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Critical Success Factors for
New European Network Infrastructure

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Summary: This paper takes for granted the importance of the emerging European network economy, in which the new information technology generates a great deal of dynamics. The critical success factors for these emerging networks are described and illustrated by means of two Dutch case studies, viz., the Flower and Plants auction in Aalsmeer and Amsterdam Teleport. The paper concludes that strategic networks will be of critical importance for the future of Europe.



1. TOWARDS A EUROPEAN NETWORK ECONOMY.

In the Treaty of Rome, which marks the beginning of the European Community, it has been agreed that transport infrastructure is critical for the economic progress in Europe and that, consequently, a common policy in this area would have to be pursued.

This observation on the relevance of transport in Europe is not a misplaced remark. In fact transport has been a vehicle of major importance in the long history of Europe. Andersson and Strömquist (1988) speak in this context of four logistic revolutions which characterize economic history of Europe. Each of these logistic revolutions can be described by the emergence and adoption of a new type of international infrastructure:

- the period from the thirteenth century onward, in which water transport (inland and coastal transport) emerged as a new logistic system connecting cities along rivers and coastal areas (the so-called Hansa economy);
- the period from the sixteenth century, characterized by a drastic improvement in sailing and sea transport and by the introduction of new banking systems, through which trade to the East Indies and West Indies was stimulated (with Lisbon, Antwerp and Amsterdam as major centres);
- the period from the middle of the nineteenth century, marked by the Industrial Revolution, in which the invention of the steam engine generated new transport modes (sea transport, railways) which also created new market areas (e.g. North-America);
- the period from the seventies in our century, which is marked by informatization and flexibilization; in this framework JIT (just-in-time) systems and MRP (material requirements planning) evolved; besides, the rapid developments in the area of communication technology generated also the emergence of integral logistics (see Giaoutzi and Nijkamp, 1988).

The historical development of Europe based on a close connection between economic growth and development of transport logistics has ultimately induced the European network economy. Europe has become an interwoven, multi-faceted network system, and this network will become even more evident after the completion of the internal market (1992) and the integration of (parts of) Eastern Europe. And therefore it is no surprise that politically independent countries such as Sweden or Austria aim at an extension of their economic and logistical links with Western Europe. Spatial interaction, geographical mobility and economic progress seem to be closely interwoven phenomena and seem to continue as major features of the European network economy, despite all environmental and social costs involved. Such networks are not only related to transnational connections (e.g., rapid trains), but also to nodal configurations (e.g., teleports). Our paper will mainly deal with the latter type of networks, but first a more general sketch will be given.

Indeed, Europe is in motion. The action radius of commuting is structurally rising, the volume of commodities transported nationally and internationally is increasing, and the airlines activities for both passengers and commodities are booming. In a recent publication this mobility drift in Europe has been described as the 'Euro mobile' phenomenon (see Nijkamp et al., 1990).

Transport policy favouring a free movement of persons and commodities in the EC is a sine qua non for a single market. The removal of barriers is of great importance for obtaining the highest dynamic integration benefits from a network economy.

It is surprising to observe that in most European countries transport has exhibited clear signs of devolution (see Van Gent and Nijkamp, 1989).

This devolution appears to be a uniform phenomenon, although in various countries and cities it manifests itself in different forms, e.g., deregulation, decentralization and privatization. However, the first and most noticeable observation in the above mentioned study is that there is a striking parallel movement of transport policies.

The previous remarks lead to various interesting observations. The most pronounced one being the surprising uniformity in the evolution of transport policies in most European countries in the past three decades: a period of expansion in the 1960s, a period of contraction in the 1970s and an era of selective expansion in the 1980s, in which the direction of selection is strongly governed by either market forces or by decentralization principles. Countries with a more liberal policy model and/or with severe deficits of the public budget are apparently the first ones to advocate privatization - in combination with deregulation - of transport policy, not only in the airlines sector and the freight sector, but also in the public transport sector. Clearly, among all these countries significant differences do still exist, as the intensity of economic stagnation and of monetarist policies may drastically vary. Similarly, in some countries local autonomy rather than privatization can be observed as a political ideology. Altogether, however, the hypothesis of a financially-driven deregulation ideology turns out to be reasonably valid in many European countries.

A second observation to be made here is that European transport policy should not only be focussed on an improvement of the intra-EC network infrastructure, but that it should pay attention in particular in particular to external links of this network. As mentioned before, an open EC has the highest benefit for both the Community itself and the world economy as a whole. Thus the improvement of cross-frontier routes are extremely important, such as the Trans-European Motorway, or the Scandinavian links. In the future also major links to East-European countries would have to be envisaged. There is also a good case here for cooperation between non-member countries which provide (transit) links between EC-members, such as Switzerland, Austria and Yugoslavia. It goes without saying that a balanced transport policy is of critical relevance for regional equilibrium in the Community. The current tendency toward major fast links is not by definition beneficial to all regions. Extensive evaluation research would be necessary here to provide policy-makers with adequate guidelines.

The major stimulus for new and advanced infrastructure policy is given by information technology (information, telecommunications and electronics). Physical distribution is increasingly relying on informatics-related activities. That holds true for containerization, fast trains and airlines. Accessible and internationally coordinated information systems are becoming a major vehicle for a further improvement of the transportation network in the Community. The International Transport Information System (INTIS) in the port of Rotterdam is a good example of this development. A necessary condition for further penetration and success of such information systems is standardization, and this policy issue is one of the most crucial corner stones of the European transport policy. JIT principles and multimodal logistic chains will never become fully operational without sufficient standardization.

Finally, the development of new mega-infrastructure, such as the Channel Tunnel, the ICE, the TGV, mega-airports etc. have to be mentioned.

From a transportation viewpoint this all looks promising; from an ecological viewpoint serious doubts may be raised. In a recent study we concluded that future transport needs are incompatible with ecological paradigms unless the possibilities of subterranean fast transport, e.g., based on vacuum pipelines, would be taken much more seriously. Seen from

the current ecological perspective, it is not at all evident that modern large-scale infrastructures add to the social well-being and quality of life of the large agglomerations of the Community. Regional sustainable development will therefore be a major concern in the next decades (see also Archibugi and Nijkamp, 1989).

2. INFRASTRUCTURE NETWORKS AND CRITICAL SUCCESS FACTORS.

It is evident from the foregoing exposition that the European network economy will face difficult issues in terms of capacity and externalities in the next decades. Any expansion is financially expensive and environmentally disruptive. On the other hand, given the foreseeable needs of the European network economy, drastic improvements have to be realized, in particular as various current transport modes are approaching the end of their life cycle (see also Marchetti 1987).

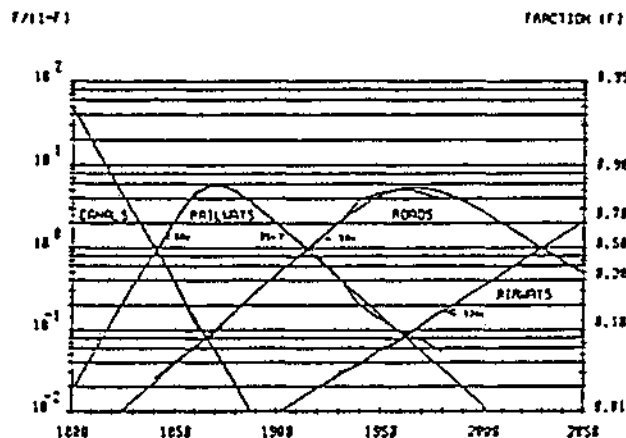


Fig. 1. Shares of types of transport modes in the USA (Marchetti, 1987).

Two remarks have to be made regarding Marchetti's approach. Outdated transport modes may again become competitive, when they are upgraded by means of informatics (e.g., railways). And secondly, intermodal transport may lead to positive synergetic effects which go far beyond the potential of individual transport modes (e.g., combined transport like Huckepack or Rollende Landstraßen).

Which strategic networks in Europe can be imagined for the next decades? At least five directions at a global European level seem to be viable here.

- a rigorous introduction of informatics and telematics systems with the explicit aim to reduce physical transport;
- a drastic change in our pattern of living and working (including the geographical dispersion of economic activities and residences);
- an upgrading of existing transport modes towards a level that is compatible with the needs of the European network economy;
- a qualitative structural change in transport and logistic systems by a far reaching combination of different transport modes;
- the development of new transport modes (e.g., Maglev, 'iron highways', underground vacuum pipelines for high speed trains etc.).

Clearly, at regional and local scales more specific networks may be needed. The development of such new strategic networks would not only serve to tackle ad hoc current local bottlenecks in transport

infrastructure, but also to design network infrastructure from the strategic perspective needed for the next century. It is evident that there is a serious lack of such strategic networks in the European context (see also Schippers 1990).

The nature of such missing networks is difficult to identify by looking at the European map of existing physical networks. Such an approach would at best be valuable for tracing missing physical links between certain nodes. Essentially a qualitative rather than a quantitative analysis of such networks is needed. The relevant dimension in any strategic network is space, so that one would have to look for modal layers which are absent in the system - or not developed far enough (e.g. inland waterways) - or for structural impediments or barriers in existing networks. This means that essentially the quality of a network (including the existence of qualitative jumps at crossing points, e.g. borders) is of critical importance. Such qualities of a network may relate to the following pentagon of five dimensions of a network:

- hard ware (e.g., efficient technological standardization);
- soft ware (e.g., use of compatible information systems);
- org ware (e.g., existence of effective management structures);
- fin ware (e.g., presence of financial institutions);
- eco ware (e.g., environment-friendly systems).

All these dimensions may be regarded as critical success factors for the design and operation of strategic networks. Such networks take thus for granted the need for spatial and economic interaction between countries and the critical role of infrastructures played in this development. From the Japanese side this awareness has even led to the creation of the GIF (Global Infrastructure Fund) concept in order to provide a satisfactory platform for financing large-scale public works which are compatible with environmental impediments (cf. Saito 1990).

In the sequel of this paper two Dutch case studies will briefly be discussed in order to illustrate the fact that designing successful infrastructure networks is not merely a question of investing a certain amount of money in physical hard ware configurations. On the contrary, the main conclusion of this paper is that the success of infrastructure networks is based on sufficient care for all five dimensions of networks. In a much broader European study for the European Round Table of Industrialists (see NECTAR, 1990) this conclusion is further elaborated. From that study, it becomes clear that even the feasibility of new infrastructure networks is increasingly being hampered by insufficient care for a number of these dimensions. We may mention the financing problems in the case of the Channel Tunnel between England and France, and the strong resistance in most countries against building new roads and tunnels (e.g., in the Netherlands) and railway lines (Kent, Flanders). Those five dimensions are therefore of strategic importance for infrastructure networks.

The first case study describes the critical success factors of the world-wide operating information system of the flower and plants auction in Aalsmeer (the Netherlands) and the second one to the critical success factors of the Teleport (new telematics centre) project in Amsterdam.

3. THE FLOWER AND PLANTS AUCTION (VBA) IN AALSMEER.

3.1. Introduction

In this chapter the physical distribution and services network of the world's largest flower and plants auction VBA ("Verenigde Bloemenveilingen Aalsmeer") is described in terms of its critical success factors in the fields of org-, hard-, soft-, fin- and ecoware. A number of examples illustrate these critical success factors. The VBA and its competitors are of strategic importance for both the national economy and for the international trade in flowers and plants.

3.1.1. Historical background

The VBA network which has nowadays a world wide coverage in terms of distribution and logistics was the result of a merger in 1972 between two former competitors, one of which was established in 1912. The merger was needed because of the rapidly growing market and concentration activities at the demand side of the market. Since the two organizations matched perfectly, a merger appeared to be rational. The VBA is a co-operation of some 4.500 growers and employs some 1.550 persons with a solid tenure (including part-timers) and a few hundred temporary workers.

3.2. Orgware

The services configuration of the VBA include the following:

- (1) the auction - by means of an auction clock - of flowers and plants from all over the world. The main goal of the VBA is 'to supply services in order to attain the highest possible prices for the products of its members'. This goal can only be achieved if the highest possible concentration of customers and growers is found at the VBA, resulting in stable, transparent pricing and trade relations. The auction system would not work if large quantities of products were sold outside the auction. This is why the VBA uses an auction duty for its members.
The VBA uses the concept of quality maximization ("kweker-specialisatie") in stead of outlet maximization - which is common in the USA. Quality refers here to workers, machines and products.
- (2) the supply of temporary storage accomodation for customers;
- (3) intermediate services in direct transactions between growers and customers;
- (4) computerized administration of transactions;
- (5) education programmes for growers as part of the quality maximization concept;
- (6) phyto-sanitarian services (quarantaine, gassing);
- (7) well-balanced promotion of the interests of all three parties in the co-operation (growers, workers and customers) ("samenwerkings-gedachte");
- (8) communication in terms of time and close attention for the growers, top-down as well as bottom-up (as part of the quality maximization concept) ("kwaliteitskringen"). The actual large scale organization is thereby "scaled down";
- (9) flexible and fast adaptation to new chances and challenges. Recent plans include additional floor space of some 50 percent.

Recent developments include:

- (1) formation of product divisions for plants and flowers separately in response to the growing differences between the two markets;
- (2) service segmentation into auction, intermediate services and super market;
- (3) risk distribution by means of supplying an increasing number of markets.

External institutional developments are also very important for the VBA. We mention here:

- (1) the EEC-treaty in 1950 - in fact a purely agricultural treaty - which has led to an enormous market growth. It is interesting to note, that the EC 1992 may be seen as a great chance by the VBA;
- (2) the role of Dutch agricultural policy in terms of providing and financing high level agricultural education, research (the famous Agricultural University in Wageningen), advisory services (starting with the Marshall plan; IMAG etc.);
- (3) the role of a subsidy programme to stimulate investment in energy saving (when the gas prices were very high);
- (4) the merger of 1972 which led to a growth of the Dutch market share from 39 to 43-44 percent and to price stabilization;
- (5) mergers and take-overs by large, financially strong, non-industry firms. These firms may simply buy lacking knowledge, and thereby becoming strong competitors. The auction clock however, will incapsulate this peril.

3.3. Hardware

This feature of the network includes the heart of the VBA, the auction clock. Next to this relatively 'old' system modern computer equipment is used.

All services are housed in the largest building in the world - 335.000 m²; about 60 soccer fields. Its site is perfectly situated and attainable by main highways in all directions (e.g. to the FRG) and nearby Schiphol Airport.

The actual transportation of flowers and plants is undertaken by specialized transport firms. In the years before the second World War small and low boats were mainly used, whereas after World War II trucks, cars and airplanes are used. In this way both transport speed and transport quantity grew strongly. Since fast transport is essential for these vulnerable goods, the product quality was also improved.

3.4. Software

Yearly investments in computers and logistics are some 20 mln Dfl. and 2.4 mld Dfl. (20 percent of the 12 mld. Dfl. production value), respectively. Recently Tele-VBA, a Videotext-like information service distributing information such as auction prices, product quality, education programmes etc. - was introduced to the growers.

3.5. Finware

The co-operative - non-profit - basis of the VBA has a number of positive consequences for the financing of its members. A financial

surplus may be used to bail customers and growers, thereby eliminating individual risks and costs and maximizing funding for the development of products and markets. Investments in storage capacity are neither necessary because they may be hired for free.

3.6. Ecoware

Investments in R&D has led inter alia to the development of cultivation on glass wool, thereby eliminating the need for dangerous pesticides and nevertheless improving product quality. Investments in energy saving in heating and lighting systems should also be mentioned.

In the following section a number of examples is given to illustrate the crucial importance of critical success factors for the VBA network.

3.7. Creative and Innovative Adaptation to Chances and Challenges

3.7.1. Growing competition of LDC's

A number of countries in the world - including Kenya - have the agricultural and socio-economic (low wages, high employment) potentials to become strong competitors for the VBA. Kenya receives also EC subsidies. Its lack of highly trained workers however, have led to the production of only low quality products (the so-called commodities). A too high supply of the same type of product leads to price cuts until prices do no longer match transportation costs, thereby eliminating this 'oversupply'.

3.7.2. Product innovation by another major Dutch competitor

In Naaldwijk (in the so-called Westland) the major Dutch competitor is situated. Next to the traditional production of commodities (with a low value added) and vegetables the production of specialities (high quality products with a high value added) is becoming popular in Naaldwijk. As in the case of Kenya, growers lack the specific product knowledge at this moment. This knowledge might be bought however, e.g. by attracting VBA members by means of attractive financial arrangements.

3.7.3. Customer wishes: segmentation of services

Two major developments at the demand side should be mentioned:

- (1) large customers such as supermarkets asking for very large quantities to be delivered at short notice and at special prices;
- (2) small customers asking for fast and efficient service.

Since both developments may lead to price distortion, extra costs etc. and necessary 'tailor made' services were impossible in the auction system, a separate agency was set up for large customers and a cash & carry-system for small ones ("CULTRA", which uses a 12 percent provision to keep the auction system attractive). At a later date small customers will be serviced at two small auctions - with whom the VBA is already merged. Larger customers may than be serviced more efficiently.

3.7.4. Opening the Japanese market

The Japanese are notorious for their ingenious system of excluding foreign competition from their home market. Their distribution system, for instance, is small scale, but therefore inefficient and expensive and firmly tied to specific suppliers. Complicated import laws and time consuming import inspection procedures do the rest.

Flowers for instance should be fully free of any animal life and bulbs be bred until flowers come out. In this way they are of course completely unsellable.

By means of improvement of production processes the VBA was able to match the Japanese standards. On site inspection at the VBA by Japanese examiners is now regular. Training programs included visits to Japan.

3.7.5. Developing the home market

Super markets make up a new market. By means of the so-called "shop-in-shop" system especially trained personnel may sell higher quality flowers and plants. This market is growing rapidly.

3.7.6. Miscellaneous factors

Other factors include:

- (1) tradition, of which the auction clock is a good example;
- (2) the lack of a good substitute for the auction clock;
- (3) the Dutch climate, with its ideal summers, whereas e.g. in Spain the hot summers tend to burn every product.

3.7.7. Conclusions

The unique combination of a large number of success factors 'in one hand' and the way in which the VBA-management, its work force and its growers use and closely monitor these factors to stay competitive is responsible for the success of the VBA and makes it hard to beat.

This network may be qualified as high-tech in all its dimensions.

4. AMSTERDAM TELEPORT

4.1. Introduction; Globalizing Business Competition

Business competition nowadays is becoming of a globalized nature. In this concept settlement places are competing at world-scale to attract and to hold (these) firms. Competitiveness in this respect includes e.g. a well-trained workforce, a nice place to live, a minimum market size and certainly well-equipped infrastructure networks. Cities are then the most likely settlement place for most firms. In this chapter we will take a close look at the development of the telematics network Amsterdam Teleport. But first we will explain the specific reasons of the city of Amsterdam for developing this project; they explain why this network might be called 'strategic'. To illustrate the power of the critical success factors of this network, a number of implementation problems is described.

4.1.1. Working and Living in Amsterdam

Most of the employment in Amsterdam may be found in the services sectors. Because of various reasons other sectors - especially the large shipbuilding and steel industry - are insignificant nowadays. A large part of the harbours is therefore unused. A great deal of the services sectors have moved away from the city centre to the south-east periphery because of the lack of accessibility, parking problems and a shortage of tailor-made buildings in the city centre. Since these locations have been - and are in rapid pace - built around motorways, public transport has a low density and a large number of workers is commuting - because of the lack of nice and affordable houses in Amsterdam -, car use is very high and causing high congestion at the main points of entry of the road network of the city of Amsterdam.

The inner city telecommunication infrastructure with its limited capacity and low quality (copper) telephone network is another reason why these firms 'moved abroad'.

For the inner city and its surrounding areas this 'drain' involves serious economic and social problems. The Teleport project - as we will see - has the potential to 'revitalize' these areas. This network may then become of strategic importance for the city of Amsterdam in attracting new firms and stopping existing ones from moving elsewhere. Its importance however lies not only in its contribution to the local economy, but - perhaps even more important - in its contribution to the national economy - given the dominant position of the city of Amsterdam in the Randstad - and the European level - given the importance of Schiphol and the Amsterdam harbour, and the fact that this Teleport may become one chain in the foreseen world-wide network of teleports.

4.2. The Project Amsterdam Teleport: Hard-, Soft-, Org-, Fin- and Ecoware

4.2.1. Hardware

Amsterdam Teleport is in terms of physical planning a new business district in Amsterdam at a short distance of the inner city, combining offices and business buildings with high-tech telematics infrastructure, expensive houses and 'green belts'. It is located around the recently built (bus-, tramway- and train) station Sloterdijk, in the former Western Harbour Area and accessible via main roads.

The telematics infrastructure include the basic PTT-package, with options like telefax, memocom, PABX (digital telephone communication), direct satellite communication, computer data cables, special telephone tariffs, connection to the growing fiber glass telephone network of Amsterdam etc. Cost saving facility management is also possible.

Amsterdam Teleport is in fact a pilot project for the very large 'IJ-bank-project' near the Central Railway station.

The attractiveness of this project in terms of accessibility may be further illustrated by means of the so-called 'Three-harbour-concept'. This concept includes the following; a direct access to public transport junctions, motorways next to the Western Harbour (sea- and inland transport; the second Dutch harbour) and the international airport of Schiphol (the fourth in Europe for goods transportation) by both road and rail. Passenger transport by rail especially is very competitive.

The Western Harbour itself is part of a revitalizing process, since the Eastern Harbour will be transformed into a large living district

('New-East'). Firms are therefore transferred to the Western Harbour. The Dutch Railways NS for instance has laid off its large but unused and old fashioned shunting-yard 'De Rietlanden' and built a modern high capacity equivalent in this harbour. The station Sloterdijk is also a remake of an old but much smaller station with the same name near its current location.

The project has a number of goals. We may name the following indicators:

- (1) a floor space of 500.000 m²;
- (2) 20.000 work places;
- (3) 20 % 'green belt', lanes in stead of 'free building' etc.
- (4) project time (1995-2000) and occupied area (in %);
- (5) attracting four different types of firms:
 - a) head quarters, because of its marketing effect;
 - b) small 'telematics-intensive firms';
 - c) middle-sized offices with 'standing' and image;
 - d) small firms needing both office and (clean) (high-tech) production facilities.

4.2.2. Soft- and orgware

Amsterdam Teleport is developed by means of a Public Private Partnership (PPS) between the city of Amsterdam (ground, physical planning, public works), PTT-Telecom and VOM (real estate management). Periodic consultations include also the Netherlands Railways. One alderman of the city of Amsterdam is responsible for the management of the public services.

The physical planning of this area is done by flexible planning in stead of the usual time-consuming and fixed planning arrangements.

4.2.3. Finware

The funding of the project is a mixture of local public capital and private capital from insurance and pension funds and firms themselves.

4.2.4. Ecoware

Ecoware is also an important component of this project. We may mention the 'green belt' and the attraction of high-tech, but clean production firms.

In the following section a number of implementation problems are described in order to illustrate the importance of the critical success factors.

4.2.5. Implementation problems

4.2.5.1. Separation of management and realization of telematics services

At the start of the project management was the responsibility of the main quarters of PTT-Telecom in The Hague, while its realization was the responsibility of PTT-Telecom Amsterdam, resulting in very long communication lines and seed financing problems. The Teleport-organization itself was then blamed by its potential customers.

The privatization of PTT-Telecom was used to renegotiate the project agreement, thereby streamlining its functioning and potential to attract both customers and investors.

4.2.5.2. Poor acquisition and marketing

Since in practice all three partners were doing the acquisition and marketing, rivalry and confusing disattracted potential customers and investors. The forementioned renegotiation of the project agreement gave the VOM (estate management) the sole responsibility for this part of the project.

4.2.5.3. Lagging demand

Not until some one-and-half years ago demand for locations in Teleport was lagging far behind schedule. The city of Amsterdam explains this phenomenon by the filling up of alternative locations in South-east and Amstel III and EC-1992 ("Fortress Europe").

4.3. The Success of the Project

The network might be qualified as successfull, since recent figures indicate a faster than scheduled distribution of grounds and attraction of important telematics-oriented firms, including foreign firms. Grounds exploitation has led to very positive results.

It should be noted however, that most of these firms were already present in Amsterdam, so that the unemployment figures may not become lower because of this project.

The scheduled number of parking places was also too low. The excellent public transport facilities in all directions are obviously not so attractive as was initially expected.

4.4. Recent Developments

A number of recent developments may reduce the (future) success of this sophisticated network. We may mention:

- (1) chemical pollution of grounds, leading to higher land use costs and slower pace of land allocation. Housing construction might be legally impossible;
- (2) a lower rate of expected use of alternative locations in Amsterdam, thereby reducing the need for locations at Teleport;
- (3) future implementation of new, but traversing and noisy, railway extensions in the heart of Teleport, thereby reducing its attractiveness.

4.5. Conclusions and Evaluation

A complex of critical success factors is responsible for the current success of this network. Initial failures were especially due to org ware problems. Next to these problems however, an external factor, viz., the market situation, did also play its role. Its recent success depends therefore both on the market situation (booming) and changes in the

project organization.

5. CONCLUDING REMARKS

Europe is in motion, politically, economically and spatially. In the past decade the European transport map has featured a wide variety of problematic developments at both local/regional and national/international scales. Despite the increasing popularity of Just-in-Time (JIT) systems and related concepts, the actual practice of both commodity and passenger transport is disappointing and often frustrating. Severe traffic congestion phenomena at the urban or metropolitan level (e.g., Athens, Rome, Paris), unacceptable delays in medium and long distance transport during peak hours, unsatisfactory service levels of European railway systems (and public transport in general), unreliable airline connections due to limited airport capacity and slow technical and institutional renewal of air traffic control in Europe; all these phenomena illustrate the difficult position of the European transport sector. And there is no clear perspective for a drastic improvement of this situation. On the contrary, it is increasingly claimed that a free European market (beyond the year 1992) and a further deregulation of the European transport sector may lead to unacceptable accessibility conditions in major regions in Europe. Another important complicating factor will be environmental policy. In contrast to the deregulation with respect to the pure transport market phenomena, environmental policy is critically dependent on a great deal of regulations. In particular, technical restrictions are likely to be imposed, e.g. limited emission levels of motorcars or even a prohibition of the use of certain transport modes.

Transport policy makers in most European countries find themselves in extremely complicated situations. A large number of interest groups, ranging from multi-national companies to local environmentalists, urges them to take action, however often in quite different directions. On the one hand it has become obvious that the environment poses its limits on the volume, the character and the pace of the extension of the transport infrastructure. On the other hand most companies in (Western) Europe are concerned about their competitiveness in a global context due to inadequate infrastructure.

The inadequate infrastructure might hit European business in several ways. First, the relatively slow development of sophisticated telecommunication infrastructure in Europe may curtail the industries in the possibilities to offer new services. Moreover it may limit the possibilities to speed up international trade in a reliable way. Secondly, the restricted capacity of inland transport networks may cause higher production costs levels in Europe. However, the last item should not be overstated as regards global competitiveness. For instance, also Japan suffers from heavy congestion on inland transport systems. Although, it should be admitted that Japan invests heavily in (high-speed) railway infrastructure and other rapid mass transit alternatives.

In this report the results of two case studies on critical success factors of strategic international networks in the Netherlands were presented. From these studies a number of interesting conclusions may be drawn. The most important one being the fact that there does not seem to exist a single major critical success or failure factor for networks. On the contrary, success or failure of networks tends to be a multi-dimensional phenomenon, since not only the hard-, the soft- and the org ware of networks should be dealt with, but also and increasingly their fin- and eco ware. Planning should therefore stress the importance of all

these factors and not just one (usually the quantity of the physical infrastructure). Planning should also take good notice of the interrelation between other policies (e.g., physical planning and housing) and the quality of networks.

Close attention and concerted action between government and interested parties might reveal a large potential for successful networks with strategic value for the European network economy.

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