CASE STUDY

SYMBIAN: CUSTOMER INTERACTION THROUGH COLLABORATION AND COMPETITION IN A CONVERGENT INDUSTRY

Fabio Ancarani
Venkatesh Shankar

FABIO ANCARANI is assistant professor of marketing, SDA Bocconi University School of Management, Università Commerciale Luigi Bocconi, Milan, Italy; e-mail: fabio.ancarani@sdabocconi.it

VENKATESH SHANKAR is the Ralph J. Tyser Fellow and an associate professor of marketing and entrepreneurship, Robert H. Smith School of Business, University of Maryland, College Park, MD 20742; e-mail: vshankar@rhsmith.umd.edu

Symbian is a joint venture between Nokia, Sony-Ericsson, Motorola, Matsushita, Siemens, and Psion (a British software company) that licenses an open operating system (OS) for third-generation (3G) mobile information and communication services in hybrid mobile devices. Symbian OS is the first mover in this emerging market. Although Nokia, Ericsson, and Motorola are leading competitors in the mobile phone market, they are collaborators with respect to the market for mobile device operating systems. Symbian directly competes with the late mover, Microsoft's Stinger, and the newly announced Smartphone 2002 mobile device operating systems.

The mobile device operating system is at the heart of the convergence of computing, telecommunications, and mobility that results in hybrid mobile devices. In a convergent industry,

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the boundaries between traditional industries are blurred and, as new competitors emerge, traditional rules of competition are challenged. Firms need to compete effectively and to collaborate with one another at the same time by focusing on customer needs. Symbian is at the crossroads in the emerging convergent market of hybrid mobile devices. If the partner companies of Symbian succeed in this venture, they will win a major competitive battle against a formidable competitor, Microsoft. If they fail, they run the risk of losing their strong positions and even existence in their traditional mobile phone market.

Until recently, Symbian was in a favored position. Symbian had a strong lead over its competitors in the mobile operating system market, Microsoft was still focused on PC-based operating systems, and the entire "anti-Microsoft" world (comprising companies such as Sun Microsystems and Oracle) seemed to be connected with Symbian. However, Microsoft appears to be gaining ground. Symbian has now been repositioned as a mobile *phone* operating system from its previous position of a mobile *device* operating system, reflecting a climb down from the initial broader focus. What are the key managerial issues and the lessons to be learned in this emerging converging market?

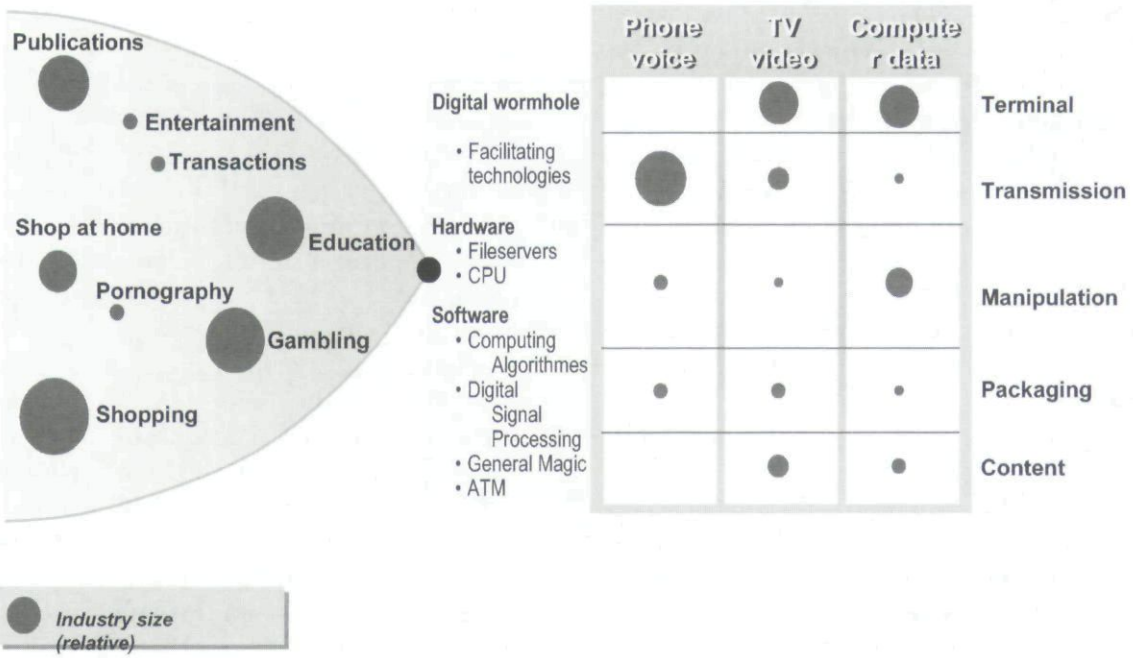
COLLABORATION AND COMPETITION IN CONVERGENT INDUSTRIES

In the high-tech environment, the boundaries separating traditional industries are blurring; there is a convergence among computer, telecommunication, office equipment, entertainment, broadcasting, media publishing, consumer electronics, distribution, financial, and insurance services industries (Collins, Bane, & Bradley, 1997; Wind & Mahajan, 2002). The widespread growth of the Internet is accelerating the process of industry convergence and creating a "blur economy," where there is a gradual blurring of distinctions between goods and services, buyers and sellers, tangible and intangible capital, and individual firms (Davis & Meyer, 1998).

Collins and colleagues (1997) proposed an initial reclassification of the convergent information and communications technology (ICT) industry (see Figure 1). In this digital convergence, there is a shift from a competitive environment characterized by vertical industries comprising sound communication (telephony), visual communication (television), and data (computers) toward a new multimedia industry structured around five horizontal segments (content production, content packaging, content transmission, content manipulation, and content reception). The shift of the new digital convergent industry from three vertical sectors to five horizontal segments implies a movement from an information distribution system dependent on content, specific technology and dedicated hardware to an independent content system distributed through a shared infrastructure. In this new competitive environment, firms can supply a homogeneous information product or service such as technology and production, transmission, and reception tools once they have acquired the information content from the specific producers. Moreover, firms that belong to the three traditional sectors have opportunities to broaden their field of action—horizontally through data communication, audio, and visual; and vertically by performing one or more of the activities in the multimedia value chain. The market for hybrid mobile device is an example of a converging market.

Managers face two key strategic challenges when competing in convergent industries: (1) maintaining focus on customer relationships; and (2) identifying partners for strategic alliances and managing the alliances, often collaborating with competitors in traditional industries.

Firms should focus more on the end customer and less on the industry or on the technology in convergent industries (Wind & Mahajan, 2002). Customer-based assets are critical for achieving competitive advantage in these industries. For example, a customer-based resource like a brand, which may not be industry specific, can be exploited across many related industries (Aaker, 1996). Firms should also increase knowledge about their customers by integrating



Source: Collins, Bane, and Bradley, 1997

FIGURE 1
The Collins, Bane, and Bradley (1997) Model

it within their firms and exploiting it in new convergent industries. Customers should become value partners for their suppliers and should be viewed as a source of competence for the firm (Prahalad & Ramaswamy, 2000). Tracking and profiling customers, and, more generally, customer relationship management (CRM) activities are critical to marketing strategies for firms competing in convergent industries.

The emergence of new forms of hybrid competition that include competition and cooperation drive the need for the right strategic alliances in convergent industries. Strategic alliances and collaboration with competition or co-opetition have been suggested as the "panacea" for success in emerging industries (Nalebuff & Brandenburger, 1996). The strategic ability to create and manage relationships with a network of collaborators and complementors is key to winning the battle in the convergent industry. An emerging view of strategic alliances, namely, the *relational view*, posits that strategic resources could cross the boundaries of firms and industries and reside in relationships between firms (Dyer & Singh, 1998). According to this view, the unit of analysis moves from the industry (*industry structure view*) and the firm (*resource-based view*) to the network of firms. Relationships between firms can be a source of sustainable competitive advantage and of rents (*relational rents*). As a consequence, managers should focus on "learning alliances," that is, building networks that permit them to increase the knowledge endowment through firm relationships (Khanna, Gulati, & Nohria, 1998). The traditional concept of the industry may be replaced by a more appropriate concept of the *business ecosystem* (Moore, 1996). Business ecosystems cross different industry boundaries; firms within them co-evolve, working both in competition and in partnership at the same time, to generate new knowledge and continuous innovation.

The Symbian case in a convergent industry raises important questions. Do these forms of co-opetition really generate value for the customer and create sustainable competitive advantages for the collaborating firms? Are firms

in convergent industries adopting the right marketing and business strategies? Is it possible to exploit the potential of customer value creation offered by alliances between firms coming from different industries? Are firms exploiting the potential of interaction with customers offered by the convergence phenomenon?

TRENDS IN MOBILE INFORMATION AND COMMUNICATION TECHNOLOGY

Mobile information and communication services are moving away from simple voice or data communication modes to a convergent or hybrid service comprising voice, data, and video capabilities. The first generation of mobile phones comprised analog systems that allowed for only voice transmission. The second-generation digital systems (GSM, Global System for Mobile communication) opened up wider services by going beyond ordinary telephone calls to Short Message Service (SMS). The third-generation (3G) mobile system goes beyond even this. (See Exhibit 1 for a glossary of terms in mobile technology.)

Increases in transmission speed and technological innovation have allowed mobile phones and personal digital assistants (PDAs) to become multimedia platforms. Through these new devices, individuals can browse the Web, use videoconferencing, work interactively, enjoy themselves (m-entertainment), and make purchases (m-commerce). The WAP (Wireless Application Protocol) is one of the initial efforts in this direction. In Europe, in early 2001, it became possible to transmit data through the high-speed mobile network (from the current 9.6 Kbytes to 115 Kbytes) using GPRS (General Packet Radio Service). This system divides voice and data into "digital packets," so that they can be transmitted more efficiently over the digital networks. The innovation introduced by GPRS is that the charges for this service will be based on the quantity of data unloaded and not on navigation time. The arrival point is based on the UMTS technology (Universal Mobile Telecommunications Service), which represents the 3G system. UMTS is a standard that makes it possible to transmit voice, data and images at a speed equal to 2 Mbytes per second and at frequencies different from those used by GSM services.

THE SYMBIAN STORY

History of Symbian

Symbian was established as a private independent company in June 1998 by Ericsson, Matsushita, Motorola, Nokia, and Psion. It is currently owned by Ericsson, Nokia, Matsushita (Panasonic), Motorola, Psion, Siemens, and Sony Ericsson. Headquartered in the UK, it has offices in Japan, Sweden, UK, and the United States (see Figure 2). Non-executive directors, representing each shareholding company, sit on Symbian's supervisory board. Their role is to set the standard licensing terms and conditions for Symbian OS. Licensing and technological issues are dealt with by Symbian senior managers on the operational board, ensuring a clear distinction between Symbian ownership and management.

The vision statements of the early founding companies of Symbian appear in Exhibit 2. Nokia sees itself as one of the world's leading players in wireless communications. Ericsson is focused on providing communication solutions. Motorola's thrust is integrated communication solutions and embedded electronic solutions. Psion's vision is centered on mobile computing and wireless networking. One common theme among the vision statements of these companies is "mobile or wireless solutions." This theme was reflected in Symbian's original mission statement: "To set the standard for mobile wireless operating systems and to enable a mass market for wireless information devices."

The Symbian coalition started out with the goal of developing an open standard operating system for existing and next-generation interactive multimedia devices. Nokia, Ericsson, Matsushita, and Motorola, the world's leading producers of mobile telephones, are fierce competitors in their market. The British firm Psion

EXHIBIT 1
Glossary of Wireless Terms

1G Systems: In mobile telephony, the first-generation systems were analog, circuit-switched. Voice links were poor, hand-off unreliable, capacity low, and security nonexistent. 1G systems are not under active development. Indeed, in some areas, 1G spectrum is being auctioned for 2G and 3G use.

2G Systems: The second-generation protocols use digital encoding and include global system for mobile communications (GSM), D-AMPS time division multiplex access (TDMA), and code division multiplex access (CDMA). 2G networks are in current use around the world. These protocols support high bit rate voice and limited data communications. They offer auxiliary services such as data, fax, and SMS. Most 2G protocols offer different levels of encryption.

2.5G Systems: 2.5G protocols extend 2G systems to provide additional features such as packet-switched connection General Packet Radio Service (GPRS) and enhanced data rates (HSCSD, EDGE).

3G Systems: The third-generation protocols support much higher data rates, measured in Mbps, intended for applications other than voice. 3G networks trials started in Japan in 2001. 3G networks are expected to be starting in Europe and part of Asia/Pacific by 2002, and in the United States later. 3G will support bandwidth-hungry applications such as full-motion video, video-conferencing, and full Internet access.

GPRS (General Packet Radio Service): A radio technology for GSM networks that adds packet-switching protocols, shorter set-up time for ISP connections, and offers the possibility to charge by amount of data sent rather than connect time. GPRS promises to support flexible data transmission rates typically up to 20 or 30 Kbps (with a theoretical maximum of 171.2 Kbps), as well as continuous connection to the network. A 2.5G enhancement to GSM, GPRS is the most significant step toward 3G, needing a similar business model, and service and network architectures. GPRS began to appear in some networks during 2000.

GSM (Global System for Mobile communication): The most widely used digital mobile phone system and the de facto wireless telephone standard in Europe. Originally defined as a pan-European open standard for a digital cellular telephone network to support voice, data, text messaging, and cross-border roaming, GSM is now one of the world's main 2G digital wireless standards. GSM is present in more than 160 countries and, according to the GSM Association, accounts for approximately 70% of the total digital cellular wireless market. GSM is a time division multiplex (TDM) system. Implemented on 800, 900, 1800, and 1900 MHz frequency bands

I-mode systems: Proprietary packet-based information service for mobile phones. i-mode delivers information (such as mobile banking, and train timetables) to mobile phones and enables exchange of email from handsets on the PDC-P network. Launched in 1999 by NTT DoCoMo, i-mode is very popular in Japan (especially for e-mail and transfer of icons), but is not currently being used elsewhere.

WAP (Wireless Application Protocol): A set of communication protocol standards to make accessing online services from a mobile phone simple. The WAP was conceived by four companies: Ericsson, Motorola, Nokia, and Unwired Planet (today called Phone.com). The WAP Forum is an industry association with over 200 members. Symbian is a full member of the WAP Forum.

Source: Symbian Web site.

produces portable microcomputers that use their own operating systems (a version called EPOC), not Microsoft's Windows operating systems. The aim of the joint venture was to produce the OS software for "intelligent" mobile telephones and third-generation devices that will function as an electronic diary, manage the mail, and access the Web and the worlds of m-commerce and m-entertainment.

At the start of the venture, Symbian did a scenario analysis to project the future of mobile devices. In the wireless world scenario developed by Symbian, access to the world of interactive multimedia services will not be through fixed channels in the future, but through mobile networks. In a simulation that appeared on its Web site, Symbian concluded that by 2010 there would be no customers using mobile telephones for pure voice communication or Web browsing in the WAP form and that the number of people using the mobile telephone as a terminal for multimedia services would probably amount to 1 billion.

Symbian has gone through important phases marked by key events (see Exhibit 3 for a list of key events). In 1999, Matsushita (Panasonic)

Symbian is owned by Ericsson, Matsushita (Panasonic), Motorola, Nokia, Psion, Siemens, and Sony Ericsson.

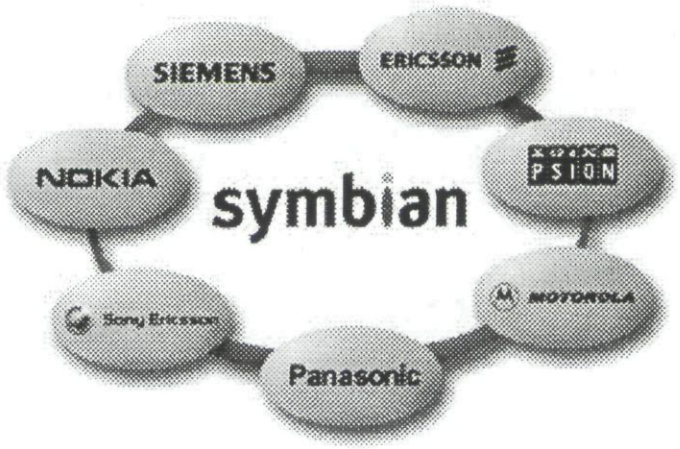


FIGURE 2
Symbian Ownership

joined Symbian as both a shareholder and a licensee. Although Panasonic's vision statement (see Exhibit 2) is not explicit about communication or wireless solutions or technology, digital technology and innovation are prominent aspects of the statement. During 1999, Symbian was also touted as a company with best future potential by *Red Herring* magazine. In 2000, Sony, Sanyo, and Kenwood became licensees of Symbian. It was during this year that the first Symbian OS phone, Ericsson R380, entered the market. Symbian gained further momentum in 2001 when Fujitsu and Siemens also became licensees. The watershed product event for Symbian was the introduction in 2001 of the Nokia 9210 Communicator, the world's first open Symbian OS phone with a full range of developer tools. In 2002, Siemens and Sony-Ericsson became shareholders of Symbian. Nokia 7650, the first Symbian OS v6.1 phone that incorporates advanced features such as a camera and multimedia messaging, shipped during the first half of 2002. Nokia anticipates that at least half of its 3G phones will be using Symbian OS by 2004.

Symbian's current vision is "Symbian OS in every phone." Symbian OS hopes to be at the heart of the convergent technologies revolution. Symbian OS integrates the power of computing with telephony, bringing advanced data services—using voice, messaging and on-board processing power—to the mass market. It drives standards for the interoperation of data-enabled mobile phones with mobile networks, content applications, and services. It is flexible and scalable enough to be used in the variety of mobile phones needed to meet a wide range of user requirements, supports complex requirements of network protocols worldwide, and enables a broad, international, developer community. Open standards ensure global network interoperability, allowing mobile phone users to communicate with anyone, any way, at any time. The compelling advanced data services that operators can provide on Symbian OS phones will help minimize churn and maximize revenue. Software developers are able to build applications and services for a global mass-market of advanced, open, programmable, mobile phones. A set of standard application programming interfaces (APIs) across all Symbian OS phones and the advanced computing and communications capabilities of Symbian OS, enables development of advanced services. The current licensees are shown in Figure 3. Nokia and Motorola account for more than half the licensee market.

EXHIBIT 2
Vision Statements of Symbian's Main Founders

Firm	*Vision Statement*
Nokia	Our business objective is to strengthen our position as a leading systems and products provider. Our strategic intent, as the trusted brand, is to create personalized communication technology that enables people to shape their own mobile world. We innovate technology to allow people to access Internet applications, devices and services instantly, irrespective of time and place. Achieving interoperability of network environments, terminals and mobile services is a key part of our objective. We intend to capitalize on our leadership role by continuing to target and enter segments of the communications market that we believe will experience rapid growth or grow faster than the industry as a whole. By expanding into these segments during the initial stages of their development, we have established Nokia as one of the world's leading players in wireless communications and significantly influenced the way in which voice and other services have been transferred to a wireless, mobile environment. As demand for wireless access to an increasing range of services accelerates, we plan to lead the development and commercialization of the higher capacity networks and systems required to make wireless content more accessible and rewarding to the end user. In the process, we plan to offer our customers unprecedented choice, speed and value. (Source: Nokia Web site, Business Strategy Statement, September 2002)
Ericsson	Our mission is to understand our Customers' opportunities and needs and provide communication solutions faster and better than any competitor. In doing so, we shall generate a competitive economic return for our shareholders. We believe in an "all communicating" world. Voice, data, images and video are conveniently communicated anywhere and anytime in the world, increasing both quality-of-life, productivity and enabling a more resource-efficient world. We are one of the major progressive forces, active around the globe, driving for this advanced communication to happen. We are seen as the prime model of a networked organization with top innovators and entrepreneurs working in global teams. (Source: Ericsson Web site, Mission and Vision Statement, September 2002)
Motorola	Motorola is a global leader in providing integrated communications solutions and embedded electronic solutions. Our *Intelligence Everywhere*™ solutions include: · Software-enhanced wireless telephone and messaging, two-way radio products and systems, as well as networking and Internet-access products, for consumers, network operators, and commercial, government and industrial customers. · End-to-end systems for the delivery of interactive digital video, voice and high-speed data solutions for broadband operators. · Embedded semiconductor solutions for customers in wireless communications, networking and transportation markets. · Integrated electronic systems for automotive, Telematics, industrial, telecommunications, computing and portable energy systems markets. (Source: Motorola Website, Mission and Vision Statement, September 2002)
Panasonic/ Matsushita	Panasonic's vision of the digital future is driven by the needs and aspirations of our business customers and millions of consumers around the world who use our products every day. We share their dream to live a fuller life by providing ways of working smarter and enjoying the rewards of technological advances. Panasonic will continue its Customer First tradition of creating new products that resolve the challenges in business and personal life, helping us all enjoy more of what life has to offer. The name Panasonic is synonymous with innovation, quality, performance and ease of use. We look forward to a bright and shining technological future, and to playing a leading role in the digitally networked society, propelled by the creativity and dedication of our employees here and around the world. (Source: Panasonic Web site, Mission and Vision Statement, September 2002)
Psion	Psion PLC is a world leader in mobile computing and wireless networking and has a well-earned reputation for innovation and technological leadership. (Source: Psion Web site, Mission and Vision Statement, September 2002)

EXHIBIT 3
Symbian History

1998

- Symbian established as a private independent company in June 1998, owned by Ericsson, Nokia, Motorola, and Psion.

1999

- Matsushita (Panasonic) joins Symbian as shareholder and licensee.
- Symbian awarded title of "best overall" company with the "best long term potential" by U.S. magazine *Red Herring*.

2000

- Sony, Sanyo, and Kenwood license Symbian OS.
- The world's first Symbian OS phone, the Ericsson R380 Smartphone, ships.
- At the World Economic Forum's annual conference in Davos, Switzerland, Symbian collects an award for being one of the world's leading "Technology Pioneers."
- Symbian is recognized by the UMTS Forum for "Successful Introduction of UMTS as the Mobile Component of the Information Society" at the UMTS awards in Barcelona, Spain.

2001

- Fujitsu licenses Symbian OS.
- The first 2.5G Symbian OS phone, the Nokia 7650, is announced.
- The world's first open Symbian OS phone, the Nokia 9210 Communicator, ships with full range of developer tools.
- Symbian becomes a sponsor of the SyncML Initiative.
- Siemens licenses Symbian OS.
- Symbian OS v6.1 for packet-switched (2.5G) mobile phones unveiled.

2002

- Siemens becomes Symbian shareholder.
- Sony Ericsson announces the P800.
- Symbian OS v7.0 unveiled at 3GSM World Congress.
- Sony Ericsson joins Symbian as a shareholder.

Source: Symbian Web site.

Symbian's Alliances

Since its formation, Symbian has been actively engaged in implementing its vision. It has been very proactive in establishing a network of partner companies so to increase its resource base and the value of the relationships with its customer base. In January 1999, Symbian joined with Oracle database to expand the range of business solutions for "mobile enterprise computing." In April 1999, Symbian entered into an alliance with Sun Microsystems to allow for the development of applications in Java, a programming language created by Sun that permits compatibility with many other digital products. Motorola, one of its partner companies, entered into an agreement with Cisco for networking applications. Moreover, Motorola's links with Netscape were tied to this alliance and to AOL and Sun. In October 1999, Nokia and 3Com (the then producer of the Palm Pilot, the most popular PDA in the world), signed an agreement that would allow EPOC to be used as a standard operating system for new devices and the interface of Palm, commonly used in mobile telephones, and the optical pen. During late 1999, Symbian entered into an agreement with NTT DoCoMo, the Japanese company that launched the successful I-mode mobile phone service. In February 2000, Symbian joined with IBM with to develop PDAs based on EPOC software. In the same period, Ericsson, IBM, Lotus, Oracle, Palm and Symbian founded the GPRS Applications Alliance, an alliance devoted to improving the development and diffusion of

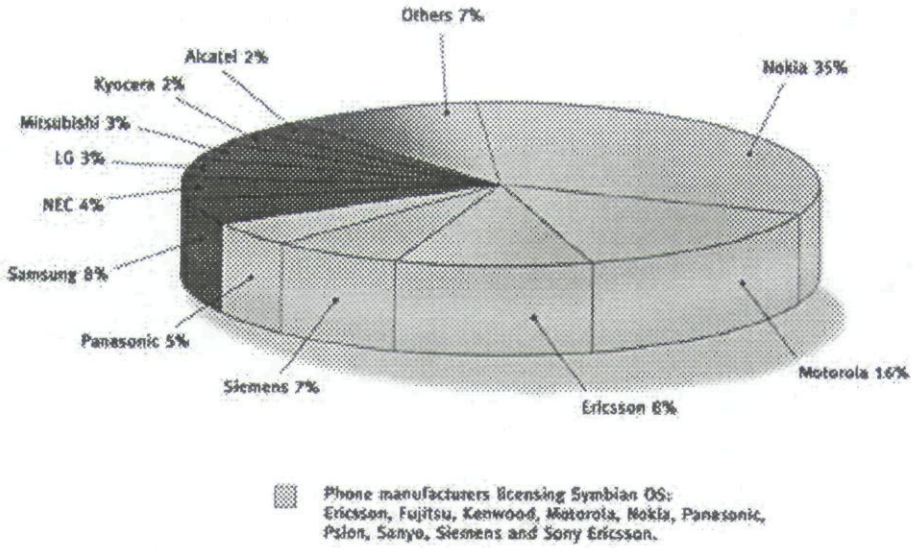


FIGURE 3
Phone Manufacturers Licensing Symbian OS

the GPRS. In April 2000, Symbian formed an alliance with Sony for using EPOC on all Sony PDAs. In August 2001 it linked up with Intel to integrate Epoc with Intel's chip technology. In April 2002, Siemens officially joined Symbian as a shareholder.

Samsung, Panasonic, and Siemens have also signed for the use of Symbian and Nokia's "Series 60" software to be used on their future hybrid mobile devices. Series 60 is a comprehensive software platform for smart phones, created for mobile phone users that demand easy-to-use, one-hand-operated handsets with high-quality color screens, rich communications, and enhanced applications. Series 60 consists of the key telephony and personal information management applications, the browser and messaging clients, as well as a complete and modifiable user interface, all designed to run on top of the Symbian OS.

Despite the wellspring of alliances in the initial years, Symbian is now facing serious problems. From a financial point of view, its IPO, scheduled for November 2000, has been indefinitely postponed. Symbian's partner companies are also experiencing financial problems, mainly due to the downturn in the telecommunications industry. The UMTS standard is unlikely to become a reality soon as its launch in European countries has been postponed many times.

Symbian is also experiencing problems within its coalition. In 2001, Motorola and Psion developed a joint project, called Odin, aimed at developing a new smart phone. This project, however, failed in part because of the inability to integrate the different professional backgrounds of the project team members (telecommunications and information technology). Ericsson and Microsoft entered into an agreement on another project and this caused some misunderstanding among some of the partners in the coalition. In March 2002, Symbian's CEO Colly Myers was replaced by David Levin. Moreover, some top managers are leaving Symbian and joining other companies.

THE MICROSOFT CHALLENGE

Micosoft's Mobile OS

In the convergent market of mobile device OS, Symbian's main competitor does not come from within the telecommunications industry. Rather it comes from outside the industry in the form of Microsoft Corporation. Microsoft, the world leader in operating systems for PCs and Web browsers is focused on setting the OS stan-

dard for PDAs, handheld devices, and mobile phones. Windows, Windows CE, Windows Pocket PC, and Stinger (now called Microsoft Smartphone) are Microsoft's operating systems for fixed and mobile multimedia applications. Microsoft has changed its vision from "A computer in every desk and in every home," to a new vision of, "Empower people through great software every time, any place and every device."

Microsoft has three major operating systems for mobile devices: (1) the Pocket PC OS, used for handheld PCs and PDAs, (2) Pocket PC 2002 Phone Edition OS, and (3) Smartphone 2002 OS (previously Stinger), used for hybrid mobile devices (mainly phones). Microsoft has licensed Pocket PC OS mainly to HP, Compaq, Casio, Sony, and other handheld PC producers while it has licensed Stinger to Samsung. Smartphone 2002 OS is scheduled to be released in late 2002. Sendo Ltd., Samsung, Mitsubishi, HTC, and Compal have announced support for Smartphone 2002.

Smartphone 2002 OS combines voice and data communications with personal information management software. It integrates PDA-type functionality into a voice-centric handset. Smartphone is designed for one-handed operation with keypad access to both voice and data features. It allows wireless access to Outlook information and secure browse to corporate and Web information and services. Smartphone 2002's slogan is "Intelligent Voice and Data in One Device." Initial phones are expected to run on GSM and GPRS technologies.

Although Microsoft is a late mover in this market, it has the potential to overtake the first mover, Symbian, just as it has done in so many other markets (Krishnamurthi & Shankar, 1998). For example, it has eclipsed pioneers in the markets for word processors, spreadsheets, databases and Internet browsers.

Microsoft's Alliances

Like Symbian, Microsoft has made many competitive and cooperative moves during 1999–2002. In 1999, Microsoft formed five important alliances with telecom companies: NTL, a British TV cable operator; Qualcomm; Qwest Communications; British Telecom; and NTT DoCoMo. With these alliances, Microsoft aimed to increase its skills in the telecommunication and media industries to become the leader in bandwidth and mobile communications.

During 2000, Microsoft focused its alliances on hardware producers. In April, it reached an agreement with HP, Casio, Compaq, Philips, and Siemens to use Microsoft as the standard OS software on their devices. In June 2000, Microsoft and Samsung reached an agreement for the joint development of a smart phone and the use of Microsoft software on it. This made it possible in November 2000 for Microsoft to launch its new OS for mobile devices and phones, called Stinger.

During 2001 and 2002, Microsoft focused its alliances mainly on mobile telecommunication operators. In March 2001, it entered into an agreement with Vodafone. In Winter 2002, it inked deals with T-Mobile (Deutche Telekom), Cingular Wireless, and Verizon. In July 2002, it formed a partnership with AT&T Wireless. It also has agreements with Telefónica Móviles (Spain), Vodafone (UK), Orange (UK), and Telstra (Australia).

Microsoft is trying to rewrite its successful PC marketing strategy in the telecommunications industry. The marketing strategy underlying these agreements is the following: Microsoft will provide its OS to telecommunication operators who will provide their services on phones made by Asian manufacturers. Telecommunication operators will therefore include Microsoft OS inside their phones and sell them with their own brands to leverage on their large customer base. Moreover, Microsoft has been able to repeat its winning move in the PC industry by licensing its operating software to many handheld producers. The ultimate goal of Microsoft's strategic move is to transform the Windows operating system into a standard platform for a new generation of Web-based services to be offered on both high-speed fixed lines and mobile telephone networks.

CUSTOMER NEEDS, MARKET OFFERINGS, AND NETWORK EFFECTS

Customer Needs

Customer needs for communication (data, voice, and video) and computing can be satis-

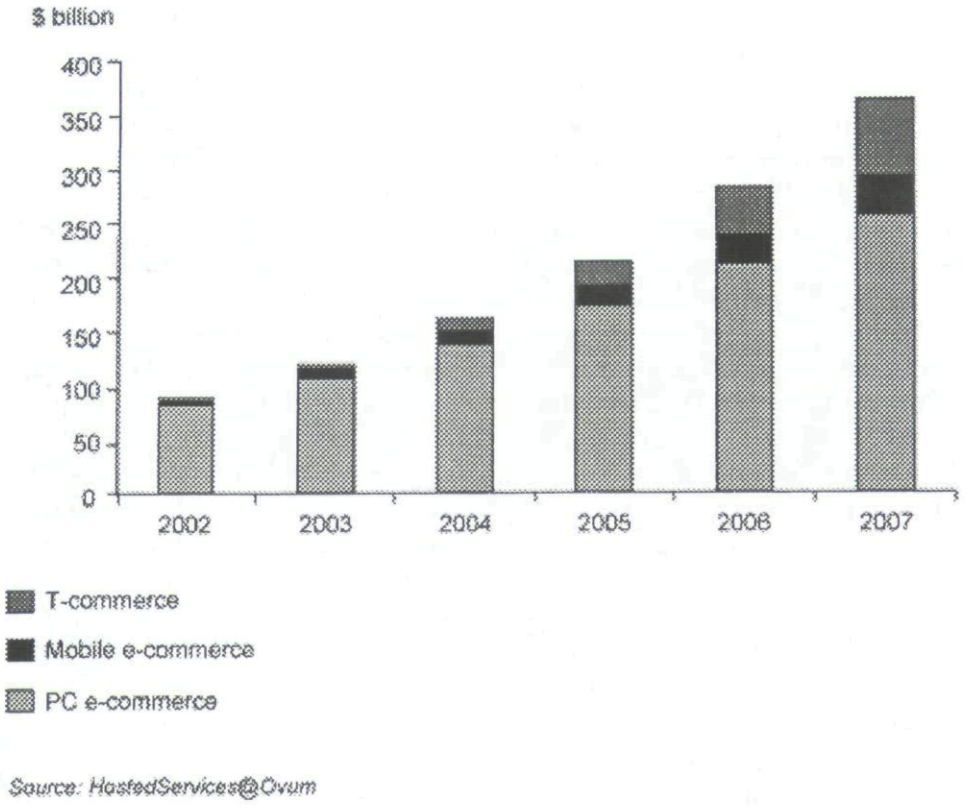


FIGURE 4
Market Projections for Television, Handheld Devices, and PC-Based Commerce

fied through three broad types of devices—Internet-enabled television, handheld devices, and PCs—resulting in revenues through t-commerce, m-commerce, and PC based e-commerce, respectively. Figures 4 and 5 capture the projected revenues and the shares of revenues from these avenues. The Ovum Research Group predicts that the majority of B2C e-commerce revenues will continue to be generated over PC-based Internet for the next 5 years. Mobile commerce valued at 88 billion dollars comprises only 7% of the business-to-consumer commerce worldwide. The mobile device may be a limiting channel for making certain purchases over the handset. However, it is a valuable channel for customer acquisition and customer relationship management. If m-commerce offerings are linked to the user's location, offered in a timely manner, and personalized to the needs of the user, they have the potential to drive traffic to physical stores and drive revenues through other channels.

Evolution in the United States. Americans have lagged Europeans and Asians in using mobile phones for data communications. For example, according to research by Ins-Stat Group, the text messaging service, SMS, has been adopted by fewer than 13 million among the 133 million wireless phone subscribers in the United States. There has been a dramatic decrease in 2002 in consumer interest in using mobile phones to make purchases. According to research by the management consulting firm A.T. Kearney, consumer interest in using mobile phones to make purchases dropped from 32% in June 2000 to just 1% in January 2002. Since January 2002, however, mobile commerce has started to show some signs of life. Spurred by the third-generation networks being rolled out by wireless carriers and by new mobile phones featuring color screens and simpler interfaces, companies such as AOL's Moviefone.com, Starbucks, and FTD.com have started offering consumers the option to pay for ser-

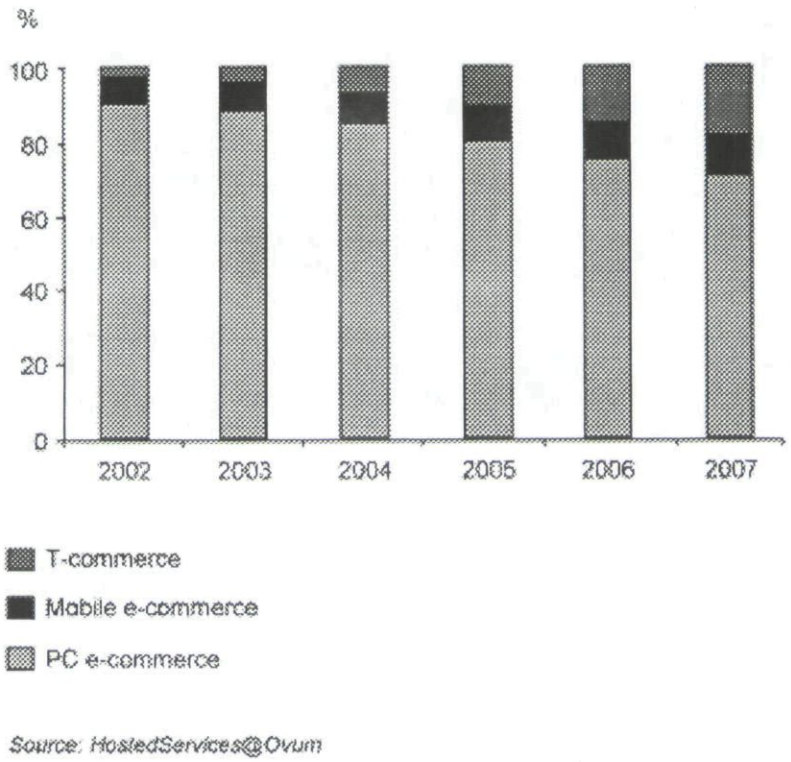


FIGURE 5
Projected Shares of Commerce Revenues from Television, Handheld Devices, and PC

vices via their mobile phones. As a result, some analysts are cautiously predicting a comeback of m-commerce. A recent forecast by Frost & Sullivan predicts that mobile commerce could rake in nearly $26 billion during 2006. With consumers numb from years of hype, mobile commerce's real hope for growth depends on offering superior customer value and convenience.

Evolution in Europe. Although there is a general slowdown in m-commerce in Europe, the picture is different from the United States in that mobile services are diffusing at a faster rate. Europe has 240 million SMS users compared to just 13 million SMS users in the United States. At the same time, however, European mobile companies have been delaying the launch of their 3G services. In many cases, 2.5G services (GPRS) meant mainly for information and business services are sufficient to meet the needs of customers. The delays have been partially blamed on quality standards in both the handset and the software that controls handover from one cell site to the next. Nokia and Motorola have also come in for some criticism for not meeting production deadlines and development time scales. Handset manufacturers also need to perfect operating systems to ensure success and appeal in a competitive market.

Overall, customer needs for mobile handheld devices and phones may be growing slowly, but there is a trend toward increased use of hybrid mobile devices. Growth in hand held devices seems to be outstripping that for phones. The IDC forecasts that shipping of handheld devices will increase by a compound annual growth rate of 30% over the next 3 years, whereas E.T. forecasts indicate that mobile phones will grow at 5%. Sales of hybrid mobile devices are also growing at an impressive rate.

There are two broad markets for mobile devices, the corporate market and the consumer market. The corporate market uses mobile devices primarily for their employees and supply

EXHIBIT 4
Mobile Devices Using Symbian OS

Brand and Model	*Availability*	*Basic Communication Features (Voice Communication and SMS)*	*Advanced Communication Features (Web Browsing and E-mailing)*	*Basic Data Features (Agenda and Contact Management)*	*Advanced Data Features (Word Processor, Spreadsheet, and Database)*
Nokia 3650	Released second quarter 2002	Yes	Yes	Yes	No
Sony Ericsson P800	Released third quarter 2002	Yes	Yes	Yes	No
Nokia 7650	To be released first quarter 2003	Yes	Yes	Yes	No
Nokia Communicator 9290	Already on the market	Yes	Yes	Yes	Yes
Nokia Communicator 9210	Already on the market	Yes	Yes	Yes	Yes
Nokia Communicator 9210i	Already on the market	Yes	Yes	Yes	Yes
Nokia Communicator 9210c	Already on the market	Yes	Yes	Yes	Yes
Ericsson R380 Phone	Already on the market	Yes	Yes	Yes	No
Psion Series 5	Already on the market	No	Yes	Yes	Yes
Psion Series 7	Already on the market	No	Yes	Yes	Yes
Psion Revo	Already on the market	No	Yes	Yes	Yes
Psion Revo Plus	Already on the market	No	Yes	Yes	Yes

Source: Symbian Web site.

chain management. Wireless devices and networks are reshaping the supply chains of many companies (Shankar & O'Driscoll, 2002). The IDC reports that in the United States, 30% of the companies planning to use more than 500 PDA-like devices for their employees will use Microsoft OS. It also reports that IT managers seem to prefer Compaq IPAQ, a licensee of Microsoft, as a corporate handheld device. The choice of the operating system is dependent on that of the device. Thus, in the corporate market for PDAs, Microsoft seems to be in a favorable position.

In the consumer market, the situation is more favorable for Palm than for Microsoft operating systems in the United States primarily from a pricing angle. Because Palm PC is generally cheaper than Pocket PC, they have greater market share among consumers.

Market Offerings

There are three main operating systems in the market for mobile device OS: the traditional market leader Palm OS (Palm is both a producer of handsets and a developer of software), Microsoft, and Symbian OS. The devices running Symbian OS are listed in Exhibit 4. The first three devices are new entries. Nokia 3650 has just been released, and Nokia 7650 and Sony Ericsson P800 will be released in the next months. All the other devices are already on the market. With the exception of the Psion devices

(which are computers), all the other products are phones. Only Nokia Communicator is a hybrid mobile device, because it has word processor, spread sheet, and presentation features together with basic and advanced communication and data features. The other products are closer to a phone or to a PC (the Psion devices).

Some of the Symbian user interfaces and hand held devices are shown in Figure 6. There is a series of interfaces corresponding to data, voice, and video features. The devices also vary in appearance. Sony Ericsson P800 and Nokia 7650 are similar to phones with numeric keypads while the Nokia 9200 Series Communicator looks like a mini-computer with a keyboard.

Besides Nokia and Ericsson mobile devices, the other hybrid mobile devices in the market are the Handspring Treo, a Palm OS-based device; Samsung SPH-300 and Kyocera, Palm compatible devices; and the Motorola Accompli, which uses proprietary Motorola Wisdom OS. These Palm-compatible devices allow word processing and spread sheet features with compatibility to Windows Word and Excel. Hybrid phones are expected to be commercially available at the end of 2002, so most market share data refer to Pocket PC OS.

There are two main technological differences between Symbian and Microsoft Smartphone OS. Symbian is an open platform that allows licensees to add innovation and value to the product, whereas Microsoft is more proprietary. Symbian fully supports Java, whereas Microsoft does not.

Network Effects

The hybrid mobile device may benefit from network effects. In many industries, the network of consumers using compatible products or services influences the benefits of consumption. Positive network effects arise when the consumer utility of using a product or service increases with the number of users of that product or service. The mobile device is a good example since the value of being part of the network rises as the network size increases. Consumption benefits can also arise in markets where a large customer network leads to increases in complementary products and services (such as photo software), which in turn leads to increased consumer utility. Other examples of industries thought to exhibit network effects include automated bank teller machines, computer hardware and software, videocassette recorders, video games, and Internet Web browsers.

Typically, the firm with the larger network size or user base wins against its rivals. However, success also depends on the strength of network. The strength of a network depends on resources, marketing skills, and the alliances. A late mover can overtake an early mover if the late mover's network strength is higher than the early mover's (Shankar & Bayus, in press). Microsoft prides itself on its marketing abilities and partnerships and has huge cash reserves. Microsoft's network base is primarily composed of PC users whereas Symbian's user base is made up of cell phone users. Thus, Microsoft's Smartphone could potentially catch up and overtake Symbian in worldwide sales if its network strength is higher.

THE FUTURE OF SYMBIAN

The jury is still out on the Symbian vs. Microsoft battle. It is unclear which will become the new leader in the emerging industry of operating systems for mobile devices, although there are some indications. According to data from IDC and Giga Information Group, Palm is still the leader in the worldwide PDA OS market, but it is showing a downward trend in market shares. Microsoft is showing an upward trend. Symbian is third in terms of worldwide market share with a stable trend. Exhibit 5 shows the market share trend in the OS software for handheld devices industry worldwide.

U.S. vs. European Markets

There are important differences in the market shares of mobile operating systems between the United States and Europe. In the United States, Palm is the market leader and Microsoft is second, having doubled its market share during 1999–2001 (see Exhibit 7). Symbian has only a marginal position. The picture, however, changes if we consider Europe. Symbian is the

market share leader (34%), followed by Palm (30%) and Microsoft (31%) (see Exhibit 6). Symbian is better positioned in Europe than are Microsoft and Palm. A major reason for Symbian's dominance in Europe is that the cellular phone penetration in Europe is higher than in the United States and Symbian comprises companies that reach 85% of market share in the cellular phone market. In the United States, however, Palm is better positioned, but Microsoft is steadily gaining ground.

To better understand why Symbian is more successful in Europe than in the United States, consider the mobile phone purchase process in these geographies. In the United States, a customer purchases a mobile phone service from a mobile operator such as AT&T, Sprint, or Verizon and the phone or hardware is bundled with the service. The first customer choice is therefore the choice of the mobile operator. The mobile service is operational only in the hardware or the handset chosen by the customer. In contrast, in Europe, typically, a customer first chooses the cell phone brand such as Nokia, Motorola, or Ericsson and then decides to purchase a service card from a mobile operator that could be inserted into any phone. Customers also keep buying new mobile phones to satisfy their need for novelty, functionality, variety, fashion, and social status. Thus, in the United States, hardware brands are less powerful with customers than they are in Europe. Because Symbian is comprised of cell phone makers, it has a greater share in the European market than it has in the U.S. market.

Financial, Product, and Customer Issues

From a financial perspective, Microsoft is in a stronger position than Symbian (see Exhibits 8 and 9). As expected, Symbian has negative earnings and there is pressure for funding the Symbian OS due to the financial stress for its partner companies in the telecommunication industry. Although Microsoft's Smartphone 2002 will not be profitable for a while, given Microsoft Corporation's huge cash reserves, it may not suffer from lack of funding. Microsoft has shown its ability to drive out a competitor by virtually offering its product free as in the case of its Internet Explorer against Netscape Navigator. Microsoft would likely be prepared for such an offensive in the market for mobile OS.

EXHIBIT 5
Market Shares in OS Software for Handheld Devices Worldwide

	1998	*1999*	*2000*	*2001*
Microsoft	14%	12%	25%	34%
Symbian	13%	8%	13%	10%
Palm	73%	80%	55%	48%
Others	0%	0%	7%	8%

Source: IDC Group and Giga Information Group.

Microsoft appears to have a better competitive positioning against Symbian. Besides market share analysis, many other facts seem to favor Microsoft. Integration and compatibility among fixed and mobile devices and among multiple channels are becoming a critical issue. Microsoft is in a favorable position in this respect since it has different versions of the same software (Windows) for fixed and mobile devices. Symbian's chances would have been good if the UMTS and the related PDA/smart phone markets had taken off rapidly, but UMTS is subject to big delays and the entire telecommunications value chain is experiencing a major financial crisis. European mobile telecommunication operators have paid too much money to their governments for the UMTS licenses. This could help Microsoft.

The biggest threat for Nokia and its allies in the Symbian coalition is that users may want to use on their mobile phones the same software that runs on their PCs, typically Microsoft's. In this case, there is a danger that mobile phones might become a commodity and Nokia may lose its leadership and the value of its brand. In other words, it is running the serious risk of being "Netscaped" by Microsoft. Microsoft's marketing strategy is to prevent people from increasingly using the proprietary software of mobile phone/devices to access the Internet. In fact, if mobile phones become a one-stop-shop solution for customers, customers may remain

EXHIBIT 6
Market Shares in OS Software for Handheld Devices in Europe

	2001
Microsoft	21%
Symbian	34%
Palm	30%
Others	15%

Source: Canalys Research Group.

EXHIBIT 8
Symbian's Key Performance Indicators (in U.S. Dollars)

	2001	*2000*
Total revenues	27.44 m.	22.17 m.
Revenues from royalties	4.96 m.	7.13 m.
Gross profit	9.61 m.	7.13 m.
Operating loss	(66.96 m.)	(64.64 m.)

Source: Psion Annual Report.

loyal to Nokia's and its partners' brands. Symbian has better chances to succeed under this situation.

As far as the customer focus is concerned, the Microsoft vs. Symbian competition is not only a technological battle to develop the OS standard for mobile devices, but is also a battle of marketing strategies. Customer-based assets are critical sources of competitive advantage both for Symbian and Microsoft. In particular, the wide customer base and its present and future values seem to be the most critical resources for both the companies. Symbian is trying to leverage the phone customers of its partner companies whereas Microsoft wants to cross-sell mobile applications to its PC customer base. Brand is another critical customer-based asset. Nokia and Microsoft are among the world's leading brands in terms of consumer awareness. However, Microsoft seems to be in a better position than Symbian. Nokia has a very strong technology base, whereas Microsoft has deeper pockets and strong marketing skills and has a history of wins in the battles for standards. Symbian partners are very strong in marketing activities for manufactured products (mainly cellular phones), but they are weak in marketing activities for software, which is Microsoft's forte. The problem is that in the mobile telecommunications industry, as in the computer industry, software is gaining ground over hardware. Moreover, the I-mode mobile phone is more of a marketing success than technology success in Japan (Ratliff, 2002).

Collaboration and Alliance Issues

With regard to the co-opetition issue, in general, Symbian seems to have done well in developing a wide network of alliances. A deeper analysis, however, reveals possible problems. Symbian's equity structure shows six major shareholders, four of them with big shares (Psion, 26.6%; Nokia, Sony-Ericsson, and Motorola, each with 20%) and two with smaller shares (Matshusita, 8.4%; Siemens, 5%). However, the managerial burden is not distributed in an equitable manner. The majority of the top management team is from Psion. Only one executive vice president is from Ericsson, and

EXHIBIT 7
Market Shares in OS Software for Handheld Devices in the United States

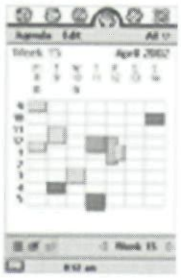
	1999	*2000*	*2001*
Microsoft	10%	15%	22%
Palm	84%	79%	72%
Symbian and others	6%	6%	6%

Source: Business Wire.

EXHIBIT 9
Microsoft's Key Performance Indicators (in U.S. Dollars)

	2001	*2000*
Revenues	25,296 m	22,956 m
Operating income	11,720 m	9,421 m
Net income	7,346 m	10,937 m

Source: Microsoft Annual Report.



UIQ user interface - Agenda week view

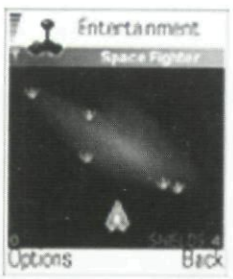
UIQ user interface - Colorscheme application view

UIQ user interface - Messaging MMS view

UIQ user interface - Contacts edit view

Series 60 user interface - Applications view

Series 60 user interface - Bookmarks view



Series 60 user interface - Games view

FIGURE 6
Symbian User Interface and Handheld Devices
Source: Symbian Web site.

there is no top management person from Nokia. From a strategic stakes perspective, Nokia should have a strong representation in the top management. Symbian's success seems to be linked strictly to Nokia because Nokia is Symbian's key client. Together, Nokia, Sony-Ericsson, Motorola, Matsushita, and Siemens account for more than 85% of the world mobile phone market. Why did they decide to cooperate? One view is that they were forced to cooperate with each other to ensure their own survival in the telecommunications industry. The web of alliances created by Microsoft seems to be completely different. Microsoft is the undisputed leader in the coalition and its partners do not come from the software industry, but from converging industries and they are not direct competitors.

In linking customer focus with alliance focus, Microsoft has been able to create a broad network of not directly competing firms with asymmetric resource endowment, which seems to generate a great value proposition for the customer. In this respect, the Symbian alliance may be too focused on the mobile telephone producers. Symbian can be viewed as a mobile phone company competing in a convergent industry without really converging in terms of resource endowment generated by asymmetric companies. Although Symbian has developed a number of alliances, only a few of them are with mobile telecommunication operators and with producers of handheld devices. Moreover, no one in the Symbian coalition has really been a champion in the battle for standards.

Recent research on strategic alliances suggests that link alliances, which allow alliance partners to increase their resource and knowledge base, are becoming common (Khanna et al., 1998). There are two types of alliances among competing firms, scale alliances and link alliances (Dussauge, Garrette, & Mitchell, 2000). Scale alliances are alliances created with the purpose of achieving economies of scale in production, marketing, R&D, etc. In these types of alliances, firms contribute with symmetric knowledge. Link alliances are alliances created with the purpose of increasing the knowledge base of the partner firms through contributions from partner firms with asymmetric knowledge.

Empirical evidence shows that is difficult to make link alliances work when partners come from the same industry (Dussauge et al., 2000). In fact, these partners are prepared to share knowledge, since they have a common knowledge base, but it is very difficult for them to create new knowledge. They need partners with asymmetric and not symmetric knowledge endowments. These results have important implications for Symbian vs. Microsoft competition. Symbian is a link alliance since its aim is to create a new OS for a new converging industry. In the Symbian venture, the only partner with asymmetric knowledge endowment is Psion. Microsoft, on the contrary, has a web of partners with really asymmetric knowledge endowment, ranging from fixed to mobile telecommunications, to cable TV, to handheld producers. Thus, Microsoft has the potential to make its link alliance work.

If co-opetition and alliances among competing partners are generally recognized as an indispensable competitive strategy in convergent industries, some cautions are necessary. There may be an "alliance life cycle" in which firms should create link alliances in the early stage of development of a converging industry, but as the industry matures, they should focus on scale alliances. When the industry stagnates or declines, to revitalize the industry, firms may have to focus again on link alliances.

In convergent industries, firms may have to reconsider creating alliances only with competitors, because this may limit their ability to create new knowledge. Putting together a partnership with firms coming from different related industries to create new knowledge and to shape the future of the new industry may be important. In Symbian's case, it is made of similar partners (except Psion) coming from the mobile phone industry. A related implication could be that co-opetition is a good competitive strategy only for firms competing in mature markets and seeking for industry dominance through scale alliances. Co-opetition could be a risky approach in convergent industries if firms are coming only from one industry.

Another issue related to link alliances is the management of relationships between competitors. In convergent industries, firms should mitigate the risk that competing firms view the alliance as a "Trojan horse" (Dussauge et al., 2000). In this case, the risk that they will use the alliance to appropriate their competitors' knowledge is very high. The Ericsson–Microsoft joint project seems to reflect this possible risk.

The integration between supply-side strategies (focused on co-opetition dynamics and on the creation of a web of alliances) and demand-side strategies (focused on the creation of strong and long-term relationships with customers) seems to be an important strategic issue. As customers increasingly demand cross-industry value propositions that are simple, personalized, timely, and location based, firms are forced to offer bundled value through partnership across markets to increase customer reach and build loyal relationships (O'Driscoll, Reibstein, & Shankar, 2002). Alliances should be formed such that they increase the value of the bundle offered to customers and the potential of learning from customers. By pooling together different resource endowments, firms competing in convergent industries should be able to bundle products and services in an integrated package for their customers. By doing so, they will be able to satisfy their customers' needs with a one-stop-shop solution.

The bundling strategy can offer many advantages. It will be easier for firms to resort to cross selling and up-selling strategies, thus increasing the value of their relationships with the customer. Firms also have the chance to leverage on their existing customer base and on their partners to enter new converging industries. The linked resources of different partners will help firms to better interact with their customers through multiple channels and to develop "contextual marketing" strategies (Kenny & Marshal, 2000). The value-creating potential of the link alliance will also help firms to develop most effective lock-in strategies.

In convergent industries, successful firms should be able to create "focal points" by integrating the power of link alliances with customer focus. A focal point can be defined as a collection of software interfaces that reduces the need for other interfaces by standardizing the links among hardware, software and users (Persson, Rosengren, & Wilshire, 1999). An operating system for mobile devices can be defined as a focal point as it is the Microsoft Windows operating system in the PC industry. Therefore the competitive battle of Symbian vs. Microsoft could be seen as a battle for creating and controlling a focal point. In this respect, Microsoft may have an advantage over Symbian due to its past experience of creating a winning focal point in the PC industry.

Key Success Factors

Five factors are critical to the outcome of competition and collaboration in convergent industries: customer intimacy, degree of competition among different players in their focal markets, alliance formations, brand equity, and execution.

- **Customer intimacy**: Who has access to and has built strong relationships with end customers? Firms with the deepest access and the strongest relationships with end customers are at an advantage in convergent industries. In the Symbian case, the Symbian partners, notably Nokia, have greater customer intimacy than Microsoft in Europe although it seems to be declining due to the growing clout of mobile operators. In the United States, however, Microsoft seems to have greater customer intimacy.
- **Degree of competition among different players in their focal markets**: How competitive are the focal markets for the players? For example, in the PC operating systems market, Windows is almost a monopoly. Thus, Microsoft is more dominant than the PC manufacturers whose market is fragmented. The mobile hardware market is also fragmented, albeit a little less than the PC market, but this situation could favor Microsoft's Smartphone 2002 in the mobile device OS market.
- **Alliance formation**: Identifying the right partners and having the right partnership incentives in place may be key to success in

convergent industries. Alliances with partners having asymmetric knowledge endowments have the potential to create greater knowledge for the alliance. The incentives for horizontal partners in an alliance for a convergent market may be different. In the Symbian case, being the market leader in mobile phones, Nokia has the highest incentive among its partners to make it successful. Others like Ericsson have lower incentives to work toward making Symbian the dominant mobile OS. On the other hand, it is unclear whether Microsoft's alliance partners may have much clout in the mobile operating systems market, in particular, in Europe.

- **Brand equity**: Powerful brands may cut across industries and can be successful in a convergent industry. In this case, the brands in focus are Microsoft and Nokia. While Microsoft can successfully leverage its brand by sub-branding the Smartphone, this could be a problem for Symbian. Symbian is an independent brand and cannot be a sub-brand of Nokia because Symbian is also made up of brands like Ericsson and Motorola, which may not want to promote the Nokia brand, as it is a competitor brand in their traditional mobile phone market. Perhaps because of this problem, there are signs that Symbian may end up being the software arm of Nokia (the launch of Nokia 60 series software may be a move by Nokia to leverage the Nokia brand equity).
- **Execution**: Although a firm may have a sound strategy, the execution of that strategy is critical to its success. In this regard, while Microsoft has had an impressive track record with respect to its products in other markets (such as software suites and Internet browsers), Symbian is still a question mark.

Looking to the future, there are interesting predictions by analysts, but several questions remain unanswered. For example, Gartner predicts that there will be two winners depending on whether the market is primarily phone based or PDA based and on whether the region is the United States or Europe. According to Gartner, the winners will be Nokia–Symbian in the telephone market and Microsoft in the PDA market, and Nokia–Symbian in Europe and Microsoft in the United States. Gartner, however, does not recognize the hybrid mobile device market as the market of the future. Will Symbian, the first mover, regain ground in its competitive battle against Microsoft for the dominance of the emerging market of mobile operating systems? Will collaboration among competing firms work in convergent industries like hybrid mobile devices? Can Symbian better link its alliance strategy to the customer value creation process than Microsoft? When different resource endowments of firms coming from converging industries are put together, how can managers increase the value of the relationships with their customers to exploit the potential of customer interactions? If Symbian is refocusing on phones, what will be the role of Psion, which has the highest stake in Symbian?

REFERENCES

Aaker, D.A. (1996). Building Strong Brands. New York: Free Press.

Collins, D.J., Bane, W., & Bradley, S.P. (1997). Industry Structure in the Converging World of Telecommunications, Computing and Entertainment. In D.B. Yoffie (Ed.), Competing in the Age of Digital Convergence (p. 159–201). Boston: Harvard Business School Press.

Davis, S., & Meyer, C. (1998). Blur. The Speed of Change in the Connected Economy. Boston: Addison Wesley.

Dussauge, P., Garrette, B., & Mitchell, W. (2000). Learning from Competing Partners. Outcomes and Duration of Scale and Link Alliances in Europe, North America and Asia. Strategic Management Journal, 21, 99–126.

Dyer, J.H., & Singh, H. (1998). The Relational View: Cooperative Strategy and Sources of Inter-Organizational Competitive Advantage. Academy of Management Review, 23(4), 660–679.

Kenny, D., & Marshal, J.F. (2000). Contextual Marketing: the Real Business of the Internet. Harvard Business Review, November–December, 119–125.

Khanna, T., Gulati, R., & Nohria, N. (1998). The Dynamics of Learning Alliances: Competition, Cooper-

ation and Relative Scope. Strategic Management Journal, 19, 193–210.

Krishnamurthi, L., & Shankar, V. (1998). What Are the Options for Later Entrants? In Mastering Marketing. London: Financial Times Prentice Hall.

Moore, J. (1996). The Death of Competition. New York: Harper Collins.

Nalebuff, B.J., & Brandenburger, A.M. (1996). Co-opetition. London: Harper Collins.

O'Driscoll, T., Reibstein, D., & Shankar, V. (2002). Mobile e-Business: Disruptive Technology or Untethered Extension of Business as Usual? Working Paper. Robert H. Smith School of Business, University of Maryland.

Persson, F., Rosengren, J., & Wilshire, M. (1999). The Soft Side of Telecoms. McKinsey Quarterly, 4, 123–133.

Prahalad, C.K., & Ramaswamy, V. (2000). Co-opting Customer Competence. Harvard Business Review, January–February, 79–87.

Ratliff, J.A. (2002). NTT DoCoMo and Its I-mode Success: Origins and Implications. California Management Review, 44(3), 55–71.

Shankar, V., & Bayus. B.L. (in press). Network Effects and Competition: An Empirical Analysis of the Video Games Industry. Strategic Management Journal.

Shankar, V., & O'Driscoll, T. (2002). How Wireless Networks Are Reshaping Supply Chains. Supply Chain Management Review, 6(4), 44–51.

Wind, J., & Mahajan, V.J. (2002). Convergence Marketing. Strategies for Reaching the New Hybrid Consumer. New York: Prentice Hall.