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Building Relations through Open Collaboration - a strategic perspective on innovation and standard setting

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Introduction

Knowledge has become an important foundation for competitive advantage. However, in many industries information and knowledge floats more and more free and is thus rapidly spreading among competing companies. As a consequence, companies are finding it difficult to sustain an acquired lead over the competition. A contributing factor is that it has become increasingly important for companies to establish and manage relations with external constituents. Especially within high technology markets this is a central strategic issue. In these industries, products are merely components within a larger system and their value, hence, depends on the system in its entirety (Cusumano & Gawer, 2002). The underlying driver is networks and their effects, which have come to play an important role in shaping the dynamics that control market and customer behaviour (Arthur, 1996; Shapiro & Varian, 1999). A consequence of importance is that technology intensive companies founding their success upon innovation must pay attention to the game of setting a standard (Hill, 1997). For a company being able to set a standard (e.g. Matsushita in video recorders or Microsoft in operating systems for personal computers) means, that it will attain, in terms of competitive advantage, a beneficial position. However, to remain in that position or for that matter reach it in the first place, every part of the system, as noted, must be managed and be made to work together. Few companies, if any, have an ability to drive innovation around a standard defining technology at industry level. They need to find allies.

Where are then allies to be found? One would imagine them to be suppliers of for instance raw material or established manufacturers of complementary goods. But not only that, companies, in order to gain access to the resources and capabilities needed, are increasingly seeking support from customers and independent external developers (cf Thomke & von Hippel, 2002). These exchanges tend to take place via collaborative arrangements characterised by openness and uncertain conditions regarding commitment and obligations. This form of collaboration will in the paper be termed an open collaboration. And although an open collaboration contains characteristics that make it suitable when developing new technological solutions, its characteristics make it from a strategic viewpoint troublesome. This means that for the company who sees its competitive position resting upon proprietary knowledge and innovation, the use of an open collaboration is challenging.

The aim of the paper is therefore to discuss how the use of an open collaboration can be conceptualised from a strategic management perspective¹. The findings stem from two case studies on how Palm and Sun Microsystems have used open collaboration in their efforts to make PalmOS and Jini standards in their respective fields. PalmOS is the dominating operating system for handheld computers and Jini is Sun's solution for how electronic devices spontaneously are able to form networks and communicate with each other. Theoretically it is foremost the literature of the resource-based view, network effects, alliances/collaborative arrangements and the growing literature on communities, that has been drawn upon.

Standards - what is it?

To follow the argument made in Häglund (2002) standards may not be obvious, they may not be what make the headlines, but they matter. In industries ranging from transportation to high-tech sectors such as the computer- and telecommunications industry standards play an important role (Hill, 1997). An issue of great importance is which technology that will become the next standard since it will affect the future development of the sector and companies unable to compete under the conditions given by the standard will find themselves in a cumbersome position, i.e. a company's ability to compete under a standard is dependent upon the alignment between its resources and the demands given by the standard (cf. Schilling, 1999). This means that we can conceptualise a standard as a dominant design that shapes the direction and configuration of all other products within its product class (Tushman & Anderson, 1990). As society gradually is becoming more and more technologically interconnected, the importance of standards also increases. This development comes from that individuals wish to communicate and interact with others. And in order to do so a number of devices, often electronically, tend to be involved. Not every one of these is designed to work together and from a consumer perspective this is of course a drawback. However, from a company perspective it means that if it is able to form a network of devices compatible with its own technology it will be in a good position. An implication is then that the value of a device depends on which system it belongs to, since a larger system is of more value than a smaller one. It then follows that if a company is able to source a large system its competitive position is strong. A fundamental characteristic of these networks is hence that value

¹ For further elaboration see Häglund (2002)

for a user of being part of a specific network increases with the number of other people participating in it. This phenomenon has been termed network effects or network externalities (Shapiro & Varian, 1999). No matter what description is used, the message is the same, everything being equal; it is better to be connected to a large network than a smaller one. An often-used example on how components from different fields together create utility for the user is computers. To create a functioning computer, manufacturers of hardware, software and operating system must integrate their separate products. A computer with an operating system on which no programs will run is of little use and so is software that does not work with the most common operating systems (Brynjolfsson & Kemerer, 1996). Schilling (1999) argues that these interdependencies give rise to a self-perpetuating cycle and the implication is that the larger the size of the installed base, the higher the availability of complementary goods and vice versa. Consequently, different players are dependent upon each other and not only that, the customer, as shown above, also plays an important role.

How can a standard be set?

A company that aims at setting a new standard will experience that the factors deciding which technology that will become the new standard more are focused on potential customers beliefs about the size of the installed base than on price and product features. This is to say that consumers choose which good to buy based on their expectations on how large the network will be in the future (Katz & Shapiro, 1986). And consequently, if a small network is envisioned it is likely that they will not buy the product and their expectations thus become self-fulfilling. A related characteristic is then that consumers decide and act upon a belief about what other consumers will do. Since consumers normally cannot coordinate their choices there is thus a presence of uncertainty and from this it follows that the perhaps best technology will not prevail. Another central aspect to bear in mind is that most consumers value compatibility, which means that products that are compatible with existing systems tend to be favoured over those who are not. It is therefore plausible to assume that any company attempting to launch a non-compatible technology will be up for a hefty task (Besen & Farrell, 1994). A complicating factor is normally also that consumers experience switching costs when adopting a new technology due to, for

instance, less available complementary goods or a need to learn how to operate the new technology.

So, if the presence of network externalities has the effect that if someone gets ahead in the market it will be difficult for the competition to close the gap (Shapiro & Varian, 1999), a key question becomes how companies can do this? A central dimension in this game seems to be how consensus among industry actors can be established? Hill (1997) as well as Schilling (1999) notes that licensing and strategic alliances have been used as means to stay ahead and control an industry. Matsushita is an example of a company that successfully used licensing with the aim of maximising the use of the VHS-format. If properly managed a licensing strategy as well as strategic alliances have the ability to align the expectations in the market and balance the mutual dependence that exists between the standard defining technology and complementary goods. The importance of complements have been touched up on earlier and it is worth considering how valuable a Nintendo machine would be if there did not exist any games that would play on it or how many people would be interested in owning a CD-player if the record companies did not produce music in CD-format. Licensing and strategic alliances share the feature of being about setting up interaction with other companies. Something that for many firms today almost has become usual practice (Gulati, Nohria, Zaheer, 2000). Especially companies that compete in markets where technology and speed play critical roles, depend on their ability to collaborate and build networks (Das & Teng, 2000). However, the use of collaboration is from a strategic management perspective not altogether uncomplicated. In fact, it is regarded as the next important step in advancing our understanding of competitive advantage. What is it then that needs to be developed?

New challenges for strategic management theory

From a business perspective there has now for quite some time now been an interest in explaining why certain firms seem to perform better than others do. The dominating paradigms for doing so are the theory of Industrial Organisation (IO) and the Resource-Based View (RBV) (Eneroth & Malm, 2001). In Industrial Organisation the primary unit of analysis is industries and the performance of a single company is considered as a function of the surroundings. Firm

performance can thus be explained by analysing market position and industrial characteristics (Porter, 1980). For the firm this implies that it should carefully select which industry to compete within and try to influence industry parameters to its advantage. Porter (1985,1991) argues that a firm that not deliberately choose which activities to perform and on which direction to follow risk ending up in a situation with no entry barriers where customers and suppliers enjoy a powerful position, close substitutes and intense competition among participating companies.

Although IO has contributed to our ability to explain firm performance it has been criticised for focusing too hard at the industry as deciding factor. The Resource-Based View (RBV) was introduced partly as a response to this critic and instead argues that differences in firm performance best is explained with reference to organisational resources that are heterogeneously dispersed among firms (Wernerfelt, 1985, Barney, 1991). However, not all resources can generate above-normal returns. A core tenet of RBV is that only resources that meet the conditions of being: valuable, rare, inimitable and non-substitutable (Barney, 1991), have this ability. This is to argue that a company must be in possession of resources not accessible for competing companies or of limited of use for them. It also means that RBV and IO share the importance ascribed to exclusivity and uniqueness but for RBV it is the difference in resource bases between firms that make up the main difference in performance (Peteraf, 1993). Both approaches are foremost focused on the firm and in the case of RBV concerned with factors residing inside the firm as sources of competitive advantage. However, a growing stream of research, working on improving our understanding of the challenges that face firms in an ever-increasing complex and turbulent environment, are extending the scope of RBV to also incorporate interorganisational collaboration (cf. Dyer & Singh, 1998; Foss, 1999).

Competitive advantage and collaboration

During the last few years it has been argued that the field of strategic management must pay more attention to how networks, alliances, joint ventures and other forms of inter-firm relationships affect firm performance (cf. Eneroth & Malm, 2001). In a growing number of industries the interest for forming and participating in various forms of networks and alliances have risen and this can be seen as a response to a changing and increasingly demanding and dynamic

competitive environment. In particular, companies competing in network markets, where one company's success hinges upon the presence and success of other companies, depend on support from other organisations (Wade, 1995). The insight that there were benefits associated with joining forces was something that managers in the beginning of the 1980's began to realise (Gugler, 1992). And the trend with networks and other forms of interorganisational ties being formed has since then continued. Of all the benefits companies expect to gain from entering into partnerships, the most important is the one of increased competitive power (Doz & Hamel, 1994). Das & Teng (2000:51) writes the following:

From a resource-based point of view, the very objective of forming alliances is to join forces with partners in order to pursue market opportunities that are otherwise beyond reach.

Network theory is a continuously expanding area comprising a number of different research streams. These streams have somewhat different starting points and among them we find: learning (Anand & Khanna, 2000; Dyer & Nobeoka, 2000); share risk, scale and scope generating (Katz & Shapiro, 1985); market access and shortened time to market (Haagedorn, 1993; Kogut, 2000); and gaining access to resources and capabilities (Haagedorn, 1993; Gulati, 1999; Afuah, 2000). They all of course have their place in the literature on networks but for our purpose it is foremost the market perspective and access to resources and capabilities that are of importance.

A market and resource perspective

According to the market perspective it is difficult for a single company to monitor and keep pace with market changes and at the same time develop new products and processes. If instead companies are working together the chances of a successful market introduction increases and collaborations also have the ability to create new markets and products. For instance, Yoshino & Rangan (1995) write about alliances that are formed by companies from a variation of industries with the purpose of working on technological development. The reason being that the companies neither has the technological skills nor the market knowledge to be able to succeed on their own. Yoshino & Rangan (1995) terms these pre-competitive alliances. It is though important to note

that the companies remain competitors and this makes it important for them to protect their sources of competitive advantage.

When companies decide to join forces an important implication is that it perhaps no longer is meaningful to view competition as something taking place between two individual companies or technologies, instead it is groups of firms and innovations that may provide a more accurate focal point. This is to argue that the important boundaries are those between rival technology networks or groups. Gomes & Casseres (1994) argues in the same direction when he states that more and more companies are linking themselves together in networks with the result that neither companies nor networks can be considered islands anymore. A web of networks is in the making and within these the sharing and access to resources and capabilities plays an important role. And the spinning of the web increased in both speed and complexity with the advent of digital technologies. What was it then that happened?

The rising of a new power

A popular term during the last years that to some extent is regarded as an "old buzz-word" is the new economy. And the critics may be right, but then again, something did change with the advent of digital technologies. According to Löfgren (2001) who refers to Castells (1998) our radically new ways for communicating created a new spatial logic in which companies and individuals are tied together in networks and goods and information are transported through new channels of communication. People are linked into new contexts and are gradually learning to think and act in various new ways (Löfgren, 2001). The improved solutions for transmitting and developing our collective knowledge and experiences has brought with them large gains in terms of efficiency and speed. It is plausible to assume that information technology will continue to give rise to changes, not only in the economy, but also in society as a whole. Not surprisingly has it on many occasions been proclaimed that the increased use of IT and the development of which, will mean that companies must prepare themselves for a partly new business setting with different competitive rules. Especially high-tech companies operating on a global market must likely rise to the task and face the challenges of the (new) economy. A powerful, and for innovative companies, particularly important change is that IT actively is contributing to the creation of new

organisational identities that span company borders and further breaks up the dualism of the market and the firm (Kuhn Pedersen, 2002). As will be revealed such new identities have been able to produce complicated and highly useful solutions. They therefore become of interest for the innovative firm, but they also pose new challenges for how to manage innovation. An open collaboration is considered as one such entity.

For the profit-seeking firm a problematic development is that the improved solutions for communication and transmitting and developing information is not only creating large gains in terms of efficiency but is also increasingly making knowledge a collective good. As a consequence it is likely that the business community will see and are seeing a rise of new and alternative organisation networks, which largely is driven by and thrives upon shared knowledge. A good example of a network where the interactions and relations grows and expands due to freely flowing knowledge is the *Open Source* movement. It illustrates, not only the new possibilities, but also the power, when individuals as well as companies can come together and jointly create something. Linux, the operating system that is considered a viable competitor to Microsoft's Windows (Wayner, 2000), is perhaps the most well known product developed with an Open Source approach. Other examples are Sendmail and Apache who runs on approximately 50% of the world's web-servers. A core characteristic of networks as the one forming around the development of Linux is that they are not controlled networks in the sense that the participants, for instance are free to contribute for a shorter or longer period, valuable knowledge is freely transmitted and it is uncertain for how long the collaboration will be functioning. An understanding of what drives participants to devote time and energy therefore becomes of vital importance when deciding upon the use of an open collaboration.

Informal in character

When companies engage themselves in relying upon organisational entities residing outside company borders, a key issue becomes to understand how they function and what drives them. If the company fails in this area the outcome may very well deviate substantially from the intended. Networks such as the one forming around Linux are not characterised by being formally bound together. Instead the linkages between the various participants lie on more informal plan. The act

of giving seems to be just as important as receiving. This is of course not sensational news since a collaboration without these ingredients stands a slim chance of being established. What are then important drivers underlying an open collaboration? From the Linux example we can conclude that it obviously not is about money, not primarily anyway. Instead the principles of a gift economy have been used to explain the behaviour-taking place (Kollock, 1997). A gift is seen as a transaction in which there is a latent assumption that the giver will be reimbursed at a later point in time. This can then be compared to for instance the purchase of a bottle of soda water in a convenient store. Such transactions do not imply an obligation for the buyer to return to the store at a later time. It is interesting to note that the exchange takes place among individuals or companies that most likely never before have met. The result is an entity formed by participants that does not know each other but that still is sharing valuable knowledge. And perhaps even more striking is that the majority avoids choosing, from an individual standpoint, the most logical path, but that would mean the end for the collective effort. Namely to stop contributing and only use the network as a source for new and useful information and knowledge (Kollock, 1997). Hence, a central motive for participation is an expectation to be compensated later on.

Here, we can see why an open collaboration can play an important role in managing the dynamics of network markets. This because such markets stability and evolution in essence depends on the interdependence among the participants. Two examples are the efforts of Palm and Jini in trying to make PalmOS and Jini standards within their respective fields.

Palm – putting the world in people's hands

When Palm introduced the model 1000 in April 1996 it was an immediate success and a new design for handhelds emerged. An alternative to using the old paper-based agendas had finally hit the market. What differentiated the handhelds from Palm from the earlier attempts was the focus on simplicity and speed. There is a story that says that when Jeffrey Hawkins designed the Palm he carved on a piece of wood to make it fit in his pocket. Once he managed to do this he added the functions and any function that was not absolutely necessary and made the pocket yield to the weight was removed, even if the function was cool (Smitt, 000517). Jeffrey Hawkins has on numerous occasions emphasised the importance of good design and functionality as compared to power and cool applications (Kahney, 991021). Palm was among the first to incorporate desktop

compatibility and with the use of a docking station the user could connect to and receive data that was stored in his/her PC (Chhabra, Kaplan, Mathulla, Schanman, 1998). Of course the functions, the size and the weight of the handheld were important, but so was the price. The Pilot was sold for less than 400 dollars and this made it a rather cheap handheld when compared to the competition. It did not take long before Palm captured a large part of the handheld market and although the competition has come closer Palm is still dominating the market. Palm has over the years stayed true to its focus on making a handheld that is functional and easy to use, while at the same time evolving into manufacturing a more complete computer that is fully functional in terms of multimedia communication (Palm.com).

1996 was also the year when a number of companies abandoned their own proprietary systems and began licensing other operating systems. A big player in this game was and still is Microsoft. Microsoft's version of an operating system for handheld computers is called Windows CE. Unfortunately the first versions running Windows CE were bulky and difficult to handle and despite that users were familiar with the programs enclosed (e.g. Word and Excel) the consumers were sceptical. If Microsoft saw the handheld as an extension of the office PC, Palm did not. According to the team behind Palm, the handheld should be considered as a device with its own demands and needs. As an important piece in making this vision come true, Palm developed its own proprietary software and its own hardware. The product was designed to function smoothly and Palm was initially the sole provider of handhelds powered by PalmOS. Palm was however soon about to allow for other manufacturers to make handheld computers running its operating system. In order to strengthen the use of PalmOS, Palm initially charged moderate licensing fees and consequently most of its revenues came from hardware (Fried & Shim, 010727). The perhaps most well known licensee today is Sony.

For developers Palms handheld design meant that they had to learn a new environment for developing software and applications, i.e. Palm used its own software developer's kit² (SDK) (Dahlin, 001221). All the same developers teamed up around the Palm effort and this can be seen as an effect of Palms open strategy. What Palm did was to make its development environment

² a software developers kit is a set of software routines and utilities to help programmers write an application (Techweb.com)

and development tools freely available, and this increased the interest among potential developers to make programs and applications for Palm (Torvalds & Diamond, 2001). The PalmOS developer program also provides developers with a full range of developer services, which may include, depending on level of membership, direct technical support, access to selected source and sample code and documentation and programs to help market developer products. And it seems as if Palm strategy has worked since today there are well over 260.000 developers working on making programs and applications for PalmOS (Palmsource.com). The applications relate to business, communication, databases, religion, travels and so forth. Palm also continues to support its developers after the initial phase and for instance test applications and give them a trademark if they pass. All activities that relate to Palms network of developers' forms what Palm terms the "Palm Economy". The goal with this economy is to build a rapidly evolving eco-system of strategic partners and licensees, developers and users and the plan is to increase the value of owning and using a handheld from Palm. This is at least what Palm believes and hopes and Alan Kessler, chief operating officer of Platform and Products in 2000, stated that "Our development community has been a driving factor in the phenomenal growth of the PalmOS platform (Liu, 000911). And Palm may be right. After all, a number of observers point out that a large part of Palm's success can be ascribed to the fact that its has many third-party developers and therefore can offer potential customers many different applications (Deckmyn, 001123). This approach has been so fruitful because Palm has been using an open development environment, an environment that let external innovators contribute to the platform, which has provided good possibilities to capitalise on these opportunities (Nelson, 010123).

Jini – the forming of spontaneous networks

It was on January 25, 1999 that Sun launched the Jini technology. The place was a global event in San Francisco and at the same time Sun made a number of partner announcements (Higaki & Venners, 990131). The slogan for Jini was "connect anything at anytime, anywhere". This catchy phrase captures the essence of what Jini is about, namely a simple, easy-to-use vital platform through which various forms of appliances can be connected to networks ranging from home networks to the Internet (Niccolai, 990127). A prominent feature of Jini is that when a device is plugged in, may it be a hard drive, camera or perhaps even a toaster, it will automatically alert the

network of its existence and what it is capable of performing (Jacobsson, 1990:13). In addition the system contains a flexible dimension in the sense that when a device leaves the network no files connected to the device remains on the network. These features are according to Sun examples of a self-configuring network and Jacobsson (1990:13) argues that from a theoretical standpoint this would make Jini every system administrator's dream. When Sun launched Jini it was a large corporation that had been successful and prosperous, but it still would not be an easy task to successfully put Jini on the market. For one thing, in order to demonstrate something that was supposed to exemplify how Jini would work, Sun needed help. For if a technology as Jini is to succeed it is not enough to work on one unit, there must be a whole functioning infrastructure. An important aspect for Sun was therefore to convince potential customers about the benefits of Jini, for even though everybody could see in the visions that it seemed to be a great idea it was more difficult to understand what the benefits would be in daily use. And not to forget when Microsoft presented its own technology, Universal Plug and Play (UpnP), as an alternative to Jini things did not become any easier for Sun. In fact they probably became worse since Microsoft were out to secure the role of the PC in the future. This was not surprising since Sun, with the new technologies, obviously saw a chance of fulfilling its old dream about the network as the computer.

By creating the Jini Community Sun tried to find a way of promoting co-operation between vendors who otherwise would be fierce competitors. Day (1991:31) claims that a goal with the use of the community approach is to create critical mass behind Jini to establish a widespread presence of Jini and at the same time accelerate the development of innovative Jini services. The organisation of the community follows a model that is self-organising with a democratic structure (Burrell, McCarty & Yount, 2000). Among other things this means that the process under which the development takes place should be jointly defined and decided upon by the members. There are several areas within the community in which developers and other interested parties can participate, discuss, review and exchange code and information (Day, 1991:31). Some areas are secured and only open to members who have agreed upon terms stipulated in the Sun Community Source License (SCSL). SCSL is according to Day a mixture of open-source principles and a traditional for-profit licensing model of the past. As a consequence the Open Source movement does not accept it. An interesting feature of this is that Sun returned to the environment from

which it once came, in the sense that it semi-apply the ancient rules of the hacker-community. The two main principles that separates the SCSL from an Open Source license is first that compatibility among deployed versions of the software is required and enforced through compliance testing and second that proprietary enhancements, including performance improvements, are allowed as long as compatibility is maintained (Jini.org). Under the SCSL the participating companies receive free access to Jini. This does not only mean that companies have free access to the source code of Sun's implementation of Jini but also that members have access to a wide range of resources and forms of expertise that are intended to aid in accelerating the innovation and success of individual companies. Sun feared that, when organising the work in a community form, stability would be in jeopardy and it was therefore decided that Sun's development team would act as shepherds (Day, 991031). The shepherd role meant that the team would assist the projects run within the community. As an example Day takes the printing group where Sun assists in questions related to the Jini technology and where the group focuses on domain-specific questions such as distributed printing. According to Day this organising scheme utilises competence in that Sun and companies from different areas of specialisation come together to assure that Jini develops in the best possible way. Sun's ambition with creating this form of co-operation has therefore been to form and employ a development model that will produce good and co-operative designs that will work well with other Jini services and clients (Day, 991031). A key aspect in making it happen has been to make different interest groups work together in order to "define and refine standard interfaces for their category of service and provide useful community source and verification suites" (Jini.org).

Open Collaboration – strategic effects

How can then the use of an open collaboration be conceptualised from a strategic management perspective? It has been shown and discussed a number of times that a system defining technology, a standard, brings great value. As with everything else that is valuable this spurs an interest in figuring out how to best capture as much of it as possible. Companies therefore seek to establish a favourable position to compete from. An important question then becomes how they can find ways of improving their chances for success and it is here argued that the choice of an open collaboration can be seen as an attempt to do so. The importance of collaboration for

companies that try to position themselves and influence industry parameters to their advantage was discussed above. But, just as inter-organisational collaborative arrangements can aid in creating a competitive advantage, they pose challenges to our understanding of the grounds for appropriation for the single participating firm. After all, the collaborative effort may secure the survival of the technology, but whether or not all of the contributors will follow the same path is less certain.

Dyer & Singh (1998) and Foss (1999) state that for a collaborative agreement to give rise to competitive advantages it must be idiosyncratic, i.e. it should not be possible to easily replicate the resources generated elsewhere. Varadarajan & Cunningham (1995) also highlight the importance of an idiosyncratic setting and that exchanges of resources and knowledge should be specific to the collaboration at hand. If this condition holds and the pool of resources generated meets the criteria's postulated by RBV (Barney, 1991) then a collaborative arrangement, according to the logic of RBV, can generate competitive advantages (Varadarajan & Cunningham, 1995). When discussing the question of who will appropriate value, Gulati & Singh (1998) argue that if a collaboration is set up among a few well-trusted partners with contracts governing the dispersion of value, it is probable that all participants will find a ground for appropriation. As discussed, the problem with an open collaboration is that these conditions do not appear to be present.

Be generous – but not too generous

A prominent characteristic of an open collaboration is that anybody can join and leave and at the same time participate in similar arrangements set up by the competition. Thus, an open collaboration does not meet the condition of idiosyncrasy. Neither is it made up of a few, trusted partners and contracts that ensure that the one who adds most to the collaboration should be the one to gain the most are seldom established. In the case of Sun, it stood a lot to gain if Jini would make a breakthrough as a new standard for creating networks. If so, the use of Internet and thus traffic over a number of networks would rise. A rise in network traffic with an increased demand for information and services over the Internet would affect Sun's opportunities of selling servers, storage and software favourably. Therefore, Sun's act of submitting Jini to open collaboration,

can be seen as an attempt to win something else. A related reason was a desire to avoid that somebody else would define the new network standard. The obvious threat came from Microsoft who, in order to further promote the Windows concept, always has aimed at ensuring that the PC remains central. Such an aim has Sun never shared nor supported. On the contrary Sun's visions has always been quite different from those of Microsoft and Sun therefore had a lot to lose if a technology favoured by Microsoft would be the new standard.

When considering Palm it can be observed that an initial idea was to make money from both hardware and software sales. The first version of PalmOS was tailor made for the Palm Pilots hardware configuration. This meant that if customers became interested in the features of PalmOS they would have to buy a handheld computer from Palm. However, we can also observe how Palm has licensed its operating system to a number of other vendors for very modest fees. An explanation for this is that Palm became aware that the competitors gained ground and threatened the position of PalmOS. Obviously, this was an unfavourable development for Palm and to hinder the progression the company decided to enlarge the number of manufacturers selling handheld computers running PalmOS. Their action can be explained by the same reason that was behind their decision to give away development kits to developers in order to create applications that would boost the value of owning a handheld computer from Palm: it can be more profitable to own a small part of something big than a large part of something small. This seems to be especially true for a company operating within network markets. In Palm's case this would manifest itself in that an initial loss of hardware sales would be made up by both increased hardware and software sales later on, due to an overall enlarged market for handheld computers using PalmOS.

Hence, the use of an open collaboration can be interpreted as an act of contributing to the progress of something else like a good or a service that is kept within the company's control. Following the logic of RBV an implication of this is then, that it is unlikely, that an open collaboration in itself will give rise to competitive advantages. How can then an open collaboration in relation to competitive advantage be understood?

A dependent industry

When a standard is set, it will affect the future technological development within the industry, meaning that a company, badly equipped in terms of resources and capabilities, will find it difficult to remain competitive, and is in danger of being locked-out (Schilling, 1998). In an opposite case a company endowed with suitable resources for the technological paradigm will stand a good chance to grow stronger and gain in wealth. In fact, Bowen, Clark, Holloway & Wheelwright (1994) argue that when a company develops a new technology or product the growth and extension of the firm's capabilities is an even more important result of the development process than the technology itself. In addition, firms often learn in a cumulative and self-reinforcing way (Schilling, 1998). A firm that is allowed to operate under a technological paradigm of its choice will therefore be competitively strong due to well-adapted competencies and capabilities. Because of the self-reinforcing effects in network markets it will grow stronger and stronger. Since companies competing under a standard have few alternatives but to conform to the conditions given by it, it can be argued that being able to set a standard is the equivalent of attaining a favourable and profitable position. A standard can therefore be considered as a unique and valuable resource that allows for exploiting opportunities and neutralising threats, which according to Barney (1991) gives rise to a competitive advantage. But, due to its influence on the technological development as discussed above, the company behind the standard will not only benefit from the fact that other companies depend on it, it will also benefit from its own dependence on it. Consequently, a company that establishes a standard can be considered to have to two main sources of competitive advantage, the standard in itself and the resources within the company, which due to their connection to the standard, become resources that strategically can differentiate the firm within the paradigm.

Open collaboration – a catalyst

As was shown in the cases of Palm and Sun it sometimes is difficult for a single company to set a standard and in such a situation an open collaboration can be an alternative. It has been discussed that a problem when submitting a potential standard defining technology to open collaboration, is that it promises to be difficult to appropriate rents from the technology itself. Any rents must

therefore come from somewhere else and we now know that the resources and capabilities within the firm sponsoring the technology have the ability to be that source due to their adaptation to the standard. The logic behind an open collaboration can therefore be conceptualised as catalytic. An open collaboration is used in order to ensure that the company gains a competitive advantage through its internal resources and capabilities if not through the standard. Consequently, as seen in the cases of Sun and Palm, companies should not try to protect everything, but concentrate on protecting something. Companies must protect the areas at firm level that, according to the logic of RBV, is a source of competitive advantage.

Concluding discussion and managerial implications

The rapidly increasing possibilities for transferring information has been shown to constitute an important force in competitive environments that to an increasing degree is driven by technology and know-how. An aspect that has been discussed in this paper is that new collaborative forms resting upon the abilities of IT have revealed themselves as able to create advanced technological and innovative solutions that are able to compete with large and global companies. But they function differently than the traditional forms of collaboration. Their existence hinges upon interaction and communication among such disparate entities as customers and developers external to the firm. They are informal, hard to control and driven by motives not usually associated with this kind of activity. Also, an open collaboration is more similar to a market than a hierarchy since it does not necessarily consist of long-term relationships and governance mechanisms such as contracts or that partners are few and well-trusted are seldom if ever present. The company wishing to compete and thrive in this dynamic and challenging environment will likely be forced to focus on partly new things concerning handling knowledge and control. A key issue following from that everything in a sense are more free flowing and that organisational entities residing outside company borders are gaining in importance, will be to decide upon what knowledge to share and which not to. In all its simplicity a difficult task. From a research perspective the effort of applying RBV to the network level can be seen as a clear indication that there is something of interest and importance residing at inter-firm level, but it does not yet aid in understanding what happens when an open collaboration is applied, in terms of competitive

advantage. In this paper it has been argued the strategic effect of an open collaboration is to be viewed as catalytic.

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