

Facit and the Displacement of Mechanical Calculators

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Facit, a successful Swedish manufacturer of mechanical calculators and typewriters, collapsed in the shift from mechanical to electronic calculators in the early 1970s. This article describes how Facit struggled during this transition and explains why the company lost its competitive advantage after almost 40 years of successful expansion and continued profitability.

Gordon Moore, the cofounder of Fairchild Semiconductor and Intel, suggested in 1965 that digital technology would become exponentially cheaper and better during the following decades. His prediction that the number of transistors on an integrated circuit would double in 18 months became a surprisingly accurate forecast of how digital technology has evolved since then.¹

His colleague, Robert Noyce, who coined the integrated circuit, argued in 1977 that this development would both create entrepreneurial opportunities and displace other technologies.² It is frequently argued in literature on the economics of innovation that technological innovations create extensive uncertainty and industrial turbulence. Industry incumbents often struggle to sustain their competitiveness when facing a technological discontinuity.³

This article seeks to describe and explain how Facit, a Swedish incumbent firm in the office machine industry, lost its competitive advantage in the shift from mechanical to electronic calculators. After almost 40 years of successful expansion and continued profitability, Facit's success abruptly ended in 1971–1972. Facit's management was accused by the Swedish press of having failed to recognize the microelectronic revolution. Although this myth has been debunked by other scholars,⁴ more knowledge is needed concerning why Facit struggled in the shift to electronics. How could Facit encounter such difficulties despite having understood that electronics would displace its mechanical calculators?

The article begins with a brief review of literature on technological discontinuities. This is followed by more detailed background on the company and the office machine industry. Lastly, the article explores the shift to electronics and Facit's actions to counter this threat.

Literature on Technological Discontinuities

"It is not the owner of stage-coaches who builds railways."

— Joseph Schumpeter⁵

Technologies tend to evolve along certain trajectories. Occasionally, these trajectories are punctuated by a discontinuous change that upsets the established paradigm.⁶ It is well documented that established firms often encounter difficulties when the underlying technology is altered. An abundant body of literature has explored under what conditions incumbents struggle to handle such changes.

Some scholars have argued that a key determinant of incumbent failure is the extent to which existing competencies are rendered obsolete.⁷ When firm competencies have been built and refined in relation to an established technological paradigm, this knowledge is often considered to be path dependent and difficult to change.⁸ Discontinuous changes may therefore turn core competencies into core rigidities, hampering a firm's attempts to develop a radically different technology. This logic does not only

relate to technological skills, but also the cognitive capabilities of a firm's employees.⁹

Another stream of research has pointed out that incumbent firms frequently lack incentives to invest in new ventures because they are already committed to an established product portfolio and therefore face a high opportunity cost.¹⁰ Because new technologies often start out as inferior and initially prosper in fringe markets, large, established firms are usually not able to prioritize small, uncertain markets that offer lower profits.¹¹

A third category of explanations is related to changes in industry structure and firm linkages to the market. Technological discontinuities that distort established customer relations are considered particularly difficult to manage.¹² An incumbent's performance will also be affected negatively if a new technology lowers the barriers to entering the industry because such a change often increases competition.¹³

Although the available literature points out some of the factors that influence an incumbent's response to a technological discontinuity, it is not exhaustive. There are determinants of incumbent failure, the role of which has not been sufficiently explored by previous literature. In other academic domains, scholars have shown that differences in country-specific institutional settings generally affect the performance of firms. Access to skilled labor, innovative suppliers, and lead customers are factors that influence the competitiveness of a firm.¹⁴ Although we would expect that the location of a firm shapes its response to a technological transition, this issue needs to be further explored.¹⁵ The empirical description in this article illustrates that this was indeed the case for Facit. The contribution of this article is therefore twofold. Apart from providing a detailed empirical account of Facit's decline, it adds to our theoretical understanding of technological discontinuities by suggesting that factor conditions in a firm's environment partly determine how it handles a technological discontinuity.

Industry and Company Background

The office machine industry can be traced back to the late 19th century when mainly American firms developed typewriters, adding and calculating machines, and cash registers. The industry became increasingly consolidated during the first half of the 20th century and remained stable until the rise of electronics in the 1960s and 1970s.

These companies were vertically integrated and had their own R&D, production, and marketing organizations. Another reason for being vertically integrated was the need for specialized components, and hence, the industry was capital intensive. Facit's mechanical calculators contained approximately 2,300 components that required specialized machinery to be produced. In combination with the fact that electromechanical technology had been incrementally enhanced over several decades, this implied that there were high barriers to entering the industry.¹⁶ At times, the industry was referred to as "the office machine club," implying that there were only a few, well-established firms and little opportunity for entry.¹⁷ Firms such as Olivetti, Olympia, and Facit dominated their respective domestic markets in Europe.

Up until 1965, Facit was called *Åtvidabergs Industrier*. The company had gone bankrupt in the early 1920s when the Swedish economy experienced a significant downturn. By the time it was taken over by Elof Ericsson, there were only 200 employees. In 1928, Ericsson acquired a calculator patent. Unlike other mechanical calculators, this design had only 10 digits, making it lighter and cheaper to manufacture. After years of refinements, the company launched the world's first mechanical calculator using only 10 digits in 1932. It was called Facit and experienced a remarkable success that fuelled the firm's growth in the following decades. By that time, the Facit calculator was arguably one of the most profitable products in Sweden. As the calculator became the flagship of the firm, its name was changed to Facit AB in 1965. Apart from some aesthetic modifications over the years, the Facit calculator essentially remained the same for 40 years.¹⁸

Based on the calculator's success, Facit became the dominant force in the Swedish office machine industry. It acquired typewriter manufacturer Halda (1938) and the calculating machine company Original-Odhner (1942). Because Halda did not have any sales organization, it was easily integrated into Facit's business. However, Original-Odhner was left intact with its own sales force up until 1966,¹⁹ even though the benefits of integrating them were numerous.

After these acquisitions, Addo was the only remaining competitor in Sweden. Over time, Addo was outperformed by Facit, largely thanks to more efficient operations and a stronger sales organization. Facit eventually acquired Addo in 1966 and emerged as the

Facit and the Displacement of Mechanical Calculators**Table 1. Facit turnover and profits, 1960–1971.**

Year	Revenue (million SEK)*	Earnings before income tax (million SEK)*	Operating margin (%)
1960	299	35.4	11.8
1961	343	47.7	13.9
1962	381	28.6	7.5
1963	408	32.6	8
1964	467	47.6	10.1
1965	519	58	11.1
1966	696	49.1	7
1967	723	30.5	4.2
1968	804	40.5	5
1969	879	42.9	4.9
1970	1,002	25	2.5
1971	953	-54.4	-5.7

* Five Swedish krona (SEK) corresponds to approximately one US dollar.²⁴

national champion of the Swedish office machine industry with a broad portfolio of mechanical calculators, typewriters, and office furnishings. Although the scope of Facit was broadened in these years, mechanical calculators remained its main source of profit.²⁰ For instance, in 1967, 52 percent of its corporate profit could be attributed to sales of mechanical calculators.²¹

The company also expanded to other geographical markets and established subsidiaries in Norway (1948), France (1949), the United States (1950), Brazil (1950), Germany (1951), and Mexico (1958). Throughout Latin America, Africa, India and Australia, Facit's products were sold both via their own sales organization and through special dealers. In 1964, the company had more than 100 such dealers. Facit also established several manufacturing sites across the world, for example, in Brazil, India, and Mexico.

Much like its American competitors, Facit remained vertically integrated and developed a large market organization that gave the firm a competitive advantage. In the small Swedish market, Facit had approximately 90 sales offices and 120 engineering workshops where machines could be repaired. These offices exhibited Facit's calculators, typewriters, and office furniture. About five salespersons would work in one office. They visited customers frequently and invited them to meetings, dinners, and various events to maintain good relations.

Because calculators were capital goods in those days and cost about 3,000 Swedish krona (SEK, approximately US\$600),

purchasing one was a considerable investment, and often, customers would first borrow a calculator for a couple of weeks. Bearing inflation in mind, 3,000 SEK in the 1950s would correspond to an amount about 10 times larger in today's currency (US\$6,000). Before a transaction was made, the salesperson would both install the machine and briefly educate customers on how to use it. The sales force and service networks were a key source of competitive advantage for manufacturers of mechanical calculators and further increased barriers to entering the industry. This observation has been confirmed elsewhere; a senior executive for one such firm stated once that, "You don't have a chance in this business without this capability."²²

Facit's strong sales organization made it possible to establish long-lasting relationships with customers, and this has been referred to as a key success factor for Facit. The sales force was well trained and had a strong common identity. Even today, more than 40 years after Facit's decline, former sales staff still get together occasionally in Sweden.

After World War II and up until the mid-1960s, Facit experienced remarkable growth as a result of the high demand for its products. In this era, demand exceeded supply and customers were often clamoring for Facit's machines. At its peak, Facit had about 10,000 employees in Sweden and about 3,500 abroad.

In the 1950s and early 1960s, the main task of Facit's directors seems to have been one of managing growth along a defined and certain trajectory. The CEO of Original-Odhner reported to the board of Facit in 1966 concerning how the company had performed in comparison to its 10-year plan implemented in 1959. Original-Odhner had exceeded expectations and was in fact two years ahead of its plan regarding revenue growth.²³ Factories across Sweden increased their capacity to cope with demand for Facit's products.

Although Facit was still a profitable company, evidence suggests that the company entered a stagnant phase as early as 1965, before electronic calculators had any significant impact. Table 1, which shows the turnover and profits of Facit between 1960 and 1971, clearly illustrates that both the profit in absolute numbers and the operating margin peaked in 1965. The revenue growth between 1965 and 1966 can be attributed to the acquisition of Addo.

A couple of factors contributed to Facit's declining financial performance in these years. First, by the mid-1960s markets became increasingly saturated as the long economic growth period after World War II gradually came to an end. Customers were no longer in desperate need of Facit's products, and price competition, which had been virtually nonexistent before, now started to increase.

Second, Facit's acquisition of Addo in 1966 decreased profitability as Addo was losing money. Moreover, Addo was not integrated at all into the Facit corporation. Sales, marketing, and product development was performed in parallel by Addo and Facit,²⁵ and thus, no synergies were obtained from this acquisition. In retrospect, CEO Gunnar Ericsson has stated that it was a mistake to buy Addo. His main rationale for doing so was fear that a foreign competitor would take over Addo and enter the Swedish market. Addo was in fact inferior to Facit in most regards, so it can be questioned whether anyone was interested in acquiring the company.²⁶

Even though Facit's performance declined from the mid-1960s, minutes from board and top management meetings in 1965 and 1966 do not reveal any concerns. Rather, management seems to have been occupied with expansion plans. In 1966, a company forecast was presented to management projecting that sales of mechanical calculators would continue to increase 12 percent annually over the coming years, which implied that the number of employees in the calculator business in Åtvidaberg would increase from 1,060 to 1,830. The only expressed reason why this would be unrealistic was that the local labor market would not cope with this demand.²⁷ Thus, in the years prior to the transition to electronics, top management seemed positive about the company's future. CEO Gunnar Ericsson has often been described as a genuinely optimistic person. Having experienced decades of continued expansion and profitability, it can be argued that this success also shaped the mindset of Facit's management.

Early Versions of Electronic Calculators

Calculators based on individual transistors started to emerge in the early 1960s. These devices were more reliable than the vacuum tubes that had previously been the dominant technology for electronic calculators. The products were still complex and expensive to manufacture because they contained

numerous discrete parts, and thus, their production was a labor-intensive and time-consuming process. Therefore, Japanese companies had a competitive advantage over European and American manufacturers of calculators as wages in Japan were approximately one-tenth of the wages in the Western world.²⁸

The first electronic products were aimed at niche applications such as specialized technical and scientific segments, a part of the market that Facit was not present in.¹⁶ Nevertheless, Facit made its first entry into electronics in the 1950s when it created the subsidiary Facit Electronics. Some of Sweden's best electronic engineers were recruited to the company between 1956 and 1962, and significant investments were made to develop large computers. (These efforts have been documented previously in *IEEE Annals*²⁹ and will therefore not be covered in further detail here.) According to Gunnar Ericsson (the CEO by that time), some attempts were made to direct the group's efforts toward electronic calculators in these years, but the potential was deemed to be limited, especially considering how labor intensive electronic products were prior to the introduction of integrated circuits. Additionally, competence in electronics was scarce in Sweden in these years, and Facit had difficulties finding skilled employees.³⁰

In the late 1950s, Facit had also established a relationship with North American Aviation (NAA), a company that supplied advanced electronics to NASA and for some military applications. NAA's subsidiary Autonetics considered developing electronic products aimed at nonmilitary purposes. A collaboration was set up between Facit and Autonetics with the initial goal of developing and manufacturing electronic products for scientific and technical purposes that could be sold throughout Facit's global sales organization. The first versions would be delivered in early 1966, and both parties hoped to build a long-term relationship and later on develop products for office use.

Autonetics experienced some technical difficulties and was unable to specify a price. The agreement would nevertheless last for five years, but the eventual outcome of it is unclear. This issue was scarcely mentioned in board and top management meeting minutes over the coming years, so the general impression is that little came out of the collaboration. Other sources state that NAA later licensed its know-how to Hayakawa

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Table 2. Calculators manufactured by Japanese companies in March 1970.

Company	Volumes sold	Market share (%)
Sharp	41,500	36.5
Canon	17,600	15.5
Casio	10,500	9.3
Toshiba	10,500	9.3
Hitachi	7,400	6.5
Busicom	7,200	6.3
Rico	5,500	4.9
Others	13,300	11.7
<i>Total volume</i>	<i>113,500</i>	

and other Japanese firms and that Facit may have missed a unique opportunity here.³¹

One plausible explanation for why Facit never went further with Autonetics could be that an agreement with Hayakawa Electric in Japan was set up at about the same time. Hayakawa had launched its first all-transistorized electronic desktop calculator in 1964 and later on changed its name to Sharp, which was the brand that had been used for most of its products. Having considered other potential partners such as Canon and IME, it was clear to Facit’s directors that Sharp offered the best products for office use. Sharp would emerge as the dominant manufacturer of electronic calculators in the coming years.

Table 2 provides information on the volumes of calculators manufactured by Japanese companies in the industry in March 1970. Approximately 50 percent of this volume was exported.³² The table clearly shows that Sharp was the undisputed market leader at this time.

The agreement with Sharp would give Facit the right to sell Hayakawa’s desktop

calculator Sharp CS-10A on a nonexclusive basis via its sales organization over the following two years. Sharp would still be able to sell the machine on its own, and the Facit version would have different colors and use the Facit brand.³³ An initial order of 1,400 calculators at the unit price US\$530 was placed, with deliveries starting in January 1966.³⁴

According to CEO Gunnar Ericsson in 2009, this collaboration departed from Facit’s method of operations because Facit had previously not sold products developed by others. He points out two important reasons for the agreement with Sharp. First, Facit had to obtain a position in electronic calculators and doing so was difficult because the company had little experience with electronics. Second, it would have been virtually impossible for Facit to produce these calculators in Sweden, considering the high wages and labor-intensive nature of electronic calculators at this point.³⁰ The reviewed material does not indicate that Facit’s management ever considered manufacturing electronic calculators at this point. By the late 1960s, several Western manufacturers of mechanical calculators such as Burroughs, Monroe, Friden, and Olympia set up similar agreements to Facit’s (see Table 3).

Table 3 shows a selection of Japanese manufacturers of electronic calculators and the companies that sold them. The table illustrates that most Western manufacturers of mechanical calculators tried to gain a foothold in electronics by collaborating with Japanese firms. Collaborations with Japanese companies seem therefore to have been a common strategy among firms similar to Facit.

A new agreement with Sharp was signed in 1967.³⁵ Although electronic calculators exhibited high growth rates in 1965–1967, sales started from low levels and were insignificant when compared with mechanical calculators. In 1966, Facit sold 773 of the 1,400 electronic calculators ordered from Sharp, and the remaining ones were sold in the coming years. This figure corresponds to less than 1 percent of total calculator sales. Having increased to about 3 percent in 1967, the total amount was still negligible in terms of revenue and profit.³⁶ Reading minutes from board and management meetings in 1965–1966, one gets the impression that little attention was paid to electronics apart from the collaboration with Sharp, which is mentioned occasionally.

Table 3. Selection of Japanese manufacturers of electronic calculators and the companies that sold them.

Manufacturers	Companies selling these calculators
Sharp	Sharp, Facit, Addo, Burroughs
Canon	Canon, Monroe
Hitachi	Hitachi, Friden
Busicom	Busicom, NCR, IME
Casio	Casio, Commodore, Remington
Matshushita	National, Olympia
Sanyo	Sanyo, Dictaphone
Tatcichi	Adler-Triumph, Oxron

The Shift to Electronics

“The shift from mechanics to electronics was a revolution.”
 — Lars Hallgren, CFO of Facit²⁸

The early transistorized calculators were larger and heavier, and they cost about twice as much as Facit’s mechanical calculators. There was extensive media coverage of electronics in these years, and curiosity among certain price-insensitive customers seems to have been the main rationale for purchasing these calculators.

This started to change when individual transistors were replaced by integrated circuits. A 25 to 35 percent price reduction occurred almost instantly. With the introduction of medium-scale integrated (MSI) electronics and later large-scale integrated (LSI) electronics, electronic calculator prices entered a phase of steep decline from 1966 on.³⁷ For example, a nonprinting electronic calculator cost about 6,500 SEK (US\$1,300) in 1966, and four years later it cost 2,600 SEK (US\$520).³⁸ A few years later, they would cost approximately 1,000 SEK (US\$200), about one-third of what Facit usually charged for its mechanical calculators.

The rapid decline in prices, combined with continued miniaturization fueled an explosive growth in sold volumes (see Figure 1). Japanese manufacturers dominated the industry in these years, controlling 66 percent of the global market in 1967 and 75 percent in 1972. The number of sold units increased by 18,000 percent between 1967 and 1972.³⁹ New products were launched at an accelerated pace, and older versions of electronic calculators were replaced quickly. At the large Hannover fair where manufacturers of calculators exhibit their latest products, 22 electronic calculators were presented in 1968. This figure more than doubled the following year, and in 1970, 68 electronic calculators were exhibited, out of which only 13 had been shown the previous year.⁴⁰ In 1972, 160 electronic calculators were shown and only 33 of them were left from 1971.³⁹ Hence, the intensity of product launches was in fact accelerating in these years.

Interestingly, Facit’s sales of electronic products also increased rapidly during this period (see Figure 2), mainly thanks to the collaboration with Sharp. At the corporate level, sales of electronic calculators increased from 8,800 units in 1968 to 41,000 units in 1970 and was predicted to rise to 64,000

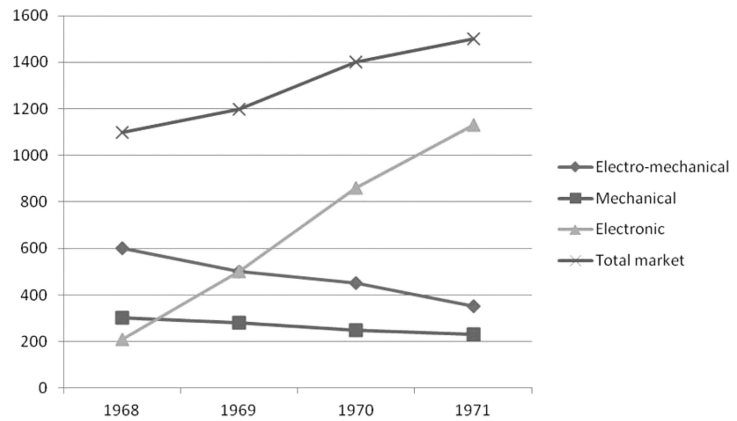


Figure 1. Global sales of mechanical, electromechanical, and electronic calculators, 1968–1972. Figures are in thousands of units.³⁹

units in 1971.⁴¹ In 1972, sales of electronic calculators increased by 28 percent.⁴²

Facit’s growth in sold electronic calculators however did not compensate for the decline in sales of mechanical calculators in terms of revenues and profits. Margins on electronic calculators were about 60 percent lower than margins on mechanical calculators in 1968 and 1969.⁴³ As order intake of mechanical calculators decreased by almost 50 percent between 1970 and 1971, the company had to replace a high margin product with a low margin product.⁴⁴ This steep decline also forced Facit to lower prices on mechanical calculators,⁴⁵ so the shift to electronics had a considerable impact on the corporation’s total profit.

Electronic calculators offered lower profits for several reasons. First, because Japanese companies dominated the electronic calculator business, their share of the total market

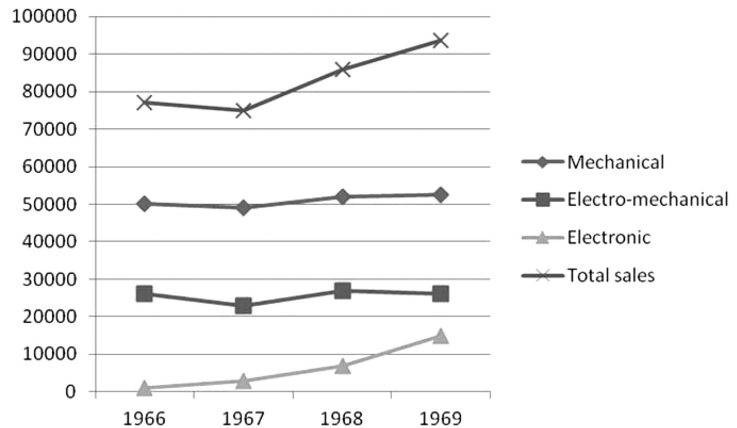


Figure 2. Facit’s sales of different calculators, 1966–1969. The graph only includes the Swedish market and Facit’s international subsidiaries, but not all dealers. Addo is not included in these figures.⁴¹

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became progressively larger and Facit's market share smaller. Second, a significant increase in firms entering the industry could be observed in 1971 and 1972, in both Japan and the United States.⁴⁶ In the US, semiconductor manufacturers such as Texas Instruments and Rockwell launched their own calculators in 1972. From 1969 on, Facit's customers were approached by an increasing number of manufacturers, forcing Facit to lower prices. Thus, competitive rivalry in the industry became more intense in these years, and price wars were more frequent. In late 1970, Sharp lowered its prices by 50 percent.⁴⁷ With only about six electronic calculators to offer in 1969, Facit's product portfolio was narrower than Sharp's, so Facit struggled to keep up with competition.⁴⁸

As new products were introduced at an accelerating pace from 1970 and on, it became increasingly difficult for Facit to handle inventories of both mechanical and electronic calculators. For instance, in July 1970, manufacturing had received information that 16,000 units of mechanical calculators should be made, but only 1,051 were sold that year. Eventually, 6,000 units were sold.⁴⁹ Electronic calculators could be sold for about one year, and consequently, there was a great risk that inventories had to be written off, especially when selling Sharp's products that had already been launched. This trend was already visible in 1967 when Facit had to get rid of its transistorized calculators because products using integrated circuits were taking over the market.⁵⁰ In the first quarter of 1971, Facit's inventories rose almost 30 percent,⁵¹ and by early autumn, Addo had inventories corresponding to seven or eight months of sales.⁵²

The situation was worsened by the fact that Sharp only offered limited technical support and maintenance of their calculators.⁵³ Because products were continuously replaced by better and cheaper models, Sharp saw little reason to offer extensive support or to provide spare parts. At one point, Sharp's deliveries to Facit contained 7 to 25 percent dysfunctional products,⁵⁴ and fixing them turned out to be complicated and expensive⁵⁵ since Facit's service network lacked the capability to do so.

As mentioned previously, having a large service network had been a key source of competitive advantage in the mechanical era. With the shift to electronics, Facit could no longer take full responsibility for

their calculators vis-à-vis customers. The conflicts between Facit and Sharp concerning spare parts and dysfunctional products illustrate how service networks became less important once the shift to electronics gained momentum.

The continued decline in prices and miniaturization of electronic calculators also affected Facit's sales organization. With 90 sales offices in Sweden and its own subsidiaries abroad, Facit was extensively integrated vertically. The firm's sales model was designed to build strong customer relations and sell small volumes with high margins per sold unit. By 1972, calculators had become so cheap that it made little sense to sell them through Facit's sales organization.⁵⁶ Already in 1968, concerns were expressed by Facit's management that Sharp would sell its calculators through other channels such as retailers.⁵⁷ Additionally, with the rise of small and simple pocket calculators, sales staff no longer had to install machines and instruct customers. During a top management meeting in 1971, a discussion took place concerning whether or not Facit should manufacture electronic calculators in the long term. The CEO by that time, Gunnar Agrell, answered that Facit should do so, provided that these products could be sold through Facit's sales organization and that they were not aimed for retailers or other distribution channels.⁵⁸

When calculators later on became consumer products, Facit's extensive sales organization lost its value because profitability could not be reached by selling small volumes of cheap products. Calculators were increasingly sold via bookstores, discount retailers, and other channels that could handle the large volumes needed to remain profitable. This shift had only started to take place in 1971–1972, however, and therefore is probably not the main explanation for the downfall of Facit.⁵⁹

Facit's Attempts to Develop Electronic Calculators

"The cogwheels in the mechanical calculators were the soul of the company."

—Gert Persson, former employee at Facit Electronics⁶⁰

As stated previously, reading meeting minutes from 1965 and 1966, one gets the impression that Facit at this point had not recognized the full impact of electronics.

From 1968 on, however, there is a much higher sense of urgency and electronics receive more attention. During a meeting in August 1968, the CEO stated that “electronic calculators are growing rapidly. If we want to remain competitive it is necessary to focus our efforts on electronic machines.” At that same meeting, it was also stated that it would be many years before the company had an electronic calculator of its own.⁶¹ An investigation in autumn 1968 suggested that attempts at developing an electronic calculator would not be profitable for about four years.

Nevertheless, there were some efforts at making electronic calculators. The strategy was to focus on higher segments while purchasing cheaper versions from Sharp.⁶² Development took place both at Addo Electronics in the United Kingdom and in Sweden, first in Stockholm and then in Åtvidaberg.

In Sweden, Facit aimed to manufacture 8,000 calculators in 1971 and to sell 70,000 units in 1971–1972. This work turned out to be more problematic than the company had anticipated for a number of reasons. More than 60 employees with skills in electronics had to be recruited to Åtvidaberg, and it proved difficult to find people with this competence.⁶³ Also, Facit struggled to reeducate its staff,⁶⁴ and calls were made for further education activities and a larger diffusion of knowledge throughout the company.⁶⁵

Partly due to a lack of competence in electronics, several technical difficulties were encountered and resulted in severe delays. An electronic calculator was shown at several exhibitions in October and November 1971, and according to internal sources, it was generally well received, but sales could not take off as only about 100 machines were manufactured per week.⁶⁶ The situation had essentially not improved by mid-1972 when a high degree of dysfunctional machines made it impossible to meet demand.⁶⁷

Facit’s efforts continued in the following years, but in the end, the company failed to launch any competitive products. They did not stop these initiatives, however, until 1977.⁶⁸ A couple of attempts at collaborations were also initiated in these years, for example, with Philips and Hewlett-Packard, but they did not result in anything. Facit continued its collaboration with Sharp and the sold electronic calculators still came from Japan.

The Crisis

“We sit out in the forest and have no idea what is going on in the world.”

— Göran Arvidsson,
member of top management, 1971⁶⁹

Although Facit still made a profit of 25 million SEK (US\$5 million) in 1970, the company had entered a period of steep decline. In 1971, sales deteriorated and the company reported a loss of 54.4 million SEK. About 1,500 employees were laid off that year. Moreover, Gunnar Ericsson’s brother-in-law Lennart von Kantzow had only been Facit’s CEO for a short time when he was also fired in late 1971 and temporarily replaced by the CEO of Addo, Gunnar Agrell. In combination with the surprisingly large losses and layoffs, this created a great deal of negative publicity for Facit in 1971–1972. The situation got worse in 1972 when it was decided that an additional 2,400 employees would be dismissed. Because the situation was desperate, calls were made in the Swedish media to nationalize Facit. Most of media attention focused on the fact that a previously successful and well-reputed company had suddenly entered a state of crisis. Few articles tried to explain what had actually happened to the company.

Facit’s stock had peaked at 390 SEK in 1966, and by 1972, it had declined to 60 SEK. Eventually, Electrolux, a Swedish manufacturer of stoves, vacuum cleaners, and refrigerators acquired Facit, paying 64 million SEK (80 SEK per share) in late 1972.²⁸ Electrolux made several acquisitions at this time; the rationale for buying Facit was probably its balance sheet, where for example forests worth 40 million SEK could be found.⁷⁰ Facit continued to report losses in the following years despite extensive rationalizations. In 1982, the company was sold to Ericsson, a manufacturer of telecommunications equipment, for 200 million SEK.³¹ It is hard to tell whether Electrolux actually made a profitable acquisition. Inflation was high during those years so the numbers are difficult to compare. Moreover, the size of Facit’s losses in the 1970s are unknown.

Discussion and Conclusion

This article has sought to describe and explain why the office machine manufacturer Facit struggled in the shift to electronic calculators, despite having recognized it at an early point. The study shows that Facit

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made some strategic mistakes in the 1960s, such as the acquisition of Addo, which weakened its balance sheet and implied that Facit's efforts to develop electronic calculators were distributed throughout several divisions.

Clearly, these endeavors augmented Facit's problems, but in retrospective, the encountered challenges seem almost insurmountable for a number of reasons, especially bearing in mind that other manufacturers of mechanical calculators experienced the same problems. First, Facit's competencies were related to mechanics, not electronics. The company's R&D, its machineries, and the skills of its employees had been refined over the years for the purpose of developing, producing, and selling mechanical calculators. These core competencies now became core rigidities. Once the technology shift came into motion, electronics went from being bulkier and more expensive to cheaper and better within only a few years. Because competencies are generally considered to be rigid and path dependent and electronics became exponentially better between 1968 and 1972, Facit was indeed put in an awkward position. Facit obtained a position in electronics, but it could only be done by drawing upon Sharp's competencies.

The market for electronic calculators was insignificant by 1966–1967, and thus, too little attention was paid to it at this point. Once Facit's management realized this in 1968, it was too late because the entire competence base had to be transformed in only a few years. Moreover, Facit's management had for the preceding decades primarily been concerned with administrating growth along a predefined trajectory. They were not used to acting under conditions of high turbulence and discontinuous change.

The shift to electronics also had considerable impact on the industry structure. The mechanical era was characterized by high entry barriers and little competition. With the shift to electronics, Japanese and later American firms entered the industry, increasing competitive rivalry. Consequently, the overall industry profitability declined in these years, and in Facit's case, sales of high margin mechanical calculators were replaced by low margin electronic products.

Additionally, electronics affected the vertical scope of Facit. Sales organizations and extensive service networks had previously been an important source of competitive advantage. Facit's sales model was aimed at small volumes, high margins, and strong ties to

customers, whereas pocket calculators and later consumer calculators demanded much larger volumes to be profitable. From 1972 on, calculators were increasingly sold via other distribution channels.

The description here also illustrates how being situated in the small town of Åtvidaberg in Sweden augmented Facit's problems. Facit's location hampered the firm in a couple of ways. First, the labor-intensive nature of the first transistorized calculators seems to have prevented Facit from entering this business. In retrospective, several directors have stated that the comparatively high wages in Sweden made it difficult for Facit to develop electronic calculators in the years 1964 to 1966. When Facit's management realized the urgency a few years later, the company struggled to find competencies in Sweden related to electronics. Åtvidaberg was a small company town dominated by Facit and skills related to mechanics; developing electronic calculators in this setting therefore proved more difficult than first anticipated.

Generally speaking, Facit seems to have been disconnected from the groundbreaking innovations driving the industry. Integrated electronics was pioneered and developed in California while the Japanese industry made large efforts to launch products based on the technology. The quote from Göran Arvidsson about Facit's directors sitting in the forest not knowing what's happening in the world provides a good summary of how the company's decline is partly related to economic geography. This article therefore contributes to our theoretical understanding of incumbent failure by providing an illustration of how a firm's location affects its response to a technological discontinuity. More research is needed concerning how economic geography and factor conditions can explain the fate of firms undergoing technological transitions.

To conclude, the shift to electronics implied huge changes not only to Facit and its competencies, but also to the industry's structure. Because all this happened within only a few years, Herculean efforts would have been required to remain competitive under these circumstances of rapid structural change.

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