Non–Fordist Routes to Modernization: Production, Innovation, and the PoliticalConstruction of Markets in the Swedish Automobile Industry before 1960

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The US-European productivity gap constituted a major problem confronting all the West-European economies after the turn of the century. Prolific and suggestive images of mechanised pre-planned production of standardized goods in large volumes -- Americanisation in short -- clearly fascinated European industrialists enough to induce a steady stream of industrial pilgrims across the Atlantic. The intrinsic appeal of high volume production aside, the crucial question was, to contemporaries on the European side of the Atlantic, how far to emulate the American system of mass production.

Sweden constitutes no exception to this rule. Much of the literature on Sweden assumes, however, that the Americanisation of Swedish industry proceeded rapidly and smoothly. Hence, there is a widespread agreement in the literature that the Swedish transition has to be seen in terms of a larger social and institutional context, namely the so called Swedish Model, which is held to have facilitated the Americanisation of Swedish industry [10]. In this approach, local union resistance to technological change and industrial restructuring is taken as a potential barrier to industrial rationalisation. Sweden, on this view, thus represents the opposite case to that of Great Britain where economic growth is widely supposed to have been slowed down by a social zero-sum game that hindered the introduction of advanced fordist technologies [14].

There is clearly something to this type of explanation. Political values aside, proponents on all sides agree that a positive-sum bargaining process is feasible as a vehicle for joint conflict resolution during circumstances of economic growth. More problematic, however, are basic ideas about micro-level modernisation. Those suggesting a Fordist underpinning of the Swedish Model subscribe to the assumption about economic growth that is firmly footed in a simplistic understanding of Alfred Chandler's school of business history. Hence, they share the notion that economic growth of modern times can ultimately be attributed to the advent of the vertically integrated corporation, mass-production and scientific management methods as the core of industrial an universal "best practice."

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This portrait of Swedish industrial experience is, however, highly misleading. In my view a historical explanation is required, which empirically examines the crucial turning points in the development of a political system and the development of technological trajectories. The key to this problem is that of change over time. It remains to be seen, I argue, which specific technological trajectories and relations between industry and social institutions have in fact promoted, or hindered, Sweden's industrial development. In particular, this is of particular relevance for the sectors of the Swedish economy (e.g. the transport goods sector including the automobile industry and the heavy electrical engineering sector), which to a large extent defined the modernisation Sweden's economy in the late 1950s.[2]

My major concerns in this paper are thus with (a) the larger institutional setting of the Swedish automobile industry and (b) the development of production strategies. The general upshot is that the expansion of the Swedish automobile industry in the interwar years was not based on a Fordist route to modernisation, while the institutional constraints (e.g. transport policy, agricultural policies, etc.) limited the scope for mass-production methods. More precisely, this short essay argues that the company that not only survived the crises of the 1930s but also stabilised Swedish automobile sector at higher level, i.e., Volvo, practised production methods based on diversified markets, rapid development of new models, flexible investments, extensive outsourcing, and subcontracting to general engineering firms. Largely relying on flexible technical resources, Volvo's managers were able to successfully target a variety of new models for the narrow and demanding segments of the final market. Given the diversification of the markets, it becomes essential to analyse the political construction of the market and the institutional mechanisms to which this diversification can be attributed. Therefore, the paper seeks to pinpoint the impact of national polices, i. e., trade policies, protection of the national railway system, agricultural policies, the expansion and segmentation of the market, and how the political construction of the markets limited the scope for the implementation of American production methods.

Unexpected Success: Volvo's Non-Fordist Route to Modernisation

The vast output of the American auto industry on the Scandinavian market, including Ford's and GM's assembly plants in Stockholm and Copenhagen, during the late 1920s reopened a debate on trade barriers and gave impetus to the advocates of the Swedish automobile industry to claim protection. Trade barriers, however, remained modest throughout the 1930s despite the promises by the Swedish industry to expand their undertakings. Even so, the harsh realities of the time, with soaring industrial unemployment, made government planners sensitive to foreign competition's presence on the Swedish labor market. No less than 16,000 unemployed men applied for the jobs when Ford recruited workers at its plant in Stockholm. While Swedish trade barriers more than doubled at the turn of the century (from ca. 6% to 15% on average), automobile as well as automotive parts

[2]Michael E Porter's argument about strong up-stream links between the traditional industrial nexus (timber, pulp, steel) and the expansion of energy and transportations sector in the Swedish economy is of relevance here.

tariffs remained stable at 15% and 12% respectively throughout the 1930s . Obviously, Sweden did not follow the British and French examples with increased trade protection of the domestic automobile industry in the decade [1, 17].

During the 1930s British and American exporters to Sweden mainly kept their dominating positions in the Swedish passenger car market, while the truck market experienced rapid change. Judging from trade statistics, foreign firms were challenged by domestic truck production in the mid-1930s. As for medium and heavy trucks, Volvo had by the late 1930s established itself as the leading truck producer on the Swedish market. American firms, on the other hand, focused on the lighter end of the market [6].

It is, perhaps, a fundamental paradox that the first trajectory leading to a stabilisation of the Swedish automobile industry in the late 1930s took place when the chief sectors of the industry were, on the one hand, occupied by large scale firms based on the American continent, and by the re-vitalised European competitors on the other hand. While a large number of the more marginal firms in the European automobile industry were driven out of business in the late 1920s, the large national producers were increasing their hold on national markets. The critical importance of the combination of standardisation of products and rutinisation of short cycle work and mechanisation typical within the framework
of the American system of manufacturing need not be corroborated further here. Careful historical research, however, also demonstrates that the European auto industry was reluctant to emulate what proved to be best industrial practice in the American context. In their countercharge against the American's industrial paradigm, leading European firms, like Morris and Austin, successfully experimented with less capital intensive and flexible production techniques to produce innovative products on the much less predictable European markets [29]. On balance, however, economies of scale gained importance throughout the 1930s as the European industry tried to pair surging production volumes with functional flexibility. There is, in any event, ample evidence that the period leading up to 1939 was characterised by a strong tendency towards concentration of capital in the industry as a handful of firms gained larger market shares. It is in this context of collapsing markets and increasing competition between the major international players that Volvo not only made what proved to be its successful entry on the automobile market, but also stabilised the platform from which domestic production could emerge. In short, the industry experienced a first phase of capital concentration in the inter-war years.

It is against this background that the significance of the Swedish case shall be examined. To explain the successful attempt to establish import substitution during this period, we first have to consider other embedding factors, then those within the boundary of firm.

The Political Construction of the Truck Market

This section investigates the increasing demand for road transportation and trucks. On one hand, it is held that the 1920s represented a second major transformation of the transportation structure since the railroad. Aggregated data for Sweden show how the use of trucks soared the 1920s, which is often explained by the trucks flexibility and already through favourable cost structure. Nevertheless, it is essential too look beyond the flexibility and relative cost structures of truck

technology. Having said this, to fully grasp the development of Swedish trucking we need to focus on the competition between railroads and road transportation, and in particular on the state's role in regulating competition. A new pattern emerged already before the 1930s as the state tried to save the financially depressed railroads from direct truck competition by subsidies, but the state also used its powers to block the expansion of trucks in the market for goods transportation through transportation policy. The instrument at hand was the Road Haulage Act, which regulated the trucking industry. It not only limited the number of trucks in commercial use, but also regulated both the types and quantities of goods that individual trucks were allowed to carry, as well as their territory. The outcome was simple enough: trucking became highly regulated as the market divided into small sectors. Very few movements between these sectors of the market were allowed, meaning that truckers could not compensate for economic downturns by seeking new customers in other areas [12, 19].

The major outcome of the state's regulation was that the scope for long distance road haulage was largely checked by the authorities. Secondly, a large proportion of the trucks engaged in agrarian markets, which were less constrained by the state. The two other major truck-dominated sectors were the forest industry and building industry [7].

In general, this means that not only was the truck industry's growth potential limited, but so was the demand for trucks. To develop a better understanding of the interplay between market segmentation and the political mechanism we will address the development of dairy transportation and the political aftermath of the agrarian crises in the late 1920s in some detail.

Agrarian Crises, Agricultural Policies, and the Structure of Dairy Transports

As in many other European countries, Swedish farmers tried to exit the grain market and enter into meat and dairy production as profit margins kept diminishing after the turn of the century. But as the agrarian market was hit by surging price fluctuation in the late 1920s price competition became fierce also in the expanding dairy sector [19].

The general approach taken by the state to stabilise dairy product prices was to strengthen the farmers' co-operative movements and, hence, to put an end to price cutting through the farmers' organisations. Particularly, the state engaged in a forceful attempt to strengthen the farmers' organisations, such as the Swedish Dairy Association. In effect, the state used both economic and legal measures to force farmers to join the organisations and, thereafter, to reorganise the traditional small-scale dairy structure into centralised large scale units. Inspiration for the drive towards centralisation and increasing economies of scale came from the Danish agriculture sector with a long-standing commercial tradition [13, 25, 22, 30].

From a transportation perspective, centralisation of production implied mechanised means of transportation as the dairies were turned into large scale production units serving larger areas. Since the state strongly promoted centralisation, the dairies found it more cost effective to invest in trucks, or to commission the transportation of milk between milk producers and the production units to local truckers. Either way, larger production units serving a vast area made heavy trucks with higher load capacity more cost effective than light trucks [6, 20].

The insight gained is this: the state not only blocked expansion in long-distance road haulage, but in addition, it provoked a surging demand for heavier trucks on the agrarian market [6]. If this is not entirely off the mark, it can also be said, as I will argue below, that the outcome of transport policy had implications as well for the development of truck technology in Sweden.

The Limits of the American Dominance

The relationship between military use and mass production is a central theme in the history of technology and, it is widely assumed, the origins of the "American system of manufacturing" during the early decades of the 19th century lay in the American Army's preference for standardisation and interchangeable parts [23, 24]. Given the recognition of the truck as an effective and flexible means of transportation during World War I and the US Army's subsequent ambitions to build a fleet of standardised military transport vehicles divided into light, medium and heavy trucks, the leading American truck manufacturers would, by the same token, be the most likely to mass produce sturdy trucks in the inter-war years for the expanding commercial market.

Yet the history of truck technology, particularly concerning the links between the American military use of trucks in World War I and commercial mass production, reveals quite a different and complex story, one that supports the idea that the military had yet to provide the crucial stimulus for the technological breakthroughs in heavy truck manufacturing [3].

Like most large-scale enterprises, Ford and GM followed specific strategies to gain and maintain their substantial market shares. Typically, each utilised mass production technologies originally developed within the production of passenger car production and then transferred to truck manufacturing. While the big manufacturers largely ignored the heavy segments, the manufacturing statistics illustrate, subsequently, that over 85% of American trucks produced in the 1920s were light Ford and GM trucks (0.75 to 1.5 ton capacity) [4].

As clearly revealed by the US Army's procurement process during the inter-war years, the absence of a skill base in truck engineering on Ford's and GM's part was reflected by the Army's choice of standardised trucks for field conditions. Initially, the US Army experienced, huge problems concerning truck procurement, because the kind of rugged vehicle that was sturdy and advanced enough to take heavy loads at reckless speed in field conditions was not available off the rack in the mass producing sector. Even when the Army finally issued contracts for standardised military trucks, such as the Jeep and the 2.5 ton truck nicknamed The Duce and a Half, Ford lost the bidding process to small special truck manufacturers that utilized more advanced technologies. Although lacking the solid reputation of the Big Three, the original contract for the 2.5 ton truck went to Yellow Truck and the Jeep-contract to Willys-Overland [3].

Product Innovation and Flexibility

Broadly speaking, American competition was divided into two main sectors. The multinational mass producers focusing on light trucks were, in fact, among the most internationalised manufacturers of the time, while the small American specialists manufacturing heavy trucks remained mainly domestic with little export

capabilities. Lacking the financial strength of the Big Three, the small but technologically advanced firms were unable to set up and maintain vital supporting export structures, such as service networks.

Given the structure of the American truck industry, an opportunity opened for Swedish truck producers to exploit the narrow market segments. Hence, Volvo focused its resources on advanced trucks to embark on a route to rapid product development in the 1930s involving no less than 15 distinctly new truck models, each make produced in runs of ca. 2,500 units for two or three years before new models were introduced to replace the old ones. More specifically, Volvo's truck manufacturing varied from short series of a few hundred heavy trucks (5-7 tons) to the 2.5-3.5 tons trucks produced in larger volumes up to ca 10,000 units [6].

The rate of innovation clearly indicates that trucks that eventually would meet the demands of the more advanced customers, like the dairy-producing agriculture sector and forestry, were not available on the Swedish market by the early 1930s. The truck was, as a product, still in need of perfection before it was viable from a commercial point of view. To gain insight into what technological improvements were most required by the most demanding customers Volvo managers attended several meetings where representatives of, for example, the forest industry gathered to discuss that much troubled sector of the Swedish economy [6]. Arguably, Volvo thereby established a rudimentary form of user-producer relation with the most demanding segments of the truck market. To meet that demand Volvo emerged as a flexible producer of trucks as firmly footed in flexible production methods as the American industry was in volume production.

Volvo augmented a non-Fordist production strategy that would balance the need for rapid innovation. In this case, increased sales depended not on product standardisation, but on a wide range of constantly evolving products which opened new market opportunities. Productivity soared as Volvo was able to engage in batch production of trucks that were produced for short periods of time, and was therefore able to expand volume more rapidly than would have been possible with a single product and single-propose machinery [6].

As the flexible output made careful planning of the production process less likely, the team assembly workers (team size varied from 5 to 15 members) were largely responsible for the development and refinement of their own methods. Or as a former production engineer put it in an interview:

> The workers embodied the production methods... We had little insights in the development of new methods and we concentrated on the balance between pay and effort. So, we took the worker-led development of new methods for granted. We just tried to keep an close eye at the costs involved through price-rates studies.

Rather than the rigid and capital intensive control system based on single purpose mechanisation, day-pay and tight foreman supervision typical of American Fordism, according to David Hounshell [9], Volvo committed itself to a flat-rate pay system. This system allowed substantial learning on the shopfloor, permitting Volvo to minimise the costs of control, the development of productivity, and new work routines in order to enhance productivity [6].

In addition, Volvo augmented a network approach to extensive outsourcing as an additional organisational instrument to come to terms with the problems

connected with rapid product innovation. In fact, instead of turning to more specialised suppliers of components Volvo initially turned to the Swedish general engineering sector, which had developed general batch production skills to meet a final market for investment goods and other customer-specified items produced in short runs. Typically, the main suppliers like Köpings Mekaniska Verkstad (gearboxes) and Pentaverken (engines) and Bofors (engine parts and axes and shafts) employed ca. 50% skilled workers [6,11].

The Post-War Experience

In post-war Europe, the automobile industry faced surging demand for both passenger cars and commercial vehicles. To be sure, the governments in the chief automobile producing countries were soon inclined to exploit the industry's growth potential, which indeed constituted a prime mover towards mass production of automobiles in Europe. Even so, the political motives that propelled the European drive towards mass production varied across Europe. Whereas the French government, for example, saw the Americanisation of the automobile industry as a key to long term economic growth and political stability of the Fifth Republic [15, 2, 16, 18, 21], the British post-war government pressed for increased production volumes for reasons of securing short term hard currency incomes [8,5].

Despite Volvo's pre-war success, the Swedish government saw the automobile industry neither as a key to future techno-economic development, nor as a potential export commodity that could be exploited as in the British case. On the contrary, as of March 1947 the Swedish government imposed a tight regulation of all imports to Sweden through a system of binding import licences, which clearly came to cause a contraction of domestic automobile production. Vital components to the auto industry were made inaccessible to Volvo through the import regulations and the import of automobile components to the domestic industry dropped more than the industrial average [6].

Just as the state protected the railways from competition in the previous decades, the state now used the same framework of regulation, the Road Haulage Act, to achieve goals related to Sweden's balance of trade. A noteworthy statement is that of the foreign trade regulation authorities (Importberedningen), which recommended that "as for the issue of truck transport licences, the current restrictive levels should be maintained to keep the demand for trucks at low levels" [6].

The policies in question implied slower post-war growth in the truck industry than was expected. As Volvo's managing director, Assar Gabrielsson, addressed these matters he concluded:

> the demand for trucks are what we under normal circumstances would call very weak, but since the foreign competitions is limited by the import barriers we will get a barely satisfactory share of the market anyway [31].

In sum, the market for Volvo's main product line, the trucks, which accounted for the lion's share of company revenues (80% in 1947), was for a few critical years subjected to political limitations which made production uncertain. As can be imagined, this caused considerable distress to Volvo's management and the

company had to find other products, such as tractors for the agricultural sector, to substitute for lost truck production.

However, for a long term solution of this problem Volvo began to look for business opportunities in the potentially expansive passenger car market. As the Swedish government announced its commitment to joint the GATT negotiations, the company decided to direct the resources of the company to production of passenger cars. It was then assumed that the state would not open the truck market for future expansion, but Volvo managers were equally assured that the state would open the Swedish passenger car market to foreign competition. Volvo was left with no other option but to mimic the Fordist development path of the other European auto companies [6].

Moving from flexible to volume production was not a transition without major problems. Volvo's pre-war production of passenger cars can best be characterised as marginal, though the company successfully manufactured commercial vehicles (mainly taxicabs) in batches of a few thousands on a yearly basis. War-time production, of course, further enhanced Volvo's heavy vehicle profile. As Volvo emerged from World War II, passenger car capacity was thus extremely limited. Given that car production was almost negligible in 1948 (or less than 3,000 units) Volvo had to develop for an industrial strategy and structure that would increase production volume in a few years in order to remain on the market (50,000 units was the target for 1952) [31, 6].

American Production Principles and the Organised Labor Market

Given that it is a valid claim that the Swedish macro-institutional setting impelled the shift from trucks towards passenger cars in the post-war years, what then matters here is the anything but straight forward way that the organised labor market responded to this transition.

The emerging commitment to volume production led management to an attempt at a new local union agreement, which included a trade off between wages and labor productivity at a higher level. The upshot was to maintain the local flat piecework contract, but to do away with the old piece rate standards that were established through decades of bargaining. In short, Volvo tried to strike a new deal with the union to ensure high productivity and high wage levels [6].

While the local union received the proposed agreement with approval, the Swedish Engineering Association (SEA) refused to accept it because they found the agreement to violate the national agreement in terms of both wage levels and extension of employer's responsibilities [28]. Now that SEA's lack of support had checked this possibility, Volvo management began in the early 1950s to look for more radical alternatives and subsequently contracted an American firm, Method Engineering Council, to implement the MTM system.

However, the implementation caused severe unrest and a series of strikes as the company tried to carry through an analysis of the work process in the Gothenburg plant to establish actual labor intensity. Once again, the national labor market organisations were approached by the local parties respectively to resolve the situation caused by Volvo's commitment to volume production. Conspicuous enough, in the subsequent negotiations both organisations arrived at the same conclusion: namely that the Swedish engineering sector should avoid what they conceived as "American methods" at the plant level.

In his report to the employer's association, the SEA representative Oscar Werne wrote about a meeting with Erland Fägerskjöld, then responsible for the implementation of the new system at Volvo, where Werne made his position clear to Volvo:

> I gave him [Fägerskjöld] some examples of the unrest and confusion that U.S.-experts and their systems already had caused on the Swedish labour market, for instance the strike caused by the implementation of the Bedaux-system at the Alm shoe factory in Gothenburg in 1936 [28].

In subsequent communications Werne was even more explicit. His counterpart in the negotiations was equally frank in his report to the Swedish Metal Workers Union (SMWU):

> I came to the conclusion that everything should be done to impede the application of this system in the automobile sector as well as in the industry more generally [27].

Meanwhile, the views held by the respective organisations did not hinder Volvo in introducing the MTM system on the Swedish labor market in the course of the 1950s. Concerning the labor organisation's attitudes, the subsequent industrial conflicts led to a divide between the communist union leadership which advocated industrial activism as the only way to block the MTM system and younger Social Democrats of the union membership at Volvo maintaining that the system was there to stay, but consistent union policies could modify the worst drawbacks through local negotiations. The attitude towards MTM adopted by the young social democrats, of whom Gunnar Lundberg was perhaps one of the most prominent, was influential as the national union agreed to include MTM-related terms in the national agreement [26].

Even so, there is no evidence that supports the idea that the Swedish state, or national labor market organisations, were committed to a Fordist evolution of the Swedish automobile sector in the early 1950s. The suggestion here is that Volvo was the radical innovator, while the state and the organised labor market were still in the in the process of defining a conceptual framework for the industrial structure for the post-war era.

Conclusion

In sum, this paper covers some of the key issues involved in the debates on the limits to Americanisation. The central building block of this paper, then, is a distinction between basic types of production systems within industry as representatives of different types or visions of industrial efficiency. It seeks to establish which competing technological systems have been predominant in different firms or sub-branches of the automobile industry.

Still operating without such basic innovations as moving mechanically driven assembly lines in the late 1940s, Volvo, the leading Swedish truck manufacturer, appeared to be an ill-equipped competitor by American standards. However, the rationale behind the apparent technology lag is closely related to

primacy placed on rapid product innovation in the 1930s. Outside the domain of mass production, the findings suggest that the Swedish institutional setting shaped an avenue of flexible dynamism. In this sub-sector of the truck market managers experimented with less capital intensive production, relied more on outsourcing and found no use for rigid assembly practices.

On balance, however, the conclusion implies not only that Swedish industrial development in the inter-war years was rooted in a much more complex reality, with investment concentrated on flexible equipment capable of serving diversified final markets with innovative and complex products, but it also follows that political construction of domestic markets limited the scope for Americanisation of the firm's production strategies.

However, Volvo began by the mid-1950s to experiment with Americanisation of the production strategy in response to liberalisation of the expanding passenger car market and, thereby, gradually began to abandon the fundamental principles of rapid product innovation and flexibility of the 1930s. The trend towards Americanisation was highlighted by implementation of the infamous MTM system at Volvo in the mid-1950s.

The prevailing view is that the government's overriding concern with industrial efficiency coincided with that of the automobile industry facing the soaring passenger car market, which reinforced two central premises of industrial management, pre-planning and control over labor process, and that Volvo's transformation during the 1950s thus was analogous to a more general trend towards post-war Americanisation.

Yet historians are well aware that the post-war economy was one of institutional regulations that filtered economic events. On this view, the crucial questions and answers clearly rest with how the key actors judged the post-war economy and how they understood the automobile sector in relation to the larger setting. Insofar as the actors' understanding of the post-war economy were not homogeneous and that actors took more than one view on the future of European automobile industry, this has to be seen as a corrective to the notion of a universal organisational and technological route to economic growth.

To be sure, significant differences between the European countries can be discerned in the extent and forms of political support for Americanisation during the post-war period. In contrast to the French government, which clearly encouraged industrial Americanisation, in part for the industrial underpinnings of long-term political stability, the Swedish decision-making elites mustered little direct support for the expansion of the domestic automobile industry, let alone for the introduction of American-style mass production methods as solutions to the economic challenges of the post-war era.

Seen in this way, the economic dynamism of each industrial model cannot be evaluated outside of definitive institutional and historical contexts, nor can it be fully determined in advance which technologies are the more dynamic. This means, simply put, that more than one outcome should be considered possible, but the practical realisation of either possibility depends on a contingent and variable framework of institutional regulation at both micro and macro levels.

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