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THE NORWEGIAN CAR.

The Cultural Adaption and Integration of an Imported Artefact*

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1. The Car - Artefact or System?

There is usually agreement that American and European cars - as ideal types - are different. The French post-modernist Jean Baudrillard puts it this way:

> *"In Europe, the street only lives in sudden surges, in historic moments of revolution and barricades. At other times people move along briskly, no one really hangs around ... . It is the same with European cars. No one actually lives in them; there isn't enough space".*[1]

And:

> *"The way American cars have of leaping into action, of taking off so smoothly, by virtue of their automatic transmission and power steering. Pulling away effortlessly, noiselessly eating up the road, gliding along without the slightest bump ..., braking smoothly, but instantly, riding along as if you were on a cushion of air, leaving behind you the old obsession with what is coming up ahead, or what is undertaking you".*[2]

To the sociologist of technology, Baudrillard's conclusion looks very promising:

> *"Drive ten thousand miles across America and you will know more about the country than all the institutes of sociology and political science put together".*[3]

Cultural stereotypes may also prove pertinent to an analysis of the difference between European cars; the French cars being innovative, but ideosyncratic, the Swedish cars being dull, but safe and solid; the German cars being of high quality, but without spirit, and the Italian cars being small, quick and unpredictable. Admittedly, these characteristics are highly debateable, in particular when we consider the success of the world car concept.[4] However, the point is that it seems meaningful to talk about the Swedish or French car in a sense which means more than just stating the country of origin.

In this light, it is of course perfectly meaningful to talk about the Norwegian car - except for the fact that Norway does not have any car industry. The cars that are sold in Norway today are produced in Japan (39,3

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[1] J Baudrillard: *America*, London: Verso, 1988, s. 18.

[2] Op. cit., p. 54.

[3] Ibid.

[4] *"After 1979 (...) (t)he types of automobiles demanded across the developed world converged dramatically"* (A Altschuler et. al.: *The Future of the Automobile*, Cambrigde, MA: MIT-press, 1984, p. 7).

%), West-Germany (32,1 %), France (9,6 %), Sweden (6,8 %), etc.[5] Can we nevertheless use the expression "a Norwegian car" in a meaningful way, and what would in that case be meant by that expression?

Within the framework of traditional approaches to the social study of technology, it does not make sense to talk about a Norwegian car, except possibly as a joke. Usually, the car is conceived as an artefact with certain characteristics, and the diffusion of this artefact has a lot of important (and partly problematic) consequences. Diffusion is the key concept here. When the car is seen as an object of diffusion, this implies that the artefact somehow is a stable object. In a physical sense, this is of course correct,[6] but should the car be defined in strictly physical terms? Moreover, can we assume that if the physical phenomenon that we call a car is introduced in any social system, its long-term effects are predetermined?

The observations made by Baudrillard above, however ideosyncratic and French they may be, are reasonably sound suggestions that this is not the case. There is more to American driving behaviour than just the technical characteristics of the cars. Consequently, we need a different perspective to understand the phenomenon - a perspective that allows us to conceive of the car as an ensemble of culture, politics and economy.

To begin with, we could note that the car (and, in principle, any other technical artefact) can be understood both as an individual object and in systemic terms. On the one hand, the car is a piece of technical equipment, a machine, that has certain qualities which can be analyzed with a view to its human users - driver and passengers - or to those otherwise directly affected: Pedestrians, bicyclist, and those who dwell alongside roads. To its users, the automobile offers a great increase of their capabilities. Using the concepts of the German philosopher Arnold Gehlen, we can say that it represents a combination of three different capabilities. First, as a *replacement technique* it allows the driver to perform beyond the potential of his organs. Second, as a *strengthening technique* it extends the performance of his bodily equipment. Third, as a *facilitation technique*, it relieves the burden upon the driver's organs, it disengages them and saves effort.[7] The situation of the non-driving others may be radically different and not very well accounted for by this philosophical antropology: Increased risk of accidents, pollution, etc.

The viewpoint that the car is just a piece of individual machinery gives a rather limited understanding of this phenomenon. The car also represents a kind of sociotechnical system where driving machines are tied together with a lot of other artefacts and social actors. In this sense, we can analyze the car system as *a large technological system* by using the concepts offered through the analysis of Thomas Hughes in his *"Networks of power"*. We are then talking about a system consisting of roads, gas stations, oil companies,

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[5]The figures are the percentage of new cars registrated in Norway in 1988, according to country of origin. Source: *Bil og vei. Statistikk 1989*, Oslo: Opplysningsrådet for veitrafikken, 1989, p. 34.

[6]Strictly speaking, a car may undego minor technical changes in the hands of the importer/vendor.

[7]A Gehlen: *Man in the Age of Technology*, New York: Colombia University Press, 1980, p. 3.

automobile vendors, auto repairs, carowners' associations, numerous public institutions, etc. The systemic point of view thus informs us that the car is a very powerful institution of modern society, the influence of which hardly can be overrated, and consequently, an institution which is very difficult to change in any radical fashion.

However, to use Hughes' concepts has certain problematic implications.[8] The major attractivity of his theory - besides its appearant ability to produce good history - is exactly the idea of technology as a system of artefacts and social institutions which acquires momentum to continue its development along a spesific trajectory. Thus, some of the compelling ideas of the model of a *technological imperative*[9] is preserved, but without bowing to technological determinism. This is an important achievement, but the effort raises some rather important problems. First, Hughes applies the concept of systems heuristically, more as a metaphor than in the sense of general systems theory. This is in his case a pragmatic, fruitful solution, but to students of other "systems", it is not so helpful. For example, the problem of deciding what is inside and what is outside is no pededantic detail. Second, the generality of the temporal stage model which he presents is not very well argued and his treatment of the "mature stages" with a high level of momentum is very sketchy. Third, his idea of "reverse salients" as a main force behind technological development has a distinct functionalist and rationalist flavour.

However, at least as a heuristic, I think it is important to keep the idea of technology as a system. In that spirit, I will continue to analyze the car in Norway through such a perspective. This will imply a shift between seeing the automobile as an artefact and as a system. Metaphorically one could borrow the idea of wave-particle dualism from quantum mechanics, saying that technology shows a *artefact-system dualism*. I will return to the fruitfulness of this at the end of the paper.

Some of the problems arising from the application of a systems perspective may be amended through the use of an action or actor oriented approach. In the new sociology of technology, the so-called *actor-network theory* of Michel Callon, Bruno Latour and John Law is an effort to develop such an alternative.[10] Compared to the idea of large technological systems, actor network theory concentrates on the continous work of translating interest and define and distribute roles in order to establish and expand a given socio-technical network. The only systemic properties that are considered, are the size and strength of the network. The main focal point is the political-rhetorical work performed by the network-builder(s).

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[8]The following discussion is based on T Hughes: "The Evolution of Large Technological Systems", in W Bijker, T Hughes and T Pinch, eds.: *The Social Construction of Technological Systems*, Cambrigde, MA: MIT-press, 1987.

[9]See e.g. L Winner: *Autonomous technology*, Cambrigde, MA: MIT-press, 1977, pp. 100.

[10]See B Latour: *Science in action*, London: Open University Press, 1987; M Callon, J Law and A Rip: *Mapping the dynamics of science and technology*, London: Macmillan, 1986.

Actor-network theory is developed to analyze and account for the increasing influence of scientific and technological laboratories in modern society. However, the exemplars of this theory are all cases of discovery and innovation in a R&D sense. *Use* of technology has been of little concern. This observation is valid also for Hughes' large technological systems-approach which even have the very spesific characteristic of being applied mostly - if not only - to technological systems where the parts are so-to-speak materially connected through transmission lines, railways or telephone lines.[11]

This paper is meant as an effort to see how well the concepts of these two approaches stand up to the challenge of analyzing a case which is more concerned with adaptation and use than with innovation.

2. The role of the automobile in Norwegian society today according to official statistics

When we look at the growth in the number of cars in Norway, the resulting curve looks just like a traditional diffusion story (see Figure 1). Also in this country, the automobile has gained an enormous popularity. With a ratio of inhabitants per private car of 2,6 in 1987, Norway ranks about average among Western industialized countries. However, the United States is still a little in front with 1,7 inhabitants per private car.[12]

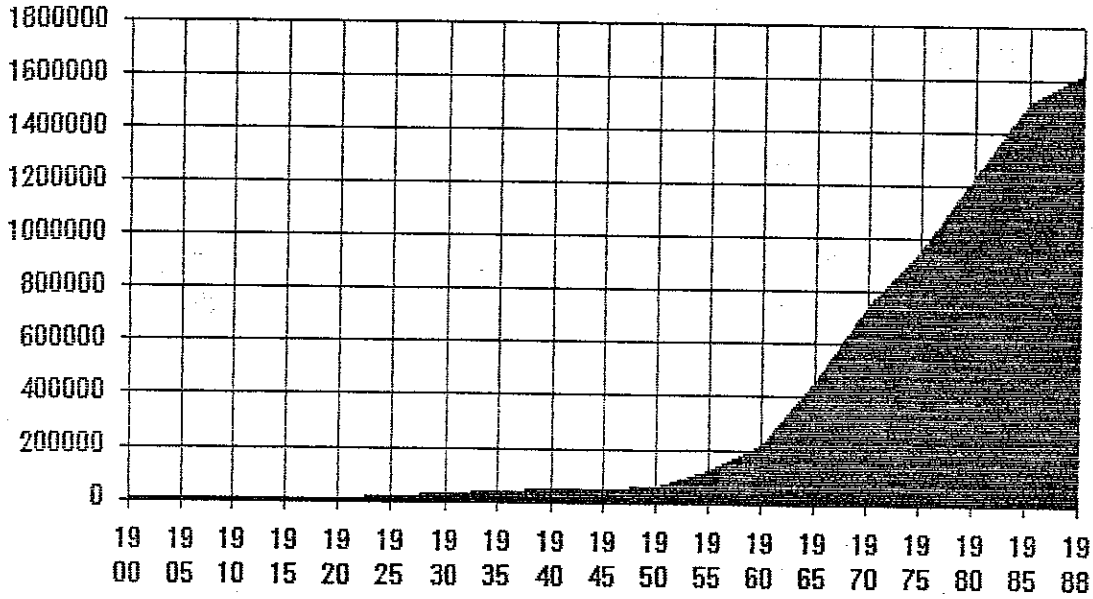

Figure 1. Number of cars in Norway 1900-1988.

[11]See R Mayntz and T Hughes (eds.): *The Development of Large Technical Systems*, Franfurt aM: Campus Verlag, 1988.

[12]*Bil og vei. Statistikk 1989*, Oslo: Opplysningsrådet for biltrafikken, 1989, p 116.

How Norwegians value their car(s) is indicated by Table 1. It shows how much the average houshold spend on buying and maintaining means of transportation (including caravans, motorbikes and bicycles) as a percentage of their total consumption. As we can see, there has been a dramatic increase in the relative spending on cars from 1958 to 1983-85 where automobile-related costs amount to nearly 17 per cent of the total consumption of the average Norwegian houshold. To compare, in the latter period food represents 18,6 % and housing (including heating and light) 20,1 %. Thus, through the diffusion of the automobile, transportation costs of Norwegian households have grown to the extent that households now have *three* large sets of expences instead of the traditional two: food and housing.

Table 1. The percentage of total consumption of average Norwegian households spent on byuing and maintaining transportation equipment, 1958-1985. Source: Official surveys of consumer expenditure.[13]

1958	1967	1973	1977-1979	1983-1985
2,5	11,7	14,6	15,5	16,5

This quite dramatic increase of transportation costs also implies that a very substantial part of the increase in household income in the post-war period has been spent on the rapid growth of the car system. This may offer some explanation why the automobile got to be a symbol of progress. In a similar vein, Table 1 give an indication that automobiles are expensive to buy and maintain in Norway. In fact, we could say that cars have been *politically constructed as luxury*, although to Norwegian consumers it also appears to be culturally constructed as a necessity.

Figure 1 shows that the take-off of automobile diffusion in Norway started around 1960. The period of rapid growth of car ownership coincides not only with a high rate of economic growth in Norway, it is also the beginning of the age of two-paycheck households. It has been argued by Norwegian transport researchers that the growth of the car system to a substantial extent could be attributed to the increased labour force participation of married women. The argument is that working women represent a latent demand for a second car in the familiy.[14] However, from Table 1 one could also argue that married women started to work to pay the increased transportation cost of the household, in particular of their husbands. It is even possible that the car has contributed to a change in the allocation of time of families, and thus facilitated increased labour market participation of married women. All these statements probably have some ring of truth, because the changing relations of gender are important to most social issues. However, as we shall see later, the growth of the car system has a far more intricate dynamics than some simple set of cause-effect relationship.

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[13]NOS: *Transports and communication statistics 1987*, Oslo: National Bureau of Statistics, 1987, p. 76.

[14]Gustav Nielsen and Nils Vibe: *Drivkrefter bak trafikkutviklingen i byene*, Oslo: Transportøkonomisk institutt, 1989, pp. 50.

The dramatic increase in household transportation expenditure shown in Table 1, raises a question of what was gained through this. Table 2 demonstrates a simple, but very striking efffect: a dramatic change in the transportation pattern. First, we see a change from a situation dominated by public transport to a domination by private cars. Second, we find a very considerable increase in the amount of motorized travel. What has taken place is not a reduction in the amount of public transport; in absolute terms this has increased very substantially over the whole period. The relative turnaround is due to a much higher rate of growth in the use of private cars.

Table 2. Domestic transport of persons according to means of transportation. In billion passenger kilometer (BPK) and percent of total.[15]

Means of transportation	1946 BPK	1946 %	1960 BPK	1960 %	1970 BPK	1970 %	1986 BPK	1986 %
Public	3,5	75,0	6,0	52,0	7,3	28,4	10,3	21,5
Private cars	1,0	24,0	4,8	41,3	17,8	69,0	36,7	77,0
Motorbikes etc.	0,1	1,0	0,8	6,9	0,7	2,7	0,7	1,4
Total	4,6		11,6		25,8		47,7	

In the same 40-year period the population in Norway increases from 3,1 million to 4 million. The per capita amount of travel increased in the same period from 1 500 kilometers to 11 900 kilometers. These figures show that *a totally new pattern of mobility* - and propably also of social interaction - was introduced in Norway during these years. Travelling became more frequent, the speed of travel increased substantially, and this has made it possible to interact with people within a far larger area than previously.

This development is by no means particular to Norway. Data about average yearly driving distance per car show that Norway - with 14 100 kilometer pr car in 1988 - is on the same level as e.g. the German Federal Republic (14 300 km in 1987), but somewhat behind countries like Finland (17 300 km in 1987) and Denmark (16 230 km in 1987).[16] In fact, such figures suggest that increased mobility and range of social interaction is a universal feature of the automobile in affluent societies.

However, the pattern of automobile use should not be seen as an intrinsic quality of the car as a technical artefact. The car is obviously made for driving, but its material appearance is not very informative as to *what kind of* driving it can be used for. The last comprehensive survey of car use in Norway was done in 1980. Table 3 contains the probably most pertinent information, namely data about the distribution of driven distance according to purpose of the journey.

Table 3 indicates the development of a rather complicated pattern of car use, relating the automobile to a lot of different activities. The car is not only an instrument to get to work and to travel during week-ends and vacations. Everyday life activities like shopping and organized leisure have been increasingly bound up with automobility. This is evident if one compares

[15] *Personbilpolitikk*, NOU 1984:6, Oslo 1984, p. 31, *Bil og veistatistikk 1989*, p. 72.

[16] *Bil og veistatistikk 1989*, p. 90.

the results of Table 3 with the results of a similar survey undertaken in 1973/74. During this seven-year period, the relative amount of driving to/from and in work and week-end and vacation journeys has declined.[17]

Table 3. Driven distance according to purpose of the journey. Private cars and vans 1980. Per cent.[18]

	Driven distance in per cent of total
Driving to/from work	23
Work-related driving	15
Driving to/from school, kindergarten, etc.	2
Driving to/from shops, public office, doctor, etc.	11
Driving to/from recreation areas, visiting friends, etc.	20
Week-end driving	7
Vacation-related driving	8
Other purpose	11
Purpose not reported	3

To understand the dynamics behind these figures, we need to consider car use in a more qualitative manner. What are these different purposes, how dependent are they upon widespread car ownership, and what is the resulting system or network? In the following sections, I will make some comments about this.

3. Automobile politics and car culture in Norway

The statistical information presented in the preceding section does not support the hypothesis of a spesific Norwegian car culture. Available comparative data - admittedly scarce - suggest on the contrary that the Norwegian relationship to the automobile falls into a rather typical and quite homogeneous pattern of car ownership and car use in Western, industrialized countries. It is possible that this Western pattern will dissolve in the face of a more detailed analysis, but let us now for a while bracket the car as an artefact and concentrate on its systemic or network properties.

Both from an actor-network and a large technological systems perspective, the analysis of the car should start by studying the actions of the innovator-entrepreneurs who create the car industry and thus powerful enteties that act to diffuse the automobile. Obviously, a very good case can be made to argue that the large companies like GM, Ford, Toyota, Renault etc. through their cars (as well as through their economical and political resources) have been eminently able to promote certain actions throughout industrial societies. In the case of Norway, however, these companies are not present to influence national and local politics the way they may do in the countries where the cars are made. There is no doubt that for example GM, Ford and Chrysler to a considerable extent have been shaping automobile

[17] *Personbilpolitikk*, p. 155-156.

[18] Ibid.

politics in the United States.[19] To contrast, the representatives of these companies in Norway have much less political clout. Consequently, it is interesting and meaningful to ask: Who were the actors that were pushing the development of the Norwegian car system? This urges us to look at automobile politics in Norway, and in particular at the institutions that emerged as a kind of automobile infrastructure.

When we study the automobile field in Norway, we can identify at least five different networks where the car the major focus. First, we have the *motor trade* that during the 1930ies becomes organized into four different trade associations:

- the car dealers
- the garage owners
- the car painters
- the tyre sellers.

In 1962, these organizations merged into the Norwegian Motor Trade Association.[20] Second, we have the oil companies and the gas stations. Third, public institutions have been established or changed to take special care of automotive issues. Prominent examples of such institutions are The Official Driving and Motor Vehicle Examiners and The Highways Directorate. Fourth, we have the car owners associations. The largest one is Norways Automobile Association. It was founded in 1924 and has around 400 000 members, making it one of the largest interest organizations in the country. Fifth, we have scientific institutions doing R&D in transportation, highway construction, etc.

The most obvious candidate to the title of car system builder is of course the motor trade. In particular, the car dealers have a very strategic position in the sense that they are the immediate persuaders of new people to be enrolled into the car network as owners. Since the trade employs around 40 000 people, it has at least some economic power. However, even the 50th Anniversery Account of the Motor Trade Association does not picture them in the role of system builders.[21]

One of their most offensive moves was the establishment in 1948 of a network called *The Information Council for Car Traffic* ("Opplysningsrådet for veitrafikken"). The list of members of this organization is very interesting. Besides the different parts of the motor trade, the oil companies, the gas station owners' association, insurance companies, and the car owners' associations, we find the following:[22]

- The Association of Asphalt and Tar Producers
- Askim Rubber Factory
- The Association of Auto Tariffs
- The Norwegian Association of Breweries
- The Norwegian Medical Association
- Norwegian Farmers' Association

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[19]See e.g. J Flink: *The Automobile Age*, Cambrigde, MA: MIT-press, 1988.

[20]S J Herstad: *Bilen i fokus. Riss av norsk bilbransjes organisasjonsmessige utvikling og innsats gjennom et halvt hundre år*, Oslo 1978.

[21]See Herstad, op. cit.

[22]Opplysningsrådet for biltrafikken: *Bruksbiler*, Oslo 1951.

- Norwegian Taxi-owners Association
- The Norwegian Manufacturing Assoction
- Fedration of Norwegian Commercial Associations
- Association of Norwegian Bus Owners
- The Norwegian Cement Federation.

The list makes interesting - and impressive - reading. It demonstates that actors in the motor trade was able to build a network that looks quite strong, at least on paper.

To understand why it was possible to translate so heteregeneous interests into the basis of a network, we have to consider the realities of automobile politics in Norway from another angle. Since Norway was (and is) without its own car industry, cars have to be imported. They are thus a cost to the national economy it the sense that a high turnover of cars may produce a deficit in the trade balance with other countries. Such considerations led to the introduction of import quotas on cars, an arrangement that was effective from 1945 to 1960. During this period, those who wanted to buy a private car had to apply for an import licence, and such licences were granted on the basis of assumed needs. This favoured people who could argue that they needed a car to facilitate their professional activities, like doctors, shop-owners and craftsmen.[23]

Moreover, compared to the larger, car-producing countries, Norway early began to tax cars and car-use relatively heavy, and this tax-level increased in the whole post-war period. This was legitimized by labelling the car as luxury, as I have mentioned previously. The political system consequently constructed the private car as a relatively expensive and unecessary artefact, and this construction has been quite efficient, in particular between 1945 and 1960. The car was then juxtaposed to the efforts of reconstructing the Norwegian society after the war, as something that could seriously disturb the far more important trade balance. Neither the motor trade itself, nor the much stronger alliance of *The Information Council for Car Traffic,* was able to counter such arguments effectively.

As Figure 1 demonstrates, the success was greater in the long run, but it is questionable if this should be attributed to the efforts of *The Information Council for Car Traffic*. Another network appears to have been of far greater importance. The political labelling of the private car as luxury was by no means unambigous. The car was also an important symbol of modernity, perhaps the most striking one. This relates in part to the very central and visible place of the automobile in the culture of the United States, the country that to post-war Norwegians was *the* symbol of a modern society. Quite early, it seems, the car was established as a very attractive - and not totally unattainable - luxury. Also the political establishment must have experienced the ambiguity, but there is little evidence of this in the official car policy of the 1950ies. In fact, it is difficult to indentify any such coherent

[23]See P Østby: "Bilen i 1950-årene - Omrisset av et teknologisk system", STS-working paper 11/89, Trondheim 1989 and P Østby: "De gyldne årene - Massebilisme på 1960-tallet", STS-working paper 1/90, Trondheim 1990. The following argument owes much to Østby's work.

policy. Cars were debated in terms of balance of trade or better local roads, but not as an issue in itself.[24]

What then emerges as the most visionary and active network builders are different kinds of experts: highway engineers, transportation economists, and planners. In the early 1960ies, a quite influential network of such experts placed either in scientific institutions or in the Highway Directorate became a reality.[25] The pioneer here was Hans Hagerup Krag who was general manager of the Highway directorate from 1874 to 1903. As early as 1899 he suggested increased public grants to improve roads to prepare for the use of cars.

> "*(I)t would be of great harm, if the nation - due to lack of resources to improve roads - still for some time should have to do without the great advantages of such means of communication*".[26]

Two years after, Krag drove with a car across the Norwegian mountains from Otta to Åndalsnes, a streneous journey, to make his contemporaries aware of the car and its - in his opinion - great possibilities. Krag also sent people from his directorate to other countries, not only to study highways but also to study cars and driving.[27] In some sense, it seems as the Highway Directorate since the turn of the century has made conscious efforts to adapt Norwegian roads - and through that, the Norwegian society - to the demands of the automobile.[28]

What the experts did, were to transfer - or import - visions about cars and knowledge about how to adapt and develop the necessary infrastructure. I would like to emphasize this kind of transfer which often is neglected. The point is that when cars come to Norway as artefacts, they come without any instructions regarding their use (except for a few technicalities). Thus, the automobile and the demands it is making have to be explored and discovered, one could say *re-invented* or *re-innovated*. In this process of re-invention/re-innovation, several channels of information are important. The professional/scientific is of course prominent, but there are others among which books, magazines, and movies are the easiest accessable.

If we look more closely at the professions concerned with the physical structure of modern societies: architechts, urban planners, highway engineers, etc., I will assert that the car as a system was closely integrated into their visions of the future. More spesifically, we may observe that the automobile was fitted together with phenomena like sky-scrapers, suburbs, population growth, economic growth, commerce, and speed. The construct that emerges is not the modern Utopia, but a kind of plan based on statistics and prognosis, that is: based on strong, modern rhetoric which says that this is the probable development, not a vision.

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[24]See Østby, 1989, op. cit.

[25]Østby, 1990, op. cit.

[26]J Skougaard: *Det norske veivæsens historie*, bind II, Kristiania (Oslo), 1914, p. LI.

[27]G Kristiansen: *Bil, vei og meninger*, Gjøvik 1975,

[28]See Skougaard, op. cit.

This is eminently expressed by the famous French architecht Le Corbusier in his book *The City of To-Morrow and Its Planning* where he is careful to argue more in terms of rationality and necessary solutions than in terms of what is attractive. The following passage illustrates how he constructs on paper an enormous network of artefacts, people and institutions:

> "*(A)ctually these sky-scrapers will contain the city's brains, the brains of the whole nation. (...) Everything is concentrated in them: apparatus for abolishing time and space, telephones, cables, and wireless; the banks, business affairs and the control of industry; finance, commerce, specialization. The station is in the midst of the sky-scrapers, the Tubes run below them and the tracks for fast traffic are at their base. And all around are vast open spaces. There need be no limit to the number of motor vehicles, for immense parking areas linked up by subterranean passages would collect together the host on wheels which camps in the city each day and is the result of rapid* ***individual*** *transit. (...) One can only come to one conclusion; that the city which can achieve speed will achieve success*".[29]

This quote is not presented to argue any "Corbusierization" of modern societies, least of all a "Corbusierization" of Norway. However, the impact of this way of posing "problems" and "solutions" seems to have been considerable. In particular, it is striking from Norwegian planning documents how assumptions about increased car use and the necessary adaptions to this were made very matter-of-fact like, using the language of statistics and prognosis.

The result of these efforts on the part of the expertise was the gradual physical transformation of Norwegian society, partly to adapt to cars, but also by assuming in a material sense common car ownership. Norwegian cities as well as its villages give ample evidence to the latter fact through the way in which dwellings, shops and factories are scattered over large territories without any kind of axis system that would allow for efficient public transportation. People adapted gradually to this pattern, presumably because they experienced that the car which more and more of them could afford, made it possible to link up geographically distant objects in a reasonable fast, flexible, and comfortable way.

This trajectory of urban and rural development was probably not foreseen in the 1950ies and early 1960ies when the pattern started to emerge. Increased car ownership opened up this new pattern where new urban and rural areas were made use of in a senseless way, seen from the perspective of any other means of transport than the private car. Later, plans were adopted to the established "realities" which in this sense became professionally confirmed. When the car had proved that it could patch together scattered settlements, urban and rural planners adopted to this experience very matter-of-fact like, leaving few traces of critical questions. This is evident from the cool, prediction-oriented prose of planning documents.

The result is not very well described through the metaphor of a system, because it says little about the cohesion and power of the resulting socio-technical construct. In actor-network terms, what happened in Norway was the development of a network where private cars, one-family houses, highways,

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[29]Le Corbusier: *The City of To-morrow and Its Planning*, New York: Dover, 1987 (org. ed. 1929), p. 187-89.

highway engineers and urban planners became cornerstones of a structure with very strong physical as well as social bonds. To remove the private car from this network would not only be difficult because of all the social interests attached to it, but also because the material structure of Norwegian society demands such an artefact to function.

In sum, there are good arguments to support the assertion that the resulting car-network should be characterized in some sense as particular to Norway. Even if it is evident also from the developments in the United States that expert groups like highway engineers and urban planners were quite important,[30] their influence does nevertheless appear to be subservient to the large automobile companies in a way that their Norwegian colleagues did not.

4. The car and its Norwegian users: Rational adaption or irrational seduction?

In some sense, the increase in car ownership in Norway appear as being more led by demand than spurred by supply. This appearance is of course in particular related to the period of import restriction where demand by far surpassed supplies. But the rapid growth in the number of cars demonstrated in Figure 1 and the arguments regarding material structures presented in the past section, both suggest that demand for cars was more a question of sufficient affluence than marketing efforts of car sellers and car companies. At least by the standards of today, the advertisements for private cars in th 1950ies were very sober, but neither were they - for that matter - very informative.

Why have Norwegians in great numbers been buying private cars, and to what use have these cars been put?- In this section, I will not answer these questions directly, but I will try to say something about the direction which some answers might take us. As earlier remarked, the development of a pattern of car use must in a sense be an innovation, although much of the ideas behind the innovation may be available through cultural imports.

What do we know about Norwegian car use? We have some information of the kind presented in Table 3, but little else is easily available. An interesting and promising way out of this, is of course to look into what we might call *the popular car discourse* - Norwegian books and magazines about cars. In the following, I will report some temporary findings of such an effort.[31]

In 1951, *The Information Council for Car Traffic* produced a pamphlet called *The car in daily use*. The main objective of the pamphlet was to counter the labeling of the private car as a luxury, and it describes the different uses of the private car in quite enthusiastic terms. It states that "The private car has become a necessity", and continues:

> *"It is a sign of our times that the youth has become car-minded, but the car is not only for sports or a toy which satisfies the child in us.*

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[30]See Flink, op. cit.

[31]Sources for the following part of the paper are in particular different volumes of *Motor*, the journal of the Norwegian Automobile Association, Anniversery reports of local divisions of the same Association, and popular books on cars and car use.

Today, most car-owners conceive of the car only as an instrument of transportation which brings them where they want to go, when there is need for it, whether it is related to work or their private life".[32]

In the following pages, these applications are mentioned:

- the car in the service of the King
- transport of public servants
- transport of members of county councils
- transport of priests and teachers
- bringing ill people to hospitals
- transporting doctors and midwives
- forestry
- replacing the farmers horse
- industrial purposes: sale, transporting engineers and managers
- increasing the efficiency of construction work by transporting the architect, the mason, the plumber, and the electrician.
- easing the work of housewives
- leasure.

A striking feature of this list is the concentration on work-related acticivities. The two most important exceptions are the last ones. About housewives, the pamphlet says:

"The housewife often has a long way to go to do all her necessary errands. She seldom has any help, and when she has kids from the age of babies and upwards, its is often impossible for her to get outside the home. Nevertheless, it is still only a few people in our country who understand how much help it would be to the housewife to have a car at her disposal, if only for a few times a week".

From the United States, we know that even before WWII the car had become an important technology to housewives and housework, changing the pattern of shopping and preparation of food:

"By midcentury, the automobile had become, to the American housewife of the middle classes, what the cast-iron stove in the kitchen would have been to her counterpart of 1850 - the vehicle through which she did much of her most significant work, and the work locale where she could be most often found".[33]

James Flink describes part of this development as a widespread diffusion of *the automobile-refrigerator complex.*[34]

Norwegian statistics about car use suggest that the car never became available to a great number of housewives until they became wage-workers. The American pattern is moreover strikingly absent from the popular car discourse. This is not only an effect of women's position in society. It also falls within a general pattern of the car literature which says very little at all about everyday life uses of the automobile.

In fact, when we leave aside the issue of techno-economical information about cars, the whole popular car discourse could be interpreted as an

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[32]Opplysningsrådet for biltrafikken: *Bruksbiler*, op. cit.

[33]R S Cowan: *More work for mother*, New York: Basic Books, 1983, p. 85.

[34]Flink, op. cit., p. 164.

expression of *a critique of everyday life*. To be more spesific, the discourse relates to *travelling* in the sense of *getting away* from everyday chores. Handbooks and magazines contain page after page of information about exotic places of travel for the car owner, about vacations and - in particular - about camping. A lot of anniversary reports made by local divisions of The Norwegian Car Owners Association tell a similar story. The activities of the local divisions are reported to be of five kinds:

- political pressure for better roads,
- support of establishment of camping areas,
- motor sports, in particular map-reading trials,
- technical services,
- talks about vacations and places to travel.

The preoccupation with travels in the literal sense should not make us forget the importance of what we could call *mental travels*. By this I refer to car-related activities of a leisurely character which marks a break with everyday life-kind of efforts. The most prominent example of such mental travelling is the maintenance, repair-work and general fumbling with the automobile. Here, there is a vast literature of instruction manuals, general introductions to how the automobile works, and lots and lots of particular suggestions about how to solve special problems. In a sense, this is of course something very rational: the development of an ability to take good care of ones car and to be able to handle unexpected and possibly urgent breakdowns. However, the abundance of such literature concerning car in comparison to the scarcity of such material concerning nearly every other kind of everday life technology, suggests that there is more to the issue than instrumentality.

Presently, I can only speculate about what this "more" is. An obvious candidate is the *social production of gender*. Gradually, during the last 20-30 years, the ability to make car repairs has become part of the definition of masculinity. Stereotypically, it is required of a "real man" that he is able to master the car as an artefact. He should be able to control and manipulate it. I will also suggest that the car has made it possible to construct a masculine room physically close to the more feminine room of the home. Men who comply with demands of being at home, may nevertheless get away by sticking their heads into the motor compartment of their car.

Thus, the car is a very interesting contradiction. It is the artefact of a lot of everyday life activities, and at the same time a prime vehicle to get away from it all. The car has thus retained a considerable interpretative flexibility, even if there exists a dominent design with regard to its physical structure. The contradictory nature, the interpretative flexibility, I believe is well captured in modern car advertising which often connotates to travel, literally or mentally. The car *is* everyday life, and - at the same time - an embodiment of a critique of the same experience. This characteristic of the car probably makes it unique among everyday life technologies, maybe except for home computers. Further analysis of the car should explore the contradiction and its implication for the car's position on the Norwegian society, as well as in other societies.

5. A network of steel, concrete and culture

In the transformation of traditional society into modernity, the car obviously plays an important and interesting role. It contributes extensively to the fluidity, flexibility, and mobility which characterizes the modern. However, to view the car as either a cause of modernity or caused by modernity is to accept a problematic divide between car and modernity and an even more problematic assumptions about a causal relationship between them.

As a possible alternative, I would like to conclude this paper by suggesting some contingencies which involves the car and which may be interpreted as a kind of network of social characteristics. The point is to try to understand the changing dynamic of transport in modern societies, compared to the pre-modern. This dynamic could be argued to be contingent of at least four sets of main social or techno-social parameters:

- general social dynamics
- capasities and needs of transport users
- infrastructure
- capasities and capabilities of artefacts.

The point is to be able to situate transportation among technical and social needs and potentials, and *vice versa*.

A very preliminary and very schematic picture of the pre-modern and the car-based transportation dynamics could then be made as shown in Figure 2 and 3, respectively. These figures should be interpreted as systems of interdependencies where one should be very careful to attribute a stronger transformational force to one of the parameters than to the others.

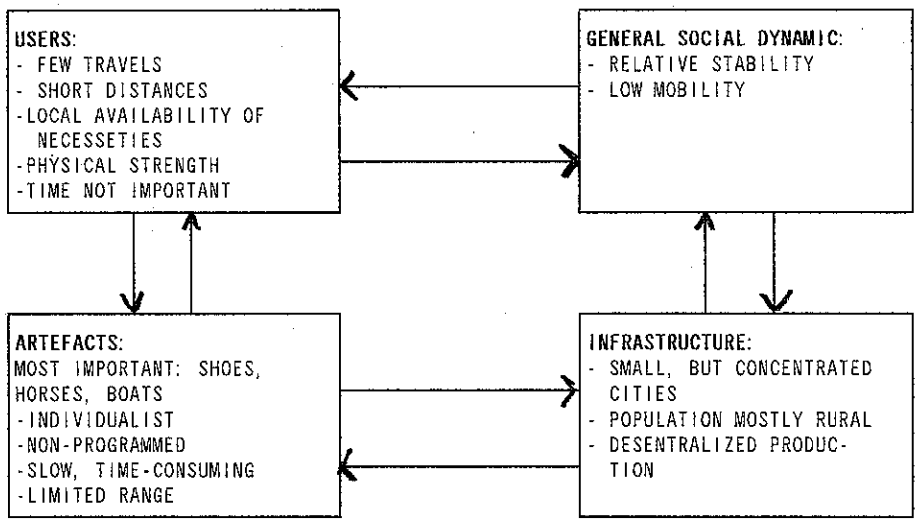

Figure 2. Transportation dynamics of pre-modern Norwegian society.

Figure 2 designates a slow-changing dynamics that is reproduced through the interplay of the characterstics of the four groups of parameters. The general social dynamics which here is a quite abstract and generalized measure of social change, makes few demands on transport and consequently support a transportation paradigm characterized by a relatively small amount of relatively low speed travel and a relatively small volume of goods. Correspondingly, user

needs as well as user capasities emphasize little travel and "non-automated" travel means. Also the infrastructure of the society is congruent with low transport capasity, facilitating a way of living that makes small demands on transport and transport technology. This is essentially a pre-industrial, pre-railroad society.

What emerges is a kind of Parsonian social order which lend itself to stable reproduction, except for disturbing "externalities". For the present purposes, this is a workable model - but Figure 2 should by no means be taken literally as a description of pre-modern Norwegian society. The main point I want to make - a point which should be clearer when Figures 2 and 3 are compared - is that the transportation dynamics is a product of a fine fabric of interdependent social and techno-social relations. The nature of this fabric warns that questions about the relationship of "car and society" should be phrased and analyzed tongue-in-cheek.

Moving to Figure 3, we have a transportation dynamics of a seemingly different order than in Figure 2. To put it short, the characteristics of the four groups of parameters all support a transportation paradigm characterized by high volume and high speed travel with a large volume of goods also. This is a paradigm of change and growth, and the dynamics observed seems stable because the relations within and among the four parameter groups all support change and growth. However, this kind of change and growth is not indefinitely supportable. There is an inherent instability that raises the question whether it is possible to transform the system into something which is relatively stable, without making very dramatic changes in the characteristics of the parameter groups.

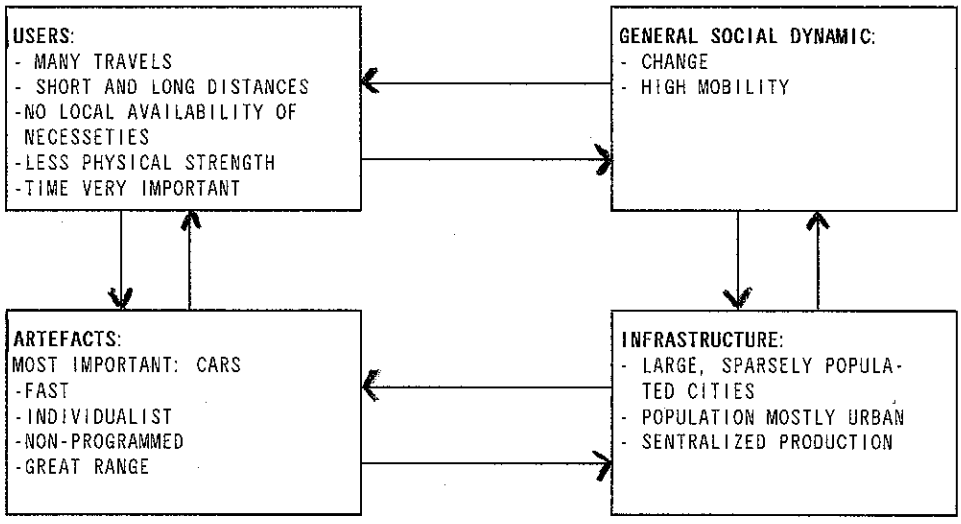

Figure 3. Transportation dynamics of car-based Norwegian society.

There is of course an important "period of transition" between the social orders which are suggested in Figures 2 and 3. The car is by no means the only important novelty to change patterns of transport - even in pre-modern society, new inventions slowly contributed to changes in transportation. To modern patterns of transportation, the railroad and the steamship were of particular importance. Nevetheless, the dynamic suggested in Figure 3 would

not be possible without general access to some transport technology with similar characteristics as the car in terms of flexibility and individuality of travel.

A consequence of the line of reasoning presented here, is that it is fairly difficult to stabilize the transportation dynamics only through changes on the side of the artefacts. It is only in an abstract, analytical sense that artefacts can be isolated and manipulated independently of the social factors and relations. However, this is in a sense what todays environmentally affected car policy is assuming when it aims at technological changes and imposed limitations on the use of the artefact *without* changing any of the other parameters.

As I have tried to show in this paper, using Norwegian material, the "diffusion" of the car (see Figure 1) is not a cause of the change from pre-modern to car transportation dynamics pictured in Figures 2 and 3. At best, the diffusion can be interpreted as a measure or an expression of the change. While the car has indeed been an necessary instrument in the processes of change and as an element in the "new system", these processes of change are in a sense situated in all the four parameter groups of the above figures. Without changes in the way of living, in patterns of housing and consumption, in patterns of production and distribution, etc., the car would not have the very strong position it has today. Thus, on the one hand we may conclude that the modernization of Norway as we know it, has been contingent of the car. On the other hand, the position of the car in this modernized network of extreme strength and durability, is contingent of other processes of modernization.

When taken literally, neither actor network theory nor Hughes' large technological systems are very well able to account for the resulting network. To depict the car as a large technological system is probably to underrate its position, and moreover, to emphasize technologically related changes at the cost of more important political and cultural processes. While Hughes' model integrates politics and culture, it is nevertheless technological change which is *the* important thing to analyze and explain.

However, the idea that technology has an artefact-system duality, introduced in the beginning of this paper, retains some importance. The arguments presented in the preceding sections represent a continous shift between a system and an artefact perspective, implying the impossibility of understanding for example the car phenomenon without such shifting of perspective. Moreover, this idea corresponds to the way we experience technology in practice. We experience the car both as an artefact which we drive and maintain, and as a system that influence the way we live.

The problem with actor network theory, taken literally, is two-fold. First, its insistence that social changes in modern society is produced through techno-scientific institutions is an overstatement that neglects for example the great importance of learning processes in "extra-scientific" institutions. Second, actor network theory presupposes that networks - in principle - lend themselves to changes if the actor-entrepreneurs are sufficiently efficative, and emphasizes such strategies of change. While one may sympathize with this insistence that change is in principle possible, the neglect of how existing networks are reproduced and strengthened is a problem. In our case, this is particularly important because we need to be able to paint a realistic picture

of the car-based sociotechnical network which in its widest sense comprises all of Norwegian society.

On the other hand, the key concepts of actor network theory used in the analysis of this paper have proved to lend themselves to an understanding of the car as an artefact-system duality through which a very durable network has been produced and added to. Although the network only partly can be argued to have a techno-scientific origin, the traces of techno-scientific influences are evidently of great importance and should be studied more carefully.

The Norwegian car has in this paper been described as a network literally of steel, concrete and culture - in addition to a lot of other actors/elements too. To what extent the network has particular Norwegian characteristics, is a more open question. When the title of the paper was chosen, I did not have comparative studies in mind. Consequently, it has not been important to approach comparative issues in a serious way. What I really wanted to do with the title, was to infer that the car is a socio-technical creature in such fundamental way that there *has to be* a comparative dimension. I hope that the content of the paper has made this contention more probable, and that some implications of this has been clearified, in particular with respect to the nature of the re-inventions/re-innovations taking place when a technological artefact like the car is imported and adapted in a society.

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