Just-in-Time Transport: New Road Freight Transport Strategies and Management: Adapting to the New Requirements of Transport Services

A Research Seminar arranged by OECD and VTI, June 22-24, 1987, Svenska Mässan Gothenburg
Session IV: Panel discussion
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ABSTRACT

This part of the Just-in-Time conference includes a panel discussion and three rapporteurs sum up the earlier sessions: 1) Demands, 2) Organization and Informatics and 3) Road Implications.
In this session, we will try to sum up the three sessions we have had earlier. The panel discussion is organized as follows: We will first hear from the three rapporteurs and they will give us a summing-up of their opinion of the important things that have been said during the sessions, and after these three reports we will have a discussion with the panel members, who can if they like comment on what has been said by the rapporteurs. After that, we will also give you a chance to take an active part in the discussion. I would like to remind you that the purpose of this seminar is mainly to find out important research areas for the future in order to work further within the OECD on Just-In-Time problems. So if you have any good solutions for research projects, please let us hear your suggestions.

I would first like to give the floor to Mr Hanappe who will give us a summary of his opinion of what was most important during the first session.

Mr Hanappe.

Session I. Demands

Rapporteur Mr P. Hanappe, INRETS, France

A fairly general agreement concerning the sources of the phenomenon is observed, and also concerning its most essential features. This is indicated by the similarities of the various realizations described, i.e. especially by Dr Anderson and Mr Binnenbruck during this first session and by many others during the following sessions.

Concerning the financial nature of this transport, Mr Savy and Mr Velz have been joined by Mr Colin and Mr Fiore in order to place it in the production organization, which from now on integrates more closely the conveyance of goods rather than the method of transport and its traditional, corollary, storage.

The main question of the seminar is, however, as follows. It is a matter of adaptation of transport systems, above all roads, to this development. More precisely, how we adapt this type of transport, i.e. the conveyance of goods, to our aims, that is, a smoothly functioning economic system considering the advantages and the costs connected with the
various solutions to be expected. This is really an economic problem, in the strict sense of the word.

It has to be confessed that until now the literature relating to this subject has been rather vague. The descriptions of the phenomena, which are more or less enthusiastic, emphasize the advantages which apparently should be derived by all parties. They are accompanied by the denunciations of previous routines without any effort to explain the reason why our predecessors indulged in such stupid actions as maintaining inventories and producing large quantities. It would be sufficient to explain that now begins the glorious age of Information and Communication.

Properly speaking, the essential experience of the seminar is without doubt that one discovers that a considerable number of persons have started working on various economic questions which are within the general problem, i.e. the theme of the seminar. Certainly, they derive from various ideas and the opinions are different, sometimes contradictory. In order to report this effectively, I will have to leave after the first session, but I hope that my fellow reporters will forgive me.

I will have to leave the methodical description of the phenomena. This is the work of Dr Anderson and Mr Binnenbruck in the first session and many others in the following sessions.

But it is also necessary to investigate the actual facts; this is the aim of the French study at the forwarding agencies, which Mrs Gouvernal will present, and also the study in Arizona which has been described by Mr Radwan.

Another important stage is constituted by the econometric determination of the connections between the quantities concerned. Mr Mathews has shown us that it was not the prerogative of the universities, but that of the professionals of transport who could also give important contributions as regards the scientific knowledge of the management of their enterprises.

It is also possible to determine with a certain precision the fields of economic application in certain processes. Mr Niérat on the one hand and Dr Seidelman and Mr Künzer on the other have done this for combined transport, and Mr van Rens, Dr de Leijer and Mr Duoma for another original technique.

The use of Just-In-Time results in benefits for manufacturers who apply this system. Mr Lindström, in the first session,
and later Mr Nemoto and Mr Yoshimoto, as well as Mrs Kaartama, have described their quantification tests of certain of these benefits. Concerning the balance, Mr Whitford has proved that it is possible to evaluate the noticeable augmentation of transport costs for the forwarding agents who use Just-In-Time, as well as the development of other economic magnitudes.

This inventory also shows a suitable path to progress in research.

The quantitative aspects of things should be better known. Two domains seem to be given priority: the firm, concerning production or transport, where the cost functions and the sensitivity to the introduction of new logistic techniques have to be investigated, and the degree of penetration of these processes in the system of production and distribution.

The first domain is in the field of micro-economics, the second rather belongs to meso-economics. In both cases, it is desirable to be able to measure development during the phenomenon of overtime, in addition to instantaneous factors, however detailed they may be.

All conceivable economic questions have to be formulated in the strict sense of trying to adapt scarce means to unlimited aims. The variety of what was presented during this seminar in this field shows that there is no lack of questions, but that it is a matter of means of benefits and inconveniences of various processes or the search for the economic fields of application. It is important to try to solve these, not only in theory but also quantitatively; during these three days we have seen that this is possible, even if certain methods of evaluation remain to be improved.

This search for quantitative elements, this identification of economic questions and efforts to solve them should be inserted in a general complex of problems, which has to be defined and which should be improved gradually during the development of work.

There is no chronological priority which should be attributed to each of the three tasks. They should strengthen and elucidate each other in measures which should be open to all development.

These are the orientations which I propose for the continuation of our discussion.
Session II: Organization and Informatics

Rapporteur: Dr F.J. Huiskamp, Ministry of Transport, the Netherlands

Ladies and Gentlemen,

When starting this report on the results of Session II, I realized that I would more or less have to create my own criteria for judgement.

I say more or less, because both the opening speech of Mr Sandebring and the paragraph in the programme that describes the objective of Session II offer me a certain OECD framework.

As a free-lance (and unpaid) "rapporteur" I decided that I have the right and possibly even the duty to make my own translation of what the objectives, the results and - last but not least - following the Seminar as a whole and Session II in particular should be.

In this sense, the Seminar as a whole allows me to make 3 clear statements:

1. The OECD succeeded in creating a temporary platform for exchange of views of research and practical applications of logistics in general and Just-In-Time Transport in particular.

2. Transport and forwarding companies who really want to get involved in J-I-T transport should be prepared for a dramatic change in management and high investments in manpower and EDP-equipment.

3. Governments of various countries should be made aware of the fact that the potential need for J-I-T applications in their production sectors can only be met by a successful development of a new service industry.

If the OECD organization agrees with these conclusions, I can imagine that they also consider it as their task to inform at least the governments of the OECD-countries that the creation of a more permanent platform for development of logistics is an absolute need.

I can tell you that my government, which as you may know is the Dutch government, would have no problem in following up this kind of recommendation.
Ladies and Gentlemen,

As far as the results of Session II are concerned, I think it is of little use that I give you a summary of what is written in the papers. Each of you can draw his own conclusions and it would be rather arrogant if I should try to force you into some generalizations.

Therefore, the only thing I can do is to give you my personal impression. Before doing that I think you should know that my professional background consists of 15 years of transport and forwarding experience and 5 years of government policy on road transport affairs, which is not the best place to get involved in J-I-T transport. This means that my position towards logistics in general and Just-In-Time transport in particular is based far more on feeling than on knowledge. This leads to my first and only general conclusion on the presentations of Session II, which I would like to describe as follows:

- A great deal of creativity on the side of the French researchers.
- A very practical but concerned approach of the German researchers.

and

- A perfect show by the English forwarders.

As I think that I owe an explanation to the individual speakers, I will let them know what impressed me most in their presentations.

- Mr Fiore convinced me with his "downstream theory" that the ultimate consequence of Just-In-Time transport can be none other than a production system which is fully based on series of products with the same delivery time.

- Mr Niérat puzzled me with his pure mathematics approach to the chances for combined rail/road transport. However, taking into account the fact that many French policymakers still think that combined transport is the solution for every problem in road transport, I am happy that he proves to them that this can only apply for distances of about 700 kilometres and more.

- Mr Künzer confirms once more that the storage function of containers can be a real alternative solution for production firms who cannot apply J-I-T transport but nevertheless wish to cut their storage costs.
- Mr Schneider is very convincing with his statement that more intelligent use of the existing roads, by means of information on traffic and weather conditions, might be a far better solution for road congestion than building more roads.

- Mr Binnebruck proves with his clearing-house construction that there is only one way for smaller transport and forwarding companies to get involved in J-I-T transport:

**COOPERATION**

- Mr Hazle and other speakers not only show that teamwork can lead to a perfect presentation, but also indicate that the development of Just-In-Time transport stands or falls with the quality of the entire staff of a transport and forwarding company.

- Mr Nojiri perhaps unintentionally gives the impression that the so-called "gap" between logistic development in Japan and Europe does not exist as far as J-I-T transport is concerned.

Ladies and Gentlemen,

Allow me to finalize this report with a statement which for the participants of this Seminar may sound like a "cliché", but is meant very seriously:

**IF WE CREATE A PERMANENT PLATFORM FOR DEVELOPMENT OF LOGISTICS NOW, WE ARE JUST-IN-TIME.**

Thank you.
Session III: Road Implications

Rapporteur: Mr C. Swerdloff, Department of Transportation, USA

Objectives:
Assess the economic and other impacts of Just-In-Time transport on road network operation and road investment and rehabilitation programs.

Major conclusions:
1. If is unclear at present as to the degree to which J-I-T systems will be advantageous to different industries beyond the automobile industry and others with similar production characteristics.
2. In many cases J-I-T will result in higher transportation costs - however, these costs are compensated for by greater cost savings in reduced inventory requirements and other areas.
3. The increased benefits to manufacturers of J-I-T need to be accounted for in evaluating the C/B analysis of roadway improvements and in allocating the cost responsibility of roadway improvements and rehabilitation.
4. J-I-T is likely to result in an increased volume of truck movements, but with reduced average loads.
5. Variability and uncertainty in travel time may be as important, or more important, in the use of J-I-T than average travel times. This may mean there will be a need for better "real time" information on roadway conditions.
6. J-I-T may require more sophisticated "real time" information from monitoring systems on the exact location and classification of vehicles.
7. Shippers and carriers may become much more interested in the plans and actions of public agencies who are responsible for roadway improvements and investment when using J-I-T systems - much more interested in local roadway improvements.
8. Users of J-I-T will be much more interested in the quality of roadway service and not just average speeds.
Such things as reliability, freedom from congestion, smoothness of the roadway etc. There may also be greater interest in alternative routes and "real time" information on traffic conditions.

9. Present models used in simulating and forecasting highway freight traffic flows do not presently have the capability or sensitivity to evaluate J-I-T systems.

10. As satellite-based vehicle monitoring technologies become available and less costly, J-I-T will become an option for smaller firms.

Issues for further research

A. Highway Planning and Investment Analysis

1. How widespread, and how quickly, will J-I-T systems be adopted by industries? What impact will this have on highway traffic volumes? What impact will this have on other freight modes - piggyback, rail etc?

2. What are the factors affecting highway reliability and travel time variance? Can models or relationships be developed for estimating variability in travel time and service reliability based upon factors such as highway design, traffic volumes and traffic mix of different sizes, weather conditions etc?

3. How sensitive is J-I-T system performance to roadway deterioration and lack of investment in highways? Can predictive relationships be developed?

4. Techniques for estimating the indirect benefits of transportation improvements to users of J-I-T. Better methods for allocating the costs of roadway improvements to J-I-T users - do existing allocation methods properly handle the costs and benefits from J-I-T usage?

5. What will happen to decision-making on location of industries using J-I-T? Will they avoid urban areas and seek locations where road performance is less variable, even though shipment distances may be greater. What are the land development implications of JIT?

6. What will be the air pollution and other environmental impacts of greater truck usage resulting from J-I-T?
B. Highway Design and Construction

1. Will roadway designs need to be altered, especially for lower level and local roads, to accommodate increased truck traffic from J-I-T? Will industries place greater importance on local road design serving their plants?

2. What is likely to happen at the micro-level to pedestrians and automobile safety as a result of J-I-T?

3. Will pressures on government to increase the size and weight of trucks be reduced as a result of the greater use of J-I-T systems? Is this likely to lead to longer pavement and bridge life?

C. Highway Operations

1. How can "real-time" information on highway traffic performance be quickly made available to carriers and shippers using J-I-T? Who should pay for this information and how? Similarly, information on alternative routes.

Mr Sandebring: Thank you Mr Swerdloff. We have now heard the three rapporteurs and I wonder if anyone in the panel wants to make any comments on this. Yes, Mr Frybourg:

Mr Frybourg: Mr President, later on I will come back to the questions about themes of research for our future activity. It's not about this point that I would like to interfere immediately, but rather about the meaning we have to give to the term "strategy". I fear that there is a slight incomprehension concerning the weight we have to give to a strategic vision of the company which uses transport as well as of that which performs the transport service.

We do not - most of us - come from schools of commerce or even less from military schools, which means that we are accustomed to use the expression "strategy" in the same way as is taught in the commercial schools. I prefer to take the example from the commercial schools rather than the military schools, because in a matter of economic competition, you deal with a competition rather than with a real war, so to say. In fact, strategy has an importance that we have perhaps underestimated, occupied as we are by the economic optimum.
More and more we have to do with big organizations, big organizations that have to be motivated from a clear plan which is comprehensible for all the levels in the company. The term "motivate" is important. In my country, it has been said that the employees were not motivated and we know what severe consequences that can be the result, especially concerning quality, because there cannot be - and we know well from the quality circles - there can only be quality if, at all the levels of the company, you are convinced that it is important that the company in which you work is well adapted to its purpose.

If we refer to those in history who have, let's say, best dominated the important organizations, without having at all followed the management education that we actually develop - well, I cite Hannibal, Richard Coeur de Lion and other great strategists - it's because the great organizers after all have a talent which reposes on a concept that emphasizes the advantage of better visibility of the significance of the company's action.

We must not be astonished at a departure from comparatively simple, very pragmatic concepts, which were perhaps born in the SMED's workshop - I remind you that SMED means "Single Minute Exchange Dice". This is the possibility to change tools rapidly and thereby reduce the length of the series, because everything starts from here. These ideas were gradually vulgarized and developed with the denomination "Just-In-Time", which is the title of our seminar. I would in any case call attention to the fact that these strategies have a very great mobilizing quality - at least they make it possible to take big steps in the apprehension of what a better organization could be, which involves not only the company, but also its suppliers and its clients, that is, in reality a better integration of the economic issue. With that in mind, I don't think that we need speak ironically about the fact that when we have done this, we have not yet calculated the economic optimum.

And what has struck me is, that when you have started to work a little - because at a certain point of course you have to talk about figures, you have to sum up - you notice all the obvious defects in these systems which we in France call "à flux tendu", or fragility, to use a simplified term. Well, most of those defects didn't exist because they disappeared in comparison with the advantage, the visibility, given by this strategy and especially the possibility to reveal the company's disfunctions, until this moment masked by the stocks, not to mention the inconveniences implied by the drivers' handling of the materials which often caused quality defects compared to a continuous steering of the flow.
I'll stop here with this remark. Nevertheless, I don't pretend that we don't have to continue these strategic visions of reflections of an economic nature. But let's not forget that the economic optimum has never alone started creativity and movement. But the very great mobility of our economy implies that today we have competition which implies movement and rapid movement. We are not in a trench war which supposes that we improve the second decimal.

I'll take as an example the automobile industry which has often been cited. You know that in the automobile industry the essential studies were for a long time based on what was called "le bureau de méthodes" ("the methods office"), which tried to ameliorate productivity and I have often heard the joke "that they spend thousands of hours trying to save a few grammes on a bolt, but not one reflection to try to find out if it was possible to take away the bolt". Well, at the point where we are now, I think that it is important not to depreciate the idea of strategy, using as a pretext that a strategy does not imply a calculation of economic optimum.

Thank you, Mr President.

Mr Sandebring: Thank you, Mr Frybourg. Mr Hirano, please.

Mr Hirano: I am an outsider in logistics and traffic and my background is operations management. So if I may compare with what is happening in manufacturing, what is happening in logistics perhaps, I can see that there are a few issues coming up. At a basic strategic level - I am sorry for my use of the adjective "strategic", what is happening in manufacturing is, first, that people aimed at degrees in variance of crossing time on the shop floors, and that resulted in shorter process time. It looks like there is some confusion at the moment in traffic: Which is more important? The decrease in variance in travel time or decrease in travel time itself? This seems to be one of the issues here.

At the operation level, Just-In-Time seems to be implemented based on three elements. The first is the increased ability to react to disturbances through more control or larger information flows, and this has become possible through the use of computerized information systems. One of the typical approaches is called MRP, and against this MRP, I think, DRP is being more and more talked about.
The second factor - or a second way to implement J-I-T - is the increase in ability to react to disturbances through less control or smaller information flows and this is what KANBAN is about. To implement KANBAN, it was necessary to realize shorter setting-up time of machine tools or to train multi-skilled workers. I suppose that the standardization which is discussed now in logistics is a way to increase the ability to react to disturbances by less control or by smaller information flows.

Thirdly, people try to decrease the disturbances themselves in production. For example, Toyota just forces the customers to wait for a month or up to three months before the ordered car is delivered. So, simply by using waiting lists Toyota have succeeded in decreasing the disturbances themselves, and I wonder if the same thing can be done by using logistics.

At the management or administrative level and of course in production and manufacturing, closer cooperation among functions must be realized. And of course the comparable phenomenon in logistics seems to be closer links with suppliers, distributors and everyone else. Still, what is not certain about these kinds of closer links in the production industry or the manufacturing industry is the full implications for industrial relations, for example, or organizational structure, or management style. Do we have more management by expanding in the future? We do not know everything about these kinds of management or administrative implications, even in operations management.

And finally, at the social level, probably we have to address the issue of external economic effects. At least in Japan, arriving early is no better than arriving late and both are subject to penalty. So what is happening in Japan is that you see a great many lorries in parking lots, on the highways or in the neighbourhood of the factory, and the driver is just waiting until his time to get into the factory comes. At the moment, we do not know who is to pay for these kinds of external consequences and what is necessary for the implementation of Just-In-Time transport. I believe that this kind of discussion about social implications is also necessary.

Mr Sandebring: Thank you, Dr Hirano. Mr Mittman, please:

Mr Mittman: I would like to comment on a couple of points that were made by Mr Hanappe and Mr Frybourg. There was a question about the lack of specific methodology when
considering the strategic implications of information systems and the computer and communication aspects of the Just-In-Time problems. It seems to me that as we have seen throughout this seminar, the information systems and information technology aspects of Just-In-Time strategies provide the glue that ties together the players in this whole enterprise. From the point of view of information technology and the communications systems, several key points seem to be emerging. First of all, we have seen a distinction being drawn between the strategies at the firm level and strategies at the industry, country or continent level; and this point has been made several times.

So I wonder whether we can look at these different levels of use of technologies at the firm level, at the industry level, at the country level and in the case of Europe at the continent level and try to draw some conclusions and develop theories that may involve consolidation of lower level theories. We can attempt to consolidate firm level strategies and create an industry level strategy, consolidate industry level strategies and develop a country level strategy and so forth. This might be a research effort that would be worthwhile considering.

For example - we have talked about the so-called value activities of the firm, those activities within the firm that add value and how one can try to search for strategic opportunities in the use of information technology among these activities. Is it possible then to look at value activities of the industry, value activities of the country, value activities of the continent, and study how information technology and communications might function in those activities? And there could be other consolidations as well; we could look at individual business strategies and expand those to industry strategies, to national strategies and to continent strategies. So it seems to me that when we talk about research methodology, we may be able to look at this as a continuum of subsystems growing into larger and larger systems.

Mr Sandebring: Thank you, Mr Mittman. Mr Jensen, please.

Mr Jensen: I would like to give a few comments which I think here will represent a person who is working with public roads and public roads administration. The general comment I would suggest is that the whole attitude - this increased consciousness - on the side of road users which the J-I-T idea really calls for also necessitates a closer dialogue between road users and public road administration. The requirements I’ve seen from the users will be more specific,
more detailed, since they have a much higher interest not only in reducing travel time speeds but also in increasing regularity in transports. Certain aspects of this I think have already been taken into consideration in most European countries, for example when it comes to establishing the information service from the road administration to the users as to road conditions throughout the year and throughout the day.

This is a more specific comment I would like to make before concluding this comment on the dialogue between users and road administrations. Traditionally, I think the road administration people have not been sufficiently concerned about what road users really need and the economics behind this. I think there has been progress on this regardless of when the J-I-T concept came into being, but I think the J-I-T concept will increase the pressure here for a more specific dialogue which will also lead to more specific actions from the road administrations to satisfy road users' requirements.

A more specific comment that I would like to make, Mr Chairman, concerns the concept of congestion. It was touched upon yesterday and it was, I think, in general considered as something that is rather singular and is difficult to fit into a proper model. When it comes to what I like to call regular congestion - the type you have between seven and nine in the mornings in most urban traffic for example - that is something which you can consider as affecting travel time. It also causes a nuisance and costs us a great deal, but I mean conceptually this is something concerning travel time and the way to remedy it is to increase road capacity and other work to encourage the use of public transport for all the people. But when it comes to congestion, I think this is much worse on a number of roads which we have more or less in all countries which operate near capacity. You are then very close to a situation where you run into congestion. One or two weeks might pass without any and then on the third week congestion may occur two or three times. This was touched upon yesterday in the papers of both Mr Nemoto and Mrs Kaartama; you have the average travel time and you have the deviation and the variance of these and I think that is where you approach this phenomenon in a theoretical sense.

We know that when you operate with a J-I-T system in goods transport - and when it comes to passenger transport we all work with a J-I-T concept - you have to arrive at the airport at the right time, you have to go to a meeting at the right time. This is, I think, the most common situation where we are faced with an absolute requirement of being there just in time. Now, if there is a risk of unexpected congestion,
that is, higher than a given percentage, then you must allow for it, which means that nine out of ten times you are thirty minutes early, which is also undesirable. But on the tenth day you’ll be there just in time.

This unexpected congestion I think sometimes also calls for rather high investment efforts from the road administration’s side to remedy, but there may also be cases where fairly specific efforts or investments might be a good help for occasional congestion. One example or case is what we are faced with in Norway, where we have all these mountain passes, which are very hard to keep open in the winter. We feel that if there is a bad storm one day it is after all beneficial in a total view for us to put a good deal of money into keeping the road open, even if it costs us on the average up to thirty or forty dollars per vehicle for a stretch of 100 kilometers. This is because we think the benefit for industry is so much larger. The benefit for industry which accrues just from the value and importance of the individual cargoes and also here of the degree of certainty which we can introduce.

So I mean that sometimes you can provide more certainty and then eliminate this occasional congestion or irregularity by specific measures from the government, as industry very often tells us. They may also be of a tougher type where you really need fairly considerable measures - construction of a new road, or an alternative road and so forth. I think that there is a basic difference here between what I call regular congestion and irregular congestion. Irregular congestion is very harmful too, and I think it might often be useful to look closer into possibilities of eliminating this. That might often be a much cheaper job than eliminating the more general congestion and in an economic sense the two forms are about equally harmful I think.

Thank you.

Mr Sandebring: Thank you, Mr Jensen. Are there more comments from the panel? Mr Horn, please,

Mr Horn: It is somewhat difficult to add any words after all these scholarly remarks. When the OECD Steering Committee chose this topic, we were not at all clear whether we would have success with an activity like this since it was quite a hot, new and novel topic. What has been proved during these three days is that it was really possible to bring together people who have worked on the conceptual side and to have some information on the practical side - on case
studies of what is really going on - and also to have people from the road administration and to make them conscious of the need to consider the implications of J-I-T strategies in operations and investment planning. So I think from this point of view that this seminar was quite successful.

As to the establishment of more permanent projects and activities within the OECD programme, I think first of all we should try to get the proceedings out and distributed widely, not only in the form we have them today but maybe some sort of summary of the discussions we have had and will have this morning. This report should be distributed among those interested in industry and in the transportation sector and allied fields. I think that's one of the tasks we should really consider because I think it is quite unique information, quite valuable information, quite novel information that we have put together here.

As a second remark, what comes out of the discussion here is a really new look at transportation in the whole industrial and economic context of our Member countries, i.e. a change of attitude regarding transportation as such, which is sometimes considered a little brother of economic growth and activities. Transportation is essential and J-I-T strategies show how important transportation is in the overall industrial process and also in the policies which aim as such adjustments of our industries. This is one of the big things of OECD; there will be a report coming out very soon now on structural adjustment policies in the member countries.

I do not wish to repeat what has been said now, but I have a very specific and short comment. This concerns the discussion we had yesterday on the standardization of containers and swapbodies. I think that something really has to be done. This question has also come up at the last symposium we had in Montreal at the end of April on the question of the safety of trucks and on the accident involvement of trucks. The bigger containers which are now being considered or are already being used in the United States may also come to other countries where there are special clearance problems, road problems and road design and operational problems, and I think that something has to be done on that point.

Well, that's about all that I want to say for the moment. Thank you.

Mr Sandebring: Thank you, Mr Horn. Any more comments? Yes, Mr Hardy.

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Mr Hardy: One short remark Mr Chairman and perhaps a small piece of advice. If you want to proceed - and I agree that this is a very good starting point - by getting people together and talking about this subject, I would like to point out that the industry - the user - of this system in fact is not here. We have had a very - let me say - general statement by the gentleman from Atlas Copco. But let's be frank, the money can be made only by the user of the Just-In-Time systems being the manufacturing industry and I would like to stress that you should proceed to invite them if you are to go on constructing a platform like this. Why do I say this? Because, in the daily practice of business, I can tell you that most manufacturing industries do not really know what their logistic costs are. The reasons for that is that their responsibility is split up. As you know, we have research and development departments, we have the purchasing department, we have production, marketing and sales distribution and every part of them - a part of the chain of logistic cost - is allocated. Apart from one or two smart general managers, nobody knows really what you are talking about. Maybe they are aware of the possibilities and the savings and the gains which you can achieve there. So I would like to point out that you should really invite those guys to get along in the seminars or whatsoever in this field and in the Just-In-Time techniques.

Thank you.

Mr Sandebring: Thank you Mr Hardy. Mr Frybourough raised this question with me yesterday and I asked one of the gentlemen from Volvo whether we perhaps could have some comments on how they regard this JIT concept specifically in their company. I think that Mr Leif Segerberg could say a few words about this, so we can have this as a base for our discussion as well. Are you prepared to do this, Mr Segerberg?

Mr Segerberg: We have formed a special transport company in the Volvo group - Volvo Transport Corporation - just to coordinate this Volvo transport inbound from our suppliers and out on the market with our products. And I will explain why. We want to make a car "the Volvo way" and that is to construct a car, to market it and to put it together, but by buying the components from specialists. That means that we have widely spread-out supplies. We have our main factory here in Gothenburg, but we have factories all over southern and central Sweden making the components, the engines, the gearboxes and so on. We have factories abroad too, but we
buy in all Europe, Japan and the United States and so on and of course in these markets we can’t apply the Just-In-Time concept. Just to see the variety: We have about one million tons of material coming into the Gothenburg area, into Sweden and you can see that this comes from our main suppliers in Sweden (about half of it) and from West Germany, the United States, Great Britain, Ireland, Belgium, France, Japan and Canada - you can see we get material for Volvo from all over the world. And this is for cars, for trucks, for Penta engines and so on - all Volvo products. To see what the development is in logistics and Just-In-Time and more frequent transports we made a study - I think about two years ago - to find out what our customers (the truck and car corporations for example) were doing regarding development in material management. You can see that the quantities will be smaller - much smaller - for trucks and not that big for cars. They have already worked with more than trucks so they will not change so much. The lead time will increase. The components - the part numbers - will change somewhat and the number of suppliers will decrease greatly for the trucks, but less for the cars. As for the demand, there we have the Just-In-Time concept with more and more parts being be made in this way. We can divide this into different levels:

* We have the sequence, that means that the parts come in with just the right sequence. You have a red car, a blue car and a black car on the assembly line and the parts will arrive in the same order. We have this for some parts today - the seats for example. They come from the supplier of seats. He gets an order when we put a car on the assembly line and then he has eight hours to produce the seat in the right colour and so on and to transport it and it should be in the car eight hours later. Of course, this kind of supplier has to be quite close to the assembly line. In this case, we have a supplier twenty kilometers away. We have more examples and there will be more in the future. The suppliers will come closer to us and establish their factories close to our production. Flexibility, fiscal service and administration, that is, the pressure on it, will increase in the future. And this is a development over three to five years. We have also tried to put figures on this. The picture shows a summary from the different Volvo companies. As an example: Quantities will decrease within five years from today’s four tons per consignment to about 1,6 tons. And this is what we were talking about yesterday - smaller consignments but not smaller trucks. The lead time will decrease from today’s 28 days from order to supply to about eight days - that is quite
a lot. This is an average for all our suppliers - from Japan, Europe and Sweden. As for components, the number of parts numbers will be about the same, but the number of suppliers will decrease from about 1 600 to 1 200. This means bigger suppliers. The number of parts being delivered "Just-In-Time" will increase very greatly.

The right parts for the next day's production. You order today and you will have it in production tomorrow. This is one thing that will increase, we think. In this way, we can cover our suppliers in Sweden and the northern part of Europe at least. How can we do this without increasing the transport costs too much? I will give you an example. If you think of a map of the southern part of Sweden, we have an average transport distance in Sweden of about 300 kilometers from our suppliers. This is what we do. We group together certain cities where we have suppliers. They are close geographically to each other along a main road. They have enough material to fill one lorry each day with 30 to 33 tons of goods to Volvo in Gothenburg and north of that area. We make timetables for these lorries going around picking up material and we transfer this in a terminal in Gothenburg. Almost 99 per cent of our material is packed in standard pallets of Volvo design and it is an easy operation to transfer from that lorry to another for distribution. This is very efficient. It means that each of these suppliers in this area has a connection with Volvo companies more at the frequency that we decide. So you can see from the map how they are connected. We can see how one supplier has a connection on Monday, Wednesday and Friday and we come and pick up what he has on his schedule and we have another one where we can pick up on Tuesday and Thursday. They know that they have a frequency three days a week or twice a week. And we decide what frequency. We are in the area with a Volvo lorry every day of the week and then you have the possibility to transport a full load of Volvo material over a long distance and can bring down the costs. Of course you have distribution costs, terminal reloading costs, but we keep them low thanks to standardization of packing material.

That was a few points from Volvo. Thank you.

Mr Sandebring: That was a very good illustration of practical thinking. Well, it's now 10.30 and we will take a coffee break till 11.00. Then we will allow you all to take part on the panel, so to speak. We will have an open discussion for all the participants after the break. We meet at 11.00 again.
Mr Sandebring: Ladies and Gentlemen, I think it’s time to start again and I would like to ask you - as we are taping this session for our notes and for our work on the report to the OECD - to begin your contributions by stating who you are, so that we have this on the tape as well. Now I leave leave the floor open.

Mr Wandel, please.

Mr Wandel: My name is Sten Wandel - I am originally from Sweden, but currently on loan to the International Institute for Applied Systems Analysis outside Vienna. This is an organization of sixteen countries including Japan, the USSR, the United States, Canada and most European countries both in the east and west. We are looking at how new technologies impact economy and society and we have chosen particularly two cases. One is new production technologies, computer integrated manufacturing, robots and such things and new logistic technologies. This means informatics and other aspects of distribution and material supply and particularly the connection between the two new production technologies and new transport technologies. So briefly the objectives we are interested in cover the whole area of logistics, where Just-In-Time only is one of them - I’ll come back to that. The objective is to increase awareness of the changes of logistics and to create better preparedness of the people involved in the logistic chains, including not only road transport but also rail and the transport agencies and transport policy. The hypothesis is that we are at the beginning of a number of revolutionary changes, we can call them the third industrial revolution, which involve not just rationalization but a change in the structure and way of operating the whole distributional production system where transport is facing completely new rules. This we have heard before.

The tasks we are undertaking are first of all to compare logistics as they are today between countries. Then we want to see what the trends are and the consequences of different cases. What the economic prerequisites and consequences are and also the social and spatial impact on education and so on.

What is new about this is that we are working on an international level of logistics and not only on the corporate level. We try to bring in science from many disciplines such as econometrics, production control and so on. Why in IIASA? Because I have worked with similar international themes, such as energy, before and we have the
environment as a hot theme at the moment and because we work on a network basis which means that we try to collaborate research activities. This means that we don't do so much research work ourselves, but rather we coordinate research within the sixteen countries. The staff is quite small - there are only two people at the moment, but we are hoping for expansion of this program with some external financing. We collaborate with quite a lot of people in the nineteen different nations, but there are groups looking at logistics at a national level emerging in many countries. I would like to invite all of you to the workshop I am going to have on November 24-25. The whole program is described in more detail in an activity plan you can find outside this room and also a questionnaire we are sending to people who are interested in collaborating with us. There is an example of a report regarding the transport consequences of new logistics that you can find there, which I will tell you about briefly soon.

The first question I talked about a little yesterday. The preliminary results show that there is a gap in logistics performance between regions. This is well-known and has been for many years and we can see sales inventory ratios of productivity of inventories, where Japan has low inventories and Scandinavia has high ones and Eastern Europe has even higher figures. The USSR has the highest inventories of all the countries that we have studied. We began to see that we had somewhat wider differences and I believe that it is most important to understand how to influence these differences in logistics.

The next conclusion is that the penetration first of all started with Toyota 1968. In the statistics you can see it started first in Japan, followed by the United States and then Europe and Scandinavia after a lag. But the trend here is different and this will affect the trade structure because the competitiveness of industry is dependent on logistics. We know that new products and new production processes and even managements can be transferred between regions fairly easily nowadays. To change the logistics capabilities in infrastructure - both roads and informatics - and supply systems is much, much harder. This means that the logistics capability of regions may be as important as the skill level of workers and other factors that we are now looking at as the major forms of competitive advantages of different regions. We now want to bring these facts out to the people dealing with international economics and we are now collecting data from the United Nations. We hope we can make these available to the OECD in their comparisons of industrial development in various regions.
Now I’ll give you an example of the trends that we have been looking at - the long-term trends. We have looked at infrastructure and also at goods transport in various parts of the world and there is a change - a substitution in infrastructure in the United States. You have the market shares and you know that there is a change from slower means of transport to faster means. Actually the shift here between roads and air is quite interesting. The forecast predicts that by the year 2010 more people in the United States will travel by air transport than by road transport between cities. Freight is of course lagging behind quite a lot in this development. The lag in infrastructure development between the United States and the USSR is I think about 45 years, but the trend is exactly the same. So that is the first thing. There is a long-term trend in modal split and we are trying to understand the driving forces behind this. In the short term, though, according to current studies in Sweden, it is in the value of imports to Sweden that the modal shift is going quite quickly, much quicker than the change in infrastructure, which causes congestion in the international road links. Oversupply of rail and sea harbours and railroads and air may change into a shortage. This is the first problem, the driving forces behind industry’s choice of modes are not in the same phase as infrastructure development.

Looking at the trends - not going into all the details - we carried out a case study where we tried to understand which logistic changes have an impact on transport, cost-benefits, and who will get the benefits and who will pay for the costs? Penetration rates and factors hindering and accelerating them, new transport requirements for these new logistics. New division of tasks along the logistic chains - who is going to do the work? Is it the transporter or the company or intermediaries of various sorts?

And then the transport consequences. You can see more details about the results in the report which you can find outside.

To sum up some of the most interesting questions, we went through eighteen different tendencies in the production field that have consequences for transport. Here we have been talking about only one - Just-In-Time. But there are others. I will mention a few:

* We might find that the logistic chain will be made shorter. That means fewer steps and that means that the speed and the ton-kilometer figure may be reduced on the transport scene. We have already seen from the statistics - from Japan for example - that the ton-kilometer figure is decreasing, even though the
Gross National Product is increasing.

* Fewer storage points, which demands higher speed, less ton kilometers and smaller shipments.

* Geographic concentration of suppliers, which might lead to a reduction of transport work.

* Small-scale production. We have not seen many examples of local production yet, but this may develop and considerably reduce the pressure on the infrastructure.

* More order production. First sell and then produce instead of produce towards an inventory. This will tend to increase the speed, the necessity of deliveries.

* In the Just-In-Time concept, we put a lot of pressure on precision - on timing. You can see more details about these changes in the paper, but some of the conclusions are that there are dilemmas with Just-In-Time. We need higher frequency, shipment sizes may vary from day to day, which means that we need to consolidate in order to make full use of the transport means. On the other hand, precision and shortage of time and sometimes also special packages of preassembled components make it very difficult to consolidate with current technology. So new types of technologies such as we have seen in swap bodies, automatic handling and all the associated information technologies are essential in order to increase the logistic performance of the transport sector without increasing the costs for it. Some acceleration of this will be needed.

* Then another table that might be of interest, particularly for Just-In-Time in areas where we have not so much transportation. It is easy to talk about Just-In-Time when you have a full truck load between the supplier and the manufacturer. But if you cannot have that - if you have a low volume and also if it is fluctuating - then you may be in difficulties. If the current transportation is daily, with a full truck and short distances you don’t have many problems. But if the current transportation is fluctuating and long distance and special packages are needed, you have to use other means. When it is low and fluctuating you can use fixed shuttles, such as Volvo showed us, where you can pick up from many suppliers on the same route. If you don’t have this advantage and the volume is small, you can use smaller vehicles - as you have heard - but you can also use terminals of a hub-and-spoke type with very efficient systems and achieve
efficiency this way. And of course you can change supplier to one who is closer. If you have a supplier who is further away there is a tendency to introduce intermediaries, as Schenker has done for BMW and to some extent Maas for Xerox who have a distributor very close to the user, from where you can take supplies Just-In-Time. But you feed the distributor or storage point with normal types of transport, and this type of new business for transport will emerge as you have already seen.

Well, now to round off. The penetration, as I have said, differs and what we are looking for are forecasts for Just-In-Time penetration. The only one I've found so far is from the Logistic Professionals in the United States. The council of this organization consists of managers who have made a survey where they predict that Just-In-Time will increase to some 40 per cent from some 10 per cent at present. Similar reports from Germany state some 25 per cent, which indicates that Europe is lagging behind. But more of these kinds of forecasts are needed to understand the penetration rates and how transport and infrastructure must react.

Concerning the economic interactions, we know that the economic implications of logistic changes are considerable, but we don't know exactly how to calculate them. Just to give you some very sketchy conclusions - if the Swedish material flow had been as fast as in the United States, we might have been able to revalue our crown by 20 per cent, which would mean that we could sell things 20 per cent cheaper - the production cost would be 20 per cent cheaper for export products. The capital freed would be the equivalent of investment for six years in industry. So we are talking about a considerable impact of industrial performance if we make changes in the logistic chain.

Secondly, the study from Finland which we saw showed benefits some 25 to 50 per cent higher if you consider logistic benefits from road investments. Thus we have to do much more research to understand this type of interaction. The missing links such as the Sweden-Denmark tunnel, or the Scan Link, are very good case studies that we could use to understand the impact. Also, we could look at links that have been built earlier, such as connecting highways in the United States. What was the impact of logistics then?

Railways we have talked about. We know the labour in logistics is some 30 per cent of the labour in the whole nation. This is very high. What will be the changes in skill and employment needs when we go into informatics and more advanced logistic performance? We are just seeing the beginning of big problems of reeducation.
We have regional consequences. Less industrialized regions may lose their competitiveness.

Thank you for your patience.

Mr Sandebring: Thank you. Anybody else? Yes, Mr Hansson.

Mr Hansson: Mr Jensen said something like this - that road administrators have not been concerned about the economics behind Just-In-Time. I don't think this is a very fair way to put it. I mean, what are the economics behind the Japanese paper by Professor Nemoto, who concentrates on the problems in urban areas? There I can see a problem. But we have a very big deviation in travel time versus the mean travel time. The Finnish paper concentrates on the highways, where we drive at 50, 60 and up to 70 kilometers per hour.

When we talk to the representatives of Volvo, they put stress on the Scandinavian Link and these are roads where you today drive at a speed of 90 kilometers per hour. If we look at the question of fixed links between Sweden and Denmark and here try to draw a map (the Scandinavians may not recognize it but the rest of you perhaps will) the easily built links have been debated for one hundred years. There are mainly two alternatives. All of those who are not familiar with the political discussions may think that going from Helsingborg to Helsingör would be much better, but the main alternative today is between Malmö and Copenhagen. Malmö-Copenhagen would imply about 50 kilometers extra driving.

If you came, for example, from Gothenburg and took the ferry between Helsingborg and Helsingör and you had the alternative of taking the bridge between Malmö and Copenhagen, the average time would be about the same, but you would have to drive another 50 kilometers. When we go to the - I don't know how translate it - but something like the Association of Truckers, they say: No, we are not interested. And when we ask the Trade Union where all the truck drivers are organized they also say: No, we are not interested in fixed links.

So the messages from the people involved are quite contradictory. In road planning, where I am working, how can we allocate high priorities when the messages are so different? That's why I think it is unfair to say that we are not concerned about the issue. We are concerned, but we don't know how it will affect priorities. I understand that everyone in industry wants more money put into the highways.
There is a lot of discussion not only about how much more cars and trucks should be taxed, but how to put the money back into the highways.

So that is one reason, but there is another reason. The benefits from industry are not taken into consideration. Well, I accept this, but even if we have more money put into the Road Authority, are we going to invest in more roads - in wider roads - or are we going to increase maintenance or provide better information? We have to give priorities to the money that we put into the Road Administration. I'm not sure if I've got an answer at this conference as to whether we are doing the wrong thing today, whether we should put other priorities on road measures that we are undertaking. This is a challenge, not only to us working in the Road Authorities, but also to all of us. To you who are working at the universities, those of you who are working in companies. To you who are working at Volvo, at Saab, in Detroit and all over the world with assembly factories.

I mean, what are the exact priorities? Thank you.

Mr Sandebring: Thank you Mr Hansson. Please, Mr Jensen.

Mr Jensen: May I - Mr Chairman - try to add a few complementary remarks to what I said before we had our coffee break? I do not think that if we get an additional amount of data on our desks we can solve the difficult problem of establishing priorities. In the view of road administrations, when one is to establish priorities between urban roads, rural roads, roads aiming at improving traffic safety, improving the environment along the road or improving the average travel time, you cannot avoid the very difficult task of establishing priorities between these competing objectives. But what I do think is important is that we can get the basic data from the road users ahead on what is important to them, with a view to reducing the total production cost, including the logistics. And I think that this may mean different things in different countries but traditionally road administration people are not very interested in these problems. Today, I think there are very clear signs of a rapid increase in the understanding of these and in the interest of having a dialogue with the users. This is a necessary condition I think for spending our road money in an optimal manner. But it is not a sufficient condition for that. We cannot - as I have said - avoid the great difficulties of establishing priorities between various objectives which cannot be compared in quantitative terms.
We also have all the political overtones in this picture which may vary from one country to another. I think, however, that now with the increased consciousness on the side of industry and road users in general, we can improve our instruments in striking a more rational balance between the various objectives we are trying to satisfy.

Mr Sandebring: Thank you. Please, Mr Dahlgren.

Mr Dahlgren: I'm Ingemar Dahlgren from Volvo Truck Corporation. I would like to proceed with the point I made yesterday concerning the common modal. I think that in all these facts all the speakers mentioned techniques that were not very clearly defined. For instance, using a clearing house, delivery centers, integrating different production units and integrating different steps in the production or transport chain. They all have a need for technical solutions. If you want to separate for instance long-haul with the internal transport system, you need to have a modal system for that.

I would also add to Mr Wandel and Mr Jensen their demand for new communication between different participants in this process. I would like to show a picture here.

In this modal system there are many participants who have different rules. But the basic thing is a standard modal in which you can build up different systems. You need a system concept and in this process there are, for instance, road standards which I think could be identified by the need for a local vehicle, regional vehicle or long-distance vehicle. This is a common problem for the road administration as well as for the vehicle manufacturer. We need a vehicle which is suited for different types of traffic. I also think that this is very important when speaking about the environmental question. For instance, we know that local problems are the main problems where all the pollution is generated. If we had a sufficient modal system we also could avoid this problem and still have a very satisfactory transport system.

Another question in which it is important to achieve a good Just-In-Time system is a supply of empty equipment. We know that there's no balance in different return transport, so we need to have a special system for supplying equipment.

Another question is when you are designing breaking point terminals - you need a specific technique for that purpose. All these questions are parts of a common system.
I mentioned yesterday that there is an absolute lack of modals in Europe today. The ISO-container is not usable and you need a new system for this. We know that in the United States they are working with 48-foot containers and the modal of that should also be possible in Europe. But all these questions mean that you need a more technical discussion. Otherwise you're only speaking very theoretically I think. It's a pragmatic discussion we need, together with manufacturers, road authorities and financing companies. I think this is a point which could be discussed.

Mr Sandebring: Thank you very much Mr Dahlgren. Is there anybody else? Yes, Mr Penissard.

Mr Penissard: Mr President, I would like to refer to what Mr Dahlgren just said about the production plan. These new techniques - which are in fact very important - consist in being able to produce small quantities economically and that means, on the production level, putting an end to every kind of waste. I think that during these meetings, the importance of removing waste on the production level has perhaps not been emphasized. Then in accordance with this, if you are talking about "Just-In-Time" transport, it's obvious that you also have to try to reduce the economic waste that you find in the transport domain today. Eliminate the slag, if you like, which you can unfortunately find at a great number of transport levels. I don't want to talk about a special way, but you find this waste everywhere.

First, you find it on the subsidy level. Certain subsidies are entirely justified economically; others are, as you know, much less justified. There the solution is a greater transparency. This has been demanded, claimed, for many years, with very mediocre results, as you know. Eliminating the waste in the transport domain is a very large subject. There has been much talk about infrastructures - actually I think that we can improve many things. We have to use them, as was said yesterday, in a more intelligent way.

We need a better signalling system. There are many things to do on this subject. It also means improving the time for loading and unloading, it means facilitating the passing of frontiers, it means reducing the number of documents that we now use for transports and moving resolutely towards a "paperless" system. In the same way as you talk about "Zero defects", you have to talk about "Zero documents" in transports. We must have the courage to say so and I think that this ought to be one of the aims of this seminar - as a matter of fact, the object ought to be "Zero documents".
And there you join together all that has been said about the advantages that the new information techniques offer.

You can go on from here, still in the same sense of reducing the economic waste in the transport domain. You come, of course, to the problem of controls. Controls are necessary, but not all of them. You have then to inquire and eliminate, resolutely in this case too, the controls which are not strictly necessary in transports. You will at once touch upon the regulation domain, it's the same approach. Regulation is necessary, but certain regulations are no longer of use today in the transport domain. I am thinking also of certain traffic regulations. For week-ends, holidays, this is supposed to have been done once and for all. I think that economics have changed: You have to look at the concept again. There are certain types of traffic prohibitions which have no economic justification today. I think this is a subject you have to consider. This means then, finally, that the "Just-In-Time" approach applied to production will find its true meaning only if the transports follow. The transports in general, that is the ways of transport, all of them, will have to be more and more efficient.

In the case of road transport or air transport, I think that we are in a rather better situation than others, because this is a sector where you are near, even very near, the technical problems, the practical problems, the human problems, the contact with the consumer. Thus, the transition to the "Just-In-Time Transport" technique, which will not be easy, ought to be practicable for us, after all.

I would perhaps also like to enter a question which is even more general regarding the "à flux tendu" transport techniques. They are the necessary complement to "Just-In-Time" production, and as such I think that they contribute some relief to the industrial companies' raising of funds, to the reduction of their short-term loans, stock financing and the "en cours" (interest costs) of fabrication. This means, then, that "Just-In-Time"-transports can help form the conditions for better growth, another type of growth, even an economic recovery, as the industrial companies will be able to reconstitute their profit margins more easily. This can facilitate their investments but evidently also as far as the transporters will be able to join the system and realize their economic interests as well, which is the real achievement, because there are power relations which do not necessarily promote the transporters.
"Just-In-Time"-transport techniques thus have a strategic interest for the entire economy and that is why I find it especially interesting to discuss this within the limits of the OECD. As a matter of fact, I believe that this concerns the whole economy and I think that this is a reflection into which we have entered during these first days. It’s a first meeting and, as someone said very correctly, it’s a new look at transports. Of course - and it’s normal - it evokes many more problems than it solves. But I think as a matter of fact that we must have a better basis at our disposal to continue the research efforts, because these are rich in prospects for the future.

Thank you.

Mr Sandebring: Thank you very much, Mr Penissard. Is there anybody else who would like to add some comments. Yes, Mr Frybourg.

Mr Frybourg: Yes, Mr President, I would like to contribute to your request concerning suggestions on future activities to pursue within the limits of the research program for transports and the road. Of course, I will not develop a program as we have to be brief, but I think that we could continue the reflections around three axes.

The first one is characterized by the complement to JIT, which I would say is a very natural one, to JIT. This is what the Americans call EDI, or Electronic Data Interchange, referring to inter-company communication or, if you like, the second generation of the "telematique" (teledata technique), which of course means communication between computers using coded numerical information. Obviously, I won’t talk about this theme in general, because it goes far beyond transport activities, but about this theme in relation to our intervention field. All those who follow the road research program know to what extent communication with the driver has lately been insisted upon, thinking mainly of the private vehicle.

Very ambitious projects, like Prometheus, have been started, using the limits of Eureka. Perhaps there has been less talk about communication of interest to the professional sector, and of course especially the transport of goods. Besides, I also think that these communication possibilities go farther than that, as you can not only communicate to get information about the goods, but also communicate with the persons "on the road", whom you will now be able to locate - naturally with the reservations that have been quoted regarding the
respect for private life. But there we are far from having reached the end of evolution.

Then, to be brief and to keep to this theme - Electronic Data Interchange - and to that which concerns our domain, I will name four, possibly five sub-themes, having in mind commercial information and not the entirely technical information.

There are the partners - as we know that these inter-company communications will develop the partnership. There are the partners grouped geographically, and there you aim especially at, I would say, the commercial unit of the "port" and even the expected realization of the "téléport". This is a subject which concerns transports very directly.

There are the partners who are dependent chronologically, providing distribution "in band, out band", the famous pipeline. This is the transport chain where we are very directly concerned.

There are the communications with the mobiles - I have already mentioned in particular experience in locating the mobiles and the possibilities of flexible use of the materials.

There is the need for a harmonious passage between the transport flow and the information flow, which of course passes through the "unité de charge", which is the real support for the information. Thus, the normalization of the "unité de charge" has been abundantly evoked.

And finally the enrichment of the transport professions as, thanks to this possibility of partnership, the transport performers will be asked to make more extensive achievements. We already have the physical distribution and more generally the possibility to perform not only transport itself but all sorts of activities which accompany transport, including invoicing, insurance and organization of transport.

Well, all this belongs to the theme "Electronic Data Interchange".

Second, the research axis.

Once again I will use the American terms, because they have, I would say, very rich evolution and there I'll take the example of air transport; what are called "hubs and spokes", which are a result of the deregulation of air transport. In this case it's a question of passengers, but I think that a
phenomenon of the same kind will occur concerning freight. We have seen an explosion on the level of the companies, but afterwards competition has cleaned up. What is it that we have been able to notice? Between the major platforms, the major hubs, there are high quality connections which to a full extent use the economies of scale. After all, there are only a small number of companies who ensure these connections. And then, around these hubs - in the United States called "the hub area" - you have the whole feeder system, ensured by the regional companies. Well, I think we have good reason to believe - and I think it must be noticed - that we will have a phenomenon of the same kind in Europe - through consolidation platforms or "groupages des groupages". That is, that we will have in Europe a certain number of major platforms, which of course will ensure consolidation operations, between which there will be transports carried out by important companies, and naturally often different ways - road, railway and waterways when it is possible. Branching from these platforms there will be a whole system of connections providing which will make possible what we call the massification of the dispersed flows.

The phenomenon of the hubs and spokes passes once again through the problem of modular charge units and I evoke of course van Derens communication, which is very interesting, and at the moment has been subjected to a simulation in Holland, but could very well result in a study on a European scale.

Of course, it's not for the state authorities to planify these platforms. Probably these platforms will develop on private initiative or on the initiative of local authorities or chambers of commerce. I am sure that a phenomenon of this kind will take place and I think that it's very important to be able to explore it. That's all for the second research axis.

The third and more directly economic axis has been evoked here. To give it a title I will call it "The external effects of the production organization".

We are really preoccupied, with good reason, with economic regulation. There is of course a system of profits and costs which develops from this reorganization of production, which profits by it and pays the costs. This is especially important.

We ought to find out how there a fair division of the profits could be made, essentially to finance the investments. Not only industrial investments, but also investments which are of interest for the transporters and the administrators of the transport infrastructures. There
you have a very large domain which of course includes all
the fiscal and pricing systems applied when using the
infrastructures: this assumes that we consider the famous
"missing-links" problem and that we introduce into the
economic calculations the criteria of the choice of road
investments and goods transports in a fashion that is a
little less summary than so far.

Mr President, these are the research axes that I have
pointed out.

Thus, the first one affects Electronic Data Interchange,
applied of course to the special domain of transport. The
second one concerns the problem of the platforms, the hub
area, which in my opinion is predisposed to develop also to
the goods level, with regard to the importance of the
consolidation - to use the English term - of what we call
"le groupage des groupages".

And the third subject is economic regulation through, let's
say, the internalization of the external costs, which allows
a correct division of the investments between the different
cooperators who contribute to the profits produced.

Thank you, Mr President.

Mr Sandebring: Thank you Mr Frybourg. Please Mr Whitford:

Mr Whitford: My name is Whitford from the United States. I
think the last two and a half days we have spent working at
JIT is of universal good. I would like to point out that
it may be true. However, what we really are talking about is
the elimination or reduction of risk in the system. Actually
we have an increasing risk in one direction by taking the
risk out of inventories.

We used to have managers - it's a risk management question
as it seems to me, taking risk out of inventory and putting
it in earlier in the value-added stream. And I would like to
press in the research we do for a delimitation of benefits
in some debts so that we can assess where the costs go. It
seems to me what we are talking about is that instead of
analyzing profits and losses or benefits and costs we are
spreading them over the system. By adding more costs perhaps
to transport we are saving it in the production process and
we are maybe improving the quality of the product, which is
a benefit to the industry and to the consumer. I think there
are a lot of hidden benefits and also a lot of hidden costs
that we may not have looked at. Thank you.
Mr Sandebring: Thank you. I think that we have time for one more intervention. Please Mr Dahlgren.

Mr Dahlgren: I would like to add to Mr Whitford's statements that the cost will increase when you introduce JIT. As Mr Wandel yesterday also mentioned, it is not necessarily so and I think we have found that if you make a new system - i.e. you don't use the old system - you can both decrease inventory and transport costs. For instance, when you have lower stocks in production you can introduce these automatic carriers and by means of computers you can keep a very low stock. For instance, by using unit loads you can make very quick turn-arounds for the vehicle and also decrease the transport cost. Thank you.

Mr Sandebring: Thank you. Please Mrs Kaartama.

Mrs Kaartama: Thank you Mr Chairman. My name is Kaartama from Finland. I would like to add to this question of who benefits. If we are thinking of the kind of industry which is producing consumer goods and selling them to shops and the dealer chains are reducing their inventories, there will be an extra cost for the producer because it is very seldom they can be charged from the shop. I think this is so in many cases. Also in the processing industry in many cases it is the producer who takes care of the whole chain of transport to the buyer. In all these cases, a lot of work is needed on the whole transport system to cover the extra cost which will be caused by short delivery or smaller sizes of shipments. So it is not so evident that everybody is gaining in this game. Thank you.

Mr Sandebring: Thank you very much. Now we have come to an end of this discussion and of the seminar as a whole. Before I close, I will give the floor to Mr Horn, who will make some final remarks. Please Mr Horn.

Mr Horn: Mr Chairman, thank you very much. Dear colleagues and friends. We have now come to the end of this seminar which I think in the mind of all of you will be an enrichment and maybe an opening up of new views on research and international cooperation. I would like to take this opportunity to thank you, Mr Sandebring, as Chairman of this seminar and also as the Chairman of the OECD Steering Committee for road transport research, for having taken this initiative to hold this seminar here. I would like to thank
especially our valued colleague Mr Frybourg, who has been one of the real instigators of this activity and - as we say in Germany - ENDE GUT - ALLES GUT. I should like to thank especially Mr Asp and his people from the VTI for all their help and organization. I would also like to thank Mr Sandebring for his hospitality and his kindness and the excellent organization of this seminar. I thank all the chairmen and rapporteurs and also especially our friends coming so far from the United States and Japan and all of you for your intense discussions inside and outside the room and even on the eighteenth floor. Thank you very much.

Mr Sandebring: Thank you very much. I will not give any final conclusions today on the discussions and the seminars. We will work on this and listen to the tapes and look at our notes and consider them very carefully. In a few months we will send our report to the Steering Committee and we will also send a copy of this Memorandum to you.

Thank you very much.