. The project and the roles played by each member, is to a large extent, previously defined by the pivotal firm, and the enlisting of actors reveals itself as classic bargaining in the framework of a commercial transaction. When other actors join the “constellation of partner firms”, the business ecosystem increases in heterogeneity and agreements must be sought out among actors who do not have the same manner of perceiving situations nor of envisioning the management of these situations.

If the way in which actors come to agreement takes on importance then it is appropriate to understand the mechanisms used and to see if the theories already employed or suggested for the study of business ecosystems study could contribute to our understanding here. Moore favors the evolutionist perspective but also recommends the use of the theory of complex adaptive systems (2006: 32). Teece (2007), who approaches this phenomenon with the theory of dynamic competences, emphasizes the complementary aspect of this theory with “Resource-Based Theory” and also suggests the use of game theory. Finally, Gueguen and Torrès (2004) propose the use of standards

theory (Shapiro & Varian, 1999). Whatever their interest, none of the theories cited above target an understanding of the way in which actors agree. On the other hand, the economy of conventions and the sociology of socio-technical networks deserve attention as they specifically target how actors cooperate despite the absence of a prior common framework. Among the studies within the “conventionalist” perspective, the body of work that Luc Boltanski produced with Laurent Th venot (1991) and Eve Chiapello (1999) seems particularly interesting for analyzing “heterogeneous” business ecosystems. In their approach, organizations are not treated “as unified entities (...) but as composite arrangements including devices which fall within the province of different worlds” (Boltanski, Th venot, 1991: 32): civic, commercial, industrial... Even if avoidance or resorting to mediators could assure peaceful co-existence, the meeting of different worlds more often degenerates into conflict. Under these conditions, the work previously cited is useful not only by the typology of solutions that are proposed ¹ but also by the analysis they make on the conditions of the emergence of solutions and their consolidation.

1. Clarification within a world, local arrangements or compromise among worlds.

As with the economy of conventions, the sociology of socio-technical networks is interested in the conditions and mechanisms of the production of cooperation. The projects studied, whether it is about the aquaculture in the bay of Saint-Brieuc (Callon, 1986) or the automatic subway Aramis (Latour, 1992), maintain a close kinship with those that served as support for the presentation of the business ecosystem communities. This is not the place to present in detail the approach proposed by Callon and Latour, but I would just mention that it states that the success or failure of an innovating project can not be understood based on its intrinsic characteristics only as the outcome depends on the existence and the maintenance of a network capable of connecting heterogeneous activities, properties and issues that are a priori incommensurate. It is the detail of these activities that the sociology of socio-technical networks would have us study in order to understand the dynamics of business ecosystems.

CONCLUSION

Business ecosystems are not a radically new phenomenon. The processes of co-evolution and coopetition, even though having been the object of particular study for the last fifteen years, are not new either. On the other hand, cultural and technological evolutions have clearly facilitated the emergence and development of business ecosystems. Up until the mid-80s, the idea of collaboration was culturally shocking “because it questioned the premise of a firm’s independence which was at the heart of dominant managerial representations” (K nig, 1996: 264). Today, this epistemological obstacle has been removed and, on this point, theoretical reflection can evolve in concert with the practices that stimulate it and that it, in return, informs. If the evolution of intellectual schemas has promoted the development of all types of business ecosystems, technological progress has, without a doubt, even more specifically benefited the business ecosystems that are structured around pooled interdependences.

The concept, as imagined by Moore (1993) translated the evolution of mentalities and attracted attention to the magnitude of the phenomenon. In order to further develop this intuition, Moore had recourse to two approaches (analogical and

definitional), both leading to important contradictions. As far as the analogical approach is concerned, it must be admitted, as Moore did with reason, that business ecosystems are in competition and their control is an essential strategic issue leading to the rejection of certain fundamental ecological principles. Not being able to envision a possible reconciliation between these two corpses, I propose the abandonment of all ecological reference. The definitional work that Moore conducted along different lines (enumeration of members, statement of properties, and case examples) also introduced contradictions even within the author's own work. These contradictions could be overcome if we accept that certain of the elements of definition proposed by Moore only apply to certain types of business ecosystems. In addition to resolving these contradictions, the typology proposed here sheds light on the specific mechanisms which shapes the dynamics specific to each type of ecosystem. It also draws attention to the fact that little place is given over to empirical research of the community ecosystems and suggest that their study could draw from theories developed precisely with the objective of explaining how agreements are reached between actors from different worlds. Finally, and contrary to what Moore promotes as being an essential characteristic of ecosystems, an ambiguous relationship to innovation is retained. All types of ecosystems could certainly be factors of innovation but, in ways specific to each type, they could equally promote reproduction.

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