A Comparative Analysis of Information Technology Strategy in American Airlines and French Railways

Nathalie N. MITEV
University of Salford
email n.n.mitev@iti.salford.ac.uk

Abstract
In choosing the computerised reservation system Sabre, French Railways was hoping to benefit from the same strategic advantage this technology brought to American Airlines during the deregulation of US air transport in the 80s. However, the adoption of a new transport distribution model based on the deregulated US air industry proved to be controversial, leading to implementation problems. The French Railways distribution system, Socrate, represents a new form of management control, particularly in its use of yield management techniques, and has to be situated within the broader context of US and European deregulation.

By reviewing the multiple aspects of Socrate implementation difficulties and concentrating on the market, economic, political and cultural differences in the transfer of Sabre from American Airlines to French Railways, this paper illustrates how strongly these differences affect strategic decisions and the use of technology. Differences found to explain some of the difficulties relate to: the nature of air and rail markets and their operational complexities, the intramodal and intermodal competition in US and European transport, US and European liberalisation, the emphasis on high-speed trans-European trains, national and regional development policy issues, cultural notions of access to transport and its pricing, and organisational change.

1. Introduction
SNCF (Société Nationale des Chemins de Fer Français) bought Sabre from American Airlines in order to build their new computerised reservation system, Socrate (Système Offrant à la Clientèle des Réservations d’Affaires et de Tourisme en Europe). One of its aims was to transform SNCF’s commercial activities through the instigation of a new philosophy of selling, based on a technological investment importing yield management techniques used in the US airline industry. When first implemented, however, SNCF staff and customers rejected this new technical tool and its underlying ticketing, pricing and selling policies.

These implementation problems were widely reported and examined by SNCF itself [1,2], French trade unions [3,4], business consultants [5,6], passengers’ associations [7], by the French government which commissioned a public inquiry into its implementation failure [8,9], and by the media [10,11,12]. Technical malfunctions, political pressure, poor management, unions and user resistance led to an inadequate and to some extent chaotic implementation [13,14]. The project management team gave a rather secondary importance to the databases and input sets; staff training was inadequate and did not prepare salespeople to face real-life problems such as tariff inconsistencies and printing problems; the user interface was designed using the airlines logic and therefore was not at all user-friendly; the new ticket proved unacceptable to customers; public relations failed to prepare the public to such a dramatic change. The inadequate database information on timetable and routes of trains, inaccurate tariff information, and unavailability of ticket exchange capabilities caused major problems for the SNCF sales force and customers alike. Impossible reservations on some trains, inappropriate tariffs and wrong train connections led to large queues of irate customers in all major stations and to a major public outcry in France. This new distribution system at SNCF must be seen as intervening in the competition between European rail, air and road travel, unlike the US where Sabre operated in the air sector only and brought considerable competitive advantage to American Airlines [15]. The changes effected through Socrate in the organisation of passenger travel at SNCF must be examined in the lights of the deregulatory changes within the European transport industry [16,17] compared to those in the US air industry [18].
Deregulation has occurred in the US transport industry for more than 15 years, and similar changes are taking place in Europe. Deregulation in the US transport sector has given rise to oligopolistic markets composed of private carriers. US air deregulation led carriers to innovate technologically by creating distribution software which synthesises cost and price information in new ways, i.e. yield management. The use of yield management techniques is a management tool for maximising profitability through controlling organisational costs. Yield management enables a new flexible management and planning of transport where resources become movable across the rail system. This modifies the nature of the SNCF public network and threatens the existing organisational culture and power base.

Placing SNCF's strategic decisions in the context of markets and organisational cultures enables us to understand the strategic aims, its associated management techniques and information systems. The European market and the evolution of national states boundaries, the development of fast trains, together with the propagation of the American air transport deregulation model, need to be understood in more depth before an analysis of the pricing strategy at SNCF, and the problems encountered by Socrate and its yield management techniques, can be carried out. The new apparatus put in place for the management of passenger travel, through the import of yield management techniques previously associated with the US air industry and represented by the choice of the American Airlines Sabre software, was intended to make a public sector enterprise respond to a new market situation. The European transport market structure is evolving from a public monopoly situation and becoming one of intersectorial competition. The complexity of these changes, which underlies SNCF's strategic choices, affects the organisation of the company and its work practices.

The next section compares transport deregulation in the US and Europe. It identifies a difference in the nature of the air and rail markets which explains some of the technical difficulties faced by SNCF, using a similar case at Greyhound Lines Inc. in the US coach industry. Other differences between the US and Europe are examined further such as intermodal and intramodal competition, European transport liberalisation measures, and the emphasis on high-speed trans-European networks.

2. Differences between US air and European transport

2.1. Deregulation

Through air deregulation in the US, the expectation was that airline companies would reduce overcapacity and costs and decrease prices. The results were contradictory. One important effect was that short routes with small profits were abandoned resulting in a higher concentration of operators [19 p49]. Other effects were: air routes were restructured in star-shaped networks with 'hubs' and 'spokes', leading to economies of scope; fare structures became extremely complex, leading to gigantic reservation information systems. The European aviation market differs in several major respects from the US domestic market, indicating that liberalisation in Europe may not produce the same results to that experienced in the US. The transferability of the US air transport deregulation experience to European air transport has been questioned [20]. Button and Swann [21 p104-105] have delineated some of the differences which present obstacles to the transfer of the air deregulation model from the US to the European air industry. Their arguments can also be extended to the possible transferability of deregulation from air to rail, as well as from the US to Europe (Table 1). Some of the most important points are:

- the nature of the markets is different, for example rail infrastructures are far more costly than air transport infrastructures.

- there are geographic and historical differences, for example, distances are much shorter in Europe (an average of 750 kilometres compared to 1300 kilometres [20]), which means that air, road and rail are much closer substitutes.

- The emphasis in Europe on high-speed trans-European networks; high-speed trains, such as TGVs (Trains à Grande Vitesse) run by SNCF, and planes compete on certain routes such as 500-700kms segments.

- The rate of adoption of liberalisation measures varies from country to country; for instance, Deutsche Bahn (Dürr, Deutsche Bahn president, in [22]) has decided not to separate infrastructures from operations, unlike SNCF and British Rail.

- Europe is much more densely populated, routes are shorter, and there are many more stops on a train line than on an air route, which makes railways more

1060-3425/98 $10.00 (c) 1998 IEEE
complex operationally.

### Table 1. Comparison of US and European air and rail transport

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport market regime</td>
<td>Long distances Unique liberalisation</td>
<td>Short/medium distances National liberalisation</td>
</tr>
<tr>
<td>Air</td>
<td>Intramodal competition</td>
<td>Intramodal pan-European competition</td>
</tr>
<tr>
<td></td>
<td>Concentration of operators</td>
<td>Many European operators</td>
</tr>
<tr>
<td></td>
<td>Hubs and spokes</td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td>Little rail passenger transport</td>
<td>High speed and traditional trains</td>
</tr>
<tr>
<td></td>
<td>No intermodal air/rail competition</td>
<td>Many stops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>National intra and intermodal competition</td>
</tr>
</tbody>
</table>

2.2. Markets

The latter point above proved to be an enormous technical problem to solve for *Socrate*, and is related to the different nature of air and rail markets. Greyhound Lines Inc. in the US [23] faced the same problems as SNCF in that there are many more stops during coach trips than on air routes. Greyhound's story is remarkably similar to the introduction of *Socrate* at SNCF. *Trips*, Greyhound's computerised reservation system, was intended to cover most operations, from passenger reservations to fleet scheduling. However, creating a coach-oriented system proved to be far too complex. An airline passenger flying from Baltimore to Los Angeles might make one stop; the same passenger on a bus might make 10 or more, with a different group of people filling the seats on each leg of the journey. "Greyhound technicians estimated that they would need a system capable of managing as many as 1,800 vehicle stops a day, more than 10 times those of an average airline" [23]. When the software was implemented in 1993 it was a disaster: learning to use it required 40 hours of training; it greeted ticket clerks with a disorganised, multiscreen barrage of options for getting passengers between any two points; because its data bank didn't include all Greyhound destinations, clerks sometimes had to haul out old log books and plot journeys by hand; the time needed to issue a ticket doubled - when the system didn't crash; terminals froze up unpredictably; the system crashed so often in some locations that agents were writing tickets manually; for days passengers missed connections, were separated from their luggage, and left to sleep in terminals overnight; phone centres were told not to take any reservations. Passenger traffic plunged 12% in August 1993 and Greyhound stock tumbled 24% in a day [23].

Almost the same incidents took place in French railway stations during the summer of 1993. Greyhound underestimated the complexity of the task and didn't allocate sufficient resources. SNCF had to adapt an airline system to a rail system, which proved to be extremely difficult technically. In both cases, the technical problems were due to the more complex nature of rail and coach transport markets when compared to air. Perhaps the expectations were raised by the fact that *Sabre* was such a successful system; however, this was achieved with a small army of technicians spending three decades and several hundred million dollar perfecting the system.

2.3. Economics

Apart from implementation difficulties due to these technical problems, economic issues related to deregulation and competition are important contextual factors. Transport deregulation in Europe is different from the US in that it has to consider intermodal competition (between rail, road and air) as well as intramodal competition (within a particular sector, e.g. air). The primary aim of European liberalisation is to harmonise standards (technical, economic, social, financial and fiscal) so that transport companies can operate freely in any European member state. Since the late 80s the European Union (EU) has introduced measures to abolish market restrictions in the air and rail sectors [24]. The first measures taken by the EU have been the clarification of the relationships between national states and transport companies, the emphasis on fast-speed networks [25], and the abolition of public service obligations and compensations. Separating the accountability of infrastructures and exploitation is the logical next step, followed by the cooperation of national companies to exploit international transport and the opening of national routes to competition. However, in the face of current opposition in many countries, it remains unclear whether the EU will achieve its aim of opening all European freight, international and domestic rail transport to competition. SNCF, for instance, has expressed strong opposition to the opening of domestic routes to competing operators, unlike Germany (Gallois,
2.4. Culture

SNCF and the French government have been, and still are to some degree, hostile to the liberalisation of European rail transport [27] on the grounds that the national rail network would be weakened if split, and that deregulation ignores the cultural and public service differences between countries. Nevertheless, since the early 80s, SNCF has had to respond to competition and increase its profitability. It has become more accountable and, in its 1990-94 contract with the French state, had to reorganise its activities into purchaser/supplier relationships. More recently, the government has decided to divide infrastructures and trains operations into two companies [28,29], unlike Germany, see above. We will see later that using yield management techniques also supports this new logic of accounting for the profitability of each SNCF route, thereby transforming routes into individual, potentially competitive, products. As in the air industry, the intention is to obtain economies of scope in the design, production and operation of infrastructures. However, consequences such as the disappearance of short routes, as in the US air market, are very controversial in a smaller and more densely populated country. This is particularly manifest in the decisions surrounding the TGV routes. The TGVs are regarded as a great technological success in France, but financing TGV infrastructures is extremely costly, and opinions are split on its benefits.

2.5. Politics

There is a very lively debate, for instance strongly argued during the massive strikes to protect the public service mission of institutions such as SNCF in December 1995 [30], on what the French call 'territory management' or the concerted planning of national and regional economic development. It is argued that the growth of the TGV network, contrary to expectations, creates a 'discontinuous' space and reinforces rural 'désertification'. The TGV is more profitable the fewer stops there are and investments concentrate on profitable segments which are becoming saturated, to the detriment of peripheral zones. And the intermodal competition increases on profitable segments, for example Paris-Lyon, where a fierce battle between the TGV and Air Inter takes place. These issues strongly coloured the public reaction to the introduction of Socrate: the new pricing policies facilitated by the new system were interpreted as forcing passengers onto the more expensive TGVs, to recoup the infrastructure costs and compete with air, and to the detriment of the 'classical' national lines, which the French public and SNCF employees, who are very attached to 'their' rail network, are very keen to protect. Having already built the most profitable lines (particularly Paris-Lyon opened in 1981 which is the only profitable TGV line in France), SNCF cannot now invest in new TGV lines without European aid, or it would run the risk of incurring enormous debts. Predictably, the French government has in fact recently dropped the construction of the less profitable TGV East route, Paris-Strasbourg [31,32].

3. Information Technology

3.1. Computerised reservation systems and deregulation

Computerised reservation systems (CRS) cannot be dissociated from the transport deregulation context. European rail transport already competes with air (and road) on a national basis (i.e. national intermodal competition). Increased national and European rail deregulation will create Pan-European rail intramodal competition, as well as 'internal' competition within SNCF across its different products. This prejudices the planning of an integrated transport policy within and across modes, which are now seen as competing rather than complementary. TGVs and 'classical' intercity lines now compete within the same transport company. The separation of infrastructure and operations is another step towards increased intramodal and internal competition. However, cooperation and coordination are still necessary: for instance, the allocation of timetables is very critical; the priority given to one's trains running on one's own network, vs trains belonging to another company; what happens in the case of limited capacity on a line, maintenance and safety, etc.

High expectations are held for the capacity of information technology and telecommunications to help solve some of these problems (traffic control, signalling, etc), and also for the CRS and Global Distribution Systems (GDS). These techniques are at the heart of the competition/cooperation dilemma. GDS and networks are carriers of economies of scope. After the US experience, European companies are well aware that domination of the GDS is important, in that they can provide a global control of travel, tourism, and distribution. But they also require technical compatibility which may be achieved through cooperation and agreements or, much more likely, mergers and acquisitions, as was the case in the US air sector.
3.2. Computerised reservation systems for air and rail

The CRS in the US are owned by the largest airlines (e.g. United Airlines with Apollo and American Airlines with Sabre) while in Europe they are owned by a number of airlines; for instance Galileo is owned by British Airways, KLM, Alitalia and several other airlines, and Amadeus is owned by Air France, Lufthansa, Iberia and SAS. European CRS are therefore much weaker firms than the largest American firms, which may display a more predatory behaviour. In fact, links between US and European air CRS have been under development for several years and in March 1992 the Apollo and Galileo systems were merged. It is very likely that, taking into account of alliances with Australasian, Canadian and Far Eastern air CRS, the industry will eventually consolidate into perhaps three or four global systems [19 p36].

The situation in terms of CRS for the rail industry, in which SNCF wanted to play a pioneer role by designing Socrate, is far less developed than in the air industry. CRS are usually developed by national railways, and SNCF failed to sell its system to German Railways, which concentrated instead on designing its own, simpler, system. The consortium between SNCF, British Rail and Belgian Railways (European Passenger Services) which runs the Eurostar tunnel channel service and uses Socrate, is an exception: this particular route, unlike most other rail routes, has no intermediate stops and is therefore more akin to an air route; electronic check-ins in Paris and London make it much easier to gather data, control passenger flows, apply yield management techniques and constantly modify pricing tactics. National rail CRS are less open to potential exploitation (e.g. by accessing rivals' data) than large global air travel CRS. SNCF signed an agreement with Amadeus in November 1995 [33]. The purpose was to make French and Eurostar trains reservations possible via the Amadeus distribution network in travel agencies and air companies' booking offices. Socrate is accessible through Amadeus point-of-sale computers. The purchase of Sabre by SNCF must also be seen as facilitating an inroad into the European market for American Airlines.

Judging from the growing global concentration of the air CRS as indicated above, it is quite likely that similar moves will take place in the rail CRS market, and that the US airline CRS may act again as the major predators. It remains to be seen whether the concentration of CRS in the rail transport industry will be mirrored, as in the US air industry, by a concentration of transport companies themselves. Nevertheless, amalgamating air and rail transport itself cannot be problem-free. The next section explores in more detail the effects of competition on transport pricing mechanisms in the rail industry. It shows how it became logical for SNCF to adapt its strategic thinking by borrowing pricing techniques from the deregulated air industry.

4. Towards a yield management strategy

4.1. The erosion of equal access through price differentiation

As a public monopoly, in order to keep and possibly increase the number of its customers, SNCF has historically been caught between the notion of public service and budget constraints. Traditionally, the aims of managing urban and rural development, maintaining a national identity and ensuring a good quality of life, formed the basis of geographic cross-subsidising ('péréquation géographique') in French rail transport. Accordingly, a kilometre had the same price all over the country, which was seen as fair and equal to all French citizens, and a ticket price was calculated on the basis of the distance travelled, whichever train or line was used and whatever the costs. Therefore, profits realised on some lines could be used to subsidise losses on other lines or segments. This principle was a result of a double constraint imposed on SNCF, that of operating unprofitable lines and that of balancing its budget on an overall national basis, rather than per market.

SNCF started introducing price differentiation in the early 80s by modifying fares according to the time of travel [34]. Price differentiation was initially quite limited. Pricing according to the number of kilometres travelled has the advantage of being totally understandable to customers who can work out the cost of a specific journey. Modulation was added to this basic pricing principle: some 'supplements' for very busy trains; a simple three-coloured calendar of three time zones, red for very busy, white for busy, blue for quiet periods, set a year at a time according to previous results, accumulated mainly through counting passengers and types of tickets in trains; this calendar tried to modulate demand in terms of day of travel; special discounts, only available in 'white' periods so as to fill trains, were devised (family cards, old people passes, youth cards, etc). This price differentiation, if simple, was quite rigid. For instance, daily variations (the time of the day), as opposed to weekly variations (the day of the week), were not catered for. This is
particularly important since daily variations occurring on profitable lines have the potential of bringing in higher profits through further price differentiation. Gathering data on daily variations requires much more sophisticated computer systems. This was a major consideration in the choice of the Sabre software. SNCF had started experimenting with further price differentiation on the TGV network Paris-Lyon in the 80s, then Paris-Bordeaux in the early 90s, through compulsory and chargeable reservation, as well as different types of supplements according to the time and day of travel. The objective was not only to fill empty trains but also to increase profits on busy routes and compete with air, which proved successful on the Paris-Lyon route. It can be seen that in SNCF’s experience, TGV technology and differentiated pricing became strongly associated and successfully so. The principles of ‘péréquation’ were beginning to become eroded in the sense that price became related to the type of train and the time and day of travel rather than the distance travelled [35].

4.2. From price differentiation to yield management

*Socrate*, with its computerised reservation systems and yield management techniques, brought the possibility of much more sophisticated price differentiation, and therefore threatened the principles of geographic and social ‘péréquation’ and equal access to transport even further. Three parameters could now be used to modulate pricing [34]: not only the type of train and a more refined division of the time of travel (the day of the week and the exact time of the day), but also the type of purchase, and the flexibility of the bought product. This new pricing implies the use of yield management techniques to know, predict and control demand, and manage available capacity according to this knowledge, so as to maximise revenues. Like marketing, yield management seeks to redefine and segment demand and concentrates on the price/quality relationship [36]. Yield management includes both pricing and seat inventory control. In the air industry seat inventory control enables the air company to influence yields and total revenues and costs on a flight-by-flight basis, within a given price structure. As well as different prices according to the type and time of train, the time of reservation now affects the price. The idea is to block a certain number of seats (a quota) for specific trains, for which the price will vary according to the date of purchase. The price of reservation varies so as to experiment with the size of quotas. This implies limiting capacity for certain groups on each train in order to smooth demand peaks and fill the lows. The means to do this are quota management and overbooking. Compulsory booking enables the gathering of information which enables an adjustment of the offer by modifying the composition and length of trains, adding extra trains, cancelling trains, etc. Another important change brought by *Socrate* is the lack of flexibility of the bought product. Tickets are now only valid for one train, like plane tickets. Previously, all tickets were valid on (almost) any train for 2 months. Exchanging tickets was made difficult and clumsy.

4.3. A cultural shock for SNCF passengers

When introduced in 1993, these new pricing mechanisms represented an enormous cultural shock for SNCF passengers: anger, confusion over the new ticketing, frustration with the new incomprehensible prices, combined with the turmoil caused by the very serious technical problems exposed above, resulted in chaotic scenes and long queues of furious customers in all major SNCF stations. Many incidents occurred, particularly in the trains where ticket inspectors had to deal with tense situations. Old ladies burst into tears when their usual ticket had trebled in price. Neither staff nor passengers could understand the new pricing logic. Trains run empty and tickets were issued for non-existent trains. Sales staff went on strike by issuing old-style tickets to delighted passengers. Compulsory reservation was also badly received. As in the Greyhound case, coach and train passengers are used to turning up in a station without reserving in advance. These passengers became very frustrated when they had to queue for hours and miss several of their usual trains. Some passengers’ associations sued SNCF and won [37]. The technical difficulties (e.g. data missing, complex user interface, poor staff training) were also partly due to a top management decision to launch *Socrate* at the same time at the TGV North (Paris-Lille) on 1st April 1993. System design had to be rushed. This decision reflects SNCF’s historical success and, in this case unjustified, confidence in the introduction of further price differentiation at the same time as opening a new TGV line.

This new principle of differentiated pricing assumes that passengers will modify their buying and travelling habits so as to bring higher profits, particularly from the TGV network; and it still maintains cheap fares (at certain times) so as to fulfill its public service mission. This seemed the ideal solution for SNCF. As Belobaba [38 p64 emphasis added] remarks about air yield management: "(it is) a pricing strategy developed since deregulation so that established airlines can at least appear to be competitive in price with the new entrants.
and might even be able to fill otherwise empty seats with stimulated demand". By maintaining some cheap fares, it seems that French Railways also saw the importance of appearing to be competitive, but in a situation of internal competition between all of its own trains, particularly the TGVs and the classical trains; whereby the original intention of yield management was for big US air companies to protect themselves from intramodal competitors.

5. SNCF information systems strategy

As a result of the adoption of this new pricing principle and control mechanism, a complex technological system, as well as a transformation of the organisation became necessary. The new computer networks and management techniques required large-scale data collection in stations and distributors such as travel agents. Global distribution systems in the service sector are a technological response to a commercial problem (capacity management) and a financial problem (profit maximisation). In the air industry, computerised reservation systems played a key role in the deregulation and the management of fluctuating prices and routes. The CRS strategy adopted by SNCF fits in with, and contributes to, deregulation. It can be summarised as follows:

- Socrate and its origin in Sabre;
- a global distribution system which must optimise the commercial and financial yields, in a context of intersectorial competition (air, rail, road), provoked by and contributing to European and national deregulation;
- a database management system centrally controlled;
- which manages the complexity of a fluctuating demand, related to the variability of prices through yield management techniques;
- real time information on marketing policies and fare structures of competitors.

5.1. Yield management techniques

The reason why SNCF's new price structures became incomprehensible to staff as well as passengers is the complexity of yield management techniques. Yield management techniques aim to know, control and predict demand, as well as manage capacity and control costs according to this knowledge. It combines differentiated pricing, profit maximisation and quota management. It balances under- and over-capacity using customers' sensitivity to prices. It determines the number of seats per train (quotas) which are discounted so as to maintain maximum profits from the normally priced seats. These quotas can be determined dynamically: they are revised continuously according to real time demand until then. Through the analysis of past statistics, comparisons of past and current demand so far, forecasts based on current demand, and other statistical techniques, the aim is to work out the ideal point at which a customer who does not get a discounted fare either transfers to the higher fare or to another train at the same price. The aim is to alter travelling behaviour and was perceived as an obscure and unfair constraint by passengers since it clashed with long-established practices. Yield management and optimisation, when compared to the previously used price differentiation where several techniques were simply used in conjunction, represents a fundamental qualitative shift: detailed information is gathered about each and every train throughout the day, the week and the year; information is gathered continuously on seats sold so far, so that the price mix on each train can be modified in real time; each train journey therefore becomes identifiable, accountable, costable and marketable as an individual and isolated product.

5.2. Global distribution system: data accumulation for capacity and profit analyses

Yield management databases and models require certain functionalities in the reservation and distribution system. The yield management system is linked to:

- historical databases (past reservations per origin-destination, per fare paid, cancellations, no shows);
- databases of current reservations;
- databases with characteristics of capacity;
- database on competition.

Information for these databases comes from the CRS, which manages the reservations and holds information on timetables, availability, prices, etc., to which are connected, through the GDS, the points of sale terminals in the stations, the travel agencies, other companies, ticket machines, and the public telecoms network (through Minitel). The yield management system manages quotas and overbooking through minimum and maximum thresholds based on predictions. Models are refined through comparisons between predicted and actual demand, capacity and profit implications. Socrate can handle up to 135 million...
reservations a year since 1995 (particularly after the opening of the Channel Tunnel and the North Paris-Lille TGV), as opposed to 30 million reservations handled by RESA, the previous SNCF reservation system, in 1989. Through the ARISTOTE (Amélioration de la Restitution d'Information, par un Système Transactionnel Optimisé, sur le Trafic d'Entreprise) system, information about past reservations is extracted from the CRS and the demand analysed.

6. SNCF's organisational transformation

6.1. Towards flexible infrastructures and resources

Yield management also transforms transport planning through the resource allocation of freight and passenger trains on a train-by-train basis to match commercial needs. Distribution of resources, decisions about new equipment, infrastructures and investments are now directly related to the results of the yield management. Relationships between commercial, maintenance and operational services are affected. Decision and power relations are transformed in an organisation where traditionally engineers and technicians dominated, and marketing and computer specialists now gain in importance. Resources need to be moved across the rail network. However, this assumes mobility of staff and resources. Staff working on TGV routes have traditionally been seen as the elite of SNCF. At least so far, classical trains have had their own resources and staff. There are fears of the most profitable lines being allocated more and more resources. These changes intensify the rivalry between high-speed and classical trains, and relate to issues of regional accessibility and development, public service and national identity, issues already described above.

Other affected areas are the relations between purchasers and suppliers and the centralisation of decision-making. The electronic network enforces a concentration of financial, technical and commercial means, a focus on 'core' activities and the outsourcing of periphery tasks such as property management, maintenance, etc. There is also a process of rationalisation and specialisation of the distribution network, with points of sale in smaller stations curtailed to match demand and the growth of the hubs. In terms of human resource allocation, there is loss of sales jobs and the setting up of automatic vending machines [39]. Inspection staff may be replaced by more intelligent check-in systems. Job flexibility through standardisation (all sales staff to do the same job everywhere and anywhere) and deskilling (the computer now encapsulates route and fare knowledge), work intensification (through automatic monitoring of sales transactions) and casualisation of labour (e.g. part-time workers for peak periods) are labour issues and SNCF employees have gone on strike about part-time work [40].

6.2. CRS and the restructuring of the transport sector

The new competitive environment explains SNCF's technological and strategic choices, as well as its alliance with the American group (the contract for joint further development of Socrate between SNCF and AMR Corp. runs until 2007). American Airlines was also to gain experience in the European transport industry; SNCF was getting the most suitable product in existence, as well as owning the first European rail CRS and gaining the possibility of selling the system to other rail companies. The restructuring of the US air industry into hubs and spokes resulted in a split of the market between firms, with fewer and bigger 'trunk' companies occupying the 'interhub' market, and local companies left with the smaller and less profitable routes between the hub and the spokes. A similar restructuring of the SNCF network seems unavoidable. For instance, coach companies may compete for profitable 'hub to spokes' traffic, to the detriment of less busy routes.

Industry restructuring is facilitated by CRS. Through the identification of the profitable market segments, CRS provide leverage to competing firms, whilst infrastructure costs ('sunk' costs) are being detached from operational costs, so that individual market segments can be made exchangeable. However, intermodal competition between road, air and rail on hub-to-hub segments could require an arbitrage in terms of profitability, accountability and fair competition. This could include other costs related to safety, traffic congestion, pollution, quality of life, equal access to transport and fiscal harmonisation [41], all issues of growing concern in the current political climate.

7. Conclusions

This article shows that understanding the reasons for the implementation problems faced by a complex system such as Socrate is only possible through an analysis of many different facets, including market, economic, political and cultural factors (Table 2).

- The technical problems were found to be related to
the more complex nature of rail market operations (and coach for Greyhound) when compared to air transport markets.

- The economics of US and European air and rail transport differ in terms of intermodal and intramodal, as well as national and pan-European competition, and liberalisation measures vary amongst European states.

- Politics was an important element in the opposition to pricing policies interpreted as forcing passengers onto the more expensive TGVs to the detriment of the ‘classical’ national regional lines, and leading to the desertification of peripheral zones. Other related political issues are pollution, fair competition, fiscal and social costs and equality of access to transport.

- Cultural aspects were apparent in the view that the national rail network would be weakened if split, and that deregulation ignores the cultural and public service differences between countries. Cultural issues also became evident in the rejection of new pricing mechanisms by SNCF passengers. Socrate was perceived as enforcing unfair changes in travelling behaviour.

- Organisational changes such as a shift in power relations and in the relative importance of certain professional groups (from engineers to marketeers and computer staff), deskilling and work intensification, were seen to be related to the introduction of Socrate.

### Table 2. Summary of contextual factors influencing Socrate implementation

<table>
<thead>
<tr>
<th>Market</th>
<th>Rail operations more complex than air</th>
</tr>
</thead>
</table>
| Economic        | Intra and intermodal competition in Europe  
|                 | Cost of high speed trains infrastructure |
| Political       | Different national liberalisation regimes  
|                 | National and regional development issues  
|                 | Pollution, social costs, complementarity |
| Cultural        | National identity and cohesion  
|                 | Public access to transport  
|                 | Organisational changes and SNCF public mission |
| Information     | Yield management  |

All these points illustrate the fact that implementing systems goes beyond simply dealing with technical issues. Contextual factors are interrelated, evolve rapidly and unpredictably, and it is difficult to state whether one is more influential than the others and to assess their relative importance. More significantly, it is clear that in transferring a technical solution from one context to another, SNCF was drastically underestimating the difficulties. Expecting technology to offer strategic solutions is simplistic. Technical solutions are not neutral, they carry with them assumptions about the context, and they interact with contexts. One important contextual difference in this case was that deregulation affects more complex and multiple transport sectors simultaneously in Europe, unlike the US air deregulation which had an impact on national intramodal competition only.

After the initial technical difficulties, Socrate system bugs were corrected at the rate of 800 a day during the following months, and the system was fully implemented on the new TGV Nord route, as planned, and on the Channel tunnel Eurostar service. On the rest of the SNCF network, the system was heavily modified: many changes were made to simplify and clarify the dreaded unique ticket and the pricing tactics in order to respond to public pressure. Public relations were drastically improved and SNCF now consults widely and consistently passengers’ associations and the general public, for instance by running a large-scale passenger survey in the spring of 1996 [42]. Sensitive pricing decisions keep being made such as widely publicised fare reductions during non-peak periods [43], and even allowing passengers to board TGVs without reservation [42] which seems to go against all that yield management stands for.

However, yield management software is still in use - even if it is not fully applied yet - and SNCF is developing expertise in yield management software logic and programs, and is accumulating some travel and customer data. The problem may be seen by some as one of marketing and public relations, since passengers are enticed into new buying and travelling patterns, Socrate will enable SNCF to significantly increase its marketshare and become the leading rail transport company in Europe, as firstly intended. This view identifies only one aspect - customers’ cultural habits - as the obstacle. It neglects many other contextual factors. For instance, it overlooks what other European air and
rail companies may do, how European, national and regional development policies will evolve, what emphasis various governments will put on road programmes, what influence environmental groups may have, how national differences may affect travelling, how distribution in the travel and tourism industry will evolve, etc. It is impossible to bypass complex contextual factors, to anticipate reactions to systems, and to predict exactly how market structures will change. And it remains to be seen whether Socrate can be used to successfully implement an ambitious pan-European business strategy in the transport sector.

8. References


