INCREASING RAIL DEMAND BY IMPROVING MULTI MODAL INFORMATION AND TICKETING – RESULTS OF THE *NIGHT&FLIGHT* CASE STUDY

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ABSTRACT

Long distance railway transport is more energy efficient and generates fewer environmental impacts that flying and automobile travel. One strategy for increasing rail use is to replace flying and driving by introducing high speed rail systems and other rail service improvements; however, even with these improvements rail travel may take too long for certain trips. Therefore, another strategy is to increase the use of rail for at least part of a trip; for example, by replacing a short-haul flight. This could be done by improving intermodal connections (e.g. flight to train connections at an airport) or by using rail on the outbound trip and air on the return trip (or vice versa). In 2005, *CityNightLine*, a European night train operator, and Swiss International Airlines developed a product that combined a night train trip with a flight. This product provided an ideal opportunity to evaluate the socio-institutional barriers towards intermodal journeys because it eliminated the physical transfer (there was no mid-trip transfer from train to plane). The research consisted of performing user and non-user surveys to obtain information about the combined product. This information was used to evaluate the socio-institutional barriers to intermodal transport using a new product adoption structure developed by Rogers. The research found that an effective Internet-based multi modal transport information and reservation system is needed to successfully increase rail travel. This system should provide accurate and complete information about all travel alternatives in a simple package and should enable customers to purchase a single ticket for the entire trip (including local public transport). The paper includes recommendations for further research.

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1. INTRODUCTION

A key strategy for reducing energy use and climate change is to shift long distance passenger traffic from air and automobile to rail. European railways are developing and implementing many programs and products designed to increase railway trips. These can be broadly defined into three approaches: first, increasing the number of train-only trips; second, increasing the use of long distance passenger rail on intermodal trips (e.g. combined air-rail); and, third, providing the possibility of using rail for travel in one direction and an alternative mode (e.g. air) for travel in the other direction. [*1*]

The most common approach is to implement programs designed to increase the use of passenger rail for entire trips. This is illustrated in Figure 1 as mono modal transport. The most well known program is expanding the high speed rail network and increasing HSR service. This approach includes infrastructure improvements as well as forming strategic alliances (e.g. Railteam-Alliance – www.railteam.eu), changing regulations and making institutional changes to encourage the use of both traditional and high speed rail. [*2*]

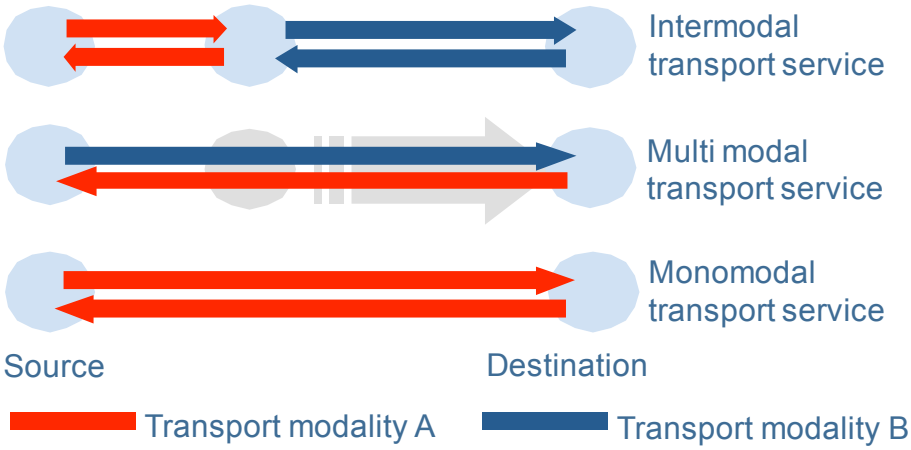

Figure 1: Forms of transport services; Source [*1*]

The second approach for increasing passenger transport by rail is to implement strategies for improving intermodal connections that enable passengers to use rail for at least part of their trip. This is illustrated in the bottom section of Figure 1. On the local level examples of this strategy are Park & Ride or bus feeder systems. On the long distance level examples include Amtrak's feeder bus systems and combined air-rail programs, e.g. Lufthansa's combined ticketing program and Switzerland's railway station check-in/baggage handling system. [*3*] [*4*] [*5*]

The combined air-rail intermodal transport services have been available for many years, however they require significant infrastructure investments (e.g. building rail stations in airports) and relatively high operating costs (e.g. luggage security and boarding pass control). Furthermore, the market demand for these services remains less than expected. [*6*] [*3*] The third and latest approach for increasing passenger transport by rail is to combine a long distance rail trip in one direction with use of another mode (e.g. a flight) in the other direction. This is illustrated in the middle portion of Figure 1. In 2005, *CityNightLine*, a European night train operator, and Swiss International Airlines developed just such a product. The *Night&Flight* program combined a night train trip with a flight.

The advantage of this integrated ticketing approach is that it does not require construction of any additional infrastructure; instead passengers can use the existing infrastructure at their origin/destination station/airport. The "transfer" takes place at the traveler's destination. Therefore this approach costs less and reduces the amount of time needed to launch new products.

There are two interesting aspects of this multi modal transport chain. First, on the practical side, it provides a good way to increase rail demand without increasing infrastructure costs. Second, on the research side, it provides a good case study to evaluate the institutional issues involved in long distance combined passenger transport since there are no physical issues involved. This is important because many of the physical problems inherent in intermodal trips have been solved (e.g. design guidelines for intermodal stations), but institutional problems remain in place.

The process of providing a combined product such as *Night&Flight* involves creating a soft alliance between companies. The new term soft alliance is used to describe an inter-company form of cooperation, whereby a combined product is offered that can be characterized by low costs, high flexibility and a high adaptability (e.g. an airline alliance such as Star Alliance). Soft alliances reduce risks for partners since the companies remain independent, capital costs are low and partners do not need to develop new know-how beyond their core business. These factors help keep the combined product uncomplicated.

This research evaluated the *Night&Flight* product to help better understand the institutional problems associated with intermodal long distance train travel. The research goal was to identify institutional changes that could increase the level of intermodal long distance passenger rail demand and thereby encourage innovative and sustainable mobility. While the research was completed in Europe, the authors believe that the general findings are applicable to other countries, including the United States, seeking to improve their passenger railway systems. [*7*]

The next section of this paper outlines the problems and potential for intermodal rail, Section 3 describes the *Night&Flight* product, Section 4 presents the research methodology, Section 5 presents results of the user and non-user survey in terms of Rogers' product adoption framework and Section 6 presents conclusions and recommendations.

2. LONG DISTANCE PASSENGER RAIL AS AN INTERMODAL PARTNER

Many trips could be made using long distance passenger rail for one stage of the journey. This is especially true in cities such as Frankfurt, Newark and Zurich where long distance and high speed rail lines provide direct access to airports. If it were easier to make intermodal connections it would be possible to substantially reduce the number of short-distance flights - the most inefficient type of flights from a costs and environmental perspective – by revising schedules and equipment. As more cities in the US and elsewhere build or improve airport railway stations, the recommendations developed in this research can help planners provide more successful connecting passenger rail service. [*8*]

A successful intermodal transfer involves both a physical and an institutional transfer. The physical transfer is the physical process of moving from one vehicle to another vehicle, the institutional transfer is the transfer between different service providers (the institutional transfer is made visible in the need for a different ticket or transferring baggage yourself). For example, a transfer at a hub airport between two flights on the same airline involves only a physical transfer while a transfer from an airline to a railway normally involves both a physical and an institutional transfer.

The problem of improving physical connections between different modes is well recognized [*9*] [*10*] [*11*] [*12*] and innovative intermodal stations and terminals are being built throughout the world. [*13*] Furthermore, on the local level railways and other transport operators are exploring new strategies for making the institutional connections between modes easier. However, on the long distance level there are still many institutional problems that discourage people from selecting intermodal trips that could result in lower energy use and fewer environmental impacts. [*14*]

The lack of attention given to improving institutional connections has a long history. Generally transport operators have focused on developing competitive instead of cooperative products. According to Givoni and Banister "Most of the transport literature only looks at mode alternatives in competition with each other, rather than exploring the potential for cooperation". [*15*] A good example is in the area of air-rail cooperation. In spite of the fact

that attractive air-rail cooperation could offer a very attractive product for travelers and help improve transport sustainability by shifting passengers from air travel to rail, there are few examples of institutional connections between airlines and railway operating companies (e.g. through ticketing) and these examples are not meeting expectations.

While it is important for different transport modes to compete with each other by offering products that take full advantage of their own specific benefits, these benefits could also be used to create marketable cooperative solutions. Instead of creating combined products most companies only provide a single mode or services from a single company, forcing passengers to make separate (institutional) arrangements for multimodal trips. It is interesting to note that freight delivery companies like Federal Express offer truly multi modal transport chains to their customers, but this is all done within a single institution; the customer is completely unaware of the mode of transport.

It is much simpler to focus on *either/or* solutions rather than *as well as* solutions. Therefore industry and transportation science were focused on this path until now. But natural systems clearly show the benefits of increasing diversification. [*16*] And, what is true for ecosystems is also true for transport systems; a well functioning multimodal transport system is much more robust and effective than a monoculture. [*17*]

3. *NIGHT&FLIGHT* PROGRAM

The *Night&Flight* program was launched by *CityNightLine* (CNL) and Swiss International Airlines in 2005 and is still available.[1] The program enables passengers to purchase combined transport services, consisting of an overnight railway journey to a destination and a daytime flight back (or vice versa) as a complete package from a single source. This makes it possible to benefit from a bundled multimodal product (one booking transaction, one price), on selected routes. Figure 2 illustrates the *Night&Flight* routes. The CNL sleeper car classes are shown in Figure 3. In economy class passengers have a single bed in a private compartment with sink and share a shower and rest room. In deluxe class passengers have a single bed in a private compartment with sink, shower and toilet. These can be combined with Swiss Economy or Business Class flights. Depending on which combination is chosen, there are four fixed prices ranging from 299 EUR to 499 EUR.

[1] http://www.citynightline.ch/nachtzugreise/view/schweiz/angebote/night_flight_ch.shtml - website address for information on Night&Flight (German only).

Figure 2: Available connections for the *Night&Flight* product; Source: [*18*]

As outlined below, the research effort included making passenger surveys of both users and non-users during 2006. The *Night&Flight* program was designed to attract business travelers. Business travelers are one of the most important groups of travelers in terms of size, capacity and revenues. [*19*] [*20*] In Germany they constitute about 30-40% of the trips, but generate 60-70% of the revenues. [*21*]

Business travelers generally do not consider using rail for long distance trips since day trains are simply not time competitive with air travel on these routes. Therefore, in the long-distance market, railways lose a target group known for its willingness to pay higher fares and for traveling more frequently than non-business travelers.

While normal train service is generally not attractive to highly time sensitive passengers such as business travelers, night trains with sleeping cars could be attractive to these customers. The first advantage is that night trains enable travelers to multi-task: traveling and sleeping at the same time. [*22*] [*23*]

The second advantage is qualitative. Night trains generally arrive in center city stations making early morning meetings possible. They are less impacted by weather-related delays than flights. They enable passengers to arrive relaxed and well rested in contrast to stressful early morning airport trips. Taking a night train on the return trip provides passengers with less time stress at the end of the day (e.g. less need to end meetings in time to get to the airport) and enables passengers to enjoy a relaxed dinner in the city before boarding the train. [*24*]

The advantages of night trains must be weighted against the increased travel time, but in many cases combining an overnight railway connection with a flight in the other direction offers real advantages over round trip flights or train journeys. While it is possible to book night train/flight trips by purchasing a one way airline ticket and a one-way night train ticket separately, this is a time consuming process and often one-way airfares are much higher than round trips. The *Night&Flight* product provided a combined air-rail ticket that could be booked and purchased in one step.

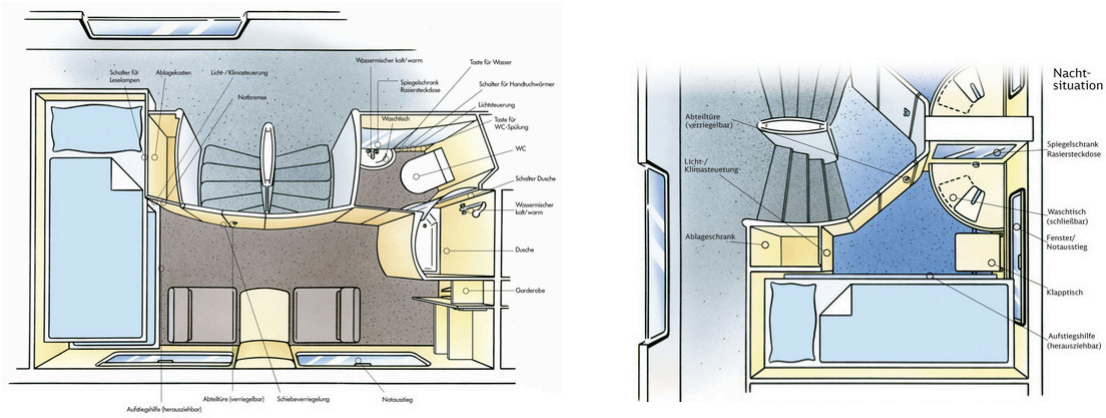

Figure 3: Sleeper Classes of CNL, Deluxe (left) and Economy; Source: CNL

4. RESEARCH METHODOLOGY

The *Night&Flight* product provided researchers with an excellent opportunity to investigate some key barriers towards increasing intermodal rail trips. The research was structured as a market research evaluation of a new product. [*7*] The new product was the combined air-rail service. This section outlines the methodology followed in completing the research.

4.1 Business Traveler Mode Choice Decisions

The study focused on business travelers since they are a key target market in terms of size, capacity and revenues. The mode choice decision for long distance business trips has historically involved either very limited or no consideration of alternative transport modes. [25] In some cases this is because there really are no feasible alternatives (for example on intercontinental trips), but in others it is due to habit. However, business travel decisions, like all travel decisions, are changing with increasing exposure to alternative travel information (via Internet travel sites), the desire to reduce travel costs and growing recognition of air travel's high environmental impacts. [*2*]

The Internet has made it easier to obtain information about travel, increased the range of travel choices available and has provided improved market transparency. However, these last two effects refer mainly to the air transport market (e.g. sites like Expedia). Information about travel products in the quasi-monopolistic railway market is also available (and tickets can be purchased) on line, but an independent integrated multimodal comparison with air transport alternatives is still not available.

In summary, today's Internet-based travel information and booking procedures have replaced the old bricks and mortar based mono-modal decision-making with a virtual mono-modal travel decision-making process.

4.2 Product Adoption Model

After selecting and analyzing the target market, a modified Rogers adoption model was used to identify potential influences for choosing or not-choosing the new *Night&Flight* product among a set of alternatives.

The modified adoption model posits that innovations (new products) spread through society in an S curve, as the early adopters select the technology first, followed by the majority, until a technology or innovation is common. Roger's Innovation Decision Process theory states that innovation diffusion occurs over five stages: Knowledge, Persuasion, Decision, Implementation and Confirmation. [*26*]

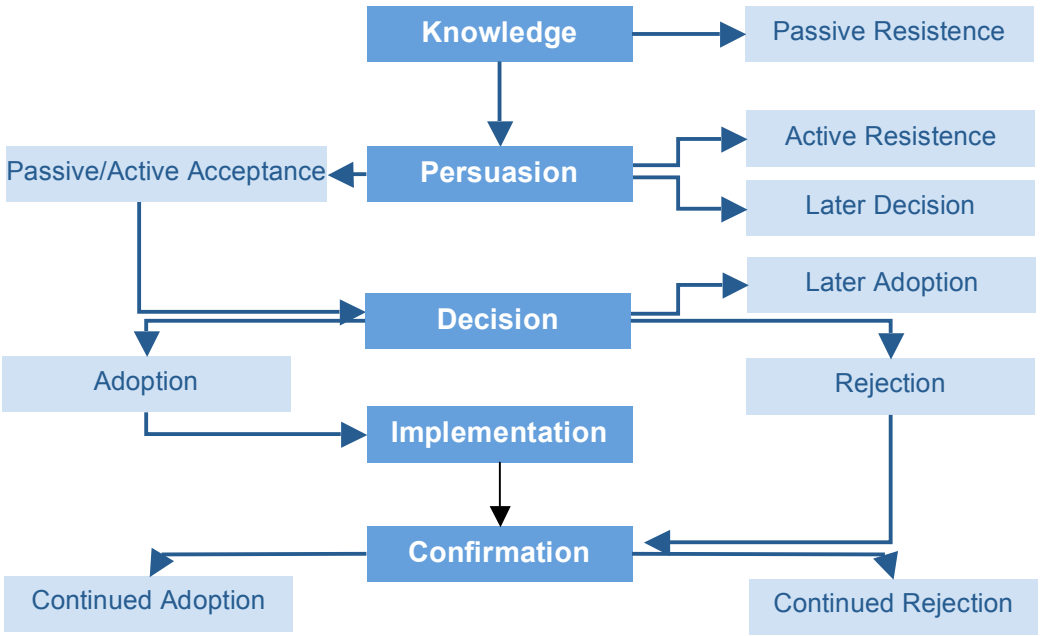

Figure 4: Innovation-Decision-Process; Developed from [*27*] [*28*] and [*26*].

As outlined below information from user and non-user surveys were used with the first four stages of Rogers' model were used to provide a structure for understanding how business travelers viewed the new *Night&Flight* product.

4.3 User and Non-user Surveys

The non-user survey consisted of interviews with 650 persons at the Zurich airport. It was designed to determine why these travelers did not use the *Night&Flight* product and help identify what could be done to attract them to this type of service. The analysis concentrated on the subset of passengers using air transport who were potentially willing to change their transport mode.

The user survey consisted of e-mail questionnaires sent to users of the *Night&Flight* product and was designed to obtain their opinion about the service and to solicit ideas for improving service. Almost half of the first 100 users participated in the survey.

5. ADOPTION MODEL FOR THE SERVICE INNOVATION *NIGHT&FLIGHT*

The research goal was to evaluate how a new travel product was viewed by target customers and thereby help identify strategies for improving intermodal travel alternatives in long distance markets. There is little research available on the specific influence of settings and subjective factors on mode choice in long-distance transport. [*25*] Therefore, this study used survey information from business travelers to evaluate the effectiveness of the new product based on a modified form of Rogers' adoption model.

The modified model consists of four stages: knowledge, persuasion, decision, and implementation. (The full Rogers model includes a fifth stage: confirmation. Confirmation was not considered since it is a later stage in the innovation adoption process.) The exogenous and endogenous influence factors were identified by applying the four stage theoretical adoption model of innovation research to the *Night&Flight* case study data. [*26*] The findings below summarize results of the user and non-user surveys within the Rogers adoption model.

5.1 Knowledge Stage

The knowledge stage of product adoption is the process whereby people learn that the new product exists and is available.

In the *Night&Flight* case, even though advertising for the new product was very limited, ten percent of non-users interviewed were aware of the product. Awareness of the product by non-users who had experience traveling by rail at night was even higher. The use of third party services to plan travel (obtain information and purchase tickets) did not have any effect on awareness of the product. Finally, there was no correlation between the instrument used to obtain travel information (e.g. internet website) and awareness of the program.

5.2 Persuasion Stage

The persuasion stage of product adoption is the process whereby people are convinced to adopt the new product. The surveys found that three product attributes were important in a customer's decision to adopt the new product: relative advantage, compatibility and complexity.

In terms of relative advantage, *Night&Flight*-users identified two main advantages for the new product: better utilization of trip time and reduced trip costs. In contrast to a round-trip flight, the combination of a railway overnight connection and a flight allows a longer stay at the destination, an earlier arrival or a later departure. The railway overnight trip time has a high value for some travelers since it is interruption free, there is more flexibility/mobility space during the journey and it is possible to sleep while traveling. The flight portion of the trip reduces unnecessary layover-times at the destination (so called "scheduled delay"), when attending a partial day appointment, which would be necessary if the roundtrip was made by night-train. Users also stated that trip costs can be reduced with *Night&Flight* by eliminating the need for a hotel stay. However, the most important factor in selecting the *Night&Flight* product was the gain of time.

It is important to note that reducing costs can only be realized by bundling both transport modes into a single product offered by a transport service provider. This is true

even though customers could, in principle, purchase tickets for a night train and one-way flight themselves. The user survey found that only one *Night&Flight* customer would have made this type of combined trip without the *Night&Flight* product.

Within the non-users a surprisingly large number of business travelers (9%), rated *Night&Flight* as a potential alternative to round-trip by air (9% is considered surprising because the actual number of customers using the service was relatively small). As shown in Figure 5, the most important advantage for them was also the better utilization of time (24%).

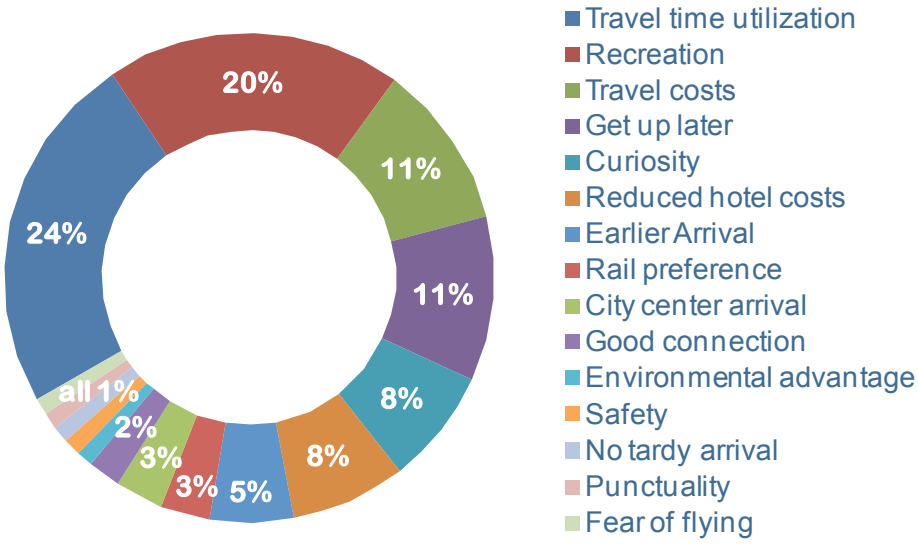

Figure 5: Principle reason for non-user acceptance of *Night&Flight*; Source: [*1*].

However, the majority of the non-users do not seem to appreciate the trade-off between travel time reduction and travel time utilization (i.e. the fact that a longer travel time which can be utilized effectively is more valuable than a shorter travel time that cannot be utilized effectively – i.e. recognizing the ability to multi-task while traveling). As shown in Figure 6, the non-users who did not find *Night&Flight* to be attractive gave reasons indicating that they were focused on comparing advertised trip times (imperative of speed), did not see the night-train trip as an equivalent to a hotel or home lodging, and believed that nights are part of their private time – they worried about unlimited working time.

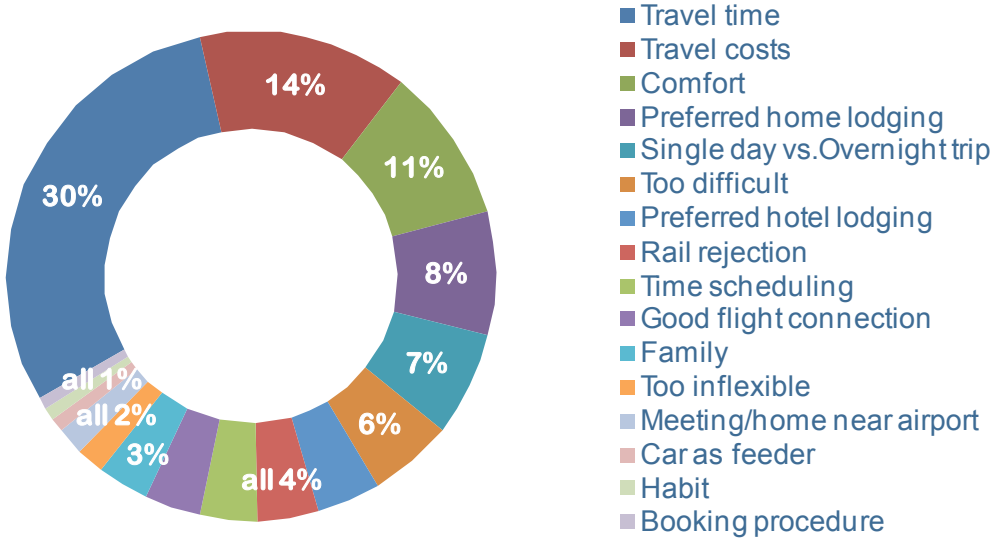

Figure 6: Principle reason for not using *Night&Flight*; Source: [*1*].

The term compatibility in product adoption is used to describe how well the product fits into many different aspects of a potential customer's life (e.g. socio-economic). The most obvious compatibility issue with *Night&Flight* was in the reservation process. In contrast to airline and railway-only booking processes, the only way to book a *Night&Flight* trip was to make a telephone call to a call center, because CNL and Swiss chose to implement the service using the booking tool with the lowest implementation costs. Telephone booking was a key incompatibility from typical travel planning today. As outlined below the service could be improved by providing customers with the ability to book tickets on internet-based travel reservation systems as well.

On the socio-cultural level the longer absence from family and the inability to participate in informal discussions with colleagues due to different travel modes were identified as important incompatibilities. Finally, the ability to drive from home to the departure station and then pick-up the car on the way back for the return trip home was a problem because of differing departure and arrival places in the *Night&Flight* concept.

The term complexity in product adoption refers to how difficult the product is to understand and use. The *Night&Flight* product benefits significantly from the fact that it is a bundle of services from two widely known providers. It is interesting to note that this would not likely be true for a similar product in many regions of the United States where railway travel is no longer well known.

Another benefit of the *Night&Flight* product is that, in contrast to other intermodal trips, no change of systems is necessary during a trip, thus simplifying the process. On the other hand, *Night&Flight* also increases complexity since in most cases a (long) single day trip is being stretched to an overnight trip when changing from a round-trip flight to the *Night&Flight*-offer. Complication increases since more effort is needed in planning the trip, there is increased error risk, travelers need to carry more luggage, and travel at the destination can be more complex (different routes to airport and train station).

5.3 Decision Stage

The decision stage is the final step in transitioning from the intent to act to the actual act. The actual choice of transport mode in business travel depends not only on the traveler's personal attitude, but on significant exogenous factors. The best examples are corporate travel guidelines (90 percent of all German corporations have guidelines for business travelers). In the past these were ex-ante guidelines for planning a business trip and an ex-post instrument of control. Nowadays, the guidelines are often implemented through electronic booking tools, in other words they are an ex-ante instrument of pre-selection.

In addition to these normative restrictions, travelers are influenced by the situational context. While long-term conditions are considered in the persuasion stage, for example family commitments are considered in the compatibility aspect and station access is considered in the complexity aspect, short term situational based factors impact the decision stage of adoption. The most common short term situational factors are a general lack of time and scheduling requirements.

5.4 Implementation Stage

The implementation stage consists of the actual act of using the new product. In this research the goal was to identify who was actually using the *Night&Flight* product.

The user-interviews showed that 60% of the travelers using the *Night&Flight* product would have flown both ways without the product. Most of the *Night&Flight* customers obtain their travel information by themselves and reported that they check travel alternatives carefully before traveling (an interesting difference from typical business travelers). Approximately 90% of *Night&Flight* passengers checked different travel alternatives before departure. The information they used came almost exclusively from the Internet. Most of the *Night&Flight* users learned about the service via the Internet and the most important sources were the communication channels provided by the night-train operator CNL.

5.5 Summary: Recommendations for improving the *Night&Flight* Product

The survey results show that *Night&Flight* predominantly activates a clientele that has a high affinity for night-train trips (i.e. they have used night trains in the past for business and pleasure travel), which otherwise would have chosen a flight-only alternative for this particular trip because of the specific circumstances for this particular trip. Therefore, instead of actually increasing the number of really new customers, the *Night&Flight* program simply increases the intensity of product utilization by existing customers.

The new offer did not succeed in attracting airline customers traveling on business trips to use night-train services because these customers see risks that outweigh the possible gains. However, it would be interesting to test the *Night&Flight* product with leisure travelers as part of a package deal (for example a weekend city-trip with night-train journey, hotel lodging and a flight back) since this market might be more responsive to a new product.

The *Night&Flight* product's visibility was acceptable especially in terms of the low advertising level. A higher level of advertising would be necessary to attract more customers to the program, but the survey shows that once customers know about the program's existence they understand the product since most Europeans are familiar with long distance train service and night trains.

The most significant problem with the *Night&Flight* product was the inability to buy tickets over the Internet. In today's travel market the possibility of Internet booking is an absolute necessity. Unfortunately, from the viewpoint of SWISS, the potential level of client demand is insufficient for developing and maintaining an Internet based self-booking system.

As an alternative to including *Night&Flight* on the SWISS reservation system, it would be possible to outsource the task of bundling the offer to an external mobility provider. The approach would be to sell airline and night-train tickets at special rates to the provider, who then bundles them for the client. The same scheme has been used for many years in collaborations between airlines and tour operators. If this approach is followed the *Night&Flight* product will have followed a path from user-organized multimodality (customers book night train and flight independently) to an operator-organized product (*Night&Flight*) to a provider-organized system. This development path is illustrated in Figure 7. It is interesting to note that this path has been successfully followed in regional public transport agencies, a point that will be discussed further below. [*29*]

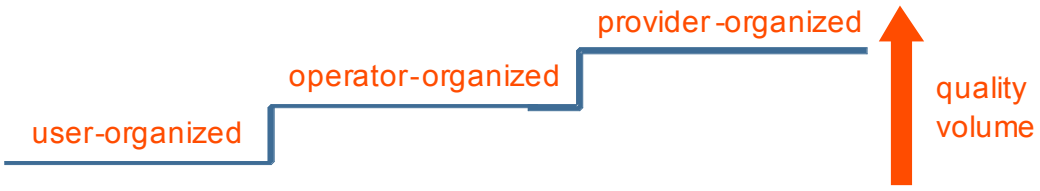

Figure 7: Possible development of *Night&Flight* approach; Source: [*1*].

As a provider-organized product the combined night train/flight product could reach a new level of quality. Product quality could be improved by adding additional airlines which would increase the number of routes offered and could reduce prices. However, even a provider-organized product would require an Internet-based booking system which would be difficult to create with only the night train/flight product.

In summary, the *Night&Flight* product was successful. Customers appreciated the service and non-customers could see clear advantages for the service. However, the lack of an Internet based booking system made it too difficult to use. As outlined in the following section, to be successful the booking system must be expanded beyond night trains, by including the complete range of railway products, especially including shorter connections (e.g. Berlin-Cologne).

6. CONCLUSIONS AND RECOMMENDATIONS

The *Night&Flight* product provided researchers with an excellent opportunity to evaluate the social-institutional barriers impacting intermodal rail travel in general. The key research finding was that better information technology systems could help increase the use of rail on intermodal trips. The research shows that action must be taken in two fields: first, providing better transport information; and, second, providing systems that can sell multi-modal tickets.

The next two sections present recommendations for creating a new type of intermodal transport information system based on the research findings. The third section evaluates how the SNCF's EcoComparateur Internet site compares to these recommendations and the final section outlines several areas for additional research.

6.1 Transport Information Transparency

The majority of transport information systems today are mono-modal, and even mono-company. There are several Internet sites that enable users to compare airline products (ticket prices, travel times, routing) from different companies, but very few that enable users to compare between different travel modes.

The obvious problem with mono-modal Internet sites is that they make it impossible to compare qualities of different transport modes for a given trip. This lack of transparency is a significant problem for railway operators who struggle with popular perceptions that trains are slower and/or more expensive than flying or driving, when, actually train travel is very competitive on many origin-destination markets.

Research has shown that most consumers perceive the costs and travel time for automobile and air travel as relatively lower than for rail travel. Costs are often under estimated due to drivers focusing on out-of-pocket costs (fuel costs) and air travelers being influenced by the heavy marketing of very inexpensive (but limited) air tickets. Travel time is often under estimated by not including congestion delays, airport access and waiting time and the time spent searching for parking. These misperceptions reduce the use of rail on trips where it would be time and cost competitive. [*30*] [*31*] [*32*]

One reason the *Night&Flight* research focused on business travelers is because finding and booking transport services in an easy and transaction cost saving way is very important to them. As opposed to more price sensitive leisure travelers, they usually do not look for a maximum benefit but rather for the first solution that meets their needs given a pre-defined quality level. Therefore, to attract these customers, multimodal transport information and booking systems must be developed that encourage customers to compare alternatives for all stages of the journey. The goal must be to confront the client with the alternative of a train ride though he may be just looking for a low-cost flight.

Therefore, an effective intermodal transport information system should enable users to compare fairly all alternatives for making a trip. Such a system would include transport system access times, have some probabilistic-based system for estimating delays and include all costs. These features could be developed as modules and added to an initial system over time. There are no technical or scientific reasons why these modules could not be developed.

6.2 Multimodal Transport Ticketing: Dynamic Mobility Packaging

The second key problem with multimodal transport is ticketing. The need to purchase separate tickets from different sources for each mode of transport is widely recognized as a significant barrier to multimodal travel. This problem is being addressed in many local public transport systems (particularly in Europe) where single ticketing schemes enable customers to use different modes of transport operated by different companies. However, aside from some limited programs such as Lufthansa's air-rail program (and *Night&Flight*), there are few examples of multimodal single ticketing. [*14*]

This research considered the importance of a single ticket for a multimodal long distance journey, but the lack of ticket coordination between long distance and local public transport is also a significant problem. Furthermore, this problem also has negative

environmental impacts for mono modal long distance journeys (e.g. renting a car at the airport because of the difficulty of obtaining accurate public transport information and complications involved in purchasing a ticket).

The importance of combining local public transport information and ticketing with the long distance travel package increases for multimodal journeys involving two different modes such as the *Night&Flight* program since customers have differing arrival and departure points (airport vs. railway station) in the home region. This makes it difficult to drive to the departure station/airport.

Several transport operators have started to offer products that include local public transport with railway tickets. For example, the Swiss National Railways and Deutsch Bahn both offer a "City Ticket" that includes unlimited local public transport in the destination city. In Germany a concept called *Fly&Ride* is being developed that integrates the ability to purchase local public transport tickets into an internet-based air ticket booking system. *Fly&Ride* enables the customer to purchase a public transport ticket for the local region of the destination airport while booking an airline ticket, thus eliminating the normally time-consuming and complicated process of buying a public transport ticket at the airport. As shown in Figure 8 the program is designed to reduce the access barrier for purchasing a connecting public transport ticket. A pilot project is under discussion. [*33*] [*34*]

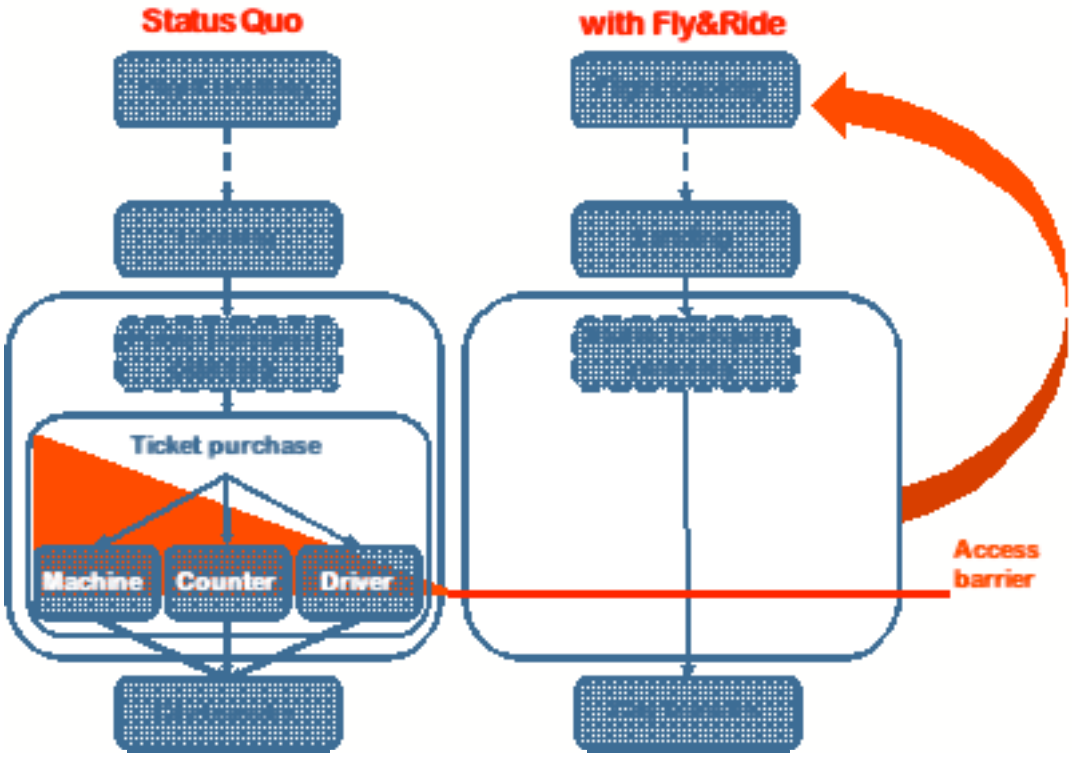

Figure 8: *Fly&Ride* program would reduce access barriers to public transport.

In summary, an effective intermodal transport information system should enable users to purchase tickets for their entire trip including local public transport on both ends of the journey. The components of these systems currently exist; they simply need to be integrated into existing booking systems. While this process will be complicated, there are no technical or scientific reasons preventing this from being done. The ultimate is to meet the ideal of "seamless travel".

6.3 Example multi-modal transport Internet site: SNCF's EcoComparateur

A good example of the first generation of multi-modal Internet sites is "L'EcoComparateur" which was developed by the French railway company SNCF in 2005 (Figure 9). The site

provides information that enables users to compare alternatives of passenger transport by car, rail or plane, and enables the user to purchase airline and train tickets. This site is a successful step into providing easy and quick multimodal travel information.

Figure 9: Result of an EcoComparateur request for the connection Paris-Berlin; Source: www.voyages-sncf.com

While the EcoComparateur does provide multi modal information and booking possibilities, it does not provide the ability to obtain local public transport tickets and the travel information is not fully transparent because it does not include access time and cost to the long distance transport modes.

On the other hand, these criticisms can be relatively easily addressed; EcoComparateur's essential structure shows that effective multimodal travel information and booking systems are possible.

6.4 Recommendations for Further Research

An important goal of this research was to identify socio-institutional barriers impacting the use of long distance passenger rail as part of multi modal trips. The most significant barriers identified were the lack of accurate information on multimodal alternative and inability to easily book tickets for multimodal trips. This paper states that both barriers can be addressed by creating Internet based multi modal travel booking websites.

Consequently, the first recommendation for further research is to examine exactly how improved information and ticket purchasing can be integrated into multi modal travel planning websites. While it is clear that these options can be integrated, it is easier said than

done; and, more importantly, to be successful it must be done well. A complicated website could be even worse than no website.

The second recommendation is to examine how activities that can be completed while traveling can be effectively communicated to travelers. The *Night&Flight* non-user survey found that most non-users did not consider the ability to sleep while traveling compelling. Since multi-tasking, especially the possibility of working on the train, could be a very attractive selling point (in contrast to traveling by air where the travel time is broken-up into many short periods), the non recognition of this benefit is a serious problem for those trying to increase the use of rail. One aspect of the communication problem is considering how this benefit can be communicated on the travel website.

The third recommendation is additional research on improving the physical barriers to increased intermodal travel. While a great deal is known about design of effective intermodal transfer facilities, taking full advantage of the possibility for integrated single ticketing, especially for local public transport, may require physical changes to systems. For example, local public transport systems that use magnetically coded tickets to operate entry barriers may need to provide alternatives for travelers. These changes would be an excellent target market for innovative technologies such as tickets on cellular telephones.

Finally, especially in light of the significant financial problems being experienced by all types of transport companies (e.g. railways, airlines), it would be interesting to consider the potential for separating the marketing and sales of tickets from the actual provision of service, similar to what has been done on the regional level through transport associations like the Züricher Verkehrsverbund (ZVV). [*29*] Under such a system a new agency would specify a level of transport service from all modes of transport, check to ensure quality levels were being maintained and sell tickets. In turn the transport operators would simply operate the service. It would be a huge change, but elements of such a system might be able to help address financial difficulties in transport companies as well as reduce environmental impacts while maintaining market competition.

In summary, the *Night&Flight* research has helped identify ideas for improving multi modal transport that includes long distance passenger rail transport. These ideas are applicable in countries such as the United States where new passenger rail services are being planned and developed as well as in other countries where existing services are being expanded and revitalized. The research clearly shows that combined transport services such as *Night&Flight* are only a first step on the path towards Dynamic Mobility Packaging, which is the customer-friendly bundling of transport services in one ticket.

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