

The Road From Dreams of Mass Production to Flexible Specialization

American Influences on the Development of the Swedish Automobile Industry 1920-1939

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Paper to be presented at the 21st Fuji Conference for Business History, January 5-8,
1994 organized by the Business History Society of Japan

1. The logic of mass production and the Swedish automobile industry

The theme of this conference is to study the impact of Fordism on the automobile industry of different countries. The Ford way of organizing production had revolutionized the automobile industry. It also had a great impact on the Swedish debate in the 1920s on the possibility of establishing a **domestic** industry. Irrespective of the conclusions drawn about the **prospects** for Swedish manufacturers to match their American counterparts, references were made by the debaters to the mass production of **standardized** products. Thus an overview of the basic assumptions underlying this **production logic** may be necessary to get a perspective on the debate and the way in which the Swedish automobile industry **eventually** developed. Those who **believed** in the possibility of establishing a competitive automobile industry on a fairly large scale, **proposed** that potential entrants should look to the mass market, and should **enter** those segments where the **American** manufacturers were already **selling** large quantities. It was assumed that a competitive advantage could be developed for **cars** and light trucks of Swedish **origin**, with higher quality and **better** durability than their American counterparts. It was thus suggested that Swedish manufacturers would have the potential more or less to **mimic** the **American** manufacturers and to compete head-on in these mass markets for standardized products.

The Ford system of mass production was **based** on a few basic principles: the standardization of products, subdivision of the work, and the extensive use of **machinery** to **replace** manual labour (cf. Hounshell, 1984). Contrary to the **common** belief, a precondition for the mass production system is not the continuous assembly line but 'the complete and consistent interchangeability of parts and the simplicity of attaching them to **each** other (Womack et al., 1990, p. 27). The principle of not catering to any customer's individual **demands** in production planning is one of the keys to the mass production system. The **focus** on the production of a single model, or a very **limited** range of models, allows the full use of a mechanised work process and specialized **machinery**. However, an automobile **manufacturer** organized along these **lines** becomes rather inflexible and vulnerable to variations in **demand**. The original Ford system was extremely inflexible because of the high degree of special-purpose **machinery** used. But later **modifications** of the system are **basically** subject to the same problems of inflexibility. Because of high **fixed** costs, a minimum proportion of the **planned** **production capacity** has to be reached for the system to be effective. Thus a precondition for the effectiveness of the mass production logic is that a large and stable **demand** can be guaranteed. A Company operating on a standardized mass market has to be able to offer an **attractive** model at a price that is on a par with that of its competitors. This means that it is very important in the development of new models to **follow** the general trend very **closely**, and to put on the market a **car** that appeals to the customers and **reaches** volumes that enable the use of the most efficient production methods.

Against this background it must have been questioned whether it would be possible to design a competitive **car** in Sweden - a country with a population of slightly more than 6 million in 1925 - to organize a rational production system and to **build** up a **sales** organization that could match the imported mass-produced American **car**.

Three different automobile manufacturers: Volvo, Scania, and Saab-GM, are operating in Sweden today. Volvo is a **public** Company, while Scania and 50 per cent of **Saab-GM** have since 1991 been owned by the Wallenberg-dominated holding company Investor. Among international manufacturers of heavy trucks Volvo ranks **second** and Scania **fifth**. For many years Scania Vabis has been the most profitable Company in the truck business. Up to the mid-1980s Volvo was a successful and very **profitable** actor in the segment of high-priced **quality cars**, with a **particularly** strong position in the United States. In the last few years the Volvo **car** business has come up against problems due to a combination of diminishing **volumes** and a low dollar rate. The plans to extend the **alliance** between Volvo and Renault in a complete merger have just **been turned** down. Saab is in the not-too-enviable position of being the **smallest producer** of family **cars** in the world and is suffering from **heavy losses**. Since 1989 General Motors has a 50 per cent share in the Saab **car** business.

The position of the Swedish automobile industry seems to be unique in a global perspective. Despite a very **limited** domestic market for automobiles, Volvo and Scania Vabis **have** become two viable actors in the global automobile industry. The way they developed in the early years in order to **reach** this position **will** be examined below. The **description** **will** be **limited** to the period up to 1939 and **will** focus mainly on Volvo. A short account of the history of Scania Vabis **will** be given, and the **development** of the two companies over the years **will** be **compared**.

The following **discussion** **will** examine the impact that influences from the **American** automobile industry **have** had on Swedish manufacturers' **choice** of **product/market** strategy and **production** methods. In this analysis attention **will** **focus** on the conceptualization of a Swedish **car** industry **that** emerged from the debate at the time Volvo was founded, and on the **direct** implications of **American competition** on the development of Swedish efforts to start a domestic **car** industry. The natural point of departure for an overview of influences **from** the United States on the development of the Swedish automobile industry is an account of the situation prevailing in the 1920s. By that time motoring had achieved its **first** breakthrough, which resulted in a rapidly increasing import of **American cars**. This stimulated a debate on the possibility of establishing a domestic industry to **replace** a portion of the imports, which were deemed to **have reached** 'alarming' proportions. The question of **custom duties** on automobiles was **also** taken up in the Riksdag (the Swedish Parliament) in the mid-1920s and a series of investigations were launched to **discover** the preconditions for an increase in the **production** of **cars**. **Besides** the **call** for the establishment of a national industry, efforts were **also** made to **encourage** the **American** manufacturers to establish assembly **units** in Sweden. With the exception of Saab, which was not founded until 1949, all the companies that **have** ever made **any** serious attempts to establish a **large-scale production** of automobiles in Sweden were already **active** on the **scene** in the 1920s. The years between **the** end of World War I and the beginning of World War II can thus be described as a **dramatic** period in the **history** of the Swedish automobile industry.

The paper **will** be organized as follows. As a start, an overview of the automobile industry in Sweden at the time Volvo was established in 1926 **will** be given. In the next two **sections** the **discussion** in the mid-1920s on the possibility of establishing a

domestic car industry and the debate in the Riksdag on the issue of duties on cars is summarized. This is followed by a description of the development of AB Volvo up to 1939. Next, different ways in which influences from the American automobile industry reached the Swedish manufacturers will be presented. Further, the unsuccessful attempts to compete on a mass production market and the niche strategy that emerged instead will be discussed. Finally, a very brief comparison between the Volvo and Toyota production systems will be made, followed by a conclusion.

2. An overview of the Swedish automobile industry, except for Volvo, up to 1939

A distinctive feature in the history of the Swedish automobile industry is that the number of companies that have tried to enter the industry is very small. Apart from the manufacturers presently on the scene, only two other major ventures have been started.¹ This might tempt us to conclude that the industry has developed in a fairly unproblematic way. However, this is not the case at all. The problems faced by Saab over the years have already been mentioned.² As well Scania-Vabis, and on certain occasions Volvo, too, have been in serious trouble and a discontinuation of the business has been considered.

When plans for a major car industry first came up in Sweden around 1925, two companies were already operating in the automobile industry. In order to provide some background to the debate and the general situation prevailing at the time of the establishment of the Volvo Company, an overview of the development of the automobile companies operating in Sweden will be given below. As only one Company survived - Scania-Vabis - most of the description will be related to this Company, and a brief account of its development up to 1939 will be given. The history of AB Thulinverken, Tidaholms Bruk, and the assembly units established by foreign automobile manufacturers in Sweden can provide our point of departure.

2.1 The failures

The first major attempt to establish an automobile industry that ended in failure was at AB Thulinverken. During World War 1 the Company had manufactured aircraft for the Swedish air force. In an attempt to change from wartime to peacetime production, Thulinverken started a major project to produce a car of German design; a volume of 1,000 units was planned. This project was undercapitalized and the timing was un-

¹A few other attempts to assemble cars from imported parts on a very small scale were made in the early years of the 20th century. Some minor efforts were also made by two companies in the 1930s to produce buses (cf. Sahlgren, 1989, p. 38).

²It may be questioned whether Saab has ever been profitable since its start in 1949, with the possible exception of a few years with a high dollar rate and the benefits of the early introduction of the turbo aggregate. Its losses have been covered by other companies in the Wallenberg group first by the Saab Aeroplane business, later, when this company merged with Scania-Vabis in 1969, by Scania trucks.

lucky, as it coincided with the start of the depression in 1920. Only 300 **cars** were produced before the Company went into the hands of the receivers. Later efforts to restart the **project** coincided with the establishment of AB Volvo, which may **have** deterred any potential investors **from** supporting the risky **venture**.

The **second** Company to go **out** of business was Tidaholms Bruk. This **company** produced its **first** automobile in 1903, and went on to become a **manufacturer** of trucks, buses, and special **vehicles** designed to **customer specifications**. Though it produced a few **cars**, it soon **dropped** this **side** of the business. The **company** had an almost **entirely** integrated manufacturing plant and an annual capacity of about 200 **units**. In the late 1920s and early 1930s it introduced some successful new designs for heavy trucks and buses, and in order to meet increasing **demand** production capacity was expanded. The greater **financial burden** resulting from this expansion **caused** the **company** serious difficulty when **demand slumped** in 1932 at the onset of the depression, and in 1933 the Company went into the hands of the receivers.

Common to both these **unsuccessful** companies was the **fact** that they **lacked** the support of a financially strong owner and thus were not given a **second** chance.

2.2 Foreign assembly units

In 1928 General Motors established a production **unit** in Stockholm, and the same year 10,000 **cars** were assembled from **imported components**. Later, in the **1930s**, they were followed by other American automobile **manufacturers** and a **number** of assembly units **operated** by the Swedish distributors of American **cars**. **Until** World War II these **assembly units** and **car** imports totally dominated the market for automobiles in Sweden.

The economic rationale for these operations was that transportation **costs** and **customs duty** were lower for parts than for complete **cars**, and Swedish wage rates were **also** lower. **After** the war the assembly of American **cars** in Sweden gradually diminished in importance. This may be explained partly by import **restrictions** on **cars** and **car components** **after** 1947, and partly by a switch in **demand** away from large, heavy, petrol-consuming **cars** in favour of small European **cars**. As a **result** General Motors and the Ford Motor Company **closed** their Swedish assembly **units** in 1957.

2.3 Scania-Vabis

In 1925 Scania-Vabis had a workforce of 329 and produced 190 trucks and buses a year in more or less wholly integrated factories, using **basically** manual production methods.³ The Company can be described as one of the pioneers in the automobile industry, as its roots go back to 1896. Scania-Vabis is the result of a merger between two companies in 1911: Scania (founded in 1900) and Vabis (established in 1891). Scania had **started** with the production of bicycles but extended its operations to automobiles in 1903. Vabis **started** by supplying the railway companies with carriages, but

³This passage is **based** on Sahlgren, 1989 and Giertz, 1991.

as a result of severe **competition** in this business was **looking** for other uses for its production **capacity**. It produced its **first** automobile in 1897. Scania-Vabis produced **cars**, buses, trucks, and special vehicles **such as fire engines**. The **scale** of the operation was extended **during** World War I and in order to ensure the supply of materials two ironworks were acquired at **inflated prices**. These acquisitions were financed by bank **loans**, which meant that the **company** was in heavy debt. Because of the **restriction** on imports during the war, Scania-Vabis had no **competition** from **abroad**.

In 1919 plans for a considerable extension of operations were drawn up, which suggests a high degree of optimism on the part of the management of Scania-Vabis. According to the new strategy the **company** was to concentrate on the production of standardized trucks. The production of special vehicles and **cars** was to be **discontinued**. The **idea** was to transform Scania-Vabis **into** a large-scale export **industry**, ready to **face** the **competition** of cheaper foreign trucks when the expected increase in the **demand** for **transportation** by truck materialized. The **company's** managing **director**, Per Nordeman, was greatly influenced by the achievements at Ford. By then the truck version of the Model T-Ford dominated the Swedish market for trucks. The **first** step in the plan was to **capture** the Swedish market, and to achieve this a **sales organization** was created. Further, and before the expected increase in **demand** had yet materialized in terms of **sales**, a large **number** of employees were recruited. In 1919 the workforce amounted to more than 550. Scania-Vabis was thus **building up** its resources for rapid expansion in the years immediately preceding the recession following World War I. This year **proved** to be a **disaster** for the Company, and Marcus Wallenberg, Sr realized that the plans for the Company drawn up by Nordeman were unrealistic; in an effort to secure the **loans** provided by Stockholms Enskilda Bank, Wallenberg made **changes** in the management. The automobiles produced by Scania-Vabis were expensive and **outdated**, and in 1920 only 81 trucks and 80 **cars** were delivered. The situation for Scania-Vabis was aggravated by a lengthy labour **dispute** in 1920. This, together with soaring **demand** and heavy debts, put a great **strain** on the **company's** liquidity and in 1922 it went into the hands of the receivers.

Scania-Vabis's biggest **creditor** was the Stockholms Enskilda Bank, which took over control of the operations with a view to **securing** their claims. A new **company** bearing the old **company's** name was established. The **first** task of the new management was **limited** to liquidating the inventory of automobiles and those that could be **assembled out** of stored parts and components. After a while the bank **began** to realize that by **continuing** the business it would be possible to regain more of the loss it had **suffered** in the failure of the old Company. Investment in the operation was almost non-existent. The **company** was given a period of grace, so long as it did not make **any** demands on its owner. According to Giertz (1991), Marcus Wallenberg was considering the possibility in the early 1930s of **selling** Scania-Vabis to the newly established but rapidly expanding Volvo Company.

The attempt to establish a position on the large market for standardized trucks had thus failed. The new Company was to develop along a totally different road. It was to concentrate on the **demand** from institutional customers for heavy vehicles with special characteristics. Among these were the Post Office, the Customs Department,

the National Road Administration, and the **local traffic** system in Stockholm. In close co-operation with its **customers** Scania-Vabis acquired experience and succeeded in designing **engines** and chassis of excellent quality in performance. These institutional automobile users had their own repair and maintenance shops. Thus, without **any** investments in a sales- or service-organization, customer-driven **product** development and a process of consolidation of the Company were initiated. By 1927 the operations were profitable **again**, and by the following year the accumulated **losses** had **been** made up.

Scania-Vabis's range of products consisted of four kinds: complete buses, chassis for buses, trucks (including special vehicles), and separate **engines**. Until 1932 trucks dominated. In 1931, 185 units of this category were delivered as **against** 136 buses, or a total of 321 vehicles. The **crisis** year of 1932 saw a turnaround, with only 74 trucks and special vehicles as **against** 130 buses. In 1938, 205 buses and 89 trucks were sold, or 294 units altogether. That year 38 vehicles were exported, representing 20 per cent of the total turnover. Deliveries of separate **engines** fell from 171 in 1931 to 125 in 1938. **Since** 1925 the number of vehicles produced had increased by slightly more than 100 **units** to a total of 294, and the number of employees had **risen** by 263 to almost 600. **During this** period the sales of trucks and buses in Sweden had multiplied, but Scania-Vabis's development did not match this growth in the market. The standstill in the development of Scania-Vabis may be **explained** by the attitude adopted by its owners. Their primary **interest** was not the development of the automobile Company as **such**, but the **recovery** of what the bank had lost in the failure of the old Company in 1922. This situation **altered** when Marcus Wallenberg, Jr joined the board of **directors** of Scania-Vabis as the **first** member of the family in 1937.

The workshop at Scania-Vabis was **manned** by a highly skilled team of **craftsmen** and was very flexible, which suited the strategy of producing to the customer's orders. However, the incentive to standardize the products and to organize **production** along **rational** lines was low. **Although** the new managing **director**, Gunnar Lindmark, was one of the pioneers in using time studies in Sweden, he **applied** his experience to the organization of work at Scania-Vabis only to a very **limited** extent. The **engines** and chassis were produced **direct from** blueprints, and the design of the working **methods** was left to the workers. Supervisors and foremen were recruited from among the workers. The **hourly** wages were not **particularly** high, but the **piece** rates, which were determined in **free** negotiations with the foremen, yielded proportionately very high earnings. To put it frankly, the craftsmen set their **own** wages, and this was normally twice as high as the **hourly** wage rate. They were regarded as among the best paid **mechanics** in Sweden (Giertz, 1991, p. 138). Available sources indicate that the way **production** was organized **left much** to be desired as regards **discipline**, order, and the principles for calculating wages. It was not until 1937 that a specialist on **rational production** methods was appointed as head of the workshop at Scania-Vabis.

3. Calls for a national automobile industry

Around 1925 suggestions appeared in trade journals and elsewhere about the necessity of establishing a Swedish car manufacturing industry to reduce dependence on the rapidly increasing importation of foreign cars (*Svensk Motorridning*, 29 March 1925, p. 115 and 12 November 1925; *Teknisk Tidskrift*, 25 July 1925 and 1 May 1926).

3.1 The UK as a model for a Swedish car industry

The point of departure for this discussion was the American dominance in the car manufacturing industry, and the measures that European companies could take to counter it. The American strategy was based on the standardization of products and the production in long runs of cars designed to appeal to the needs of large segments of the population. Up to that time the European manufacturers had been producing quality cars in short runs for a limited group of customers. The new situation, it was explicitly stated, called for a changeover to American production methods, and for the focus on small groups of customers to be abandoned. The primary reason why the question of a Swedish automobile industry was taken up just at this time was the large, and increasing, amount of imports, but another reason was idle capacity in the Swedish mechanical engineering industry. It was suggested that these companies would welcome such a venture. A few Swedish companies had already started to manufacture parts for the automotive industry, and some of them had even started exporting successfully to the American automobile industry. One of the companies referred to was probably SKF, which produced ball bearings and which by then already could boast of large exports and had a number of subsidiaries abroad. It was concluded that if it was possible to make a profit from delivering parts manufactured in Sweden to the American manufacturers, it would also be feasible to produce a complete car for the Swedish market at competitive prices. This car should be positioned as regards quality and price above the Ford Model-T, and, as the trend was set by American cars, it should have a sturdy and America-influenced design.

In the situation of the automobile industry at the time it was not considered too difficult to make the choice of a suitable design. The car had to be adapted to Swedish conditions and to fulfil the requirements expected of a modern car abroad. At the same time it was pointed out that it was very important to make the right decision from the beginning. The model, once chosen, must not be changed except very slowly and in gradual stages, as a sudden change in the model would mean an enormous outlay of capital and a less favourable position as regards the prospects of future sales.

In this debate developments in the UK were held up as an example for Sweden to follow. It was claimed that, without the protection of a customs barrier, the automobile industry in the UK had managed to capture 80 per cent of the market. From this it was concluded that a Swedish automobile industry would be able to capture 50 per cent of the demand, provided the model and the price were suitable. Swedish imports amounted to 12,000 cars in 1924, and the figure was expected to increase considerably

over the next few years. It was claimed that at a volume of 6,000-8,000 units rational production at competitive prices would be possible.

This very optimistic prediction was based on incorrect assumptions about conditions in the UK automobile industry. Since 1915, with the exception of a period between 1 August 1924 and 30 June 1925, the industry had benefited from protection at 33.33 per cent custom *ad valorem* on imports of automobiles and automotive parts (cf. Sloan, 1964, p. 3 18). Added to this, the taxation of vehicles and fuel discriminated against American cars with their larger engines. This protection is not mentioned at all in any of the articles reviewed, in spite of its importance in explaining the success of the automobile industry in the UK vis-à-vis the American manufacturers.

The reason why no production had yet been established in Sweden was that until then the demand had been insufficient to allow for rational production. However, a lack of entrepreneurial spirit was also mentioned. The way a Swedish automobile industry should be organized was more or less taken for granted. All that was needed was the establishment of an independent plant for assembling the parts produced by different companies in the Swedish mechanical engineering industry. It was assumed that several Swedish companies already possessed the necessary competence and machinery. This meant that the required investment in machinery would be limited, and a Swedish automobile industry could be made possible simply by co-ordinating the resources already available in the country. In 1925 the establishment of a car manufacturing industry in Sweden was thus regarded as primarily a question of organization. One of the journals concluded that all the conditions and requirements that were needed for the production of automobiles on a larger scale than hitherto, were now to hand. 'What we still lack is the person who will take on the task, and who has the ability to gather all the good forces around himself (*Teknisk Tidskrift*, 1 May 1926, p. 164).

3.2 Focus on trucks and buses at first, instead of cars

During the debate the situation regarding the production of trucks was also touched upon. This part of the business differed in that a wide range of models was needed to satisfy the variations in demand. Sweden already had two companies producing large trucks and buses; in quality and price they could match the foreign competition. However, there was no production of small models with a loading capacity of ½ to 1% tons. This was by far the type in most demand, and the demand was mainly covered by the Ford 1-ton model, which was described as cheap but of limited durability. It was suggested that a Swedish quality product would have a chance of finding a market in this segment. Whether this production of small trucks should be combined with a potential new production unit for cars, or whether it should be taken up by one of the existing truck manufacturers, depended on what model of car would be produced. There was an opportunity to use the front part of the car for the truck, and thus to lower the production costs. One drawback of this approach, it was pointed out, was that such a division of resources might make both lines of production unprofitable.

Not everyone shared the optimism about the possibilities for establishing a competitive automobile industry at that time. It was argued that Sweden had **been** hopelessly left **behind**, and that the American advantage was too great **unless** it would be possible 'to count on strong support from the state and the workers and **injection of sufficient capital**' (*Svensk Motortidning*, 22 November 1925, p. 551). This was not considered a **realistic** expectation, and instead of a bold large-scale **car venture**, a long and **gradual** development whereby conditions were improved step by step was **suggested**. The main **difficulty** lay not in organizing the available resources, but in raising the **substantial** amount of capital that was needed to develop an **effective sales organization**. The **prospect** of developing Swedish **car production** on a basis of the existing **production** of buses was thought to be far more promising. It was assumed that the venture's chances of **success** would increase, if the experience of the Swedish bus **manufacturers** and the resources they could make available were utilized. 'However, a development along these lines might take several years, but the **success** would without **any** doubt be considerably more reliable' (ibid.).

4. The Riksdag on car import duties

The question of the establishment of a Swedish automobile industry **also came up** when the Riksdag **discussed** the question of **duties on cars during** the period 1924-1927.⁴ The **subject** was **first** brought up in 1924 when a motion was put forward that the **customs duty** on automobiles should be increased from 15 to 30 per cent on **assembled cars**. This **demand** for increased **protection** was initiated by one of the **companies** in the industry, Tidaholms Bruk. In the following year a member of the Riksdag, on behalf of the Ford Motor Company, moved a resolution to reduce the **custom tariff** on parts and **components** used in the assembly of **cars**.

4.1 Arguments for and against a national industry

One way to sum up the debate that followed until the issue was finally determined in 1927, is to say that it **focused** above all on what would primarily benefit industrial development in Sweden: a Swedish-owned automobile industry, or assembly units **controlled** by foreign **manufacturers** (Nordlund, 1989, p. 155). In 1927 the plans for AB Volvo were **widely** known, although no **car** had yet **been** produced. With this in mind many members of the Riksdag felt uncomfortable about **reducing** the **customs duty** on **imported** parts for automobiles, in order to promote the establishing of **foreign-owned** assembly units. The argument in favour of a national industry was **based** on the need for automobiles adapted to Swedish conditions, and the necessity of guaranteeing the requirements of the military as regards vehicles, should foreign supplies be

⁴This section is based on the records of the Riksdag and, the minutes and working material of the parliamentary committee Beviljningsutskottet. A more detailed description of this debate is presented in Kinch, 1993c.

blocked. A crucial argument in this context also concerned the assumed high **qualifications** of the Swedish mechanical engineering industry and its need for a large project to promote employment. At the same time it was emphasized that **historical developments** had clearly shown that **during** its build-up period the Swedish industry would need **protection**, if it was to **cope** with **competition** from the North American **manufacturers**. Due to the exceptional position of the automobile industry and in the light of the foreign examples (cf. the customs **duties** on automobiles in the UK), many **members** of the Riksdag, although generally in favour of **free** trade, were prepared to **abandon** **such** a policy in this **case**, or to disregard **any** principled objections to the use of government subsidies to stimulate a **particular** industry or Company. In the **parliamentary** proceedings it was quite clear that the plans for the new **car manufacturer**, AB Volvo, as presented by its founder Assar Gabrielsson in a parliamentary committee, had made a strong impression on those present. Gabrielsson argued for a temporary increase in customs **duty** to 30 per cent on **imported cars**, the reason being that it would be possible in this way to **price** the Volvo **cars** at a level that would **generate** the capital required for increasing **production**, from a **planned** series of 1,000 **units** to a **volume** of 8,000 units. The project needed a further infusion of SEK 2 million to be viable, and this way was his last resort. Even if the members of the committee were not prepared to support a temporary increase in customs tariff on **imported cars**, many of them were convinced by his presentation that the Riksdag ought to look for other ways of facilitating the financing of the Company.

The advocates of the development of a national automobile industry, to be **protected** by an increase in the customs **duty** on **imported cars**, were countered by the following arguments. On grounds of principle some people rejected the **idea** of an increase in **custom** tariffs or of **selective** government subsidies for the automobile **industry**. These measures would impose **costs** on the users and would prevent the expansion of motoring. A national **venture** had to be **justified** on its own merits, and must **have sufficient** inherent strength to attract **capital** on the **conditions** prevailing on the market. Others questioned the need for a **car** adapted to Swedish **conditions** and were dubious about the possibility of starting large-scale **car production** in Sweden at that time. It would **have been** possible ten years earlier, but now the American **manufacturers** had gained an advantage that would be impossible to overcome.

4.2 Arguments for and against foreign assembly units

The Ford Motor Company had plans to start an assembly unit in Stockholm. However, the **imported** parts for **cars** were **subject** to a **much** higher customs **duty** than the 15 per cent prevailing on an **imported** assembled **car**. The tariff that would hit an unassembled Model-T Ford was estimated at 26 per cent. Under these circumstances it was not considered **profitable** to start an assembly unit in Sweden and a **change** was urged.

Those who argued in favour of the establishment of foreign assembly **units** in Sweden demanded reduced customs **duty** on **imported** parts for automobiles on the one hand and **simplified** customs clearance for **such** imports on the other. The primary rea-

son for the promotion of these ventures was that it would create employment in the assembly units, but another reason was to provide Swedish ironworks and the Swedish mechanical engineering industry with an opportunity to become subcontractors in this industry. One argument was that **after** a time, and on a basis of the experience gained at these assembly units, a competence would develop that could eventually be used to establish a national **car** industry.

The counter-argument here was that the customs tariffs were already low, and that the further favouring of foreign automobile **manufacturers** would make it more difficult for the national industry to hold its position. If the **idea** of increasing the **difference** between the customs tariff on assembled automobiles and that on parts was to stimulate the establishment of an assembly industry, it would be **better** to do this by raising the tariff on assembled **cars** and keeping the tariff on parts at its present **level**. This would favour both the established Swedish companies and the development of a subcontracting industry. Others maintained that the foreign assembly units would **find** it in their **interest** to make more use of Swedish subcontractors to a very **limited** extent **only**. The experience of other countries supported this supposition.

4.3 The decisions taken by the Riksdag

A **first** step in the resolution of this issue was that the tariff on **imported** automobile parts was reduced to 10 per cent. When the question was finally **decided** in 1927 this tariff was increased to 12 per cent and the **custom** clearance process was **simplified**. The suggestion that the customs tariff should be increased from 15 to 30 per cent was rejected. Thus, the Volvo Company was not given **any protection** from the tariff system; nor is **there any evidence** that it was blessed with **any** kind of subsidies, either. Maybe this was a necessary if not a sufficient **condition** for the development of a **competitive** Swedish automobile industry.

5. The development of Volvo, 1926-1939

This **section will first** describe the general **background** and the plans drawn up for the Volvo Company at its start.⁵ Next, the way **production** was organized is presented. This is followed by a **description** of the actual **course** of events and covers the development of the **car** and truck operations respectively.

⁵This description is based on Lind (1977) and annual reports and magazines of Volvo Corporation. Different aspects of Volvo Corporation have been reported in Kinch (1987, 1992, 1993a, 1993b).

5.1 General background to the establishment of Volvo

The **venture** that would develop into the present Volvo Corporation **started** in August 1924, when Assar Gabrielsson, the sales manager of the Swedish **producer** of ball-bearings, SKF, on his own initiative and with his own money had a **car** designed. In 1920-22 he had worked in SKF's French subsidiary and had the opportunity to **closely** follow the automobile industry in that **country**. The task of designing a **car** adapted to Swedish **conditions** was given to Gustaf Larson. He was a qualified engineer who had **been** employed at SKF some years before. He had **also** worked for an English motor **manufacturer** in Coventry, UK in 1911-14, and had **been** in contact with William Morris when he was designing his first **car**. The blueprints were completed in June 1925. However, no one was prepared to invest in the project on the **evidence** of the blueprints **alone**, and Gabrielsson had ten test **cars** produced, using his own **capital**. The parts for these **cars** were manufactured by different Swedish companies in the mechanical engineering industry, and these companies later became Volvo's main suppliers.

In a **confidential** memorandum written in June 1926 the **draft** plan of the **car venture** was presented in detail (Ellegård, 1983). According to this plan, 1,000 **cars** were to be produced in the **first** year, 4,000 in the **second**, and 8,000 in the third. Of the **first** year's **production** 400 were to be exported, and **once** **production** had **reached** 8,000 it was planned **that** around 60 per cent should be sold **abroad**. Cars were mainly sold **during** the spring and summer, and sales to countries in the southern hemisphere were suggested as a way of evening **out** **production** over the year. Argentina was **mentioned** **specifically**. This would **also** limit the dependence on the Swedish market.

The model chosen had to be a utility **car** **selling** at a **price** that could help to increase the use of automobiles in the country. The **scale** advantages of the **American** industry would be offset by the lower wages in Sweden. It had **been** calculated **that** an annual **production** of 8,000 **cars** would result in a profitable **venture**. **Production** should be **based** on the extensive use of Swedish subcontractors, and apart from design it was **planned** that only the assembly work would be carried **out** by the Company. It was for **this** **concept** that Gabrielsson **managed** to obtain the support of SKF. The whole project was taken over by that Company in September 1926; it was organized as a subsidiary with Gabrielsson as managing **director** and Larsson as **technical** **director**. Gabrielsson occupied this post until 1956, when he became chairman of the board, a position he held until his death in 1962.

In an interview Gabrielsson **declared** 'that the most meticulous work has **been** put into preparing for the **production** of **cars**. The problems **have** **been** **examined** down to the last detail, and the programme drawn up is felt to be feasible' (*Stockholms Dagblad*, 3 1 **March** 1927, p. 4). In 1935 shares in Volvo were issued to the shareholders of SKF, and ever **since** Volvo has had no owner with a dominating controlling **interest** in the Company.

5.2 'Producing the Volvo way'

The way in which Volvo organized its production system differed considerably from that of the other Swedish companies in the **industry**.⁶ Apart **from** the final assembly of the **car**, Volvo **only dealt** with the upholstery and the assembly of the bodies in its factory in Gothenburg **during** the start-up period. It may be **noted** that the operations performed by Volvo did not require **any** substantial investments in **machinery** or tools. To **begin** with, 88 per cent of the materials in the **car** came from external suppliers (Olsson, 1993). Special equipment for **cars**, such as **carburettors** and electrical components, were bought **abroad**. In the late 1930s approximately 15 per cent of the components were imported. However, most of the components were produced to Volvo's **specifications** by **five** main Swedish subcontractors and a large **number** of **smaller** suppliers. The necessary working capital could be kept to a minimum by letting the suppliers allow Volvo **credit** of such long **duration** that it was possible to **sell** the car before the materials were due for payment. This system was adopted because of a lack of **capital**, but it **also** meant that Volvo could **benefit** from the production experience possessed by various renowned Swedish companies.

Components for the chassis and the forged goods for the **engine** and gearbox were **supplied** by AB Bofors, an arms **manufacturer**. The **engine** was made by AB Pentaverken, which **e.g.** made motors for lifeboats. The gearbox was **supplied** by AB Köpings Mekaniska verkstad, which specialized in the production of **machines** for the engineering industry. **Pressed** metal sheets for the bodies and other **pressed** parts for the chassis and **engines** were **supplied** by Svenska Stålpressnings AB, Olofström, a subsidiary of AB Separator. In 1930 the assembly of **car** bodies was transferred to Olofström. Wooden parts for the bodies and wheels were **supplied** by AB Åtvidabergs Industrier, a **furniture manufacturer**. Ball-bearings, and later on castings for the **engines** and brakes, were provided by SKF. These companies were **the** main suppliers in terms of **volume**. Alongside their relationship with Volvo, these **five** companies were **also** linked to **each** other as suppliers of components and semi-finished parts. In addition Volvo used many other Swedish **firms**, which **supplied** direct to Volvo or acted as **sub-contractors** to the above mentioned **firms**. Although the production **directly** controlled by right of ownership was very **limited**, Volvo nevertheless influenced production in the different subcontractors in many ways. The companies became very dependent on **each** other, linked together in a network in which materials and parts were processed in several stages, as they were transferred between various companies and finally **assembled** by Volvo.

No other Swedish Company needed automotive parts of the kind Volvo required. The other companies in the industry, Scania-Vabis and Tidaholm, were each producing just 200 trucks and buses annually in more or less wholly integrated **factories**, using **basically** manual production methods. A prerequisite for a **decentralized** production system is the interchangeability of parts. This was facilitated by the pioneering work of the Swede C. E. Johansson, who in 1901 had invented a set of gauge blocks that made **accurate** measurements in a decentralized production system **possi-**

⁶A more extensive description of Volvo's production system is given in Kinch (1987).

ble. In 1923 he was employed by the Ford Motor Company in the United States. During the years when he worked in Sweden he had helped to spread the art of precision measurement in Swedish industry (Ratten, 1939:3, p. 2). Generally speaking the level of the mechanical engineering industry in Sweden by the standards prevailing at that time was good. However, only SKF, supplying large quantities of **ball-bearings** to the automobile industry **abroad** produced in **long series**, **ranked** as a specialist. For most of the parts Volvo could not follow a more traditional purchasing strategy in the sense that potential suppliers were set **against** one another with the one offering the **lowest price being** chosen (cf. Gadde & Håkansson, 1993). With the exception of the wooden parts of the body and the wheels, there was generally only one possible subcontractor that had the right qualifications, **machinery** and **capacity**.

Thus a necessary **condition** for the launching of **Volvo's venture** was to **convince** a **number** of potential suppliers to make long-lasting commitments and to take the steps required to achieve the quality and productivity necessary for making the **venture** a **success**. The support of SKF was **certainly** very important in making the realization of the **project** possible. **Besides** providing the required capital and **laboratory** resources, for the suppliers it was a guarantee in itself that the famous SKF **company** supported this risky **venture**. However, in order to get the needed support Volvo in many **cases** had to make commitments that later on **limited** its **freedom** of action. This way of organizing the **production** was known as 'producing the Volvo way'.

It had **been** doubted whether, because of its **limited size**, Volvo would be able to survive the **competition** from mass-produced **cars**. When the size of the Company was mentioned, Gabrielsson made a **distinction** between 'the **smaller** Volvo', which **constituted** the Company as **such**, and 'the larger Volvo', which **also** included the dealers and subcontractors. He **argued forcefully** that Volvo should be regarded as a large industry.

'Our vehicles have been exported all over the world and shown to be competitive as regards both price and quality. We do not **fear** the giant **American manufacturers** with their series of millions of low-priced **cars**.

Volvo's **production** system, by means of which a **fruitful** and **capital-saving** **collaboration** with a large proportion of the Swedish quality industry has **come into existence**, makes Volvo into a larger industry with the resources of **such** an industry. That **our** own plants cannot meet all the **demands** that are made on Volvo, is - in a view of **our** special system of **production** - only desirable.' (Gabrielsson, 1936, § 46)

The **skill** possessed by the companies in the initial stage should not be over-estimated. As events moved **on**, we can see that the adaptation and development of these **resources** to fit Volvo's requirements were probably of greater significance. Volvo had to introduce to the Swedish **supplier firms** the methods and **mentality** that had given the **American** industry its exceptional position. In the words of Gabrielsson:

'One of the big difficulties has **been** to obtain the necessary **change** at **our** subcontractors, who in many **places** were almost all used to what could be

called more or less manual production methods and who, when it **came** to automobile parts, had to be adapted to production in large firms with all that that meant not **only** in the way of changed work methods but **also** in the way of a changed mentality. We **have been** working hard on **this**, and we **have** partly succeeded in introducing an atmosphere of **Americanism** in several **places**.' (Gabrielsson, 1937, p. 22)

Volvo did not possess the required know-how on its own, but had to organize the transfer of various competences from the United States. This was achieved in a variety of ways. Swedish-Americans with experience of the American automobile industry were recruited by Volvo, licence agreements were made with American companies, and Swedish engineers were sent to the United States on study **trips**.

The decentralized production system that was initially introduced, which made extensive use of subcontractors producing parts to Volvo's **specifications**, was **gradually** transformed into a more integrated system as Volvo acquired the most important suppliers. Thus, because of their **inability** of **unwillingness** to increase their **capacity** at the required **pace**, the **supplier** of engines was acquired in 1930 and the company producing gearboxes for trucks in 1941.

5.3 The Volvo **cars**, 1927-1939

Volvo's **first** models were equipped with a four-cylinder **engine** and either an open or **closed** body. The **first car** was assembled on 14 April 1927. This model **proved** to be a **failure**; a misjudgement had **been** made regarding the proportion of open and **closed-body cars**. In 1927 **only** 297 **cars** of a **planned volume** of 1,000 were sold. In September of that year a **decision** was taken to speed up the **introduction** of a light truck **based** on **components** for the **car**. The Volvo management realized that it was necessary to try another line of **products** if the Company were to survive. The **first car** had **been** designed in **such** a way that it could easily be modified as a light truck, and the first model introduced in February 1928 was immediately **successful** on the market. In the **second** year **only** 983 **cars** and trucks were sold; 200 of the open **cars** had to be scrapped, and in order to **sell** all 500 closed-body **cars** the **price** had to be reduced. This involved Volvo in considerable **financial difficulties**, and SKF had to **cover** big deficits in Volvo. The enormous problems faced by the new **company** almost resulted in its sale to the American **car manufacturer** Nash in 1928. This was avoided only by **Gabrielsson's** personal intervention (AB Volvo Annual report, 1976, p. 45).

The Volvo **car**, designed to the standards prevailing in 1924, had become obsolete by the time it was introduced in April 1927. The new trend was for **6-cylinder cars** with **closed** metal bodies. Thus it was imperative to introduce a new model as quickly as possible, and the production of the **first 6-cylinder closed metal-body car** **started** in 1929. **Until** 1936 Volvo continued to experiment with a number of variants on this **car** model, but annual production remained in the range of 600-900 units. Most of these were designed as taxis. In 1935 a new streamlined model, the PV36, was introduced,

but it took four years to sell the series of 500 cars. It was not **until** the PV5 1 was introduced late the following year that Volvo **managed** to design a car that was received favourably by the market. For the **first time** the demand for Volvo cars exceeded the available production capacity, and almost 1,700 units were produced in 1937. In 1939 the production of cars amounted to slightly over 2,800 units, of which almost 500 were taxis. Volvo's share of the market amounted to 5 per cent and hardly **any cars** were sold **abroad**. Thus the **volumes** projected in the 1926 plan were still **out of reach** after 13 years in operation.

In the period up to World War II Volvo launched a number of car models. At least **five** different families of engines can be distinguished and as many as 10 different chassis and bodies. In addition Volvo **also** experimented with convertible models in small nms. Even if some of the components were used in more than one model, this meant that the **conditions** for using mass-production techniques did not obtain. Volvo had great **difficulty** in designing a car that was **accepted** by the market, and the company experimented with a large number of models produced in series that **often** did not exceed 500 units.

5.4 The Volvo trucks, 1927-1939

The development of the truck and bus operations was quite different from that of the **problematic car venture**. From 1928 to 1957 these **vehicles** represented the major part of Volvo's business. In the **first** two models of the trucks and cars, the same types of engine and of some other **important** components were used. However, as Volvo introduced heavier models in the 1930s, the production of trucks and buses gradually developed to become a separate business with very little **direct connection** with the **troubled car** operation. In the period up to 1939 Volvo developed a **large** number of truck models with a loading capacity **ranging** from 2.5 to 13 tons. The rate of innovation was high; it was driven by **close** co-operation with the **customers** and a willingness to **satisfy** the needs of different segments of the market. The **niches** developed by Volvo grew **satisfactorily** in the 1930s and the total market for trucks expanded. Although the **volumes** of trucks produced annually by Volvo gradually increased over the years, this was not the result of **any** attempt to follow a mass market strategy. The **fact** that some of the models introduced could be sold in large numbers did not slow down the rapid rate of innovation. Volvo stuck to the **idea** of continuing to improve the design of the truck **concept** and to produce many variants, rather than **cutting** down the range of models in order to obtain a standardization of its **products**. Had Volvo wanted to **mimic** the prevailing American **product/market** strategy, it would **have** concentrated on a few models **once** it had designed one or a small number that were well received by the market. This was not what happened. The developments in truck design were later to be the **foundation** for the truck models introduced **after** the war, when what Rad **once been** models for **niche** markets **proved to belong** to the mainstream. Although it may be **difficult** to establish what represents a new model and what is **only** a variant of an existing one, it can be said that Volvo introduced approximately 20 truck models in the

period up to 1939. The total **numbers** of **each** model, sometimes produced over a period of live years or more, **ranged** from 30 to almost 7,000. However, the **typical average** was well below 2,000 **units** (cf. Glimstedt, 1993, p. 122). To this can be added a number of bus models produced from 1932 onwards. In 1938 Volvo produced about 4,600 trucks and buses. Its market share for buses was now 43 per cent and for its **much** larger sales of trucks about 30 per cent. Exports amounted to 22 per cent of sales and consisted mainly of trucks sold to 12 different countries, including Brazil and Argentina. Even though some **components** were used in more than one truck model, this indicates that Volvo's strategy for truck and bus operation was by no means geared to mass marketing.

6. American influences on the Swedish automobile industry up to 1939

Generally speaking, knowledge of developments in the American automobile industry was spread by **technical** journals and by people **visiting** the United States. Thus it can be assumed that the general trends were **widely** known among those interested in Sweden at the time, and certainly **also** among the technicians at Scania-Vabis and Tidaholms Bruk. However, there is no **evidence** of **any** more **direct influence**, for instance through co-operation with American **manufacturers** or by employing technicians with experience from the American automobile **industry**. In **this respect** the establishment of Volvo represented a significant break with the earlier tradition. This section will **describe** the American influence on Volvo in some detail, after which a brief **description** of the foreign influences on Scania-Vabis will be given.

6.1 American influences on Volvo

Although people with experience of the large-scale **production** of automobiles were **lacking** in Sweden in the **mid-1920s**, it was still possible to recruit Swedish-speaking individuals with up-to-date knowledge of the design and **production** of **cars** from the other **side** of the Atlantic.

An example of a Swede making a **career** in the American automobile industry is John Björn. He left Sweden in 1891 and got a job in Jeffery's bicycle Company in Chicago. By the time that Company **started** the **production** of automobiles in 1901 he had advanced to being a partner in the **firm**. The name given to the **first car** was Rambler, but **after** some years it was changed to Jeffery, after the founder of the Company. In 1917 Nash acquired the majority of the shares in the Company and the Nash **car** was introduced. Björn had **been** responsible for engineering and **production** in the Jeffery Company. He worked for ten years as 'General Superintendent' in the growing Nash factories and organized the **production** along modern principles. Björn recruited many Swedes and other Scandinavians; this resulted in a **large** Scandinavian population in

Kenosha and Racine, the places where the Nash factories were located (*Svensk Motor-tidning*, 8 August 1927).

After a long strike in 1909 that affected more or less the whole of Sweden's industry, a great many engineers and workers emigrated to the United States to **seek a living**, and many of them had **careers** for themselves in the automobile industry. This flow of people to the United States was to continue for several years. The Volvo management was **well** aware of this potential resource, and over the years many people were recruited to fill various positions in Volvo itself or at its subcontractors.

In the development work that **began** in the autumn of 1924 J. G. Smith played an important part.⁷ In 1910 he had emigrated to the United States, where he worked for a number of automobile manufacturers and gathered a good **deal** of information on automobile design. When he **returned** to Sweden in 1924 he **came** into contact in some way with the **project** for the Swedish **car**. His 'hands-on' experience of **American car production** left its mark on the design of the test **cars** and the **first** serially produced models. After that, however, he disappeared from the **scene**.

Another person who was to influence the **production of cars** at Volvo for many years was Ivan ömberg. On a **temporary** visit to Sweden in the autumn of 1926 he had **examined** the test **cars**, before orders for parts and **components** for the **first** series were given to the subcontractors. He **also** had emigrated to the United States in 1910, and had worked for various automobile manufacturers there. On the occasion of his visit to Sweden he was **chief** engineer at Hupmobile.

One of the points made by ömberg was that the four-cylinder **engine** would **have** to be replaced by a six-cylinder version, as the trend in the States was in that **direction**. He suggested that the Volvo management should study - or to put it **bluntly**, copy - the **engine** that General Motors had developed for its new Pontiac model. The four-cylinder **engine** was retained, however, as it was felt that there was insufficient time to make the **change**. But ömberg did help to **solve** the problem of the vibrations in the **first** Volvo **engine**, and he **supplied** the Volvo people with information about American **engine** designs. Shortly afterwards Carl Einar Abrahamsson **became** linked with Volvo. Between 1923 and 1926 he worked in the United States, and **since** 1925 had **been** a designer at General Motors and had taken part in developing the new six-cylinder **engine** for the Pontiac. He was made head of the drawing **office** at Volvo, a position that he held until 1955 (Lind, 1977, p. 10).

In the **course** of developing the new six-cylinder **engine** for the **car** launched in 1929, Volvo had consulted Continental Motor Corporation in Detroit. Another **change** made at this time was that, instead of producing a gearbox of Swedish design, it was **decided** to buy one from Warner **Gear** Corporation. In the early 1930s Gabriëlsson and Larsson made several study trips to **American component producers** and automobile manufacturers, and **also visited** Continental Motors and Warner **Gear** Corporation.

In the 1930s many Swedes with experience of the American automobile industry were brought into the Company. In 1933 Ivan ömberg was **called** from Hupmobile by Gabriëlsson to a position as head of Volvo's **car** business. Until his death in 1936

⁷This section is mainly based on material collected in *Ratten*, Volvo's customer magazine, and on Lind (1977, 1984).

Ömberg contributed substantially to the renewal of the design of the Volvo cars. The results of his efforts were the two new models released in 1935 and 1936. Lind (1977) mentions that he also brought figures with him that made it possible to compare production costs in the United States and Sweden.

Together with Ömberg two other designers were recruited from America. One was Edward Lindberg, with nine years experience from Studebaker who was employed as a designer of car bodies at Volvo. This meant that in 1933 four out of eight technicians in the leading technical group dealing with Volvo car operations had experience from the American automobile industry. To this group should be added at least three more engineers with this kind of experience at lower levels.

After Ömberg's sudden death in 1936 there was a delay of two years until in 1938 Gabrielsson once again went to the United States to recruit a leader for the car operations. This time his choice fell on Olle Schjolin, who, after nine years with Yellow Coach in Chicago (a subsidiary of General Motors), had been called to the GM's headquarters in 1930 to take up a leading position in the design department. Among other things he had been in charge of developing the new Opel car (*Ratten*, 1938:4, p. 6). At the same time Carl Lindblom was recruited from GM. Together they brought with them a project for a small car that they had patented, but the development of this car had to be abandoned when they were recalled to the United States in May 1940, as they had been drafted for military service. Schjolin was responsible for the design of the last Volvo to be built to an American-influenced design. The PV 60 had been planned for launching in 1940, but because of the war its introduction onto the market was postponed until 1946. Not until 1950 was the originally planned series of 3,500 units sold out. Lindblom returned after the war and became responsible for the design of cars at Volvo. Shortly afterwards, however, he re-emigrated to the United States.

It was not only to positions directly connected with the design of cars that Volvo recruited people with experience from the United States. The head of the purchasing department at Volvo, Anders Johnson, had worked for the Sandvik Steel Inc. in New York (a subsidiary of AB Sandvik) between 1921 and 1925, before joining Volvo in 1928 (Harnesk, 1965). Later, one more person from this Company was attached to the purchasing department. Thure G. Gehre, who was recruited as head of the assembly factory in Gothenburg in 1929, had also worked in the United States between 1920 and 1929. Among other things he worked as a designer at Yellow Coach and Truck Co., Chicago (*Ratten*, 1939: 10, p. 8).

Other kinds of American influence affected Volvo's subcontractors. However, with few exceptions the data on this subject are meagre, although there is evidence that American influence played an important part in developing an efficient production system (cf. Gabrielsson, 1956). In 1933, Bernard Johansson, a Swede with 19 years in the American automobile industry behind him was appointed as head of the tool department at Volvo's subcontractor, Olofström (*Separatorbladet*, 1960:4, p. 27). Olofström supplied Volvo with car bodies. When the expansion of the car market in 1937 made heavier demands on Olofström's production capacity, Volvo sent for ten experts from the American coach work manufacturers, The Budd Co., who between 1937 and 1939, when the war broke out, drew up plans according to American standards. New

plants were built and a big new American stamping machine was installed (*Luftrenaren*, 1944:3, p. 15). Volvo had a licensee agreement with the Budd Co. American consultants were also brought in to introduce new production techniques at AB Bofors, the armament manufacturer, which undertook forging operations for Volvo and which for many years was Volvo's single largest supplier (Steckzén, 1946).

From all this it can be seen that during the period up to 1939 the American impact on Volvo's car operation was massive. No information is available regarding any corresponding influence on the truck or bus operations. However, it may be assumed that Volvo followed developments in the design of engines and certain components, but that the ideas for the design of chassis were very much the result of experience-based learning.

6.2 Foreign influences on Scania-Vabis up to 1939

One important factor that helps explain why Scania-Vabis managed to survive in the 1920s was the number of its successful engine designs.⁸ In 1926 Scania-Vabis introduced a six-cylinder overhead-valve engine for its trucks, more than two years ahead of Chevrolet. The man behind this was Scania-Vabis's chief engineer, August Nilsson. After he had graduated as a technical college engineer in Sweden, he worked for a few years in Berlin as a designer of railway engines. Between 1907 and 1909 he studied at the Technische Hochschule in Darmstadt and graduated as a full engineer. For three years he then worked in the United States at de Laval Steam, Turbine, New Jersey before being recruited to Scania-Vabis in 1913. He remained there as chief engineer until 1946; for many years he was the only engineer with a post-highschool education in the Company. Nilsson's orientation was towards Germany; he studied technical journals from Germany and made study trips to that country. His engine designs appear to be based primarily on development work carried out at Scania-Vabis, and influence from abroad was limited. Apart from co-operation with Hesselman Patent AB on crude-oil engines and with the German Company Magirus on diesel engines, no outside influences are known. On the contrary, it looks as though Nilsson deliberately avoided keeping himself informed about technical developments at Volvo or other competitors. In this respect the attitude to outside influence was the exact opposite of Volvo's. This remained characteristic of the Company right up to 1946, or as long as Nilsson stayed in office. However, there is one exception to this closed outlook. In 1929 Gunnar Lindmark, the managing director of Scania-Vabis, went to the United States with Nilsson to study the production of buses. Among other companies they visited the Twin-Coach Company in Ohio. Later a license for this 'Bulldog' bus was acquired, and the first one was delivered in 1932.

⁸This passage is based on Giertz, 199 1

7. From dreams of mass production to flexible specialization

The Swedish automobile industry received no protection, and the comparatively low customs tariff of 15 per cent was retained. Paradoxically, this may have been one of the most important reasons why, despite a limited population, it has been possible to establish three automobile manufacturers, of which two have at times been very profitable.

7.1 The unsuccessful search for mass markets

The efforts of the Swedish manufacturers to compete head-on with the imported American cars and trucks repeatedly failed. In the 1920s and 1930s it was not possible for them to establish a position within a market disposed to the mass production of standardized products. The Swedish manufacturers could not match the quality or the price of the more or less indistinguishable American automobiles, which were aimed at the larger segments of the market. In order to survive they were forced to adopt a niche strategy, with specialized designs produced in short runs. Later, the markets for trucks 'developed' by Scania-Vabis and Volvo became the mainstream.

Why was a mass-market strategy ever considered in Sweden? In fact, a strategy of avoiding the mass-market approach cannot have been particularly controversial. Arguments in favour of such a strategy were put forward in the debate around 1925, but the companies involved went the other way. Conditions in Sweden would make it seem self-evident that a domestic automobile industry, if it was to have any chance of developing, should try to avoid direct competition with the major American companies. There are many grounds for supporting such an approach. Sweden lagged far behind the United States in taking up motoring, and no Swedish entrant into the industry could enjoy any kind of first-mover advantage. Further, the limited size of the home market made it unlikely that a sufficiently large market for cars specially suited to the domestic taste - if such became available - would ever develop. Nor is there any evidence that distinctive competitive advantages for the production of automobiles would appear in Sweden.

Against this it could be asked: if Swedish industry had managed to establish several companies that had become successful exporters in other areas, why could a similar development not be expected for a large-scale automobile industry as well? Among Swedish companies that succeeded in becoming competitive at an early stage the following can be mentioned: SKF (ball bearings), LM Ericson (tele-communications), AGA (equipment for lighthouses), and AB Separator (separators and dairy equipment). However, it must be remembered that these 'genius companies' based much of their success on a technical innovation that put them ahead of their foreign competitors. A Swedish automobile industry could not base its future development on any competitive advantage connected with Swedish inventions in engine technology or the design of chassis, for example. The commercial exploitation of inventions in the automotive industry, regardless of whether they had been made in Europe or the

United States, had **been** initiated mainly by the **American** manufacturers, who had long enjoyed a clear **dominance** in the industry (cf. Gabriëlsson, 1937).

7.2 The development of niche markets for trucks

The **idea** of the interchangeability of parts, which is central to mass production and is a necessary **condition** for a decentralized production system, was to be fully adopted **first** by Volvo and later **also** by Scania-Vabis. However, it was necessary for Volvo to **abandon** one of the other foundation **stones** of the mass production **logic**, namely, **far-reaching** product standardization. Thus the Swedish automobile industry eventually achieved a **logic** that, in the terminology of Piore & Sabel (1984), could be **called** 'flexible specialization'. By way of **close** co-operation with their sometimes very **demanding** users, the Swedish manufacturers learned to **cater** for their customers' special needs. Instead of an anonymous market, they worked with identifiable users of their product and developed **long-lasting** relationships that promoted the **exchange** of information (cf. Håkansson, 1982; Gadde & Håkansson, 1993).

It is possible to distinguish a few clusters of users, or what Dahmén (1950) would **call** 'development groups', which promoted the evolution of the design of trucks and buses. We can see an example of this in the 1930s, when developments in the forest industry and a restructuring of the dairy industry contributed to an increase in **demand** for heavy trucks with exceptional properties and high reliability (cf. Glimstedt, 1993). The bad roads in the Swedish countryside, and the special **conditions** that were characteristic of **forest** transports, put a strain on the material and the durability of **vehicles**. Later, the floating of timber by river was gradually discontinued, to be replaced by transportation by trucks. This further increased the **demand** for **vehicles** with high loading **capacity** that were **well** adapted to rough **conditions**. In this market Volvo and Scania-Vabis were able to **benefit** from their closeness to their customers and from their very flexible production system, which allowed them to produce in small series while still covering their **costs**. It is **also** probable that the hard **competition** between Volvo and Scania-Vabis on these niche markets **also** helped to encourage a high **technical** standard in the trucks and buses. This process of experiential learning clearly helped to renew and improve the truck **concept**, and models were designed that could be **successfully** marketed **abroad**. Swedish trucks became renowned for their loading **capacity** and durability.

Thus, in order to survive, the Swedish manufacturers were **forced** to concentrate their production to segments in which proximity to the market and a flexible **production** system were advantageous. The **limited** size of the **domestic** market, which was further accentuated by the **focus** on niche markets, made exporting necessary at an **early** state in the companies' expansion programs. In this way the Swedish automobile industry soon became internationalized, which **proved** to be a competitive advantage at a later stage, when the market opened up more generally.

7.3 From American cars in Sweden to Swedish cars in America

For many years Volvo tried to develop a car designed according to American ideals that could be sold in the Swedish market. As has been shown above, during the 1930s Volvo recruited most of the team of designers attached to its car operations from the United States. It took this team, with their American experience and omlook, almost ten years before they eventually managed to design a car achieving an annual volume exceeding 1,000 units. In the original plan this had been the target set for the first year. In 1938 less than 3,000 cars were sold by Volvo in Sweden. The target for the second year had been set at 4,000 units. It was not until after World War II, when Volvo gave up the idea of copying an American car and introduced a Swedish-style medium-sized car instead, that the volumes aspired to back in 1927 were finally achieved. Between 1947 and 1965 more than 400,000 units of the PV 444-544 were produced. Paradoxically, the breakthrough for Volvo as a manufacturer of cars coincided with the accidental but successful introduction of this model in the United States in 1955 (Kinch, 1992). In less than three years every fourth car produced was sold on this market. Cars have dominated Volvo's business ever since, and North America has remained its most important market. Thus the success of the cars was based on a concept quite unlike the one that was originally conceived. Instead of developing an American-influenced model for marketing in Sweden as originally intended, the success of Volvo as a manufacturer of cars has been related to a Swedish-style car having its largest market in the United States.

7.4 'Producing the Volvo way' - Fordism or a pioneering Toyotaism?

The way Volvo organized its operations differed considerably from the Ford model. Volvo did not succeed in the efforts to standardize its products and reach for the mass markets and the American production methods introduced were not specific to Fordism. They were part of a more general tradition of applying systematic time and work flow studies advocated e.g. by Fredric Taylor. The interesting aspect of the early Volvo history is the decentralized production system so vividly described by Gabriellsson. This initial set-up had some characteristics that resembled the system later to be introduced by Toyota (cf. Wada, 1991). Right from the start Volvo made something of a 'permanent deal' with its main subcontractors and organized a network where materials and parts were processed in several 'tiers'. In a sales handbook, Gabriellsson described the advantages of 'producing the Volvo way' and presented it as a deliberate strategy peculiar to Volvo.⁹ The suspicion that his description was a way of making a virtue of necessity is confirmed in his later writings, where the system adopted is described as 'the poor man's wisdom' (Gabriellsson, 1937). This was the only way to launch the project and not something that he had desired from the start. However, this

⁹This may be questioned as already in 1924 William Monis in 'Policies that have built the Monis business', describes a similar system (First printed in *System* February and March reprinted in *The Journal of Industrial Economics*, 1924, 11: 193-206).

system was quite successful for many years and Volvo **managed** to develop its full potentials.

The decentralized production layout initially introduced was gradually **transformed** into a more integrated system as some of the most important suppliers were acquired by Volvo and the relationship to some others lost its 'permanent deal' status. In the 1930s AB Bofors by volume had **been** the largest subcontractor. However, **after** World War II it lost its position and was succeeded by Olofström. The start-up of **production** after the war made it possible for Volvo to reconsider its production design, and the purchasing strategy which had **been** more or less forced upon it was now to be abandoned. This was **further** accentuated in 1958 when plans for a new plant for the **car** assembly operation were considered. This stimulated thinking about the way **production** was organized, and encouraged efforts to **handle** relationships with suppliers on **strict** business lines. As a result of its **success** with the **car** introduced on the American market in 1955 Volvo was negotiating from a position of strength. Earlier agreements made when Volvo's situation had **been** less favourable, or was **based** on **smaller volumes** than the ones now projected, were reviewed. This process was retarded by the commitments Volvo had made over the years to some of its suppliers. In the early 1930s Olofström had **been** given an **exclusive** dealing right whereby Volvo agreed to buy all its requirements of bodies and **pressed** parts from Olofström. When in 1958 Volvo wanted to buy the Company, Olofström **turned** down the bid Volvo **offered**. As the bids were so far apart no agreement could be **reached** but the relationship **continued** as Olofström had a contract valid until 1965. It was not until 1969 that this company was eventually acquired by Volvo.

When Gabrielsson in the 1930s described how the production system and the competitiveness of the Volvo company were related he **treated** it as an organization problem in 'the larger Volvo'. The important issue was *who* should do *what* and *how*. He **stressed** the **importance** of complementary resources and the development of the competence of the suppliers. However, by the end of the 1950s, it was described as a purchasing problem. Now it was a question of **acting** on a market and making a **choice** from a given supply. A **description** of the purchasing function of Volvo from this period **bears** witness of a new production policy where **the idea** of single sourcing and longterm commitments was abandoned. It was clearly **stated** that the possibility of maintaining **competition** was a primary **condition** for achieving the right quality at the **lowest cost** (*Lufirenaren*, 1957, No. 3, p. 10). This statement is in line with the **prevailing ideas** of what constituted an **effective** purchasing strategy in the management literature of **American origin**. However, it is interesting to **notice** that this development at Volvo is quite opposite to the policy adopted by Toyota at the same time. **Contrary** to that **company** Volvo did not **have any** serious problems with the quality of its automobiles. The reason for the failure with the **cars** in the 1930s was that Volvo did not **manage** to design a model that was **accepted** by the market. Toyota experienced some quality problems when the cars were introduced in the US in 1958. This made Toyota management reconsider the way the production was organized and they **deliberately entered** and developed a system that very **much** resembled the one Volvo Rad **been** forced into from its start but then gradually abandoned.

8. Conclusion

In conclusion it can be said that the **fierce competition**, primarily from the **mass-produced** American automobiles, led the Swedish companies to adopt the **product/market strategy** that has characterized its **success** up to the present. This development was neither **based** on the adoption of American **ideas** of mass production, nor **contingent** upon **any conditions particular** to Sweden. It was **forced** on the companies more or less **against their will** and was not regarded as the **logical** way of organizing the business, as the accounts of its history presented above **have** clearly shown. Instead, it was the result of a patient process of trial and **error** and the adoption, **modification**, and **elaboration** of **ideas** borrowed from **abroad**, and a **gradual** development of competence in the design and production of automobiles.

References

- AB Volvo Annual Report 1926-.*
- Beviljningsutskottets arbetsmaterial 1924-1927* (working material of the parliamentary committee Beviljningsutskottet).
- Dahmén, E., *Svensk industriell företagsamhet: Kausalanalys av den industriella utvecklingen 1891-1939* [Swedish industrial enterprise: A causal analysis of the industrial development 1891-1939] (Stockholm, 1950).
- Ellegård, K., *Människa-Produktion: Tidsbilder av ett produktionssystem* [Man-Production: Pictures of a Production System] (Meddelanden från Göteborgs Universitets Geografiska institutioner, series B, No. 72; Göteborg, 1983).
- Gabrielsson, A., *Försäljningshandbok utgiven av AB Volvo i samband med introduktionen av PV5 1* [A Sales Handbook published in connection with the introduction of PV 5 1] (Göteborg, 1936).
- , 'Volvo - Föredrag hållet inför Svenska Ekonomföreningen' [Volvo: A speech delivered to the Association of Economists at the Stockholm School of Economics], *Ratten* 10-12 (1939), 4-5, 20-7.
- , 'Volvo under trettio år' [Volvo during thirty years], *Transbladet* 19:4 (1956), 4-19.
- Gadde, L-E. & Håkansson, H., *Professional Purchasing* (London, 1993).
- Giertz, E., *Människor i Scania under 100 år* [People in Scania during 100 years] (Stockholm, 1991).
- Glimstedt, H., *Mellan teknik och samhälle: stat, marknad och produktion i svensk bilindustri 1930-1960* [Between technology and society: State, market and production in the Swedish automobile industry 1930-60] (Avhandlingar från Historiska institutionen i Göteborg 5; Göteborg, 1993).
- Harnesk, P., *Vem är Vem? Götalandsdelen* [Who is Who?] (Stockholm, 1965).
- Hounshell, D. H., *From the American System to Mass Production 1800-1932* (Baltimore, 1984).
- Håkansson, H. (ed.), *International Marketing and Purchasing of Industrial Goods: An Interaction Approach* (Chichester, 1984).
- Kinch, N., 'Emerging Strategies in a Network Context: The Volvo Case', *Scandinavian Journal of Management Studies*, May (1987), 167-84.
- , 'Entering a Tightly Structured Network: Strategic Visions or Network Realities', in: Forsgren, M. & Johanson, J. (eds.), *Managing Networks in International Business* (Philadelphia, 1992, 194-214).
- , 1993a. 'La Vision Strategique à L'Épreuve des Contingences: L'histoire de Volvo', *Décisions Marketing?* May (1993), 9- 17.
- , 1993b. *The Long-Term Development of Supplier-Buyer Relationship: The Case of Olofström and Volvo*, Paper presented at the 9th IMP Conference, Bath, 23rd-25th September 1993.

- , 1993c. 'Riksdagens behandling av biltullar 1924-1927' [The Riksdag on car import duties 1924-27], *Working Paper 199303*, Department of Business Studies, Uppsala University.
- Lind, B-E., De tidiga åren [The early years], *Autohistorica 1-2* (1977), 1-81.
- , *Volvo Personvagnarfrån 20-tal till 80-tal* [The Volvo cars from the 1920s to the 1980s] (Stockholm, 1984).
- Luftrenaren* 1944:3 (the Company magazine of AB Olofström).
- Olsson, K., Undated and unsigned draft. Department of Economic History, University of Gothenburg (Gothenburg, 1993).
- Nordlund, S., *Upptäckten av Sverige: Utländska direktinvesteringar i Sverige 1895-1945* [The discovery of Sweden: Foreign direct investments in Sweden 1895-1945] (Umeå Studies in Economic History; Umeå, 1989).
- Piore, M. J. & Sabel, C. H., *Second Industrial Divide: Possibilities for Prosperity* (New York, 1984).
- Ratten*, the customer magazine of AB Volvo.
- Riksdagstrycket 1924-1927* (records of the Swedish Parliament).
- Sahlgren, U., *Från mekanisk verkstad till internationell industrikoncern: Scania-Vabis 1939-1960* [From mechanical workshop to an international industrial firm: Scania-Vabis 1939-60] (Uppsala Studies in Economic History 31; Uppsala, 1989).
- Sloan, A. P., *My Years with General Motors* (Garden City, 1964).
- Steckzén, B., *Bofors Industrier* (Stockholm, 1946).
- Svensk Motortidning* (magazine of the Royal Automobile Club of Sweden), 29 March and 22 November 1925; 15 August 1927.
- Teknisk Tidskrift* (published by the Swedish Association of Technology), 25 July 1925 and 1 May 1926.
- Wada, K., The Development of Tiered Inter-firm Relationships in the Automobile Industry: A Case Study of Toyota Motor Corporation, *Japanese Yearbook on Business History* 1991/8.
- Womack, J. P., Jones, D. I., and Roos, D., *The Machine that Changed the World* (New York, 1990).

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