TRANSFORMING ECOSYSTEM RELATIONSHIPS IN DIGITAL INNOVATION

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Completed Research Paper

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Abstract

The open innovation literature focuses on the organizational configurations suited for leveraging external contributions in innovation ecosystems. Less is known about the process by which a firm transforms its ecosystem relationships to establish the envisioned configuration. Such transformation is ruptured by competing values surfaced at the boundary to other ecosystem participants. Drawing on competing values theory, we develop a process perspective with which to understand the transformation of ecosystem relationships in digital innovation. Empirically, we conducted case study research on Sony Ericsson's efforts to increase external contributions in their development of mobile devices. We identify and analyze five value competitions (VC) over the 8-year process: each one of these VC involved tensions between Sony Ericsson's ambitions and the ecosystem and its established relationships with platform owners, operators, and competitors. Our process model provides new insight into how and why the process of ecosystem transformation involves tensions characterized competing values and how such tensions feed new ecosystem relationships. Our research extends existing open innovation theory and provides a basis for continued investigation of digital technology and ecosystem relationships.

Keywords: Innovation networks, Digital business ecosystems, Competing values model

Introduction

Digital technologies such as software platforms are rapidly transforming the business landscape (Evans et al. 2006; Yoo et al. 2008; Zammuto et al. 2007). New technology generations are fundamentally reshaping the traditional innovation logic, as business processes become intertwined with surrounding innovation ecosystems (Basole 2009). In particular, firms increasingly seek to leverage external information by building new forms of absorptive capacity (Cohen and Levinthal 1990) and boundary-spanning practices (Lindgren et al. 2008). Seeking such openness in innovation makes firms more dependent on accompanying changes in the firm’s environment (Adner and Kapoor 2010; Chesbrough et al. 2006; Simard and West 2006). They need to govern a range of ecosystem relationships that define the innovation space of their product and services and in many cases serve as the gateway to the future. On a general level, we refer to such relationships as the inter-firm linkages initiated, built, maintained, and terminated in an ecosystem to build business value. A closer examination of such relationships is central for appreciating ecosystems in digital innovation.
In this paper, we focus on the process by which organizations transform ecosystem relationships to leverage external information in digital innovation. We define an ecosystem as a coopetitive technology environment in which symbiotic relationships are formed to create mutual value for its members (cf. Basole 2009). In the literature, two features of innovation ecosystems stand out. First, an ecosystem is characterized by coopetition, i.e., simultaneous competition and cooperation (Walley 2007). In digital innovation, such actors can be found at different architectural layers such as contents, service, network, and device (Yoo et al. 2010). Second, ecosystems are essentially defined by the active shaping of relationships between its members. For individual firms, such relationships are ambiguous in that they involve oppositional interests. On one hand, the firm needs to shape the relationship as to capture business value. On the other hand, it needs to shape it in a way that nurtures other members of the ecology.

Looking closer at the open innovation literature, it provides a detailed view of the configurations needed to leverage external contributions in innovation ecosystems (Demil et al. 2006; Shah 2006; West 2003; West and O’Mahoney, 2008). However, little research has been conducted on the ecosystem relationships that firms need to govern to reap the benefits of such configurations. Such relationships are essential for understanding the process by which individual firms attempt to participate in ecosystems (Adner and Kapoor 2010). Our research is an attempt to redress this imbalance. The research question addressed in this paper is: What is the process by which a firm governs ecosystem relationships in digital innovation? Using competing values theory (Quinn and Rohrbaugh 1983), we conducted a longitudinal study of Sony Ericsson’s ecosystem relationships as the mobile device manufacturer attempted to improve their market position. The competing values framework (CVF) is a powerful lens for tracing competing values of simultaneous cooperation and competition in innovation ecosystem.

The remainder of the paper proceeds as follows. The next section provides a brief overview of the literature on ecosystem relationships. The subsequent section introduces the competing values theory as a framework for understanding the transformation of ecosystem relationships. Following a description of our methods, we describe the Sony Ericsson case as a series of value competitions as the mobile device manufacturer attempted to leverage external contributions through ecosystem relationships in digital innovation. We then present a process model with significant implications for research and practice. We conclude the paper by highlighting the limitations of the study and how further research can address these limitations.

Related Literature

One central theme in the open innovation literature is the identification of organizational configurations that enable “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively” (Chesbrough 2006, p. 1). Several configurations have been discussed, ranging from models used in open source (West and Gallagher 2006) to models used in incumbent firms (O’Connor 2006). Clearly, there is a general tendency towards vertical disintegration (Christensen 2006) making firms ask how open is open enough (West 2003).

However, adopting open innovation configurations is not only a question of strategic choice but relies on the symbiotic relationships that form the basis for the coopetition between actors participating in an innovation ecology. Organizations increasingly participate in ecosystems for tapping into knowledge flows outside their boundaries (Andersson et al. 2008; Chesbrough et al. 2006; Cohen and Levintal 1990; Simard and West 2006). This is based on an insight that a given innovation rarely stands on its own. It typically involves multiple actors, embedding the focal firm in interdependencies of knowledge flows (Adner 2006; Adner and Kapoor 2010; Boland et al. 2007; Schilling and Phelps 2007). Indeed, innovation ecologies represent a collaborative arrangement through which organizations may combine their resources as to create new products and offers (Adner, 2006) and tap into new businesses as to lower costs and innovate outside firm boundaries (Iansiti and Levien, 2004). However, engaging in an innovation ecosystem also includes new risks, delegating much of the control to the network outside the individual firm and dealing with the uncertainties of coordinating the new and unknown (Adner, 2006; Iansiti and Levien, 2004).

The literature on innovation ecosystems and alliances is extensive (see e.g., Adner and Kapoor 2010; De Rond and Bouchikhi 2004; Das and Teng 2000; Schilling and Phelps 2007) including Basole’s (2009) visualization of interfim relationships, Schilling and Phelps’ (2007) exploration on alliance networks and knowledge creation, and de Rond and Bouchikhi’s (2004) review of alliance dynamics and processes. Drawing on this stream of literature, ecosystem relationships can be understood across three dimensions (see Table 1). First, firms need to define the boundaries of their internal innovation activities and define which innovation activities that belong to the innovation ecosystem. We refer to this dimension as boundary definition, i.e., a firm’s attempts to define its boundaries in
relation to an innovation ecosystem. In the literature, this dimension has received considerable attention in accounts on boundary-spanning (Cohen and Levinthal 1990; Lindgren et al. 2008) and inter-organizational innovation (Andersson et al. 2008; Pittaway et al. 2004). Second, ecosystem relationships also involve attention to the control mode used by a firm for governing its technology. We refer to mode of control as the control mechanism used by a firm to capture value from its technology in the ecosystem (West and O'Mahony 2008; Shah 2006), where the control and coordination can be more or less distributed across members of the ecosystem (Yoo et al. 2008). Finally, a firm’s relationship to an ecosystem is characterized by a particular locus. We refer to locus of innovation as a firm’s position along a continuum ranging from a process emphasis at one end, to a product emphasis at the other end (West and Gallagher 2006).

Table 1. Ecosystem Relationship Dimensions

<table>
<thead>
<tr>
<th>Ecosystem Relationship Dimensions</th>
<th>Definition</th>
<th>Example References</th>
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| Boundary Definition              | A firm’s attempts to define its boundaries in relation to an innovation ecosystem. | Andersson et al. (2008)  
                               |                                                                             | Cohen and Levinthal (1990)  
                               |                                                                             | Lindgren et al. (2008)  
                               |                                                                             | Pittaway et al. (2004) |
| Mode of Control                  | The control mechanism used by a firm to capture value from its technology in the ecosystem | Das and Teng (2000)  
                               |                                                                             | De Rond and Bouchikihi (2004)  
                               |                                                                             | West (2003)  
                               |                                                                             | Yoo et al. (2008) |
| Locus of Innovation              | A firm’s position along a continuum ranging from process emphasis to product emphasis in an ecosystem | Demil and Lecoq (2006)  
                               |                                                                             | Evans (2006)  
                               |                                                                             | West and Gallagher (2006) |

Studying the transformation of ecosystem relationships over time requires a research setting where innovation ecosystems have been the dominant mode of innovation for some time. In this regard, the mobile device industry is a useful setting, since it has been an early adopter of coopetitive thinking. Given rapid product innovation clockspeed (Fine 1998), mobile device manufacturers are responsive to the presence of numerous actors along the value chain (Adner and Kapoor 2010). This includes end users, producers of complements (such as peripheral devices and software applications), and mobile operators (Evans et al. 2006). In effect, device manufacturers have become highly dependent on other organizations in supporting the supply of new technologies and applications.

New ecosystem relationships introduce new forms of business strategies and collaboration (Bharadwaj et al. 2010; Chesbrough and Appleyard 2007; Sambamurthy et al. 2003). While inter-firm collaboration networks have been suggested to significantly influence innovation (Schilling and Phelps 2007) such cooperative arrangements tend to involve relatively high instability rates (Das and Teng, 2000). In fact, it has even been suggested that the evolution of ecologies and alliances rely on struggles of competing forces (Das and Teng 2000; de Rond and Bouchikhi 2004). Given our ambition to study the process by which firms govern ecosystem relationships, we therefore adopted competing values theory (Quinn and Rohrbaugh 1983) for appreciating such struggles in innovation ecologies.

The Competing Values of Ecosystem Relationships

CVF (Quinn and Rohrbaugh 1983) assumes that organizations exist in a world of contradictory opposing forces competing for domination and control. Building on a dialectic view of the organization (Benson 1977; Seo and Creed 2002), CVF has typically been applied to explain the dynamics that describe change and innovation. That is, whenever a force or value gathers enough strength to dominate over another force the ecosystem is expected to evolve and change into new constellations (Cho et al. 2007; Das and Teng 2000).

CVF proposes three value dimensions from which organizational actors make evaluations about effectiveness. In this regard, values refer to something more than pure business value. It refers to the ethical foundation for making decisions about behavior as it is manifested in organizational action. For example, a traditional organization might emphasize formalization, control, and efficiency while a more innovative organization rather encourages values such as creativity, informality and morale (Quinn and Cameron, 1983; Quinn and Rohrbaugh, 1983). Values are not necessarily constant; rather they are expected to change throughout the organizational lifecycle.
The first value dimension is related to external or internal focus. The internal focus puts emphasis on micro processes such as the well being of organizational members and employees, while the external focus typically concerns the organization’s ability to function in its broader environment. The second value dimension concerns organizational structure, representing the tensions between stability and control on one hand, and flexibility and change on the other. The third, related to means and ends, indicates a focus on processes, such as planning and goal setting (means), or a focus on the final outcomes (ends) (Quinn and Cameron 1983; Quinn et al. 1991; Quinn and Rohrbaugh 1983).

CVF assumes that the impact of different competing forces evolve and change over the organization’s entire life cycle (Quinn and Cameron 1983). Likewise, as many studies suggest, the development of strategic alliances or ecologies depends on struggles within the network of actors. For example, Cho et al. (2007) found how an innovation remained in a fragile and internally weak state due to inherent contradictions between actors across the network. Equally, in their study of alliance instabilities, Das and Teng (2000) identified three main conflicting forces in building alliances – cooperation versus competition, rigidity versus flexibility, and short-term versus long-term orientation. Similarly, de Rond and Bouchikhi (2004) applied a dialectical framework to identify multiple competing forces in the life cycle of an alliance between two partners. They identified five overall forces: between design and emergence, cooperation and competition, trust and vigilance, expansion and contradiction, and control and autonomy. Regardless of the exact nature of the contradictory forces, the literature shows that tensions are important aspects of innovation ecologies (cf. Cho et al. 2007; Das and Teng 2000; de Rond and Bouchikhi 2004) and the creation of new paths in digital innovation (Henfridsson et al. 2009).

Drawing on CVF and the related literature on dialectics, we seek to theorize and extend knowledge on governing ecosystem relationships in digital innovation by focusing on: (1) the process by which a firm transforms its ecosystem relationships to establish the envisioned configuration, and (2) the interplay between competing values in innovation ecosystems. Given this theoretical background, we provide a detailed account of Sony Eriksson’s governance of ecosystem relationships as a means to push digital innovation. The empirical account of this paper is intended to serve as an illustration of the tactics, tensions, and opposing forces in building innovation ecosystems.

Method

Research Setting and Case Selection

A recent article of Basole (2009) explores the complexity of inter-firm relations in the mobile device industry. Suggesting that platform providers play a central role in the mobile industry as they drive innovation, Basole (2009) visualizes the structure and evolution of mobile platforms. Visualizing changes in the platform ecology during a three-year period, Basole’s study reveals growing platform diversity and rapidly changing inter-firm relationships. For example, while Symbian was the main player on the platform market in 2006, Symbian’s platform leadership was continuously decreasing as the prominence of Apple OS, Windows Mobile, and Android is growing. Basole (2009) also shows how mobile device manufacturers such as Samsung, Motorola and Sony Ericsson, increasingly provide devices based a variety of platforms.

There are a number of reasons why we selected the mobile device manufacturer, Sony Ericsson, as the empirical setting for our study. First, the mobile phone industry provides an example of a growing ecosystem, in which different actors coexist and influence each other. Marked by its large dependence on network operators and standards controlling subscribers and applications, the mobile ecosystem consists of numerous actors and segments (Basole 2009). Thus, partaking in an ecosystem does not only involve cooperation and symbiotic relationships, but also involve interdependencies, competition, and struggles for dominance (Adner and Kapoor 2010; Basole 2009; Moore 1993). Mobile device manufacturers do not function as independent units, rather they run in a complex network of operators, users, and third-party developers (Basole 2009; Evans et al. 2006). While manufacturers sell their phones through operators, software platforms work as the glue between manufacturers, operators, developers and users. Second, with an increasing dependence on external software developers and open innovation, the mobile phone industry is marked by its large dependence on external sources for innovation. This has introduced new powerful actors such as third-party developers in the innovation process. Lastly, Sony Ericsson exemplifies a firm that has undergone several stages of both success and failure, allowing careful attention to ecosystem relationships during different competitive positions.
**Data Collection and Analysis**

**Step 1: Secondary Data Elicitation**

Designed as case study research (Eisenhardt, 1989), our analysis of Sony Ericsson particularly relies on secondary data. With the intention to identify and predict “patterned regularities over time” (Markus and Robey, 1988) we attempted to collect fine-grained qualitative data (Langley, 1999) as to explicate the evolving Sony Ericsson innovation ecosystem. While the secondary data was an important means to trace the historical process and secure a correct timeline, this data was complemented with interviews as to verify and substantiate key episodes.

To this end, we used the ProQuest database and Sony Ericsson press releases to elicit relevant data to be included in our case database. We concentrated our searches to the time period between 2001 (one year before the joint venture between Ericsson and Sony) and 2009. The initial keywords were: Sony Ericsson, Platform, and Community. All in all, these searches generated 1434 press and trade articles. An initial screening of these articles resulted in 174 articles relevant for our study ranging from more than 37 different sources. In a similar fashion, we searched Sony Ericsson’s press releases between 2001 and 2009. This search resulted in 152 press releases deemed relevant for the study.

**Step 2: Data Cleansing**

In order to reduce the data material further, we carefully reviewed each of the collected articles to see whether they contained content related to our ambition to trace Sony Ericsson’s efforts to push digital innovation by governing ecosystem relationships. This screening process resulted in an exclusive selection of 43 trade press articles and 58 Sony Ericsson press releases.

We initially conducted open coding (Charmaz, 2006; Strauss and Corbin 1990) in which interviews, trade press and the Sony Ericsson press releases were coded in Atlas.ti. The open coding of the press releases resulted in76 descriptive concepts – which in turn generated five coding families: Platform, Nokia, Partnering, Innovation and Technological Releases. Similarly, the trade press articles were coded using open coding. This coding generated 143 descriptive concepts divided into seven code families: Ecosystems, Struggle, Alliances, Platforms, SE models, Timeline, and Important quotes. The interviews generated 106 codes in total.

Given the dynamic nature of the mobile device industry, the results from the coding process were used to create and refine an initial timeline over key events. By matching the press releases with the trade press articles we were able to track and coordinate events that appeared significant in the literature.

**Step 3: Establishing Key Events and Decisions**

The third stage in this study particularly involved semi-structured interviews with the community manager (since its inception) and the partner program manager at Sony Ericsson. In line with process theorizing (Langley 1999), we used the interviews to establish key events and decisions that were deemed by the respondents important to the development of the developer community time. In addition, by revealing our initial timeline to the respondents, we were able to refine the timeline and include aspects that were not covered in the literature. Our analysis of these transcribed interviews generated events throughout the 8-year period studied.

Triangulating the key decisions derived from the interviews with our secondary data material, our analysis yielded five episodes of competing values (see Table 2). These value competitions were implemented as important high-level categories and were all related to an ecosystem relationship between Sony Ericsson and an external player. Using the coding techniques implemented in Atlas.ti, we then associated lower-level categories to each of these high-level categories.

**Step 4: Synthesizing the Process Model**

Lastly, we synthesized the five identified value competitions into a process model. These value competitions were the result of temporal decomposition, which is important in process theorizing as to establish process variance (Langley 1999). By presenting the five occurrences of value competitions, our aim was to illustrate the process by which a firm transforms its ecosystem relationships to establish the envisioned configuration, the interdependencies of such networks, and illustrate the interplay between competing values in innovation ecologies.
The Sony Ericsson Case

In what follows, we present the Sony Ericsson case as a series of value competitions as the mobile device manufacturer attempted to leverage external contributions through ecosystem relationship transformations. Our data analysis distinguished three phases of this initiative.

Case Background

Some ten years ago, Nokia’s dominance over the mobile device industry was growing, and other device manufacturers were struggling to keep up with Nokia’s growth. In early 2001, the Finish device manufacturer reported a growth rate twice that of the overall market. At the same time, Ericsson had been losing substantial market shares on mobile devices, primarily to Nokia. In an EBN (the Electronic Buyer News magazine) interview in 2001, Ericsson’s CEO and President, Kurt Hellström, therefore stated:

“A weaker market has contributed to the further deterioration of our mobile phone business [...] as a result, we are limiting the scope of our phone operations to the essential part that also support our systems business. This will give us a business that is smaller, more manageable, and has lower risks.”

As a result of the ambition to lower risks, Ericsson and Sony Corporation jointly announced a Memorandum of Understanding to merge their respective mobile phone businesses. Partnering with Sony, Ericsson expected to gain increased opportunities in the growing market for 3G and Mobile Internet. Since Sony only was a marginal player with a 1% market share, it was the vast experience in consumer electronics and entertainment that caught the interest of Ericsson. In a Sony Ericsson Press Release in April 2001, Kurt Hellström (Ericsson President and CEO) announced:

“By combining the complementary strengths of Ericsson and Sony, the new company is uniquely positioned to become a world leader in telecommunications, as the industry moves rapidly toward Mobile Internet”

By August 2001, Sony and Ericsson had finalized the merger to become the top seller of multimedia handsets. At the time, telecom analysts were cautiously optimistic about the possibility that the merger would enable a strengthened position by joining forces to combat Nokia’s growing dominance. This was the start of a struggle for increasing market share on the mobile device market.

Value competition 1: Setting up P800 Developer Program for Combating Operators’ Control (2002-March 2003)

While suffering from decreasing sales in 2002, Sony Ericsson pursued the strategy to exploit Sony’s multimedia competence to introduce new multimedia-enabled mobile devices. In doing so, they also recognized the need to work with third-party developers to increase the quality and quantity of the device content. Traditionally, operators had controlled mobile content, so this was a move to break away from the current path of innovation. Rather than emphasizing control through vertical architecture, Sony Ericsson wanted to establish leeway for third-party developers to enhance the content of future devices. As an important element in this strategy, the firm formed a new organizational unit that would run a so-called developer program. As one of the founders of the Sony Ericsson Developer community remembered:

“By then, we were four people at Sony Ericsson that realized and suggested that we needed to build a developer program [for external developers] but we had no idea of how to do it.”

By partnering with Ericsson’s “mobility world” ecosystem and the US-based AppForge, Sony Ericsson intended to support developers in creating applications and content for Sony Ericsson devices. A specific target for this effort was the new high-end P800-model, featuring both color screen and built-in camera. Sony Ericsson’s partnering with AppForge allowed third-party developers to write Visual Basic applications for the P800 model:

“We are very excited to introduce our new products to Visual Basic developers worldwide,” said Rikko Sakaguchi, Senior Vice President of Applications and Content at Sony Ericsson. “By enhancing our products with AppForge’s mobile application platform, Microsoft developers can write applications directly to the Symbian-based P800 product line without having to use additional technologies.”
With the release of the P800 model, Sony Ericsson had entered the mobile device industry as a serious competitor to Samsung, Nokia, and Motorola by breaking away from the control of operators. The P800 was based on Symbian OS v.7. It was the first Sony Ericsson device that was open to the large community of Symbian platform developers. The community manager at Sony Ericsson commented:

“We were under significant stress, and I realized that we needed to take in external experts – that would require an open architecture – and we chose Symbian for a number of reasons. [...] Nokia had done some variants but, we...well we did not realize then... we wanted to have more flexibility.”

With the increased focus on flexibility and external contributions, Sony Ericsson set up a distribution channel for end-users to buy P800 applications in March 2003, serving as a complement to operators’ traditional channels. The release of the P800, including a developer program supporting flexibility, allowed Sony Ericsson to earn profit in late 2003.


Sony Ericsson partnered with Nokia in 2003 for creating a common developer tool for Symbian phones. The device manufacturers also created a common certification program to facilitate developers’ application certification and deployment for Symbian OS phones (such as the P800). In the first few month of 2003, the number of Symbian based devices exploded. In fact, one million Symbian based phones were delivered each month in early 2003. As a result of this rapid growth, however, platform governance to support external development on Symbian emerged as a significant problem. In particular, Sony Ericsson realized the complexity of the Symbian platform and how this created barriers for developers to port their applications to the platform. The Sony Ericsson community manager said:

“Symbian was an extremely difficult platform for developers. Symbian had insufficient developer tools and stuff... I witnessed how it took more than three months to learn how to work in Symbian even for professionals that had been working as programmers for like 20 years.”

Given the rapidly growing installed base of Symbian devices following the Sony Ericsson-Nokia cooperation, the platform appeared successful. However, the relative success also increased stakes and introduced tensions. For instance, in February 2004, Nokia wanted to increase control over the Symbian platform by buying out Psion’s shares in the Symbian Consortium (the consortium included several members such as Sony Ericsson, Psion, Panasonic Mobile, and Siemens). This left other Symbian members in peril about Nokia’s intentions. In a Financial Times interview in 2004, Carl-Henric Svanberg, Ericsson’s CEO, said:

"They (Nokia) must get below 50 percent, otherwise it becomes a Nokia platform...I don't think everybody would see that as a problem but some people would do. If that happens there will be a gradual deterioration in the view of Symbian and other platforms could start to materialize."

In response, Ericsson found a 'chink in the shareholding deal', blocking Nokia from gaining control of Symbian. Instead, Psion sold its shares to Ericsson in March 2004. As a result the promising cooperation between Nokia and Sony Ericsson on a common developer tool for Symbian device was put on hold and they resumed their internal developer program strategies.

Value Competition 3: Correcting Time-to-Market Failure to Tap into Sun’s Java ME Ecosystem (2003-2004)

Sony Ericsson had been working with the Java Mobile Edition (Java ME) platform for some years with the T610 model as a basis. However, early on, the T610 phone was highly criticized by operators for compatibility problems. The rapid market introduction was accomplished at the expense of poor Java-compatibility. In fact, the device could only run about 25% of the existing Java applications at the time. In parallel with going for a common Symbian developer tool with Nokia, Sony Ericsson therefore partnered with Sun Microsystems around Java. Building on the Sun-partnership as a way to tap more closely into the Java ecosystem, this criticism triggered Sony Ericsson’s top management to take drastic decisions on further developing the T610 model. The community manager commented:

“Well, I honestly believe that it was a masterstroke. We had the T610 and a very poorly implemented Java ME platform. When the phone reached the operators (who wanted to sell a ‘game’ phone) they more or less told us that they would redraw the phone if we didn’t improve things. That was in 2002/2003. The top management got involved, pushed in a lot of resources and forced us to improve the handset capabilities. And in like less than a month, the
performance had been increased by factor of 3. [...] We had proven that we could do this sort of things really fast... We suddenly had the best Java phone on the market. It was a do or die situation.”

With the success with the T610 and P800 models, Sony Ericsson started an online application shop and launched a developer web portal in late 2003. Shortly after, it was clear that the combination of improving T610 Java-compatibility and leveraging external game development strongly increased handset shipments and profits. In fact, Sony Ericsson shipments reached an all-time high as its product offering in the mid- and entry-level segments continued to gain momentum.

In 2004, Java ME received widespread support among several device manufacturers, allowing developers to write applications and distribute it across different handsets. Thus, as Java applications were hosted on the handset, rather than in the operator’s network –Java was considered detrimental for helping developers and device manufacturers to wrest the control away from the operators. As noted in a New Media Age-article in February 2004:

“[…] mobile developers and content providers are beginning to wonder if mobile Java will prove to be the technology that wrests control of the consumer's handset away from the operator and into the hands of either the consumers themselves, or media and content companies... Java makes it less easy for the operators to have control”.

While the operators traditionally had significant power through their intimate relationship with customers and developers, the focus on Java ME and external developers was a first step changing this relationship.

Value Competition 4: Leveraging the Walkman brand to Control the Music Phone Market (2004-2007)

In 2004, Sony Ericsson was searching for new business cases and upcoming ecosystems. In response to Apple’s iPod, Sony Ericsson partnered with RealNetworks for exploiting Sony’s music competence with an external partner in the segment of dedicated music phones. RealNetworks was the leading creator of digital media services and software incorporating the RealPlayer, RealAudio, and RealVideo applications. Additionally, Sony Ericsson started an internal branding process for reviving the iconic Walkman brand.

As a result of this process, Sony Ericsson released the W800i in 2005, which was the first Walkman phone. The W800i was a music phone and became a large success for Sony Ericsson. As the former president of Sony Ericsson, Miles Hunt, said in a 2006 Financial Times interview:

"I guess 12 months ago we were a little bit uncertain about exactly what the reaction would be, particularly because we weren't sure that the consumer really thought of the mobile phone as a music device. There had been so much attention on the iPod that we wondered if we could credibly establish the phone as a portable music device”

Boosted by the Walkman brand and the “cyber-shot” camera phones, Sony Ericsson witnessed a very strong sequential market growth in Q4 2005. The units shipped increased with 28% when comparing with the same quarter in 2004. Sony Ericsson was able to benefit from the Walkman and cyber-shot device series throughout 2006 and 2007. However, in early 2008, Sony Ericsson faced increased market competition as Apple and Google launched competing products. In particular Apple’s iPhone, threatened the company’s position in music phones and occasioned new considerations of the Sony Ericsson ecosystem.

Value Competition 5: Changing Ecosystem Tactics in Responding to Apple and Google (2008-2010)

In June 2008, Symbian was facing increased competition. In a June 2008-article, Wall Street Journal-writer Cassell Bryan-Low claimed:

“In the face of mounting competition from cell phone-industry newcomers such as Google and Apple Inc., established players such as Nokia are looking for ways to bring more innovative products to market -- and to do so more quickly [...] Nokia Corp. of Finland is acquiring full ownership of United Kingdom-based Symbian Ltd., a provider of software for advanced cell phones, in a move that will create a direct challenge to Google Inc.’s cell phone-software push.”

Nokia’s acquisition of Symbian was followed by a new Symbian cooperation, “the Symbian Foundation”. Headed by Nokia, the consortium including Sony Ericsson, and NTT DoCoMo decided to release the software code of
Symbian’s operating system. Making the platform available open source would enable a common platform that could accommodate the S60 (Nokia), UIQ (Sony Ericsson) and MOAP (DoCoMo) programming interfaces.

The idea of increasing commonality through the new Symbian initiative was not only a direct attempt to challenge Google’s Android initiative, it was also Symbian’s response to calls for fewer platforms among operators and device manufacturers. Nokia’s Symbian initiative, however, never succeeded. The Sony Ericsson Community Manager explained why:

“What started off as a cooperative initiative [Symbian] – soon became fragmented and politically infected. More or less all of us were simply sitting there making things hard for each other instead of helping each other out. [...] it was a very limited ecosystem.”

As a result, Sony Ericsson’s renewed interest in Symbian failed. In 2009, Sony Ericsson faced continuous weak sales. The media even speculated in the possibility of separating Sony and Ericsson. As Brown Humes, a Financial Times journalist, wrote in March 2009:

“Sometimes it's easier to stay in a troubled marriage than to undergo a costly and messy separation... It's a question that crops up increasingly often. Back when the venture was formed in 2001 by combining also-ran mobile phone units at Sony and Ericsson, keeping a stake in handsets made more sense for Ericsson. If the company was launching a new network technology, it could guarantee that compatible handsets were there to use it -- ultimately helping Ericsson win more contracts. But that's less relevant now as Ericsson focuses on open network standards, Nomura's Jeffrey says. "It no longer matters if Sony Ericsson is the company supplying the handsets," he says. Besides, the mobile industry today is more focused on software and digital content than on hardware.

Given the Symbian failure, Sony Ericsson joined forces with Google and the Open Handset Alliance’s (OHA) Android - a free and open source mobile device platform building on the Linux kernel. Unlike Apple’s iPhone, the Android platform was open to any device manufacturer. The OHA alliance was an effort to foster a new open ecosystem – independent of manufacturers and operators. Building on Android, Sony Ericsson released the Xperia X10 in early 2010. Using Android, Sony Ericsson tapped into a large community of application developers pioneered by the OHA partners, rather than trying to build their own ecosystem together with Nokia. Coinciding with this change of ecosystem, the company was able to report its first quarterly profit in Q1 2010 in almost two years.

In April 2010 Bert Nordberg, Sony Ericsson’s new CEO commented,

“We are pleased to see the positive impact of both the launch of new products and the business transformation programme improving the company’s results. The Xperia™ X10, our first android-based Communication Entertainment device...Increases in both gross and operating margins show that we are on the right track to build the correct cost structure for our business organization and strategy. We will continue to work through the transformation programme to ensure that we are competitive.”

Discussion

We set out to analyze the process by which a firm governs ecosystem relationships in digital innovation. With this focus in mind, we conducted a longitudinal study of Sony Ericsson’s efforts to improve their position in the mobile device marketplace by partnering with different actors around platform ecosystems including Symbian, Java, and Android. In what follows, we first discuss the five value competitions that were derived from the Sony Ericsson case (see Table 2). Based on this discussion, we outline a process model of ecosystem relationship transformation including key concepts and relationships. We then outline implications for the open innovation literature and the continued investigation of digital technology and ecosystem relationships.

Value Competition

The nonlinear dynamics of innovation ecosystems makes it increasingly difficult to control the nature of technological innovation (De Rond and Bouchikhi 2004; Yoo et al. 2008). Specifically, it is becoming difficult to disentangle the internal process of innovation from the underlying external ecosystem of actors.

The Sony Ericsson case illustrates the radical shifts of the mobile device industry during the past eight years. It shows how high degree of digitalization, open platform concepts, and the increasingly competitive market enable new ways to innovate with digital technology. In addition, the case highlights the fragile interplay between different
actors, and how ecosystem relationships are formed through periods of intensive and simultaneous cooperation and competition (de Rond and Bouchikhi 2004). Such value competition periods are marked by tensions and struggles generated by competing forces. Table 2 illustrates the value competitions that we generated from analyzing the data collected on Sony Ericsson.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Value Competition</th>
<th>Key Actors</th>
<th>Case Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-March 2003</td>
<td>VC 1: Setting up P800 Developer Program for Combating Operators’ Control</td>
<td>- Sony Ericsson</td>
<td>- Partnering with Ericsson’s Mobility world and AppForge</td>
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<tr>
<td></td>
<td></td>
<td>- Ericsson</td>
<td>- Seeking to break with operators’ control</td>
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<td></td>
<td></td>
<td>- AppForge</td>
<td>- Developing the P800 model</td>
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<tr>
<td></td>
<td></td>
<td>- Operators</td>
<td>- Introducing the developer program for Visual Basic application development</td>
</tr>
<tr>
<td>2003-March 2004</td>
<td>VC2: Creating Common Symbian developer tool with Nokia for Growing Installed Base</td>
<td>- Sony Ericsson</td>
<td>- Partnering with Nokia and Symbian for aligning developer tools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Nokia</td>
<td>- Struggling to block Nokia from gaining control of Symbian</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Symbian Consortium</td>
<td>- Partnership on hold</td>
</tr>
<tr>
<td>2003-2004</td>
<td>VC3: Correcting Time-to-Market Failure to Tap into Sun’s Java ME Ecosystem</td>
<td>- Sony Ericsson</td>
<td>- Partnering with the Java ME ecosystem and developers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sun Microsystems</td>
<td>- Difficulties in pertaining internal quality with demands on time-to-market</td>
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<td></td>
<td></td>
<td></td>
<td>- Improving the T610 model</td>
</tr>
<tr>
<td>2004-2007</td>
<td>VC4: Leveraging the Walkman brand to Control the Music Phone Market</td>
<td>- Sony Ericsson</td>
<td>- Partnering with RealNetworks and Sony Walkman</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sony (Walkman)</td>
<td>- Seeking to control the music phone market</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RealNetworks</td>
<td>- Developing the W series music phones (W800s)</td>
</tr>
<tr>
<td>2008-2010</td>
<td>VC5: Changing Ecosystem Tactics in Responding to Apple and Google</td>
<td>- Sony Ericsson</td>
<td>- Partnering with the Symbian Foundation and the OHA</td>
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<tr>
<td></td>
<td></td>
<td>- Symbian Foundation</td>
<td>- Focus on controlling market positions and technological development</td>
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<tr>
<td></td>
<td></td>
<td>- OHA</td>
<td>- Releasing Android based Xperia X10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- New business strategies</td>
</tr>
</tbody>
</table>

The initial value competition was the result of a partnering process between Sony Ericsson, Ericsson’s “mobility world” and AppForge. The alliance was driven by the attempt to enable external application development and innovation. The partnership resulted in a developer program for Visual Basic applications for the P800. The developer program also resulted in implications for the relation between Sony Ericsson and the operators. Historically, the operators had served as gatekeepers for the collection of user demands and needs and how these were reflected in features of the mobile device. With a direct communication channel between Sony Ericsson and the developers, however, operator control was decreasing. This created a tension between operators and Sony Ericsson. Hence, as suggested by deRond and Bouchikhi (2004), we observed how the alliance brought unintended consequences for actors not directly involved in the partnering process.
The second value competition particularly illustrates the non-linearity of innovation ecosystems (Yoo et al. 2008). While driven by the common goal of capturing value from external contributions, Sony Ericsson partnered with Nokia through the Symbian Consortium. Although Sony Ericsson’s Symbian based phone models became an immediate success, the alliance was largely disturbed by Nokia’s strive for domination. Specifically, the tension between domination and cooperation (Das and Teng 2000; deRond and Bouchikhi 2004) in combination with significant platform governance problems reflected the main tensions in the Symbian ecosystem. The abrupt ending of Nokia’s attempts to control Symbian, resulted in putting the partnership on hold, thus little, if any, technological development resulted from this partnering process.

In the third value competition, Sony Ericsson aligned with Sun Microsystems as to attract Java game developers. This alliance was marked by Sony Ericsson’s underestimation of providing the appropriate means (tools and technologies) (Quinn and Cameron 1983; Quinn et al. 1991; Quinn and Rohrbagh 1983) to attract developers and new customers. In particular, we observed how increasing pressures on rapid market introduction came at the expense of quality in internal processes. The less satisfactory performance of the initial T610 model was the result of this tension. That is, the harsh pressure on developing for external purposes had seriously damaged the internal quality process.

In the fourth value competition process, we observed how Sony Ericsson explored and aligned with external partners. However, at the same time, they exploited its internal resources (Lyytinen and Rose 2003; Taylor and Helfat 2009). Specifically, Sony Ericsson partnered with RealNetworks in combination with exploiting the internal Sony Walkman brand. This value competition, as opposed to the others, did not focus as much on external innovation and development. Rather, by inducing new alliances with strong co-branding, Sony Ericsson enabled internal innovation and thereby more controlled forms of governance. The partnering process resulted in the release of the Sony Ericsson Walkman models. However, while controlling the music phone market for several years, Sony Ericsson faced increasing market competition as Apple launched its iPhone. Their confrontation forced Sony Ericsson to rethink its initial ambitions of controlling the music phone industry to once again exploring open platform alternatives.

The last value competition process illustrated how alliances may take different unanticipated forms. When Sony Ericsson partnered with the Symbian Foundation, we observed, similar to Cho et al. (2007) how the partnership remained unproductive and fragile due to inherent contradictions within the ecosystem. While innovation, in this ecosystem, remained absent, Sony Ericsson partnered with OHA and the Android developer community. Given this partnership Sony Ericsson was forced to change its business strategies. Rather than predicting future end products and user needs, they pursued a third-party developer strategy as a new form of business strategy (Burgelman and Grove 2007) that relied on a multi sided market space (Demil and Lecoq 2006; Evans et al. 2006) between consumers, developers, and handset providers.

**A Process Model of Ecosystem Relationship Transformation**

We propose a process model of ecosystem transformation (see Figure 1). The model generalizes the five value competitions identified and analyzed through our longitudinal study of Sony Ericsson.
The received ecosystem, i.e., the coopetitive environment in which symbiotic relationships are shaped to create mutual benefits, works as a basis for individual ecosystem members to assess their competitive position and to what extent they can create a new opportunity from an emerging new digital technology. While the competitive position reflects the firm’s perceived competitiveness within the current innovation ecosystem, the new digital technology can typically be something that is new to the particular ecosystem. In this regard, the combination of a firm’s competitive position relative the current ecosystem and the inherent possibilities in a digital technology may trigger the firm to create a new opportunity. For instance, in the first value competition, SonyEricsson viewed the new smartphone (enabled by new miniaturized technologies, such as in-built camera, and improved battery technology), P800, as an excellent opportunity to establish a new ecosystem relationship with third-party application developers. Given their competitive position, largely in the hands of operators in terms of content, the more advanced handsets enabled developer programs.

Since ecosystem relationships are characterized by simultaneous cooperation and competition, such relationships tend to lead to tensions between competing values among participants of the new relationship. As suggested by CVF, such competing values can be competition between control and flexibility, external focus and internal focus, and/or means and ends (cf. Das and Teng 2000; de Rond and Bouchikhi 2004; Quinn and Rohrbaugh 1983). Tensions are the engine of the ecosystem relationship, ultimately making possible a new product and/or business strategy. In cases where tensions cannot be resolved, they may lead to an ending of the relationship. For instance, in the second value competition, SonyEricsson’s and Nokia’s joint effort to improve Symbian developer tools for establishing a common Symbian developer program led to significant tension between the two mobile device manufacturers. The controversy over the ownership of Symbian led to a termination of the SonyEricsson-Nokia relationship initiated for building common Symbian developer tools.

The model is iterative. Successful governance of ecosystem relationships over time, where the consequences of one cycle work as input in a new one, is at the heart of managing a high-tech product-developing firm. In the SonyEricsson case, we also observed how value competitions are ongoing in parallel, creating a range of ongoing set of ecosystem relationship transformations characterized by simultaneous cooperation and coopetition.

**Implications**

In this article, we develop a process model of the ecosystem relationship transformation. While the open innovation literature provides detailed views of the configurations needed to leverage external contributions (Demil et al. 2006; Shah 2006; West 2003; West and O’Mahoney, 2008), little research seeks to understand the underlying process and relationships forming such innovation environments. To this end, we set out to analyze the process by which a firm governs ecosystem relationships in digital innovation. By taking a longitudinal perspective, our process model of ecosystem relationships is intended to address this gap in the open innovation literature.

Our model not only explains how ecosystem relationships are continuously transformed, but also shows how the transformation of ecosystems emerged from tensions and competing values among actors. We suggest that when
studying open innovation ecosystems, internal tensions and consequences need to be analyzed as to understand how
to govern such innovation ecologies. By looking further into the processes underlying open innovation
environments, this study helps explaining how ecosystem relationships are transformed. It also confirms that the
instabilities and fragile nature of alliances is due to the inherent value competitions in such relationships.

In addition, we generate insights important for the continued investigation of digital innovation (Henfridsson et al.
2009; Yoo 2010; Yoo et al. 2008). Essentially, we believe that it is digital convergence (Yoffie 1997) and the
ongoing digitalization of socio-technical relationships that drive the dynamics of innovation ecosystems. Given that
the volatility of ecosystems can be traced partly to digitalization, our model can be seen as a modest attempt to look
closer at the specific relationships that mediate the creation of new competitive positions in organizing for
innovation in the digital world.

For managers, our study reveals that an innovation process rarely stands on its own. It includes a multitude of actors
that simultaneously attempt to govern their relationships. Given the multitude of governance attempts, it is not
 surprising that tensions emerge, and, in fact, works as a basis for transforming initial ecosystem conditions. More
Our case suggests that the governing possibilities of such tensions are fairly limited. Rather, we advice managers to
focus on the ways by which aligning with new ecosystem participants can be combined with exploiting internal and
external innovation processes. Our data supports the argument that tensions are neither inherently dysfunctional
(deRond and Bouchikhi 2004) nor necessarily functional.

Conclusions

We argue that the governance of ecosystem relationships may serve as the gateway to the future for product
developing firms innovating with digital technology. To this end, we conducted case study research in the mobile
device industry, which, by any measure, has been going through a tremendous transformation from being largely
dominated by operators to a situation where the control is distributed over ecosystems of many actors (cf. Yoo et al.
2008). In fact, over time, we can view how competitive dynamics increasingly has been played out on the ecological
level, where different platforms have gained and lost in popularity over time. As an example, we can now see how
formerly flourishing ecosystems such as Symbian and Java are losing dominance to rapidly growing ecosystems
such as Apple’s iPhone community and Google’s Android.

So, how can firms navigate in this competitive landscape of innovation ecosystems? As argued in this paper, firms
need to continuously manage their ecosystem relationships. The competitive position of an individual firm is
reflected in its relationships to other participants in the ecosystem. To better understand ecosystem relationships, we
therefore outline a process model with which to understand the transformation of such relationships. This model has
significant implications for the open innovation literature and the continued investigation of digital innovation.

Future studies could address several limitations in our work. First, our process model is derived from a single case
study. Although we used temporal decomposition to introduce process variance (Langley 1999) over five value
competitions, more case studies are needed to fine-tune the model. Second, variance studies could be used to test our
model. In doing this, each of the variables included in the model would require the generation of measures that allow
for collection of quantitative data. Lastly, it would be useful to see how the same pattern of ecosystem relationship
transformation that we observed would vary across industries.
References


