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An Evolutionary Stage Model of Outsourcing and Competence Destruction: A Triad Comparison of the Consumer Electronics Industry

Abstract and Key Results

• Outsourcing has gained much prominence in managerial practice and academic discussions in the last two decades or so. Yet, we still do not understand the full implications of outsourcing strategy for corporate performance. Traditionally outsourcing across borders is explained as a cost-cutting exercise, but more recently the core competency argument states that outsourcing also leads to an increased focus, thereby improving effectiveness. However, no general explanation has so far been provided for how outsourcing could lead to deterioration in a firm's competence base. We longitudinally analyze three cases of major consumer electronics manufacturers, Emerson Radio from the U.S., Japan's Sony and Philips from the Netherlands to understand the dynamic process related to their sourcing strategies. We develop an evolutionary stage model that relates outsourcing to competence development inside the firm and shows that a vicious cycle may emerge. Thus it is appropriate to look not only at how outsourcing is influenced by an organization's current set of competences, but also how it alters that set over time. The four stages of the model are offshore sourcing, phasing out, increasing dependence on foreign suppliers, and finally industry exit or outsourcing reduction. The evolutionary stage model helps managers understand for which activities and under which conditions outsourcing across borders is not a viable option.

• Results suggest that each of these firms had faced a loss of manufacturing competitiveness in its home country, to which it responded by offshoring and then outsourcing production. When a loss of competences occurred, some outsourcing decisions were reversed.

Keywords

Outsourcing, offshoring, global sourcing, stage theory, competencies, evolutionary theory, consumer electronics

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Offshoring and outsourcing remain high on managerial agendas, although the type of sourcing that grabs most headlines and managerial attention tends to change fairly rapidly. In the late 1980s and early 1990s global sourcing of components and products was seen as a key trend among manufacturing firms. The mid-1990s saw corporations farm out information technology activities on a large scale. Currently major trends are business process outsourcing to countries like India and South Africa and the continuing shift of manufacturing activities to China. The latter types of offshoring and outsourcing are not only highly contentious politically but also pose managerial dilemmas.¹

Until quite recently it was generally accepted that outsourcing, and especially outsourcing across borders, was primarily implemented to cut costs in order to maintain competitiveness. An argument commonly used by decision-makers and academic writers alike is that outsourcing, the reliance on external suppliers for the delivery of components and entire products, leads to an increased focus on remaining activities (Quinn 1999). By keeping in-house a more limited number of activities, managers can devote more attention to maintaining a world-class level in those activities. Because (foreign) suppliers likewise target their efforts, it is possible to obtain specialized help from outside suppliers with much lower production costs, so the argument goes. Of course, these lower production costs are at least partly offset by higher transaction costs, because of the difficulties associated with sourcing across borders (Mol/van Tulder/Beije 2005). This comparative cost approach is relatively well understood and has been widely implemented by practitioners, although firms often fail to take into account the true total costs of ownership in make-or-buy and offshoring decisions, as we demonstrate in this paper. The disadvantage of this approach is that it is relatively static.

In recent years a second argument has therefore been added to sway managers toward outsourcing. Outsourcing can be a means of accessing supplier competences that would otherwise remain inaccessible, or it can even serve as the gateway to the creation of competences that reside in the relationship between the firm and its supplier (Dyer/Singh 1998). Toyota, for instance, has been able to distill a competitive edge from long-term and intimate relations with suppliers like Nippondenso. Thus one might argue that the effects of outsourcing on the acquisition of competences have now come to the fore in managerial practice and academic literature. Outsourcing can be a source of both cost savings and competence acquisition.

Like in the popular press, much of the outsourcing literature is focused on its immediate impact in the form of potential cost savings. For the simplest forms of outsourcing (e.g., those involving procurement of commodity goods and services), this makes sense as an outsourcing decision will have no implications beyond the current bookkeeping period. Where more complicated forms of outsourcing are concerned, this is normally not the case. For instance, it took the U.K. government and

Network Rail ten years and several deadly incidents to reconsider the outsourcing of maintenance that accompanied the privatization of the railroads (*Economist* 2005). At the heart of these problems was the gradual erosion of knowledge on the technical state of the railways and a lack of technological investments that could have helped detect impending failures.

But any understanding of the long-run consequences of outsourcing should also include how it could affect a firm's ability to maintain appropriate skill levels and upgrade its competitive position, not just cut costs in the short run. This is much less well-understood and a less popular route of scholarly investigation. It has been noted that the long-run consequences of outsourcing are sometimes not particularly comforting (Bettis/Bradley/Hamel 1992, Doig/Ritter/Speckhals/Woolson 2001, Kotabe 1998). However, no general explanation has so far been provided for how outsourcing could lead to deterioration in a firm's competence base. Therefore we ask the question 'how does outsourcing affect competences?' By doing so we reverse the questions that various authors (e.g. Barney 1999, Quinn 1999) have addressed.

Researchers often focus on comparing the current governance costs of in-house production with those of external offerings. Transaction cost economics argues that outsourcing levels ought to be the results of levels of asset specificity, business uncertainty, and the frequency of transactions (Leiblein/Reuer/Dalsace 2002, Williamson 1985). This approach has obvious merits for its simplicity and its ability to correctly predict the governance structure of many transactions. It has also been argued, however, that there is a range of transactions for which it is not particularly apt (Barney 1999). Barney (1999) argues that transaction cost arguments are too static to cope with more dynamic industries, especially those with blurred industry boundaries. Transaction cost economics focuses on current transaction characteristics but if important future learning and change can occur, current governance costs may not be a proper predictor for future governance costs and optimal outsourcing choices.

Such shifts can occur in technologically uncertain and intensive industries, such as the electronics industry. In fact, we would argue that this is exactly what has been happening in the electronics industry over the past few decades. Firms have had to face major technological shifts, such as that from analog to digital technology. They also faced stiff global competition and business cycles, for instance, in consumer electronics (CE) and semiconductors. For this type of industry additional analytical tools may be required that incorporate long-term change into viability assessments on outsourcing. So far empirical investigations on the effects of outsourcing over longer time periods are scarce (with some exceptions, like the semi-longitudinal study of D'Aveni/Ravenscraft 1994). Also relatively sparse are discussions of forms of international outsourcing, as much published work seems

to be focused on single countries and treats outsourcing as either a strictly domestic issue or is agnostic as to outsourcing locations. We seek to address both issues, broadly asking the question how changes in outsourcing levels and locations change competence development inside the firm.

We longitudinally analyze and compare the cases of three major electronics manufacturers, Emerson Radio from the U.S., Japan's Sony and Philips from the Netherlands, focusing particularly on how these firms changed their sourcing strategies over time. Using these cases we then construct a stage model that relates offshoring and outsourcing to competence development inside the firm and shows that a vicious cycle may emerge. We describe the specific conditions under which such a cycle comes into existence, especially the loss of competitiveness in manufacturing in firms' home bases. The stage model helps managers to understand for which activities and under which conditions outsourcing is not a viable option.

Methodology: Content Analysis

Because this research question includes a longitudinal element, it cannot be adequately captured by survey or cross-sectional research. Therefore, we used content analysis of news articles, company documents, industry trends, books and other published reports as well as personal interviews pertaining to the CE industry in general and our three firms in particular. We focused on our three firms mainly because our initial review of the data documents revealed that the stages cycle emerged most conspicuously in these firms. Also, in order to keep our cases clear and discrete, we restricted our analysis only to these firms. The fact that all three firms hail from different parts of the Triad, allows us to capture different development paths in their home country electronics industries.

The time period ranged from 1954 to 2007 and we reviewed the content from around fifty different sources. Where possible, we were able to compare different reports of the same firm information or event as recounted by various reporters. We also compared what was reported against interviews on outsourcing we held with electronic firms (not reported here) and against what other authors have written about outsourcing and subcontracting in the electronics industry (Kenney/Florida, 1995). An in-depth analysis of our sources suggested that there was a similar pattern in the histories and behavior of all three firms over time even though the timing (actual years) did not correspond for the firms. Emerson Radio (U.S.) for example, went through its outsourcing experiences much earlier than Philips and especially Sony.

Global Consumer Electronics Industry

No explanation of consumer electronics firms is complete without a brief introduction to the dynamics underlying the industry in the years when the specter of global competition first appeared. The worldwide CE industry has seen much international competition since the 1950s. The Western world dominated the field of CE until this time and the 1950s witnessed the advent of the Japanese competition, which began with the export of transistors. Soon, Japanese CE firms such as Sony, Matsushita, and others became a force to reckon with. In particular, rivalry in television technology was the most intense in the 1970s. It is difficult to pinpoint exactly when global competition became so fierce among firms in the Triad region. But, in 1951, when MITI (Ministry of International Trade and Industry, Japan) permitted Japanese companies to enter into licensing agreements for television technology with foreign firms, several Japanese companies signed pacts with U.S. companies, such as RCA. At the time, MITI expected to receive only a few applications for approval but it ended up authorizing around thirty-seven applications (Partner 1999). As electrical goods rapidly permeated Japanese society, local companies grew larger and developed a competitive edge based on a quick learning process and low labor costs.

U.S. companies, such as Emerson Radio, RCA, Zenith and Magnavox also realized that they could gain cost-based competitive advantage by subcontracting assembly and later on manufacturing operations to their Asian partners at lower costs. Hence, around the 1960s and 1970s, outsourcing became popular with many U.S. firms. In subsequent years, Japanese CE firms acquired technology from U.S. companies, gained technological competency and launched new technologically advanced products derived from their own R&D. Competition between U.S. firms and their Japanese counterparts heated up when Japanese firms entered the U.S. domestic market and began selling their products at lower prices. This led U.S. firms to charge dumping allegations against the Japanese firms. The developments in the industry that followed show that U.S. companies rapidly increased outsourcing and in turn their dependence on their Japanese partners first for radios and later on for television sets. By the end of the 1960s, there were no U.S. radio manufacturers left in the United States (Partner 1999).

A discussion of the European CE industry is mostly an account of Philips and its activities. There was probably only one other company, Thomson of France, that was as active in the industry, more so than firms such as Siemens and Telefunken. Like some U.S. firms (National Union Electric, Zenith), European firms felt threatened by Japanese competition in the CE industry. Prompted by a turbulent environment post the 1970s and lobbying for protection from non-European rivals by

influential firms like Philips, Europe implemented new policies. European CE firms were also granted subsidies. Especially in the 1980s, the EU stepped in to defend its CE firms from Japanese penetration of its markets. Nevertheless, the European CE industry went through a series of restructurings into the 1990s like the major turnaround operation ‘Centurion’ at Philips.

To illustrate the intensity of rivalry and firms’ attempts to outdo each other through innovation and imitation, let us take this example. As the story goes, in 1963, Philips gave the world the audiocassette, which was a noise reduction innovation because Philips eliminated the background tape sound. Based on this product, in 1964, a Sony employee proposed the idea of a videocassette. Finally, by 1976, Sony introduced its Betamax VCR in the U.S. Late 1977 RCA launched its VHS SelectaVision VCR format that was made by Matsushita. This product was an improvement on Sony’s Betamax, which could record for only an hour. Thus, an innovation/product introduction by one firm was very quickly followed by the creation of another entrant which sought to gain market share. We historically examine the corporate strategies, trials and tribulations of three companies, Emerson Radio (U.S.), Royal Philips Electronics (The Netherlands-Europe), and Sony Corp. (Japan) in the field of CE. We focus on firm decisions related to entertainment products groups, namely audio, video and television products in these companies. Every product introduction built on and upgraded previous technology. The three companies in our sample have slightly and sometimes even drastically changed their corporate strategies innumerable times in the last 30-40 years. We focus on those strategies that are relevant to outsourcing.

All three firms, Emerson Radio, Philips and Sony were technological pioneers at some point in the early days of CE. While Emerson Radio discovered a way to retain its market share by supplying CE products at low prices, Philips “became Europe’s core consumer electronics learning base” and Sony revolutionized the industry with its miniaturization of CE products (Chandler 2001, p. 221). So, how did these firms acquire technological competences? And how did these firms start losing their technical prowess?

Overview of Three Companies

Emerson Radio (U.S.). From pioneer and maker of CE products to distributor recites the Emerson Radio saga in a sentence. The company’s history is complex because it changed ownership a few times. Emerson Radio & Phonograph, as the company was originally called by its founder Max Abrams in 1922, mass-produced radios around the time of World War II. Its radios were known to be very modern for their time and decorative in appearance. It also manufactured phonographs and TVs.

In 1965, it was taken over by National Union Corp. (NUC)² and in 1975 Major Corp (a phonograph manufacturer founded in 1956) bought its brand name for CE from NUC and changed its own name to Emerson Radio.

Emerson Radio obtained technology mainly through its own efforts and through acquisitions. Soon after entering the radio business, the company introduced the first radio-phonograph combination sold in the U.S. In 1932, it launched its popular miniature radio, which was around 8 ½ inches by 6 ¼ inches wide, and Emerson Radio was the leader in the manufacture and sale of miniature radios. By 1938, it had sold over 1 million of these radios. Years before Japan's Sony became famous for miniaturization of CE products, Emerson Radio introduced the tiniest radio to date in 1954, which measured 3½ x 3 x ¾ inches. This achievement made Emerson Radio the largest producer of tiny radios in the world. It was so technologically advanced in the 1950s that it planned to "build a radio, using transistors instead of tubes, so small that it can be worn like a wrist watch" (*Forbes* 1954, p. 22). After World War II, it introduced one of the first television sets in the U.S., and this caused earnings to more than double by the mid-1950s. Emerson Radio also had R&D labs in the U.S. By this time, Emerson Radio had a solid brand name and superior technological capabilities, and attempted to capture nearby markets, mainly in Canada and Latin America. However, as more players entered the emerging television industry, competition at home grew and Emerson started cutting the price of its television sets in order to survive in the market. It is around this time when the company realized that it needed to take drastic measures to subsist in the industry and it did (explained in the following section). In 1953, Emerson Radio launched the first compatible color-TV receiver and, in 1958, it acquired further technological capabilities when it bought CE inventor DuMont's television sets, phonograph and high-fidelity stereo equipment operations. By the early 1960s Emerson Radio had developed production capabilities complemented by a strong brand name in CE. But even then, in the battle for market share and the onslaught of foreign CE firms, U.S. producers like Emerson Radio were fast losing market share. In the latter half of the 1960s, although American companies such as RCA, Westinghouse Electric, Admiral and General Electric were struggling to make profits and hang on to their businesses, Emerson managed to continue making a profit (*New York Times* 1981). Emerson built a large customer base and acquired a significant portion of the market by eventually setting up cost-efficient manufacturing operations in East Asia to deliver electronic products at reasonable prices to middle-class American citizens. It was indeed one of the very first U.S. companies to popularize such manufacturing strategies. In the short run profitability grew but in the long run it faced several problems due to excessive outsourcing.

Philips Electronics (The Netherlands). Philips was established in the Netherlands in 1912, and grew to be the largest European CE company and one of the largest in the world. Its main activity was electrical lighting, but it acquired a leading position in CE before the mid-1970s when Japanese companies entered Europe. Right from the time it was set up, Philips was based on R&D and developed its own technologies and mostly kept R&D in-house in various labs across Europe. This enabled it to increase its own product portfolio from the 1920s. However, during World War II, several of its European operations were destroyed. Postwar Philips enhanced its technical capabilities by relying on color TV technology licensed from RCA like most of the Japanese CE firms in the 1970s. At the same time, Philips's research efforts proved to be beneficial for Japan's Matsushita because Philips owned 35 percent of Matsushita, which depended on Philips's R&D. Philips entered into collaborations and joint ventures for innovation and new product development in the 1980s. Its most successful collaboration was with Sony to launch the compact disc system. However, by the late 1990s, Philips had lost its once superior technological capabilities.

Sony Corporation (Japan). Although Sony did not invent the transistor, it was the first company to launch the transistor radio and this innovative feat played a major role in Sony's emergence as a technological leader (Partner 1999). Founded in 1953, Tokyo Tsushin, as the company was originally called before its name was changed to Sony, quickly built a reputation for itself in Japan and soon in the rest of the world. In 1953, Sony signed a pact with U.S.-based Western Electric to learn its transistor technology and then conducted its own research on radios. In 1955, Sony introduced its first transistor radio, TR-55, in the market. Just like Sony, other U.S. and Japanese manufacturers had developed their versions of the transistor radio around the same time and sold those in the U.S. market. But, in the international arena, Sony had to compete not only with other Japanese contenders but also with the U.S. and European ones, which already had brand equity and established distribution networks. In 1982, Sony introduced the TV Walkman, a technological breakthrough in those days. Throughout this era, Sony, like most other Japanese companies relied on in-house R&D, continually increasing R&D spending over the years, for instance, by 9.6 percent in 1983 to \$90.6 million. Sony, like most other Japanese CE firms, initially followed a conservative policy by keeping R&D in-house, but eventually gave in to financial concerns (brought about by an inability to meet high demand and fierce rivalry) and resorted to outsourcing. Hence, the 1990s saw "a shift from a technology-based company to a product-based company" in the words of Kutaragi, President of Sony Computer Entertainment Corp (*Nikkei Weekly* 2003). In the next section we examine the dynamic shifts, in four

different stages, in the sourcing strategies employed by Emerson, Philips, and Sony. Table 1 contains a summary.

Place Table 1 about here

Stages over time

Stage 1: Offshore Sourcing (Setting up a Foreign Subsidiary in Low-cost Locations)

Before plunging headlong into the establishment of foreign manufacturing subsidiaries, CE firms dabbled in foreign transactions. After Emerson faced trouble selling its television sets amid tough competition and after trying out the price-cut strategy, the company found another way to increase profits – by lowering costs. In 1956 sales fell from over \$87 million to \$74 million while earnings were a meager \$84,850. Then the company moved further to set up cost-efficient manufacturing operations in East Asia in the 1960s.

Philips, on the other hand, had been collaborating with foreign companies, starting in 1916 with General Electric, to exchange technical know-how and experience. Although the company had been engaged in foreign trade activities, foreign investment were not established until in the 1920s. Philips moved many of its production plants out of the Netherlands to avoid high tariffs leaving behind unemployed people. This was the first time it set up offshore production. In the following years, Philips closed down some more plants in the Netherlands. It followed an aggressive expansionist policy in the next decade and set up several subsidiaries in different parts of the world. By the late 1960s, Philips had manufacturing operations in several parts of the world including Singapore, Indonesia, South Africa, Kenya, and also Algeria in the early 1970s. Almost all of these places were low-cost locations. In 1968, the company's profits rose by 10 percent. Philips set up operations in low-cost Taiwan (1970), where it began production of monochrome picture tubes (by 1989, this facility had become the world's largest tube manufacturer and Philips had a total of 5 plants in Taiwan). In 1974, the company discontinued its non-color picture tube production in the United Kingdom and moved production to low-cost locations. Around this time CE companies the world over were involved in similar moves to low-cost regions for manufacturing. By 1974, Philips already had TV and audio plants in Singapore, a black & white TV plant in Taiwan, a stereo plant in Brazil and an electronics production plant in South Korea.

Philips suffered a setback in profits in the fourth quarter of 1975. This was also a turning point for Philips as it faced tough competition from the Japanese companies. Philips's video technology,

V2000, was in direct competition with Beta and VHS, i.e., the Japanese VCR systems. By the end of the 1970s, the Japanese companies had entered Europe and formed partnerships and collaborations and this helped them gain a foothold and market share in Europe. Although the V2000 format developed by Philips was technologically superior to the Japanese VCR systems, the V2000 system failed partly due to Philips's inability to find partners (Dai 1996). This was the beginning of the collaborative era for Philips during which it went on an alliance spree and partnered with several foreign firms. Philips increased its presence in Japan by buying a stake in Japan's Marantz in 1980 from U.S.-based Superscope that owned a majority stake in the company. Marantz, then owned by Philips, soon became its base in Japan for the production of goods at low costs. Hence, as time went by, Philips, like other CE firms had spread itself over several low cost regions, which enabled it to compete more efficiently in the industry.

Sony set up its first foreign production plant, Champagne Plant, in 1959 in Hong Kong. It was a transistor radio assembly plant through a local firm that provided all the capital and managed the business. It was only a contractual agreement for production. Goods at this plant (mainly assembled transistor radios) were then sent to Europe, Australia, Canada and other areas. However, Sony already shut down the plant in 1961 due to some undisclosed 'disagreement' with the local firm, making for an unsuccessful first move abroad. Compared to most U.S. firms, Sony moved operations abroad much later. Competition in the industry compelled it to set up several foreign plants in the 1970s. In 1973, Sony formed Sony do Brazil. In the same year, Sony also denied reports that it would second source products from National Semicon. By 1973, Sony was manufacturing radios, black and white TVs and tape recorders in its Sony Korea subsidiary. It also formed a joint venture with a Korean partner, Hwasin Industries, for production of color TVs. Following a drop in overall sales, Sony reorganized its distribution network. Other foreign subsidiaries set up in the 1970s and 1980s include audio manufacturing subsidiary, Sony da Amazonia, in Brazil, a VCR factory in Taiwan, a VHS plant in Malaysia, an audio tape manufacturing subsidiary Magneticos de Mexico, a joint venture with Motoradio, Sony Videobras for video tape manufacturing and several others worldwide. It also established Sony Precision Engineering Center in Singapore to manufacture optical pickups for CD players and joint production of CE products with a Chinese trading firm. Most of these offshore plants were in low-cost locations and involved joint production with local partners.

Until the late 1980s, Sony kept R&D in Japan. By 1988, Sony had considerably increased offshore production. The company claimed that the appreciation of the yen prompted it to expand overseas production because this made it less profitable to manufacture goods in Japan. In the 1980s around 20 percent of Sony's production was undertaken by its foreign plants and it felt the need to

further increase manufacturing overseas. Sony aimed to develop its Asian plants as supply centers for high-technology products. The company hoped that it would achieve at least 35 percent of manufacturing outside of Japan in the 1990s. Thus, it moved toward increasing offshore production in the 1980s. But, in 1985, Sony announced that it would start shifting focus from CE to business customers in response to a fall in profits. It also started setting up regional R&D and engineering centers in 1989 such as Advanced Video Technology Center (AVTC), the development base for HDTV in San Jose in the U.S. By the first half of the 1990s, Sony had over twenty R&D centers outside Japan.

All three firms perceived the need to lower manufacturing costs, and Philips and Sony responded to this need by setting up plants in low cost locations as did their industry rivals. Emerson seemed to opt directly for sourcing components and then final products from overseas manufacturers, which were low cost producers. CE firms often followed each other to low cost destinations in Asia, thereby overturning each other's temporary gains and then re-entering the race to reduce costs even further. Nevertheless, this opening move to low cost regions seemed to be successful as profits rose initially in all three cases. The relentless pursuit of advanced technologies, however, soon prompted CE firms to reduce costs even further, which characterizes Stage 2 of our model.

Stage 2: Phasing Out (Transferring Production to Independent Operators)

U.S.-based Emerson Radio moved through the stages of the model we will conceptualize later much faster than the other two firms. After the takeover by NUC, Emerson Radio continued to produce television sets and other CE products. However, sales were low and profits remained elusive. Emerson Radio began operating in the red under NUC, with the problem apparently too little volume to cover fixed costs. Between 1967 and 1971 the division lost about \$27 million. In order to reduce fixed costs, NUC outsourced manufacturing of Emerson Radio's CE products to U.S.-based Admiral Corp. Under the pact, Emerson Radio was in charge of designing, engineering, and marketing. At the same time, Emerson also imported home entertainment products and some other CE goods from East Asian manufacturers. However in 1973, Admiral terminated its contract with Emerson Radio, which was thereafter dependent almost entirely on Asian OEMers (original equipment manufacturers) for its products.

Philips went through its own share of problems and after profits took a beating in 1975, it was encouraged to further lower its fixed cost levels by increasing its reliance on offshore manufacturers. The company continued to phase out production in higher cost locations such as its color TV manufacturing plant in Canada and moved further production offshore. In 1981, it set up its seventh

factory in Singapore for the production of radios and increased its investment in product development and automation in Singapore and also set up an audio equipment plant in China in 1985.

In 1980, Philips restructured its organization. The V2000 debacle had hit Philips hard. Until then, it was a prosperous organization but after the V2000 case, profitability fell. At the time, it introduced its make-or-buy policy. Under this new policy, the company withdrew itself from certain industries such as military and defense. The company that was managed thus far as locally responsive in its various markets started moving toward globalizing its businesses, divesting itself of non-core operations and entering joint ventures for production. In the later 1980s, Philips's Chairman-CEO at the time clarified the new direction of the company by stating, "On a world scale, you must be selective and stick to what you can do best" (*TV Digest* 1988, p. 10). It also sold its white goods unit to Whirlpool and its minicomputers unit to Digital Equipment. Under its agreement with Whirlpool, Whirlpool was to own 53 percent of the joint venture with Philips, but soon Whirlpool bought out Philips's stake in the company. Philips continued to sell white goods until the 1990s when it disengaged itself from the business entirely. In 1981, Philips spun off its electronics parts subsidiary Cambridge and in a series of sales a few years later, sold two more electronics component units to Cambridge Electronics Industries. In 1981 Sanyo acquired Philips's U.K. color TV production plant to sell its own color TV sets. In 1983, after the failure of its V2000, Philips bought VHS models from Matsushita in Japan and sold them in Australia and New Zealand. NAP (North American Philips, Philips's U.S. subsidiary) on the other hand, purchased TV sets from Matsushita for sale under the Magnavox, Philco and Sylvania brands in the United States. Japan's Pioneer was also supplying consumer disc players to NAP. Matsushita also supplied VCRs to be sold under the Magnavox brand name in the United States. Thus NAP was entirely dependent on products supplied by Japanese companies.

What is notable about Philips's strategies is its proclivity to form joint ventures. After 1980s, the company ended up with many pacts with foreign CE companies for joint production or R&D in Asia. Significant examples of these are joint production of VHS recorders in South Korea with local Dong Won Electronics and the venture for compact disc players with Shenzhen Shen Fei Laser of China. These enabled the partner in the venture to learn from more technologically advanced Philips. Philips gradually increased reliance on these partners and in many cases the partners finally took over operations from Philips. Philips had a videodisc laser optics factory in Shenzhen, China, and it also formed a partnership with China's Shenzhen Advanced Science and Technology Development Company to produce cassettes for Philips in the 1980s. The output was to be used for the Chinese market as well as different world markets. By the end of 1989, Philips had increased its dependence

on this plant and begun manufacturing CD boom boxes, laserdisc players and optical discs. This 50-50 joint venture with Shenzhen used Philips's equipment worth \$40 million and also employees and technicians trained by Philips. In 2001, Philips reduced its share in the joint venture. But by this time, the Chinese partner had ample opportunity to acquire knowledge about Philips's technology. Philips also had a 20 percent stake in a VCR and other components production plant in Czechoslovakia. Philips was providing this plant with production facilities, know-how, information systems and employee training, all forms of tacit knowledge.

Other divestments include the sale of Philips's 35 percent stake in Matsushita³ to Matsushita's parent company which had by then learned most of Philips's technologies and product development capabilities in CE products, the sale of its manufacturing division in South Korea to South Korean investors, and the sale of plants that were manufacturing television and audio equipment in Singapore and Brazil in 1998. As recently as September 2002, Philips sold its contract-manufacturing unit for CE goods (PCMS, set up by Philips in 1999) to the U.S.-based EMS (electronics manufacturing services) company, Jabil Circuit, Inc. Under the pact, Philips guaranteed sales worth \$4 billion to Jabil over a period of four years even after the unit was sold. Jabil also acquired nine of Philips's plants (mostly in low-cost locations worldwide) and 5,000 employees, which include 150 design engineers.

The year 1997 was significant for Philips, in that, followed by a loss of \$349 million in 1996, the company went through a series of measures to boost profits and these included a host of outsourcing deals. Executive VP-CFO Eustace said, "In the past, we did not 'contain our creativity', under the label of freedom, we were spending an enormous amount of money on R&D." (*TV Digest* 1997a, p. 12). This statement indicates the direction of Philips's upcoming strategies toward outsourcing whereby it reduced its R&D expenditures. In October 1997, Philips moved from in-house production of 19"-20" TV tubes to sourcing them from Samsung and Toshiba. In the same year, it sold its TV plant in Greeneville, Tennessee, in the U.S. to Taylor-White. As recently as 2001, Philips laid off employees at its own VCR factory in Austria and instead moved production of VCRs to Japan's Funai Electric. Philips gradually reduced its R&D function for CE products and ultimately lost its technological capabilities (next stages).

Like the American and European CE firms before it, Sony also eventually gave in to pressures and increased its reliance on outside operators and slowly moved toward outsourcing deals with foreign firms. But, some of Sony's first outsourcing ventures were with domestic companies that it was familiar with. For example, Sony's audio speaker manufacturing subsidiary Audio Research was launched in 1969 as a joint venture of Sony and Pioneer but Sony acquired it in 1972. In 1983, it sold Audio Research in Japan to Minebea, a Japanese producer of ball bearings. Nevertheless, Sony

maintained ties with Audio Research in the form of an outsourcing relationship whereby Sony continued to be its customer and provided it with R&D support. Their relationship constituted a typical Japanese-style *keiretsu* relationship.

Sony also entered into agreements with many different firms in low-cost countries to supply components. In October 2000, Sony was outsourcing 60-70 percent of its radio and speakers manufacturing and around 50 percent of its component stereos to Chinese equipment makers. The company claimed that outsourcing to Asian countries such as China and Taiwan would boost its competitiveness against Western firms.

Sony went on to increase outsourcing to other firms such as U.S.-based personal computers and telecommunications equipment manufacturer, Solectron⁴ in 2000. Under the pact, Solectron acquired two of Sony's manufacturing units, one in Japan and the other in Taiwan. Solectron was to retain the employees at the factories and supply products to Sony as well as to other customers. Solectron had been expanding through mergers and had previously acquired Singapore's NatSteel Electronics for \$2.4 billion in anticipation of catering to Japanese business (Wilson 2001). By outsourcing production, Sony hoped to lower costs and increase profitability.

Thenceforth, Sony continued to divest its manufacturing operations in an attempt to reduce fixed investment. At the extreme, Sony even considered outsourcing production of its core CE production to its unit, Aiwa, 50 percent owned by Sony at the time. Regarding Sony's decision to outsource production to third parties, the company's President Ando was reported as saying, "There will be some products on which we think it better to entrust the production also to non-Sony group companies and business partners, and we currently outsource some audio products" (*AFX News* 2000). Sony was outsourcing some manufacturing to Celestica, Flextronics and SCI systems. The move to increase outsourcing followed a fall in profits in 1999. By March 2003, Sony had reduced the number of its factories worldwide from 70 (in 1999) to 54. Sony hoped that by outsourcing, it could reduce the fixed costs of manufacturing by transferring it to other contractor firms and instead be involved more in the design and planning stages of products. Sony planned to increase its reliance on products from Taiwanese vendors to \$938 million by 2001.

Thus, Stage 2 was marked by significant divestitures by our firms, some of which were to local partners in foreign locations. This enabled the firms to reduce fixed costs but this move gradually pushed these firms into Stage 3 of our model. As outsourcing appeared to produce short-term benefits, the CE firms increased their reliance on foreign firms and were soon exposed to the long-term effects of outsourcing.

Stage 3: Increasing Dependence on Foreign Suppliers

In the case of Emerson Radio, NUC sold the brand name to Major Electronics in 1973. U.S.-based Major Electronics used to produce radios, tape recorders and other equipment. In 1968 the company began importing these products from overseas establishments and became a distributor of finished Far Eastern goods. When it took over Emerson Radio, it was buying 80 percent of its components and products from East Asia. In 1980 Emerson Radio dropped its last U.S.-made product--the phonograph line--because labor costs had made it unprofitable. Thus Emerson was completely dependent on foreign suppliers for all its finished products. As firm President Stephen Lane commented, "I think most of the profits we've made have been because of controlling overhead and purchasing." (*Forbes* 1981) According to Lane, "Our philosophy is simple, that is, to have the best of two worlds. To be in sophisticated, state-of-the-art products by maintaining our own engineering and design capabilities here and keeping close tabs on quality control at all our vendors, and at the same time being able to react quickly to changes by having no hard assets, which would mean worrying about keeping factories going and people employed in a recession" (Mehler 1984, p. 86). Other than manufacturing capabilities, Emerson Radio also lost its design and technical capabilities as it made its fortune by persuading its East Asian suppliers to imitate high-end, branded (Sony, Panasonic) CE products and then selling them to consumers at much lower prices. Based on published records, around the mid-1980s, Emerson Radio had outsourcing deals with over 15 Asian suppliers, which depended on Emerson for over 90 percent of their business. In November 1984, Lane claimed, "It's been 12 years since we achieved our running goal of 5 (percent) net of sales" (Mehler 1984, p. 87). About this time, Emerson possessed design and engineering capabilities only for audio products, "But, in the video area, outside of the cabinetry, the U.S. firm has deferred to the superior design skills of its Japanese suppliers, such as Mitsubishi" (Mehler, 1984 p. 86).

Emerson struggled to hang on to its CE business. In 1985, it acquired a CE company H.H. Scott, a relatively small producer of audio equipment; in 1986, it introduced Asian-made refrigerators to the market; and in the following couple of years added several more electronics-related products to its range including computers in 1990. However, by 1991, it had withdrawn the H. H. Scott line and some other CE products. In the late 1980s, having lost its CE capabilities, it had begun diversifying into other areas. By the early 1990s, Emerson Radio was heavily in debt of over \$200 million. To add to that, it was involved in lawsuits and in 1993, the company finally filed for bankruptcy. What remains of the old Emerson Radio today is its brand name. Even today the company capitalizes on the brand by licensing it to other CE firms. Philips experienced its own share of troubles due to increased outsourcing. In 1988, Philips' woes reflected those of the U.S. CE firms not too long ago. Philips's

income fell again and the company claimed that competition from the Far East led to its problems. As Philips itself established plants abroad and outsourced production, it gradually increased its dependence on these foreign suppliers and unintentionally but invariably passed on tacit knowledge. The Philips-Sony liaison was a particularly interesting one. It began in October 1979 when the two companies joined hands to use each other's patent rights for certain products (tapes, cassettes, discs, etc). This pact gave Sony access to Philips's V2000 system as well as its CD-audio system. Industry analysts concluded that due to this arrangement, Sony learned to manufacture its own optical videodisc for consumer use although the company denied these charges. Philips meanwhile had plans to launch videodiscs in Europe by 1980. Philips made consumer versions while Sony made industrial videodiscs until 1982 when Sony announced that it would sell its videodiscs in Knoxville, North American Philips's hometown.

Philips continued to post lower income forecasts toward the end of the 1980s and planned to cut its workforce by 10,000-20,000 globally in the following years. The company hoped that its initial measures for cost cutting would increase profitability. But, in 1988, Philips lowered its forecast for the year and announced that it would take severe measures to improve its operations through further cost cutting. In reaction to lower earnings, the company reduced its European plants from 170 to 110 in the next five years and also shifted more production to Mexico and Taiwan. The company already operated plants in these countries at the time and this shift increased the company's reliance on these foreign plants. It hoped to cut costs by \$400 million. The company started to improve profitability for a while until profits fell again. And so the efforts went on. Toward the end of the 1990s, Philips was looking for buyers for its TV assembly plant in Juarez, Mexico (*TV Digest* 1998).

In the late 1980s Philips was involved in R&D of LCD (Liquid Crystal Display), a joint project of four of Philips's divisions, consumer electronics, lighting, research and components. Although a certain part of the development efforts used to take place at headquarters in Eindhoven, the Netherlands, production was shifted to the Philips-owned plant, Marantz, in Japan. In 1986, Philips reorganized Marantz Japan into an R&D base. Prior to 1988, NAP outsourced production of TVs to Matsushita but in 1988, Marantz (Marantz Japan Inc or MJI) began shipping VCRs to the United States for sale under Philips's brand. In 1988, Philips manufactured liquid display TVs at the Marantz plant and later increased its reliance on that manufacturing facility by producing wireless radio equipment in 1991 and new CD players in 1999. In 1997, Marantz introduced its own (Marantz-branded) low price version (with some small changes) of Philips' television models in Asia. Hence, Marantz, 50.6 percent owned by Philips at the time had learned Philips' technology, upgraded its competences and forward integrated into launching and marketing its own line of similar products.

Finally, in 2001, Philips reduced its controlling ownership stake in MJI, which also acquired the 'Marantz' brand and its business in Europe and the U.S. from Philips and established its own units in these places. The companies still maintained working relations in many areas, but MJI also developed and introduced its own products (mainly audio equipment) under its own brand name, Marantz. A year later, in 2002, Philips further reduced its stake to 14.7 percent in MJI when MJI merged with U.S.-based Denon Ltd.

The late 1990s was the age of the DVD technology in the CE industry and ideally Philips should have been a formidable contender. But, by his own admission, the Philips Sound & Vision Chairman and CEO said with respect to Philips' DVD program in the U.S., "We've had to catch up on DVD in every sense of the word. We didn't have a DVD program 12 months ago and now we've launched a player" (*TV Digest* 1997b, p. 15). The company launched a DVD player that was being sourced from Toshiba (Japan). By the end of the 20th century, Philips was on its way out of the CE industry having lost most of its development capabilities.

Meanwhile, Japan's Sony faced its own set of challenges with its partners. Even after selling its audio speaker manufacturing subsidiary Audio Research to Minebea in 1983 (explained in Stage 2 above), Sony maintained ties with Audio Research in the form of an outsourcing relationship whereby Sony continued to be its customer and to provide it with R&D support. The following year, Minebea set up its own subsidiary for audio R&D by merging Audio Research (acquired from Sony) with another of its divisions, Minebea Denshi Co., Ltd. In this manner, Minebea learned Sony's audio research capabilities.

What started off as simple contractual agreements with foreign operators eventually led Sony to increase its reliance on its partners. Agreements also took the form of joint ventures. For example, in 1992, Viettronics Tan Binh, a Ho Chi Minh City, Vietnam-based local electric appliance maker, was in a licensing pact with Sony to produce color TVs and audio players. In 1994, Sony established a joint venture with the same company to manufacture 14-inch and 21-inch Trinitron color TVs and audio products for the Vietnamese market. Thus, with this new venture in 1994, Sony in fact increased its dependence on Viettronics (from licensing to joint venture) to jointly manufacture goods at low cost.

After the Solectron deal in 2000, Sony announced that it would farm out more production to independent manufacturers if need be. It also finalized plans to create engineering, manufacturing and customer services units to cater to the needs of Sony and other firms that outsourced production. Taiwan being a source of low-cost labor, Sony increased its reliance on Taiwanese firms to supply its products. In merely a period of one year, Sony bought goods worth \$2 billion from Taiwan in 2001,

which was an increase of seven times on the year 2000. Such was the extent of its increasing reliance on subcontractors.

In February 2003, Sony entered a contract with Oak Technology to supply decoder chips to Sony, which would replace IC (integrated circuit) chips developed by Sony's in-house facility. To start with, the decoder chips were to be used in Sony's digital TVs to be sold in Japan but Oak Tech planned to supply chips for use in Sony's products sold in Europe and the U.S. later on. Previously, Oak Tech was in a similar decoder supply pact with Sony for its personal video recorders in Japan. Oak Tech also supplied chips to other CE companies like Thomson and Daewoo – another example of Sony's ever growing dependence on external suppliers and the increasing capabilities of such suppliers.

The year 2003 witnessed an awakening at Sony. Touted as the 'Sony Shock', Sony incurred a net loss of \$927 million in the first three months of 2003. Many said that Sony's state reflected that of the Japanese CE industry and also the economy as a whole. But the unpredictable global environment and the company's activities in the past few years might have exacerbated its performance. Sony had introduced only a few 'new' products in the recent past and to add to that, it was losing its once fêted technological ability to innovate. The company used to "generate huge profit from its vertically integrated business model in which it developed high-performance parts ... on a commercial basis before anyone else and released hit products based on them" (*Nikkei Weekly* 2003). However, in the 1990s, it lost a major part of its technological glory. According to Ken Kutaragi, President of Sony Computer Entertainment and a recent addition to Sony's top management team, "top management chose not to continue investing in technology" (*SinoCast China IT Watch*, 2003).

Sony's technological excellence and product creativity were further tarnished by recalls in 1996 of Sony-made lithium-ion batteries used for notebook computers. The Sony batteries have been blamed for causing some Dell and Apple computers to overheat and catch fire. As if to rub salt into Sony's wounds, due to delays in production of blue laser diodes, a key component of Blue-ray Disc players, Sony was also forced to postpone the European release of the PlayStation 3 game console from November 2006 to March 2007. Sony's current crises are also attributed to its increased outsourcing by farming out a large part of production of these components to EMS (electronic manufacturing services) companies (*Nikkei News*, 2006).

Stage 4: Industry Departure or Reduction of Outsourcing.

As time went by, Emerson Radio and Philips lost their place in the CE industry. Emerson Radio moved through the first three stages of the model so quickly that it did not get a chance to salvage itself and

instead sought to diversify into other, sometimes unrelated areas. The brand name 'Emerson' was associated solely with CE and having lost its technological competences, the firm is presently struggling to survive. Philips managed to shift its focus away from CE to its lighting and other businesses and managed to survive but not as a significant CE player.

Although Philips was originally founded as a lighting company, it made a very successful transition into CE and maintained its foothold in the industry for several decades. What is evident is that at several times Philips experienced declining profitability, restructured its organization and altered its strategies. Prior to the 1970s, Philips changed its strategy from one of local responsiveness to a more global strategy and reduced product lines. Then at the time of the failure of its V2000 home video system around 1980, Philips believed that it was probably due to its lack of partnership with other companies to effectively commercialize its technology (Dai 1996). More recently, in 1996, Philips incurred a loss of \$349 million on year and the company once again decided to increase outsourcing and increase its reliance on third party manufacturers. As of 2002, Philips planned to increase outsourcing of chip production from 10 percent to between 20-30 percent. The company also increased its reliance on products from United Microelectronics Corp. and Singapore-based Chartered Semiconductor Manufacturing. Thus, Philips never reduced outsourcing but instead increased it. In June 2001, Philips even abandoned its wireless phone manufacturing efforts and to cut costs, it also reduced its interest in its Chinese R&D plant by transferring control over to its Chinese partner, which was to make phones and supply them to Philips for sale under Philips's name. At the dawn of the 21st century, Philips was no longer an independent producer in the CE industry. It sold off its remaining CE divisions including Polygram and "to emphasize the shift of Philips' business out of CE, the CEO, Cor Boonstra, moved Philips' headquarters from Eindhoven to Amsterdam" (Chandler 2001, p. 221). Today, Philips markets CE products but its main focus is on its other divisions such as lighting and semiconductors.

The only company that is still active in the industry, Sony, is learning the hazards of excessive outsourcing and gradually reducing its reliance on outsiders for its core products. Although Sony is better known for CE than semiconductors, it uses semiconductors in many of its CE products (digital cameras, camcorders). In 1998, Sony's profits fell along with those of other Japanese companies in the semiconductors industry such as Toshiba and Fujitsu. However, the slump was attributed to lower demand for their products. Surprisingly, in 2000, Sony reduced outsourcing for semiconductors by 5 percent and also shifted to in-house production of some of its 'most wanted' products like personal computers, camcorders and digital cameras. There is no hard evidence that shows why Sony reduced outsourcing for its core products, but this move followed a fall in profits in 1999. In the year 2000,

Sony announced that it would set up a ‘supervisory company’, which would be responsible for management of design, purchase and manufacturing for several of Sony’s plants. Thus, although Sony has not entirely eliminated its dependence on outsourcing to keep costs under control, it has moved toward in-house production of its popular money-making products. Also, the establishment of a company to monitor production indicates a very cautious components strategy. As Sony President, Ando said, “Engineering and manufacturing are (some of) Sony’s key strengths. That is why key products will be done by our own internal production, not OEM” (*Financial Times* 2000, p. 36).

The fear of technology falling in the wrong hands also extends to national governments. In 2000, the Japanese government imposed an export control on Sony's PlayStation 2 (PS2) electronic game console. PS2's 128-bit central microprocessor developed by Sony and Toshiba had twice the raw number-crunching power of Intel's most advanced Pentium chip used in professional desktop computers. When coupled with a video camera, PS2 could make an ideal missile-guidance system (*Economist* 2000, Re 2003). Then in 2001, Sony was to outsource the console of its PS2 product to Taiwanese firms capable of producing at low costs. There were two drivers for this outsourcing initiative. First was Sony’s inability to meet demand and second was Microsoft’s move to outsource the XBOX (in direct competition with PS2) to firms in Taiwan. The U.S. and Japanese governments asked Sony to keep production and assembly of the console in Japan lest the Taiwanese firms (who were low-cost subcontractors) could learn the DVD application of the console’s chip and use it for military purposes (Yu/Teng 2001). In 2001, Sony also announced that it would not expand outsourcing of its personal computers production at its plant in China.

Although on the surface it appears to have evaded the grave dangers of excessive outsourcing by contracting out only ‘peripheral operations,’ it continues to face the danger of losing its core competences. In May 2002, Sony stressed the fact that it was keeping key technologies in Japan as compared with other Japanese makers who were throwing away their future due to outsourcing. In September 2002 it was reported that “Three of Japan’s leading electronics manufacturers will start making DVD recorders, reversing a trend for outsourcing the production of such items” (Pilling 2002). Sony is one of those companies. Whereas on one hand, Sony reacted to its weakening situation by reducing outsourcing for its core operations, it continued to outsource peripheral technologies. Sony did not focus on increasing investment in developing technology or its reinstating control over manufacturing operations until its awakening in 2003. In 2003, the company took proactive measures to improve its position in the industry. Under the leadership of Kutaragi, it has charted out a course to bring it back to its role as a technological leader. For the purpose, it planned to invest \$8.6 billion in “electrical equipment and electronics over three years and the introduction of in-house production and

centralized management of key components” (*Nikkei Weekly* 2003). Sony also revealed that it would reduce the number of components used to 100,000 parts (90 percent decrease) by the year 2005 and also indicate 20,000 standard parts to be shared by engineers, company-wide. By doing so, it would be able to shorten the time taken for new product development. In late 2005, Sony announced that under the leadership of its first ever, foreign Chief Executive Howard Stringer, it would reduce 10,000 jobs and close 11 of its 65 plants to boost profits at its electronics unit. However, these cuts and closures were not expected to affect jobs and plants in China, its low cost manufacturing location.

A Stage Model

With these cases in hand, we can now construct a stage model around outsourcing and competences that draws upon existing theory, specifically the resource-based view and dynamic capabilities perspective (Barney 1991, Leiblein/Reuer/Dalsace 2002, Teece/Pisano/Shuen 1997) and work on value appropriation in alliances (Nooteboom 1999). The relationship between outsourcing and a firm’s competences, the set of routines in which it has specialized, is a complex one. On the one hand, outsourcing can free up resources that can be used to speed up or redirect competence development in other areas, the argument used by some proponents of outsourcing (Quinn 1999). In our cases, however, we observe the inverse effect as over time outsourcing seemed to lead to a loss of competences. Our stage model contains a description of the process through which such competence loss occurs. We then tackle the question under which conditions such a process presents itself and, related to that, when it does not.

The resource-based view of the firm suggests that firms can be conceived of as controlling bundles of resources, also called competences (Barney 1991, Wernerfelt 1984). These competences are constructed through previous experience and over time. When resources are valuable, hard to imitate and substitute and rare, they can lead to sustainable competitive advantage (Barney 1991). The dynamic capabilities approach (Teece/Pisano/Shuen 1997) adds to this a process perspective by suggesting that capabilities are constructed through evolutionary, path-dependent, processes. Outsourcing invariably involves ceding some control over resources, for instance, in the form of transferring machinery, technology, and/or people. In an arm’s length transaction all control is ceded. In a cooperative or partnership outsourcing relationship, firms arguably maintain some control over resources, even if these physically reside at suppliers.

In such relations there are two key questions. The first question is how much value is created and the second is who gets to appropriate that value (Nooteboom 1999). Value creation is not a central

concern here, but suffice it to say that various mechanisms can be instated by the outsourcing partners to create additional rents (Dyer/Singh 1998). In our cases, lack of value appropriation is the central concern – one that has been addressed in the literature as well (Nooteboom 1999, Porter 1980, Teece 1986, 2000). One way in which insufficient value appropriation may occur is when in-house competences are leaked to the supplier, for instance, in the form of the supplier taking on board the outsourcing firm’s intellectual property rights (Teece 2000), a problem especially prevalent when no institutional guarantees are provided (Teece 1986). The supplier may subsequently start to compete head-on with the outsourcing firm or supply to competing firms leading to a loss in bargaining power (Porter 1980). Another possibility is the gradual erosion of the firm’s internal competences because it can no longer engage in learning-by-doing leading to hollowing out (Bettis/Bradley/Hamel 1992, Kotabe 1998).

Our stage model, based on the three CE cases, integrates both streams of literature. We suggest that firms need to maintain and develop their competence base in order to sustain their advantages vis-à-vis competitors, but may be unable to do so when engaging in (international) outsourcing because they cannot distill enough value from their relations with suppliers. We propose that there is a ‘*vicious outsourcing cycle*’, which occurs when the future need for in-house competences differs substantially from the currently perceived need and firms are unable to bridge that difference because they are too dependent on outsourcing. Specifically, a vicious outsourcing cycle can occur when firms either lose competences whose contribution is not understood well enough or close off trajectories of competence learning that prove to be important in the future. One might alternatively refer to these conditions as causal ambiguity and uncertainty. Figure 1 below describes the different stages of the outsourcing cycle.

Place Figure 1 about here

In Stage 1, firms see an opportunity to lower their production costs by shifting in-house production to a different country. As we showed above, Philips, for instance, set up plants in a wide range of low labor cost countries in the 1960s. Vernon’s (1974) international product life cycle model clearly illustrates this stage. Because of substantial labor cost differentials, the existing production location, which is normally the firm’s home country in the early stages of internationalization, is no longer seen as competitive. Sometimes other, more qualitative factors, such as the need to access new customers or suppliers, may come into play as well as has been documented in the literature on plant

locations and facility management (Ferdows 1997). In terms of Dunning's (1988) organization, location, and internalization (OLI) model, which intends to explain when certain types of internationalization may or may not occur, activities are transferred from the home base to low-cost countries in order to benefit from L-type advantages available in these offshore locations and because a firm possesses the O-type advantages necessary to engage in international production. As a consequence of this decision, production and engineering capabilities are transferred and replicated abroad. Such a decision will bring relief in the short term as it allows the firm to maintain or improve its margins. As suggested above, Emerson increased its profits in 1959 after a cost-cutting operation.

However, because most locations are not unique, competitors can easily replicate location decisions, and perhaps even improve on them. There are many instances of an industry-wide bandwagon where firms all relocate to the same country, for example in textiles production. The classic description of such bandwagons in international business is Knickerbocker's (1973) work on "follow-the-leader" in foreign direct investment. In other words, after some time competitors will offset any temporary gains from a production shift. If cost pressures remain high and there is overcapacity in the industry, the firm finds itself in need of taking additional measures. In our cases this tended to show up in the form of some immediate financial crisis, which came upon each of the three firms at some point in time.

When responding to such a crisis, one important option is to sell off the foreign production plant to an independent operator and outsource production to this firm or simply to outsource without selling existing assets – Stage 2 of the model. As we saw, Emerson for instance started to make extensive use of Asian OEM's. Referring again to the OLI model, the advantages of internalization (I) seem to have disappeared to the point where the market (outsourcing) is seen as a better solution. If these advantages decrease, outsourcing becomes a more viable option. In the case of Sony this occurred when it outsourced most of the making of stereo equipment to Chinese suppliers. Production and engineering capabilities are now transferred to or replicated by the supplier because the outsourcing firm will help it set up production. Thus the value appropriation issues mentioned earlier (Nooteboom 1999, Teece 2000) emerge.

Given that there are such issues around value appropriation, what motives do firms have for moving from stage 1 to stage 2 of our model? An outsourcing firm replaces internal fixed costs by the production costs of outside suppliers which are variable from its perspective. This lowers the breakeven point, providing the firm with more flexibility to respond to unforeseen changes, which are quite common in the CE industry. In particular, it helps the firm to reduce the size of potential losses. Since in our cases outsourcing often appears to be a consequence of a drop in sales and profitability,

this move seems sensible if further drops can be expected. Financial markets for instance may appreciate such decisions in the context of the CE industry where firms like Emerson and Philips saw themselves confronted with ever more intense competition from Asian producers. In case of a crisis the alternative to outsourcing is to restructure internally, which often does not involve terminating the production of specific components, like outsourcing may do, but of entire products. The wholesale closure of plants can be socially and politically sensitive and costly, and therefore outsourcing may be a preferred solution.

But if the firm outsources its fixed costs in this way, these costs will still have to be borne by the independent supplier instead. Unless that supplier can find a way to be more cost-efficient and to make these costs variable, such a move could amount to a mere accounting fallacy. Perhaps some managers and some investors buy into this but we have little hard evidence that is the case. Yet, as illustrated by the emergence of EMS (electronics manufacturing services) companies, there are reasons to believe that independent suppliers can be more cost-efficient and can make better use of fixed investments. First, independent local suppliers, operating in a low-cost location, do not have to bear the same overheads that producers from more expensive countries, like Emerson, Philips and later Sony, faced. They are run locally and, being a much smaller firm, can also be more nimble. Second, and related to the first point, their expenses for research and development are much lower, at least initially, as they import more advanced technology from elsewhere. Philips and Sony, for example, have large R&D bases because they want to be first movers in new technologies, whereas the supplier in a low-cost country would be content with adopting new technologies invented by others. Perhaps more importantly, the outsourcing firm needs to spread its fixed costs over a relatively fixed volume of products but the independent supplier has the option to supply other customers, thereby reusing its assets. So after outsourcing takes place, the supplier can enjoy larger economies of scale in production, resulting in further lower average costs because fixed costs are spread over a higher volume of production. For example, this logic applied to Aiwa, as Sony was contemplating to outsource more production to it.

Furthermore, outsourcing changes the incentive structure of the independent supplier in important ways. Some arguments for this may be found in Grossman and Hart's (1986) 'theory of costly contracting', also known as the property rights approach. They suggest that outsourcing takes place when it is relatively easy to write complete contracts, in which specific rights can be assigned to both the outsourcing firm and its supplier. When this is the case, there is no longer an incentive for the outsourcing firm to own and vertically integrate the supplier (Grossman/Hart 1986). For this to happen, a supplier must develop a set of distinct production capabilities for a component or product, to

which property rights may then be assigned. These distinct capabilities can develop if the product architecture is well-understood, allowing for easy separation of tasks. Once the supplier has gained its independence, it can then develop its capabilities further, which leads to future cost improvements. The supplier will have an incentive to develop its production capabilities because these will directly drive its cost levels, and hence its profitability, and indirectly its ability to retain the outsourcing firm as a customer in the future and to attract further customers. Because both the outsourcing firm and potential future customers will be making a comparison of their own production capabilities with those of the supplier firm, the supplier's odds of attracting future business increase with improvements in those capabilities (Jacobides/Winter 2005). In Quinn's (1999) view, the supplier builds these advantages, to the extent that it can become best-in-world in the production of this component or product, through increasing focus.

Over time several changes can occur that alter the balance of decision-making and push firms into Stage 3. One change, quite common in the context of emerging countries, is learning by the supplier, which can take the forms of increased productivity and upgraded production capabilities, as discussed above. Philips experienced this in its earlier ventures with Japanese producers and Sony found this out in Taiwan. If supplier productivity is increased by learning-by-doing and this increase is shared exclusively with the outsourcing company and not with its competitors, there is no real problem. However, when suppliers manage to upgrade their own competences, there is little to prevent them from forward integration into the firm's markets. Thus the supplier can easily become a competitor. Emerson found itself competing against the Asian producers who were initially its suppliers. The buyer now has serious problems to appropriate as much value from the relationship as it would like to. When the gain of a buyer-supplier alliance is no longer shared evenly in the eyes of the buyer, it may want to reconsider its motives for having entered that alliance (Doz/Hamel 1998).

The bargaining constellation is a second area of possible change (Porter 1980). When the supplier starts to supply to competing firms as well, it will grow in size, become less dependent on the original buyer, and raise prices, which may pose the outsourcing firm with the need to build up alternative supply sources, if that is possible in the first place. Rather than the supplier being captive, the buyer can become captive this way. A third change can be in the outsourcing firm's in-house capacity to produce and engineer the product. Because the firm no longer produces the product, it will become more difficult to keep particularly tacit knowledge about production technology up-to-date as loss of manufacturing experience leads to a loss in development capability, particularly for existing products (Dankbaar 2007). Emerson for instance had clearly given up on the idea of retaining any production knowledge in-house. This may also affect the ability to implement engineering changes.

The supplier will need to become involved in the design of the next generation of the product. Under each of these scenarios, there is change that occurs after initial contracting and that increases the outsourcing (buyer) firm's long-term dependence on the supplier because that supplier now possesses more competences relative to the buyer.

Because our evidence on Stage 4 is limited as the electronics industry is still evolving, our discussion of it is perhaps best interpreted as a form of informed theoretical speculation. When faced with a situation like Stage 3, firms essentially have two options in Stage 4. Firms can exit the industry altogether as Emerson and to some extent Philips have done. Or they can decide to take activities back in-house, as Sony has begun doing in recent years. This choice can be likened to Hirschman's (1970) exit-voice model, where decision-makers also have the choice between departing from the scene and engaging and confronting a problem. Leroy's (1976) detailed empirical work on U.S. multinational firms' production location decisions along the international product life cycle (IPLC) model points to this strategic dichotomy. He traced their production location decisions over time. In reality, a majority of U.S. multinationals stopped short of reaching the last stage of the IPLC as theorized by Vernon (1974), where the subsidiaries of those U.S. multinationals based in developing countries would have become the net exporters to the U.S. of what had once been products innovated in the U.S. His conclusion alluded to U.S. firms' reliance on product innovations and reluctance to investing in manufacturing process innovations. This finding is consistent in a way with later studies that found the sustained competitiveness of many Japanese firms resulting from their pursuit of process innovations (e.g., Cusumano 1988, Kotabe 1990). Exiting the industry equates to admitting the competence loss is too large to overcome.

Facing the problem, like Sony, sounds like a much easier task than it actually is. First, it will require precisely those fixed investments that the firm's business model is no longer based on. Thus the question is how to fund this reversal and make it consistent with the firm's strategy. Second, the firm will by now have lost much of its ability to produce and engineer the product and will have to seriously update its competences by training people and obtaining knowledge externally. Both may come at a high price, particularly since the competitive and technological landscapes may have changed substantially in the meantime. Hence in Stage 4 there is no ideal solution to the problems around competence losses that a firm has accumulated through the first three stages.

The stage model raises several further questions. One is why the loss of competences would occur, as it appears to be inconsistent with perfectly rational managerial decision-making. Several reasons come to mind. A lack of foresight perhaps produced by technological or volume uncertainty, is one possibility. Differing estimations of the buyer's and the supplier's ability to develop the

underlying competences in future could be another. Another possible reason is strategic myopia that makes the short-term consequences of not outsourcing, in the form of higher fixed costs and higher production costs, look worse than the long-term consequences of outsourcing, in the form of a loss of technological prowess (Bettis/Bradley/Hamel 1992, Doig/Ritter/Speckhals/Woolson 2001, Kotabe 1998). For instance, the more immediate trigger for outsourcing decisions in our cases appeared to be a downturn in business cycles and short term losses that firms were facing. Outsourcing may also be perceived as a response to adverse demand conditions because of its propensity to lower the breakeven point. This could be framed as a ‘Faustian dilemma’⁵. Because of immediate pressures to compete in the marketplace, firms need to focus and streamline their production activities. But in order to do so, they have to ‘sell their soul’, namely their core assets and capabilities, which in the long run will catch up with them. Viewed in this way, there is no myopia but simply a lack of strategic choice. This determinism inevitably drives firms towards more outsourcing. A further implication is that causality in our model may well run in both directions, since poor results lead to more outsourcing as much as more outsourcing may lead to poorer results.

A second question is why our three case study firms experienced their outsourcing cycles and resulting competence losses at different points in time, with Emerson being first in roughly the 1950s to 1970s, Philips following in roughly the 1970s to 1990s, and Sony being last in roughly the 1980s to 2000s. Other CE producers from the same Triad regions seemed to go through the same timing. We would like to suggest that it is a combination of the cost competitiveness of the home country and the mental models and financial incentives of managers in the country that are responsible for such differences in timing. Over time, and with the development of their home economies, firms found that their home country simply could not compete with offshore locations anymore because labor costs were too high. This effect may have occurred in the United States before it did in Europe, partly because European firms were more effective at limiting imports from lower cost producers. In Japan it may again have come at a later time, not until the 1980s. But managers in these countries are also different. In Japan, outsourcing is seen as a problem-solving tool, while in the U.S. it tends to be a problem-removal tool (Kotabe 1998). And U.S. managers are incentivized to achieve good short-term results, encouraging them to find cost savings through outsourcing, while this is less true for European (especially Germanic) managers or Japanese managers. The latter group is rewarded for market share growth more than for financial results alone (Kotabe 1998). Our earlier quote from the Emerson executive illustrates the point.

A third point is whether firms necessarily need to go through all stages for the competence loss to occur. Although this is ultimately an empirical question, our cases seem to show that all three firms

went through the first three stages in more or less chronological fashion. In Stage 4 they took different routes, though, with Sony appearing to use a voice, engagement strategy, and Emerson and Philips preferring an exit strategy. So there are different responses to the loss of competences through outsourcing. At the same time we think it is feasible that some firms, like SMEs, never set up foreign operations but immediately engage in international outsourcing. Mol, van Tulder and Beije (2005) seemed to have evidence for this in their empirical study. Such firms will probably transfer fewer assets and less knowledge to their foreign suppliers and are therefore perhaps not as prone as larger firms to competence losses. The smaller volumes these firms produce might also make it less attractive for their suppliers to engage in forward integration. This touches upon the intriguing and more general issue how inward and outward internationalization processes are related.

Finally, we would like to raise the related issue of the conditions under which this stage model is most likely to apply. Several requirements appear to apply. First, there is causal ambiguity and uncertainty over future technological and competence trajectories as discussed above. In transaction cost economics terms, this implies that asset specificity levels cannot be estimated with much certainty, and are subject to change, and that uncertainty makes it difficult to contract with suppliers. Second, the rise of new, lower cost producers in emerging countries that puts additional competitive and cost pressures on incumbents from developed countries. Third, the presence of international trade regimes that allow for this type of outsourcing. And finally a certain size of production is needed as well. Therefore we think the stage model may be generalized to some situations, especially larger firms competing in highly competitive and technologically intensive industries. One interesting thought experiment is whether Chinese automobile and component suppliers are going to benefit from collaborative agreements with Western producers and the purchase of technology like the acquisition of the remains of Rover in the U.K.

Conclusions and Implications

Outsourcing can be more than a cost-cutting device and potentially contributes to a firm's competence base (Quinn 1999). There are, however, circumstances under which outsourcing leads to competence destruction. Through documenting the experiences of three firms in the CE industry we illustrated how such competence destruction through outsourcing takes place and coined it the vicious outsourcing cycle. Clearly not all outsourcing processes will adhere to such a cycle. When firms outsource competences that later become important platforms for growth and innovation, the vicious outsourcing cycle can occur. This stands in contrast to the use of outsourcing to obtain new

competences (Barney 1999, Quinn 1999), because in our cases supplier competences appear to be less complementary and more overlapping, which generates the possibility of forward integration by suppliers. In such instances it is important for firms to consider the future value of in-house production rather than merely the present costs of keeping production in-house versus outsourcing it.

For instance, it was evident in the Philips case that on the basis of its past capabilities in R&D, it should have been able to compete in the DVD market. But due to excessive outsourcing of components and products before the age of the DVD, it “did not have a DVD program” in the U.S. market as conceded by Philips Sound and Vision Chairman and CEO Doug Dunn (*TV Digest* 1997b, p. 15). Its European DVD launch also proved to be unsuccessful. One of the main reasons was that Philips’ DVD technology MPEG-2 suffered due to unavailability of software. Future prospects for availability of content for these players were also bleak. This preempted the introduction of products based on Philips’ DVD technology later on that were based on its own previous DVD technology. To revert back to basics proved to be harder than expected because regaining technical abilities included building plants and incurring other prohibitively high costs. Philips’ case was also unique because the company’s own technologies (e.g. V2000 for videos and MPEG-2 for DVDs) found no support in the market and were largely unsuccessful. Therefore, in such cases, many firms have no choice but to buy products from overseas manufacturers in order to remain in the industry.

Information contained in our sources seems to indicate that most CE firms were similarly faced with few choices: to either exit the product line(s) because sales were dropping or to go abroad like their rivals were doing and lower costs. It is unclear as to whether or not these firms and others lacked foresight. Based upon patterns in our data, it appears as though it started off as one decision, which led to an increasing dependence on suppliers, as our model proposes. These firms progressed through the stages of the model as they faced pressures to meet demand, lower prices, etc. Thus, the increasing outsourcing relationships and their outcomes were the culmination of this gradual process. Upon the sale of Philips’ Greenville TV plant (Tennessee, U.S.) in mid 1997, Philips Sound & Vision Chairman-CEO Doug Dunn said it was “a tough decision, I don’t take any joy in selling or closing down assets” (*TV Digest* 1997b, p. 14).

Firms do not need to go through all stages of this cycle for its effects to become visible. Sometimes they do not use offshore subsidiaries but instead opt to go straight for outside suppliers from abroad. Emerson Radio at some point in time looked to nearby Canada and Latin America to set up subsidiaries but it eventually relied mainly on external Asian suppliers for its components and finished products. Emerson Radio only went through two of the stages of the cycle and much faster than the other two firms. This was probably due to the market it faced in the United States, which was

severely competitive. Philips, on the other hand, appears to have gone through the first three stages and never really got back to being a technological leader in CE. It would be interesting to observe what pattern other CE firms have followed. Furthermore, one might expect firms in other industries, where international competition has emerged later than in CE, to show a similar pattern at some point in the future.

From a decision-maker's viewpoint the vicious outsourcing cycle is more than just a cause for cautionary behavior. It provides managers with an important criterion for future outsourcing decisions: To what extent does the activity that we are considering to outsource embody competences that matter for our future growth and innovation potential? And are we sure that the competences contained in this activity are all easily observable? This criterion does not need to replace more traditional considerations of cost minimization or those that are based on comparisons between the firm's current resource stock and that of its potential suppliers, but is a useful supplement to such considerations. In addition to short-term considerations firms and their managers also need to think about long-term variables such as future growth, continued innovation and sustainability of competitive advantage, all three of which are inextricably linked together. There is no *a priori* correct answer to the question whether outsourcing is good or bad for the development of competences inside the firm. Its consequences hinge on the circumstances under which outsourcing takes place and how these conditions then change over time.

In technologically intensive industries such as CE, continued innovation is the key to future growth and sustainability of competitive advantage. But in order to innovate, firms need to learn to identify those competences that underlie components and could possibly lead to the development of unanticipated technology or products in the future. The ability for identification is often elusive or is sometimes sacrificed by myopic managers and managers suffering from the Faustian dilemma we discussed. Managers need to tell themselves not to think in terms of 'just one more component' to be outsourced. The three firms in our sample had the potential to innovate but they started giving it away bit by bit. This does not mean that firms should necessarily increase their R&D budget or keep all production activities in-house. But it calls for more judicious outsourcing strategies. Some firms have recognized this need, for example, Sony, which has shifted some of its manufacturing for semiconductors back in-house. Semiconductors, used in almost all electronic equipment today, are the basis for future innovation and being knowledgeable about the process for making semiconductors should ideally enable Sony to sustain its technological capabilities. Another important step forward seems to be the ability to move from one type of product to the next. Emerson never really made it beyond the radio and started losing out when it missed out on the DVD revolution. So firms that

outsource need to think about how they can proceed to entirely new products without having productive capacity. That may require different forms of cooperation in the research and development stage, for instance with specialist manufacturing outsourcing companies such as Flextronics, which unfortunately were not around yet when Emerson and Philips made their decisions.

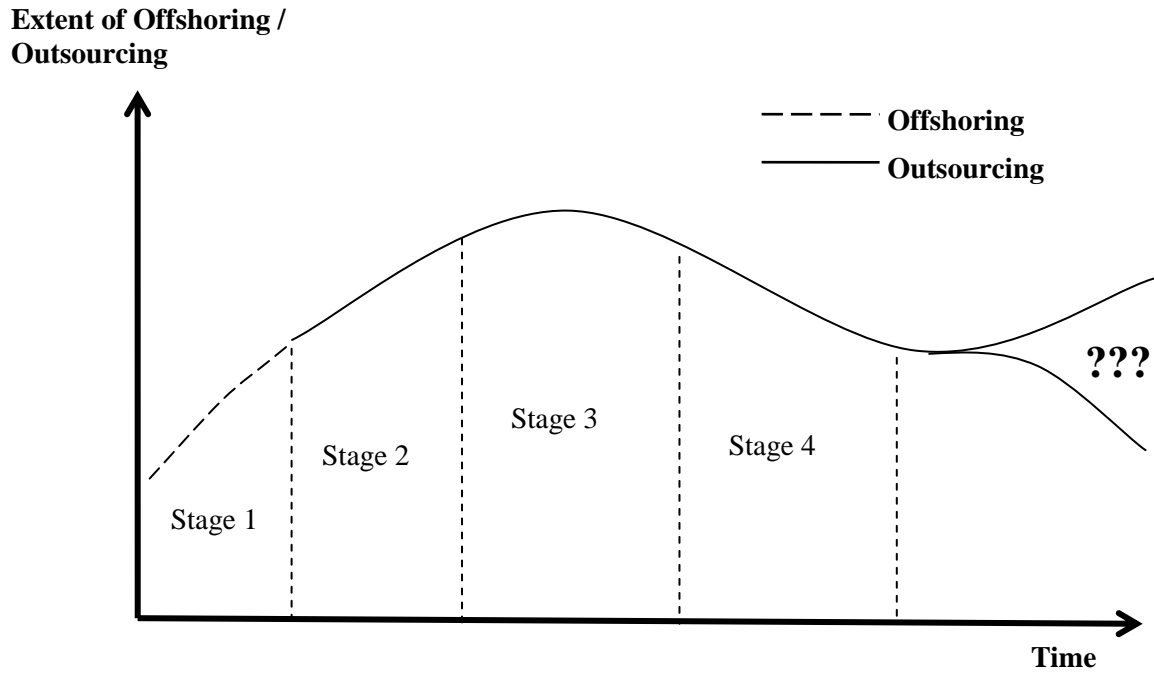
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Figure 1. The Outsourcing Cycle



Stage 1	Offshore sourcing by setting up a foreign subsidiary
Stage 2	Phasing out of foreign subsidiary to independent operators
Stage 3	Increasing dependence on suppliers leading to less value appropriation
Stage 4	Industry departure or reduction of outsourcing

Table 1. Evolution of Outsourcing Strategy

	Firm Characteristics	Trigger	Stage 1	Stage 2	Stage 3	Stage 4
Emerson (1922)	<ul style="list-style-type: none"> ●R&D Centralized ●Manufacturing - Decentralized 	Increased cost competition	Outsourcing deals with U.S.'s Admiral and East Asian manufacturers	Fall out with Admiral and complete reliance on foreign OEMs. Emerson in charge of design but not manufacture.	Realization of the loss of technology to East Asian OEMs	Complete reliance on outsourcing, unrelated diversification
Philips (1912)	<ul style="list-style-type: none"> ●R&D - Decentralized ●Manufacturing - Decentralized 	Increased cost competition	Setting up manufacturing subsidiaries in Taiwan, etc. (1980s)	Selling its foreign factories and increased outsourcing from Taiwan and Korea (1980s)	Loss of DVD technology to Japanese (1990s)	Increased R&D in-house, and stepped up outsourcing as well (1990s)
Sony (1953)	<ul style="list-style-type: none"> ●R&D - Centralized ●Manufacturing - Centralized 	Foreign market access	Setting up manufacturing subsidiaries in the US, Brazil, Taiwan, etc.(1970s)	Selling some of its manufacturing plants to Solectron; and more outsourcing to independent manufacturers (1990s)	Realization of the loss of innovative capabilities (2003)	Reduced outsourcing for high-tech components and increased in-house production of high-demand products (2000s)

¹ Although our model includes an ‘offshoring’ stage, which refers to the transfer of activities across geographical borders but inside a firm, we almost exclusively discuss the ‘outsourcing’ stage that follows it because it involves activities that are both transferred across geographical borders and performed by outside suppliers and hence is the more complex issue.

² In 1970, NUC charged its Japanese competitors with attempting to drive U.S. TV makers out of the domestic market by dumping or selling foreign made televisions at artificially low prices. This was one of the most controversial disputes in the industry at the time and the largest antitrust case against Japanese competitors. But in 1981, a federal court judge ruled that NUC and Zenith had been unable to provide sufficient evidence to support their charges.

³ Matsushita also acquired Philips’s main U.S. subsidiary Magnavox in 1992.

⁴ U.S.-based Solectron is one of the world’s fastest growing electronics manufacturing services (EMS) provider. Its offerings include product design and manufacturing.

⁵ This term is courtesy to one of our reviewers’ suggestions.