Strategic repositioning by means of alliance networks:

The case of IBM

Koen Dittrich (corresponding author)
RSM Erasmus University, Dept. Management of Technology and Innovation
PO Box 1738, 3000 DR Rotterdam, The Netherlands
Phone: +31 10 4082597
Fax: +31 10 4089014
Email: KDittrich@rsm.nl

Geert Duysters
UNU-MERIT
Keizer Karelplein 19, 6211 TC Maastricht, The Netherlands
and
Eindhoven Centre for Innovation Studies (ECIS)
PO Box 513, 5600 MB Eindhoven, The Netherlands
Email: Duysters@merit.unu.edu

Ard-Pieter de Man
Eindhoven University of Technology, Faculty of Technology Management
Eindhoven Centre for Innovation Studies (ECIS)
PO Box 513, 5600 MB Eindhoven, The Netherlands
Email: A.P.d.Man@tm.tue.nl

This paper has been accepted for publication in Research Policy. Please cite this article in press as:
Abstract

This paper aims to show that alliance networks can play an important role in facilitating large-scale strategic change projects. It focuses on the particular case of IBM, whose radical re-direction from an exploitation strategy towards an exploration strategy was realized by major changes in its network strategy. We show that by involving new partners in the network and by loosening the ties with its existing partners, IBM managed to transform from a hardware manufacturing company to a global service provider and software company. The findings suggest that the traditional view of large firms as being slow to adapt may not be valid because alliance networks can be used to overcome inertia.

Keywords: Alliance networks; strategic change; exploration/exploitation; IBM.

1. Introduction

The strong upheaval in the number of newly established strategic technology alliances has drawn the attention of academics and practitioners alike. There is growing consensus in the academic and managerial literature that alliance networks do matter for the innovative performance of companies (see e.g. Ahuja 2000; Hagedoorn, 1993; Nooteboom, 1999; Owen-Smith and Powell, 2004; Powell et al., 1996; Rowley et al. 2000). However, the same publications seem not to clarify how such alliance networks can act as catalysts of large-scale strategic change projects (De Man and Duysters, 2005). Strategic change is generally seen as something internal to the firm and not directly related to the alliance portfolio of the firm.
This paper departs from the existing literature in the sense that it proposes that external relations in a company’s alliance network can be instrumental in strategic change processes as well. The main contribution of the paper is that we describe the role of alliance networks in strategic change processes and support this view by studying one of the most impressive strategic repositioning programmes in the history of business, that of IBM. In this paper, we analyze how deliberate changes in the network structure enabled IBM to reposition itself in an unprecedented manner. Although strategic alliances have been studied extensively in the existing literature there is to the best of our knowledge no single study devoted to the role of strategic alliance networks in major company repositioning processes. Although some recent articles have focused on issues related to alliances as means for achieving exploration or exploitation strategies (e.g. Koza and Lewin 1998; Lavie and Rosenkopf, 2006; Rothaermel, 2001; Rothaermel and Deeds, 2004), none of these has looked empirically and from a longitudinal point of view at the overall impact of a firm’s network on its ability to transform its business activities and competencies drastically.

Our view therefore extends strategic management theory in terms of including alliance networks as a major repositioning tool. It departs from the classical view in which large firms reposition themselves through internal restructuring processes or by means of Merger and Acquisition activities and can also be seen as a solution to the structural inertia problem which is widely discussed in organizational ecology theory (e.g. Geroski, 2001; Guillén, 2004; Hannan and Freeman, 1984; Narula, 2002) and to the slow adaptive nature of organizations as discussed in core competency approaches (e.g. Bouchikhi and Kimberley, 2003; Johnson-Cramer et al., 2003; Markides and Williamson, 1994) and evolutionary economic theory (Ballot and Taymaz, 1997; Louçã...
and Mendonça, 2002; Suarez and Olivia, 2005). The methodological and empirical contribution of this paper lies in the use of an in-depth longitudinal case study that enables us to show the role of strategic alliance networks in the process of strategic repositioning. Such a case study is often proposed to be the most appropriate research strategy for studying networks aimed at new product development (Freeman, 1991). In this sense we open up the black box of technology alliances. This provides us with new insights that can add to current knowledge about technology alliances, which is often primarily based on large-scale data-driven studies on the effect of technology alliances on innovative performance (see e.g. Anand and Khanna, 2000; Duysters and Hagedoorn, 2000; Vanhaverbeke et al., 2002).

The paper shows that exploration strategies, aimed at innovating and business development, and exploitation strategies, which are primarily directed at making the most of existing competences, require different network structures. Network behaviour aimed at exploitation is compared to network behaviour aimed at exploration in the case of IBM. Our main argument is that the networks needed to achieve these two particular objectives differ substantially from each other and that IBM has consciously used a carefully crafted networking strategy to support its strategic change project. This paper shows how strategic change and network strategy can be linked effectively.

After assessing the connection between exploitation, exploration and networks, IBM’s strategic change programme is discussed. Next IBM’s alliance network before, during and after the strategic change programme is analysed and compared with IBM’s peer group. The final section lists the implications and conclusions of our study.
2. Strategic change: exploration, exploitation and networks

Strategic change is often considered as a necessity for companies to survive in a turbulent environment (Hamel and Prahalad, 1994). Intense international competition and rapid technological change are often mentioned as primary motives for companies to adapt their corporate strategy (Christensen, 1998; Eisenhardt and Tabrizi, 1995; Sadowski et al., 2003). One way of facilitating strategic change is to engage in alliances for the exploration of new capabilities and at the same time using alliances for the exploitation of the existing knowledge base (March, 1991). Alliances are generally seen as increasingly important instruments for learning (Kale et al., 2000; Khanna et al., 1998). The process of learning in alliances basically boils down to the exchange of technological knowledge and capabilities.

In order to come up with a more refined view on learning, we will make use of March’s seminal distinction between exploitative and explorative learning. Exploitation is generally associated with the refinement and extension of existing technologies. Exploration on the other hand deals with experimentation with new alternatives and the exploration of a new (technological) field. In this paper, we argue that there are important differences between the two types of learning (see also March, 1991; Chesbrough, 2003), which considerably affect the way in which companies should make use of their external technology networks. Though March (1991) provides examples of exploration and exploitation, he does not provide an operational definition that can be used for empirical research in the field of alliances. In this paper, we will distinguish between exploration and exploitation alliances by the type of R&D activities, type of alliance and the characteristics of the partners involved.
As suggested above, exploration and exploitation strategies are not just internal to the firm. Alliance networks are often used to support these strategies. In spite of the vast body of literature on strategic technology alliances, only recently have authors started to focus on the use of networks for exploitative or explorative learning (see e.g. Ahuja and Lampert, 2001; Hagedoorn and Duysters, 2002; Rowley et al., 2000). Most, however, have not taken a longitudinal view on strategic change by means of networking as proposed by Freeman (1991). In addition, there has been very little attention to the question of whether and how companies might transform their entire network from a focus on exploitation towards a focus on exploration. Our view therefore extends strategic management theory in terms of including alliance networks as a major repositioning tool.

The existing contributions mainly argue that firms pursuing a strategy of exploration for product development are most likely to establish alliances that are characterized by ‘weak ties’ (Granovetter, 1973). ‘Weak ties’ in this context imply that companies exhibit low commitment to their alliances and team-up with non-familiar partners. When exploring a particular new technology, companies may not want to enter into inflexible forms of alliances, because they do not know whether the technology will prove to be useful to them. In this case they value the opportunity to abandon the alliance at any given moment (Duysters and De Man, 2003). Exploration alliances are generally used when R&D efforts are aimed at the creation of radically new technologies and new procedures (Gilsing and Nooteboom, 2006; Argyris and Schon, 1996).

Strong ties, characterized by intimate, recurrent and trustful relationships, on the other hand are generally considered to be useful when firms aim at an exploitation
strategy (Krackhardt, 1992). In order to exploit knowledge and to make the most of established technologies and products, trustworthy and intensive relationships with partners are a prerequisite. Exploitation requires intensive knowledge exchange and the creation of economies of scale. Both can be achieved in strong ties but to a much lesser extent in weak ties, because only strong ties have the requisite intensity. Hence, exploration strategies require lower-commitment R&D alliances in new technological capabilities, since the focus is on learning new ideas from new partners. Exploitation strategies on the other hand will benefit from high-commitment alliances in existing technological capabilities (Koza and Lewin, 1998). In the literature we find some scattered empirical evidence on this matter. Hansen et al. (2001), Afuah (2000) and Rowley et al. (2000) find strong evidence that the value of strong and weak ties depends on the type of learning and the external environment. Rowley et al. (2000) show that strong ties are particularly effective for exploitation purposes and less effective for exploration. The need for weak ties has been shown to be particularly high under conditions of rapid technological change where the need for explorative learning is highest (Afuah, 2000). In contrast to double-loop learning in exploration alliances, exploitation alliances facilitate single-loop learning because they concentrate on current technologies, process improvements and adapting existing procedures (Gilsing and Nooteboom, 2006; Argyris and Schon, 1996).

Empirically, exploration networks differ from exploitation networks in three observable ways (see Table 1). First, exploration networks will make use of flexible legal
organizational structures, whereas exploitation alliances are associated with legal structures that enable long-term collaboration. In spite of their stability and the advantages associated with higher levels of commitments in equity agreements, those ventures seem to be less well equipped to deal with strategies of exploration (Duysters and Hagedoorn, 2000; Spekman and Isabella, 2000). In terms of exploration, the flexibility, speed and learning opportunities associated with non-equity agreements by far outweigh the benefits associated with stability and improved commitment.

Exploration networks therefore have a preference for non-equity alliances, whereas exploitation networks can be expected to exhibit a larger proportion of equity alliances (Koza and Lewin, 1998). Joint development agreements and joint research pacts are non-equity agreements with lower levels of commitment. Agreements with a high level of commitment are equity-based relations like joint ventures. A measure for the extent to which a network shifts towards an exploration strategy is obtained by counting these alliance types across different time periods.

Second, in exploration networks partner turnover will be higher than in exploitation alliances. A number of scholars (Ahuja, 2000; Burt 1998, 2000; Hansen, 1999; Hansen et al., 2001) have suggested that different contingencies require different network structures. Companies pursuing exploration strategies will change their partners more often. This is in line with the findings of Granovetter (1973) and Khanna et al. (1998). Comparing the composition of a network in period t with the network composition in t+1 will show that the proportion of new partners in an exploration network is higher than the proportion of new partners in an exploitation network. Exploration requires access to a diversity of knowledge and a continuous scanning of new technological opportunities. As these opportunities often arise outside existing partners, partner
turnover will be high. Exploitation requires intense collaboration. This takes time to build up and benefits will accrue only after long-term collaboration. Consequently, exploitation networks will have a higher proportion of the same partners over time than exploration networks (Kale et al., 2000; Rowley et al., 2000).

A third measurable characteristic of networks that differs between exploitation and exploration strategies relates to partner capabilities. In exploration networks companies will look for partners with capabilities outside their own existing business. In exploitation networks companies will tend to look for companies with similar technological knowledge. Exploration strategies should lead to an innovation network consisting of partners in new technological areas. Exploitation strategies on the other hand may be expected to lead to an innovation network of partners in similar technological areas. From an exploration perspective similarity among alliance partners will decrease potential learning effects (Mowery et al., 1996; Duysters and Lemmens, 2003). The literature emphasizes that too much focus on local search might aid exploitation but can lead firms to develop core rigidities (Leonard-Barton, 1995) and subsequently can cause firms to fall into competency traps that decrease the amount of explorative learning (Levitt and March, 1988). This is similar to what Benner and Tushman (2002) and Ahuja and Lampert (2001) refer to as local versus distant search, i.e. for capabilities close to or distant from the focal firm’s current skills and capabilities.

We will attempt to take the discussion of exploration and exploitation to a higher level by including a longitudinal view on companies. We are in particular interested in showing the use of alliance networks for implementing strategic change processes. To find out whether companies actually use and adapt their network when they are striving
for strategic change, we will study various network measures in the particular case of IBM. In the 1990s IBM went through a major reorganization, changing from an exploitation strategy towards an exploration strategy. This makes IBM a particularly interesting case. We will observe whether IBM changed its network accordingly to facilitate this change, using the network measures as stated in Table 1.

3. Strategic change at IBM: entering the internet era

The general outlines of the history of IBM are well known (Gerstner, 2002; IBM, 2002a). The relevant part of IBM's history for our research question starts in the 1980s when IBM was the leading computer manufacturer in the world. At that time, it was probably the best example of a vertically integrated corporation: almost all stages of design, production and commercialization of computers remained internal to the firm (Ernst, 2003; Lloyd and Phillips, 1994; Tushman and O’Reilly, 1996). This was the case for semiconductors, hardware, operating systems, application software, and sales and distribution. IBM was the world leader in computer manufacturing and it seemed that the company’s leadership position would remain unchallenged for many years to come. Because the position of IBM was seemingly comfortable, the company had not developed sophisticated strategies to cope with fierce competition. This was also evident from the organizational culture, which was focused on internal procedures rather than concerned with the reality of a changing market environment (Hemp and Stewart, 2004; Lloyd and Phillips, 1994; Tushman and O’Reilly, 1996). With the advent of the ‘next big thing’, which was the rise of UNIX rather than personal computing, IBM was suddenly under serious attack (Hamel, 2000; Meyer et al., 2005a). UNIX was an ‘open’ operating system, supported by Sun and Hewlett-Packard, which offered
customers the first attractive alternative to IBM’s mainframe computers (Gerstner, 2002). In addition, IBM failed to see that personal computers (PCs) would be widely used by business and enterprises, so the PC market was not a high priority for IBM. PCs were not thought of as a major challenge to IBM’s core business of enterprise-wide computing and systems integration (Balogbin and Pandit, 2001; Hamel, 2000). IBM gave control over the operating system to Microsoft and the microprocessor to Intel, and in the early nineties IBM’s leadership position started to deteriorate (Balogbin and Pandit 2001; Hamel, 2000; Langlois and Robertson, 1992; Takahashi and Namiki, 2003). Fujitsu, Digital Equipment and Compaq were the competitors for hardware components and were catching up fast (Curry and Kenney, 1999; Hamel, 2000). EDS and Andersen Consulting were gaining ground in information services, while Intel and Microsoft were more profitable in the PC market than IBM at that time (Hamel, 2000). The once so comfortable position of ‘Big Blue’ was fading away at a very rapid pace. In April 1993, Louis Gerstner was appointed as CEO and he had the difficult task to transform IBM in such a way that it could regain its competitive position.

Two forces that emerged in the computer industry in the early 1990s were decisive for IBM’s strategic change (Gerstner, 2002). The first was system integration, which originated from customer demand. Customers increasingly valued companies that could provide so-called integrated solutions: systems integration for business enterprises and bundled software and services for the consumer market (Curry and Kenney, 1999; Ghandour et al., 2004; Hemp and Stewart, 2004; Meyer et al., 2005b). Because of this customer-driven force, IBM realized that in time the ICT industry would be service-led rather than technology-led. The second force was the emergence of the networked model of computing that would replace the stand-alone PCs that dominated the market.
at the beginning of the 1990s (Curry and Kenney, 1999; Sweeney, 1998). The PC would be one of the networking devices, but the management of the enormous flows of digital information would be done on large-scale systems rather than desktop computers (Gerstner, 2002). Thus, computing infrastructure and software would have the future. It was clear that IBM had to turn its attention toward services and software.

Hamel (2000) provides an illustration of the strategic change that helped IBM transform from a hardware manufacturer into a dominant service provider. A few visionary individuals at IBM, who discovered the Internet as a potential source of future revenues, brought about the major change that took place in the mid-nineties. This small group of believers developed an Internet strategy for the corporation as a whole.

Palmisano, Gerstner’s successor, took e-business even further, using a different strategy (Hemp and Stewart, 2004). He successfully made IBM’s organization flatter and more flexible, which enabled the company to adapt more quickly and more adequately to a rapidly changing competitive environment (BusinessWeek, 2003; Hemp and Stewart, 2004). Palmisano’s strategy was to exit commodity hardware technologies and concentrate on higher-margin software and services, and especially integrated (e-business) solutions (BusinessWeek, 2004a; Ghandour et al., 2004; Hemp and Stewart, 2004).

In short, before Gerstner initiated its strategy change, IBM followed an exploitation strategy. This is apparent from the fact that there was a strong focus on the internal development of hardware and software in existing expertise areas of mainframe computers and PowerPCs. IBM’s organizational culture was focused inwardly, where a preoccupation with internal procedures hindered the company in understanding the reality of drastically changing markets (Tushman and O’Reilly, 1996). After Gerstner’s
strategy change, IBM followed an exploration strategy. This is evident from the fact that IBM was willing to sell and share technology in exchange for know-how in new areas of software and service development (Gerstner, 2002; Takahashi and Namiki, 2003). Whether this change also meant a change in IBM’s alliance network will now be researched.

4. Data and sample

Whether IBM’s alliance network was redirected to support its move from an exploitation strategy towards an exploration strategy is studied by means of looking at the network composition in three pairs of years\(^1\) over five-year intervals: 1991/1992, 1996/1997, 2001/2002. The predictions based on Table 1 are that, over time, IBM starts to make relatively more use of non-equity alliances, increases the number of new partners in its network and looks for an increasing number of partners outside its 1991/1992 core business. Especially when it suffices to focus on an isolated aspect of a case and it is not necessary to study cases in their entirety, repeated observation is a good method to research the changes in relevant variables over time (Yin, 1989). In this case, the IBM alliance portfolio is such an isolated aspect.

For our specific research question the alliance portfolio can be researched in isolation from the multitude of other characteristics of IBM's transformation, and hence repeated observation is applicable here. The longitudinal case study approach that we use in this study is also based on event analysis, by singling out a period of strategic change and taking snapshots of the IBM network before, during and after that period in order to investigate the fit between the event (strategy change) and the company’s

---

\(^1\) Pairs of years are used, rather than individual years, in order to obtain a reasonable number of alliances for our study.
alliance network. This method of repeated observation around an event aims to increase our understanding of network change, by combining qualitative with quantitative analysis. The IBM case is selected because of the possibility to replicate our theoretical predictions. In addition, a comparison is made with an IBM peer group to show that IBM’s renewal process was markedly different. In this way, emerging theory about the use of alliance networks for strategic repositioning can be extended (Eisenhardt, 1989).

In this paper, we argue that new strategic directions induce firms to adapt their alliance networks in order to facilitate the required strategic change. Therefore, the need for strategic change comes first, then firms adapt their alliance networks accordingly to facilitate this change, and as a result the strategic re-positioning process in the market can be concluded.

In addition to establishing a theoretical fit with the framework, the conclusions about the use of networks for strategic change may also be in line with related research into networks, as discussed in relation to Table 1. When this form of literal replication exists, it would indicate a wider validity of the findings than just the IBM case. Our aim here is to refine theory on alliance networks by studying the mechanisms companies use to realize a strategic change from exploitation to exploration with the help of alliances.

We will test our theoretical predictions using alliance data from the MERIT-CATI database and the CGCP database, which tracks alliance activity over the period covering our study.² The databases register the partners, their industry and the type of alliances and thus contain all relevant information. The periods are chosen because they represent three time periods relevant for IBM’s strategic change. In 1991/1992 IBM had an

---

² More information on the CATI database can be found in Hagedoorn and Schakenraad (1992). The CGCP database is used as a complementary database for the period 2001-2002, for which the data were not available in the MERIT-CATI database. The data collection method of the CGCP database is similar to the MERIT-CATI database. For a description of the CGCP database, see http://www.cgcpmaps.com.
exploitation strategy. In 2001/2002 the effects of the strategic change towards an exploration strategy should have materialized. The years 1996/1997 are years in which the first effects of the strategic change initiated by Gerstner should have become visible. Gerstner started in 1993 as CEO of IBM and he took some time to formulate the new strategy. Next, it takes about one or two years before an alliance is set up, negotiated and announced, so that 1996 will be the first year in which the strategic change could be discernible in IBM’s alliance network. In addition, we compare alliance activities of IBM with the alliance activities of the company’s main five competitors: Apple, Compaq, DEC, Hewlett-Packard and Toshiba. The alliances of these firms are used as benchmarks to determine to what extent the changes in the alliance network of IBM differed from other main players in the same industry.

Alliance agreements can take a variety of forms, with a wide range in the level of commitment. Alliance agreements include (cross-)licensing agreements, customer-supplier contracts and standard-setting agreements. Since this is a study of innovation networks, the alliances that are of particular relevance are those that involve joint research and development or other forms of technology sharing (Koza and Lewin, 1998). We therefore study joint development agreements, joint research pacts and research joint ventures.

IBM is historically by far the most active in alliance formation among its peer group. The company has had more alliances than any other company in the ICT domain: 384 registered technology alliances with 227 different partners in the period from 1985 to 2002. These numbers make IBM an interesting case for further investigation.
5. IBM's alliance network: 1991-2002

In this section, we will investigate how networking strategies facilitated the business transformation of IBM initiated by Gerstner. In order to do this, the networking strategies of the early nineties, before Gerstner’s arrival in 1993, are compared with the networking strategies in the mid-nineties and the beginning of the 21st century. Most activities that characterized IBM in the late eighties and early nineties have been gradually farmed out to multiple layers of specialized suppliers, giving rise to rapid market segmentation and an ever-finer specialization. This has given rise to the co-existence of complex, globally organized product-specific value chains (e.g. for microprocessors, memories, board assembly, PCs, networking equipment, operating systems, applications software, and sales & distribution). An important initial catalyst of vertical specialization was the availability of standard components, which allowed for a change in computer design away from the centralized IBM mainframe to decentralized architectures, PC and PC-related networks (see e.g. Langlois and Robertson, 1992). In order to see the significance of the overall corporate strategy change at IBM, the network embeddedness of IBM in the period before Gerstner’s appointment is compared with that in the ensuing period.

5.1 IBM's alliance network: 1991-1992

In the period 1991-1992 IBM engaged in 55 alliances, 42 of which were joint development agreements and joint research pacts, nine were joint ventures and research consortia and two were cross-licensing agreements (see Figure 1). From those 55 strategic alliances, 23 were in the field of computer manufacturing, mainly in the development of microprocessors, and 23 in the field of software development, mostly
related to operating systems and software architecture. IBM had two important alliances with Microsoft and Intel. Microsoft and IBM cross-licensed Windows New Technology and with Intel, IBM had a long-term agreement on the development of microprocessors. This latter agreement had a time horizon of 11 years, but was terminated in 1993. The two agreements confirm IBM’s choice for the so-called Wintel personal computers.3

IBM has also been active in developing software for third parties. Examples of these types of software development agreements are alliances with airline-companies such as a flight reservation system for American Airlines (AMAIRL) in 1992. IBM is also very active in developing communication networks, such as local area networks (Soh and Roberts, 2003). The company is involved, to a lesser extent, in industrial automation, such as CAD/CAM applications.

--- Insert Figure 1---

IBM intensively collaborates with personal computer and software developer Apple in many fields of alliances within the ICT domain. The collaboration with Apple at first sight seems to be a little odd, since IBM and Apple support different and competing basic designs of computing (Hagedoorn et al., 2001). However, in the period 1991-1992 IBM and Apple shared ten strategic alliances, mainly related to the development of microprocessors and software architecture. The technology developed in these alliances is mainly related to microprocessors for PowerPCs and mainframe computers, and the development of associated software, including network software, operating systems and some multimedia applications. These technologies focus on RISC architecture, which

---

3 Wintel is a contraction of Windows and Intel. IBM had set the standard for the PC, Microsoft for the operating system and Intel for the microprocessor (see also Takahashi and Namiki, 2003).
both companies had been using for a number of years. Though non-equity R&D agreements may indicate a strategy towards the exploration of new capabilities (Koza and Lewin, 1998), it is clear that IBM and Apple were highly committed (Gulati, 1999; Nooteboom, 1999; Uzzi, 1996, 1997; Walker et al., 1997). According to Granovetter the strength of a tie is “a combination of the amount of time, the emotional intensity, the intimacy, and the reciprocal services which characterize the tie” (Granovetter, 1973, p. 1361). All these factors are likely to be high in the case of the Apple-IBM alliance. The long-term relationship between these two companies therefore indicates a strong tie for exploiting technological capabilities in RISC architecture and software. Strategic alliances between IBM and Apple are not reported in the period 1997-2002.

5.2 IBM's alliance network: 1996-1997

In the period 1996-1997, IBM had 32 strategic alliances, 27 of which were joint development agreements, two were joint ventures, two cross-licensing agreements and one a standardization agreement. What stands out immediately when comparing this period (Figure 2) with the previous one (Figure 1) is the collaboration with multiple partners and the increased complexity of the network configuration. In the period 1991-1992 most agreements were bilateral, but in the period 1996-1997 there are some large consortia involving many different partners. The multiple partnerships with Toshiba and Motorola are all in developing microchips, one of IBM’s core competencies, indicating that IBM was exploiting existing capabilities (March, 1991; Walker et al., 1997).

However, more and more of the partnerships in the period 1996-1997 were joint development agreements in relatively new areas of expertise, indicating that exploration of new technological capabilities was becoming more important to IBM (Khanna et al.,
1998; Koza and Lewin, 1998; March, 1991). This was especially true for joint R&D in the development of multimedia and browser software. Before the mid 1990s, IBM had no presence in the consumer software markets, but the company did have an increasing number of alliances from 1991 onwards for developing products related to multimedia and browser software. Along with these relatively new fields, existing technological capabilities in microelectronics and computing were used for developing microchips and improving PowerPC technology.

From 1996 onwards it was becoming clear that the pioneering work of the Internet group at IBM (Hamel, 2000), discussed above, was being mutually reinforced by corporate networking strategies. Before 1996, IBM had no alliance agreement related to the development of Internet-related products or services. In 1996-1997 only 6 out of 32 alliance agreements dealt with the Internet, one of which was a joint venture with Netscape, Oracle, Sony, Nintendo, Sega Enterprise and NEC. This joint venture was set up for the development of Internet browsing software. From 1996 onwards, Internet-related products and services were becoming more and more important. IBM has gradually employed networking strategies in a variety of Internet-related products and services based on the products developed by the Internet group, such as Internet browsers, ThinkPad, WebSphere and other e-business applications. IBM’s core competencies were still in computer hardware and software, but the focus of attention was shifting to Internet and e-business solutions, a field unknown to the company before 1996. The relatively strong market position in e-business solutions that IBM established
around 2000 (see Figure 4) followed from a targeted alliance strategy with partners in
telecom and ICT consultancy, initiated in the early 1990s, such as the alliance with
Televerket on electronic data interchange and business consulting. Developing these
new capabilities clearly indicates an exploration strategy (Khanna et al., 1998; Koza and
Lewin, 1998; March, 1991). So, in a relatively short period of time IBM managed to
change from a hardware manufacturer into a global service provider. This was achieved
first through internal organizational transformation and second through a new portfolio
of networking strategies.

5.3 IBM’s alliance network: 2001-2002

When comparing the network of alliances of 1996-1997 and 2001-2002, it appears that
alliances in computer manufacturing were becoming less important. In 1996, hardware
manufacturers like Motorola and Sun Microsystems were prominent partners of IBM
(Figure 2), whereas there are no alliances with these companies in 2001-2002 (Figure
3). On the other hand, alliances in software and telecommunications became more
important. The sharp increase in telecom and Internet alliances in the period 1996-1997
led to steady revenue growth in global services in the period 1996-2002 as compared to
revenues from software development and hardware manufacturing (Figure 4). Alliances
with Microsoft, Peoplesoft, and Citrix Systems in 2001-2002 (Figure 3), for instance,
show that IBM engaged in a wide variety of software development projects. In the field
of telecommunications, IBM was developing new products with network developers
Cisco and Nortel Networks, and leading mobile phone manufactures such as Ericsson,
Nokia and NTT DoCoMo in 2001-2002. These collaborations made IBM a strong
partner in telecommunications in North America, Europe and Asia.
The data presented in Figures 1-3 show that IBM has engaged mainly in alliances in the fields of computer manufacturing and software development, the company’s traditional core competencies, which might lead to the conclusion that IBM has mainly exploited existing capabilities. Frequent partnerships in computer and software development demonstrate IBM’s high level of commitment (Gulati, 1999; Krackhardt, 1992; Nooteboom, 1999; Uzzi, 1996, 1997; Walker et al., 1997), in that the company maintains relationships with a select group of partners in a wide variety of projects over a longer period of time. However, especially in the period 1996-1997 and 2001-2002, IBM established more relationships outside its existing technological capabilities. Thus, gradually exploration of new capabilities was becoming more important (Khanna et al., 1998; Koza and Lewin, 1998; March, 1991).

5.4 Alliance networks as a means for strategic repositioning

The revenue streams as shown in Figure 4 confirm the trend that IBM is exploring new capabilities, whereby the company gradually transforms into a service-led company. The products developed by the Internet group led to an increase of e-business activities of IBM and eventually transformed the company into a global service provider. Not surprisingly, hardware had been the core business activity in the second half of the 1990s, but in 2001 the revenue stream of global services outgrew the revenues of the hardware division. The strong revenue growth in services was preceded by a strong increase in alliances in telecom, software and Internet, and a decrease in alliance activities in hardware manufacturing from 1996-1997 onwards. The global services
division generated revenues of almost $35 billion in 2001 compared to $30.5 billion for hardware. The gap between the revenues of global services and hardware had grown even further by 2002, at respectively over $ 36.4 billion and $ 27.5 billion (see Figure 4). Under Palmisano’s leadership the decreasing importance of the hardware division is also evident from IBM’s recent deal to sell most of its PC division to the Chinese company Lenovo (BusinessWeek, 2004b). Furthermore, IBM bought PriceWaterhouseCooper’s consulting division in 2004, which is also a strong indication of the growing importance of IBM's service business (InformationWeek, 2004).

In terms specifically of alliance type, speed of change of partners and the type of capabilities sourced via alliances, Tables 2-4 show numerically what changes in the IBM network took place. In addition, we can compare IBM’s alliances with those of the company’s main five competitors in that period: Apple, Compaq, DEC, Hewlett-Packard and Toshiba. These companies together dominated the PC market from the early nineties till the late nineties. The numbers of these five companies have been aggregated to make a comparison between IBM and one benchmark (Top-5) possible, and to level out the potential volatility and inconsistencies of the figures of the five individual companies.4 First, a change in networking strategies can be seen in a change in the proportion of non-equity versus equity agreements. The first category of agreements consists of joint development agreements and joint research pacts. These non-equity joint research and development agreements indicate exploration strategies,

--- Insert Figure 4 --

4 Note that DEC was acquired by Compaq in 1998 and Compaq merged with Hewlett-Packard in 2002.
as discussed in Koza and Lewin (1998). Equity agreements, such as joint ventures, are usually associated with exploitation (Koza and Lewin, 1998). Though the pattern of alliances is volatile, in terms of both the number of agreements and their type, it becomes clear from Table 2 that equity agreements have become less important in IBM’s networking strategies over the last decade. A relatively large proportion of high commitment agreements and an abundance of licence agreements related to microelectronics and computing characterized the period till 1992. After 1992, the proportion of high commitment agreements decreased, while the proportion of lower commitment R&D agreements increased. In the base period 1985-1990 and 1991-1992, equity agreements took shares of respectively 12% and 18% of all alliance agreements. In the period 1996-1997 and 2001-2002 these shares decreased to 6% and 5%, respectively. When looking at the five main competitors of IBM (Top-5), we see a similar pattern; in the period 1991-1992 on average 17% of alliances of the five companies were based on equity alliances, while in 1996-1997 this proportion decreased to 5% on average (see Table 2). In the period 2001-2002, however, the average proportion of equity alliances increased again to 11%. Following Koza and Lewin (1998), this trend seems to show that non-equity alliances, which indicate a tendency towards exploration, are becoming slightly more important than equity alliances (exploitation) after 1991-1992 for IBM. This also holds when comparing IBM with its competitors, but the shift from non-equity to equity alliances is relatively small and volatile. Therefore, no strong conclusions on a trend towards exploration can be made based on the data on equity and non-equity alliances.

-- Insert Table 2--
Comparing the types of alliance partners in the three innovation networks with each other and with the period 1985-1990 demonstrates that the alliance activities are dominated by a search for new partnerships (Granovetter, 1973). Table 3 shows that the share of new partners in the network compared to each of the previous periods is relatively high. In the period 1991-1992, 63% of the partners were new to IBM, and in the period 1996-1997, the share of new partners was 68%. The most notable change, however, can be seen in the transition to the period 2001-2002, where the share of new partners increased to 78%. This means that IBM collaborated earlier with only 13 out of 59 partners and all other partners were new to the firm compared to the period before 2001. When we compare IBM’s figures with those of its main competitors (Top-5), we can conclude that IBM was renewing its partner network much faster than the other five companies. In the period 1991-1992, on average only 38% of the partners of the five main competitors were new in comparison to the period 1985-1990, compared to 63% in IBM’s network (see Table 3). The average proportion of new partners in the competitors’ networks increased in the periods 1996-1997 (59%) and 2001-2002 (66%), but these proportions of new partners are much lower than in the case of IBM’s network in the same periods (68% and 78% respectively).

Moreover, most of IBM’s partners in 2001-2002 come from a different technological field than IBM’s. Only a few of the frequent partners of the periods 1991-1992 and 1996-1997 in hardware manufacturing can be found in Figure 3. Instead, IBM’s partners in the period 2001-2002 work mainly on client-based software and services. This trend indicates that IBM is becoming more of a service-led company,
which again reflects Gerstner’s strategy of business transformation towards exploration of new capabilities.

---Insert Table 3---

To get a better grip on the technological capabilities that are searched for, all alliances that IBM engaged in are subdivided into six categories: computers, software, Internet, telecommunications, microelectronics and other ICT related activities (Figure 5).\(^5\) The focus of attention in strategic technology alliances of IBM over the years is rather volatile, but alliances in computer and microelectronics manufacturing, and the development of standard and dedicated software, are most common in the period 1985-1992. In the period 1985-1990, half of IBM’s agreements were in computer manufacturing and one-quarter in software development. In the period 1991-1992, computer manufacturing and software development have equal shares of 42% and naturally there were no alliances in Internet applications (see Figure 5). The five main competitors (Top-5) show similar figures, 33% in software and 44% in hardware alliances. However, strategic networking in the development of Internet applications (both hardware and software) became more important after 1992. In 1996-1997, 19% of IBM’s alliance agreements dealt with Internet applications in comparison to 10% of the Top-5’s alliances. But especially in 2001-2002, the proportion of alliances in Internet applications is remarkably high with a share of 55%. The five main competitors show almost no growth in Internet alliances, with a small increase to 12%. Thus, IBM showed a much greater increase in Internet alliances than its main competitors in the periods

---

\(^5\)These are categories that are common in the MERIT-CATI and CGCP database. A detailed description of all categories can be found in Duysters and Hagedoorn (1993).

**This paper has been accepted for publication in Research Policy. Please cite this article in press as:** Dittrich, K., Duysters, G. and De Man, A.P. Strategic repositioning by means of alliance networks: The case of IBM. Research Policy (2007), doi: 10.1016/j.respol.2007.07.002.

--Insert Figure 5--

6. Implications and conclusions

In this paper we have described the role of alliance networks in strategic change processes. We analyzed one of the most impressive strategic repositioning programmes in the history of business, of how deliberate changes in the network structure enabled IBM to fully reposition itself in the industry. The strategic change project that IBM initiated in the 1990s is clearly facilitated by the changes brought about in its alliance network. The network reflects the vast shift in the way IBM shaped its learning strategy with network partners, changing it from exploitative learning towards explorative learning.

The study of IBM’s network has a number of important implications. The first is that company alliance networks can be used to facilitate strategic change inside a company. This role of alliance networks has, so far, been relatively neglected in the alliances literature. We show that strategic renewal is not just limited to an internal project. The case of IBM shows that strategic repositioning can be facilitated by an active use of the company network. Different strategies require different types of networks. Learning strategies aiming at exploitation require different alliances and alliance partners than learning strategies aimed at exploration. To be successful, new company innovation strategies need to be translated into new networks (De Man, 2004).
We have shown that it is not the number of alliances which matters but the nature of the alliance network which is most important. In fact, management attention and integration costs may grow exponentially beyond a certain level of alliances (Duysters and De Man, 2003). In other words, a firm can start to suffer from information overload and diseconomies of scale once it is involved in too many alliances at the same time. IBM did well in that respect because it focused on changing the nature of its alliance networks and did not focus on expanding the number of alliances as a goal in itself. This paper, therefore, strongly suggests that the traditional view of large firms as inert organizations that are unable to adapt swiftly to changing environmental conditions as described in organizational ecology, evolutionary economic theory and in resource based theories is no longer a valid perspective, given the opportunities that alliance networks create for companies to reposition themselves in the market.

Second, this strategic change in the network can be brought about by two main mechanisms: increasing the speed of change of partners and looking for partners in areas outside existing competences. IBM has used both of these techniques to support its new strategic direction. Even though some authors have claimed that networks stimulate innovation (e.g. Chesbrough, 2003; Porter, 1990), the techniques that companies employ for this have rarely been identified. The IBM case not only shows these techniques, it also shows they are employed simultaneously to obtain the full effect. Merely changing partners is not sufficient; the type of relationship with them should change as well, as should the type of partner. From a practitioner’s perspective, but also from an academic point of view, these findings are very important because, apart from a few notable exceptions (Ahuja and Lampert, 2001; Hagedoorn and Duysters, 2002; Rowley et al., 2000) the dominant stream of literature on alliances tends
to ignore a more in-depth view of various types of learning and the employment of
different alliance strategies to accommodate such learning. Somewhat surprisingly the
actual contribution of our associated variables (non-equity relations and low-
commitment alliances) is found to be rather low. This is interesting because the existing
literature seems to indicate otherwise. This may imply that in a situation of substantial
strategic change, high commitment to some partners is still important, for example
because knowledge exchange is easier in high commitment alliances. This helps a
company build up new capabilities in a new industry faster. In addition, finding reliable
allies in a new industry may be of such strategic importance that it is worth sacrificing
some flexibility in partner relationships. The thesis that low commitment alliances are
important for exploration may therefore be true only when companies remain active in
their own sector, but hold only partly when companies move swiftly into entirely new
sectors.

Third, this study suggests IBM has been consciously able to manage the shift in its
network. The alliance literature has paid some attention to change and network
dynamics. However most of the attention has been theoretical. Empirical tests of
network dynamics are virtually absent (De Man and Duysters, 2005). The vast majority
of large-scale studies into networks are limited to tests of networks at one point in time,
rather than across different time periods. Case studies have paid some attention to
dynamics, for example Gomes-Casseres (1996). Their focus however was not so much
on how companies adapt their alliance portfolios, but on changes in alliance
constellations on an industry or alliance group level. Dynamics at the level of a focal
firm is therefore an area that is not well-researched. There has been little investigation
into mechanisms that companies employ to create and sustain a dynamic alliance

This paper has been accepted for publication in Research Policy. Please cite this article in press as:
Dittrich, K., Duysters, G. and De Man, A.P. Strategic repositioning by means of alliance networks: The
portfolio, even though they are a relevant explanatory factor behind network dynamics, as the IBM case shows. The IBM case supports the opinion that companies have a choice in shaping their networks and are able to affect network composition. Of course a powerful player like IBM may have more latitude in directing its network than smaller companies, but clearly a deterministic view on networks is not supported by this case. Rather, networks are shaped by the conscious actions of companies. These findings definitely strengthen the call for a more dynamic approach to network research (Oliver, 2001).

A fourth conclusion pertains to the method used. By comparing snapshots of networks over time in relation to a specific event, it was possible to reveal and understand the main trends in the IBM network. This method is an extension of the method of repeated observation in case studies (Yin, 1989). In this case the time period for making observations is not chosen randomly, but connected to a specific event. The combination of qualitative and quantitative analysis provides a more solid ground for drawing conclusions than a purely qualitative description would have done. Simultaneously it provides more understanding than a purely statistical network analysis could have achieved, because it stays closer to real-life characteristics of alliances (equity vs. non-equity, type of industry of partners, new partner or not). In the case of IBM the method of repeated observations around an event works well: it delivers good insights about relevant changes in IBM’s network related to the event of its change of innovation strategy. The disadvantage of the method is that it may be vulnerable to the choice of event and time-windows. Table 4 for example shows volatility in the number of software and computer related alliances. This may be caused by the choice of year. Another limit is that the focus has been on only one event. Even though this appears to
be the most important event for IBM over the period studied, other events occurring
during the period 1991-2001 may have had an impact on IBM’s network as well. The
method used does not allow us to evaluate the influence of those events. Hence, the
method is probably best applicable to research looking at the long-term developments of
networks around large-scale changes that require a number of years to elapse before
their full effect shows. More fine-grained case studies are required to obtain detail about
the impact of lesser events.

A question raised by this case relates to the effect on the network partners of
strategic change in a company. The alliance literature stresses the importance of
(personal) relationships, trust and reputation in alliances and networks (Gulati, 1995;
Jones et al., 1997). If these elements are relevant then restructuring a network could be a
painful and difficult affair. IBM however seems to have adapted its network fairly
quickly. Does this mean that these relational aspects are less important than is often
thought? Or do relational aspects apply mainly in a situation of exploitation, and if so,
what relational aspects are relevant for exploration networks? Or have the costs of
changing the network indeed been very high for IBM and its partners? The previous
study has not given answers to these questions. Surveying or interviewing partners may
help to shed light on this issue. This is especially relevant because little is known about
the relative importance of social ties versus business logic in networks. Both have been
recognized as relevant influences, but to what extent they strengthen or contradict each
other is unclear.

In this paper we have tried to improve our current thinking about strategic
repositioning efforts by showing the importance of strategic alliance networks; an
importance thus far neglected in the literature. The IBM case shows that strategic
change is facilitated by changing the company network and that companies are able to change the focus of their network from exploitation towards exploration. The translation of the strategic change project into a new alliance network was realized by changing the type of alliance, changing the partners and bringing new capabilities into the network. By describing the IBM case we hope to have proved that an integrated approach linking strategic change to network change not only has theoretical but also managerial merit.

References


Table 1: Network characteristics for exploration and exploitation strategies

<table>
<thead>
<tr>
<th></th>
<th>Exploration</th>
<th>Exploitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliance type</td>
<td>Non-equity alliances; few equity alliances</td>
<td>Relatively high number of equity alliances</td>
</tr>
<tr>
<td>Speed of changes of partners</td>
<td>Higher: many new partners enter the network</td>
<td>Lower: few new partners enter the network</td>
</tr>
<tr>
<td>Type of partner capabilities</td>
<td>Partners with different technologies</td>
<td>Partners with similar technologies in same business</td>
</tr>
</tbody>
</table>
Table 2: Non-equity versus equity agreements

<table>
<thead>
<tr>
<th></th>
<th>IBM</th>
<th>TOP-5 Competitors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of</td>
<td>Number of non-</td>
<td>Avg. number of</td>
</tr>
<tr>
<td></td>
<td>equity alliances</td>
<td>equity alliances</td>
<td>equity alliances</td>
</tr>
<tr>
<td>1991-1992</td>
<td>10 (18%)</td>
<td>45 (82%)</td>
<td>3.6 (17%)</td>
</tr>
<tr>
<td>1996-1997</td>
<td>2 (6%)</td>
<td>30 (94%)</td>
<td>0.8 (5%)</td>
</tr>
<tr>
<td>2001-2002</td>
<td>3 (5%)</td>
<td>57 (95%)</td>
<td>4.8 (11%)</td>
</tr>
</tbody>
</table>

Table 3: New partners in IBM’s innovation network in comparison with Top-5

<table>
<thead>
<tr>
<th>Year</th>
<th>IBM</th>
<th>TOP-5 Competitors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>New partners</td>
</tr>
<tr>
<td>1991-1992</td>
<td>44</td>
<td>28</td>
</tr>
<tr>
<td>1996-1997</td>
<td>44</td>
<td>30</td>
</tr>
<tr>
<td>2001-2002</td>
<td>59</td>
<td>46</td>
</tr>
</tbody>
</table>

Figure 1: IBM’s innovation network 1991-1992

Source: MERIT-CATI database
Figure 2: IBM's innovation network 1996-1997

Source: MERIT-CATI database (1996); CGCP database (1997)
Figure 3: IBM’s innovation network 2001-2002

Source: CGCP database
Figure 4: Revenues of IBM 1996-2002

Source: IBM (Annual Reports 1996 to 2002).
Figure 5: Search for capabilities in innovation networks of IBM and Top-5 competitors