"Development of a MobilityCard by DB AG"

- Risk & chance for development of an innovative product in public transport -

1. Management Summary

Core theme of the analysis is the development and introduction of a "Mobilitätskarte" in Germany, which would be a real innovation in passenger transport market[1].

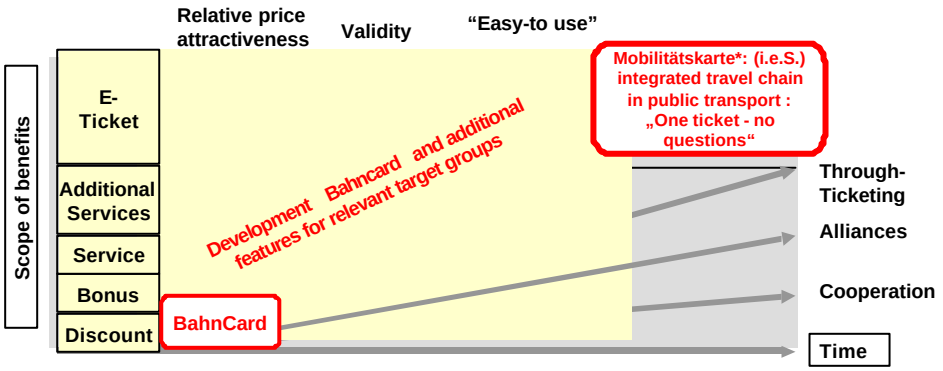
Out of a strategic situation analysis of public versus public transport the profile of a new product is sketched by which public transport would be a real competitive offer to the customer:

This "Mobilitätskarte" is a transparent, easy-to-use and price-competitive system, which allows the customer to be mobile apart from and instead of an own car. It is even a real alternative to an own car in the cities and to a second one in regional areas.

But it is a complex product in a simple shape[2]. So in the background many players with different motivations have to interact and have to find agreements between each other. Also technical problems have to be solved at the interfaces between different transport modes and regarding to a fair distribution of the revenues between different companies. Financial risks are huge.

So conclusion is made, that a "step-by-step" proceeding is the better way. Driver of this process is and should be the DB AG (German Railways), which has best premises for the gradual development and implementation of a "Mobilitätskarte", because it is the biggest public transport service provider and has stakes in other complementary means of transportation as CarSharing or Call-a-bike yet[3]. Last but not least it has a well-known product namely the "BahnCard" which can be the base for the further development.

Migration path to "Mobilitätskarte"[4]



[1] See for an overview over innovation management Hauschildt (2004)

[2] About complexity of demand and production systems in local public transport see also Klein (2004)

[3] It has to be marked that following analysis is handling a real complex subject as well on the side of customers, who represent the whole possible spread in attitudes, incomes, habits, sociodemographic attributes and transport decisions as on the focussed passenger transport market, which is characterised by a whole bunch of companies, interfaces, prices and production structures. On account of this argumentation is focused and concentrating on the crucial drivers, attributes to strategically analyse this really complex field as well on the side of possible customers as on the side of developing an innovative and superior solution.

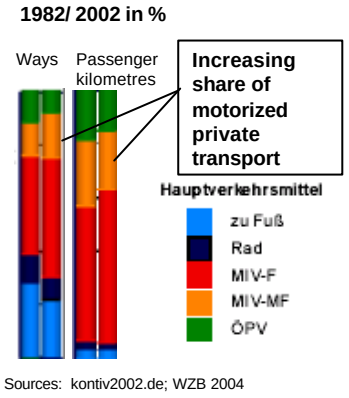
[4] Own draft, fully understandable after reading whole paper

2. The public transport market

The following analysis concentrates on public transport market. Public transport is the alternative to the individual motorised traffic done with the own car or the own motorbike. Public transport offers different means of transportation, which are open for the public like trams, busses, taxis, trains, etc.

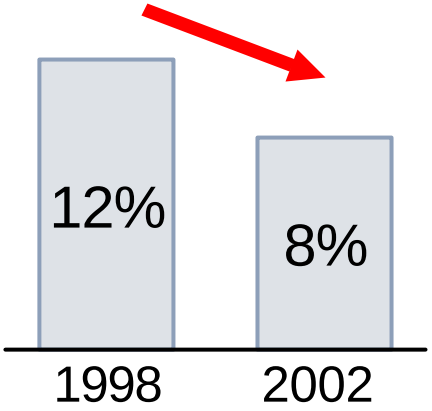
Market share of public transport has declined in the past decades, stabilising in last years on a low level[5]. Workloads are low as well. Further downsizing of capacities is not possible and not wanted, because they are necessary to provide a competitive offer to the customer in terms of availability and frequency.

Share of mean of transportation by ways / passenger kilometres[6]:



Sources: kontiv2002.de; WZB 2004

Share of public transport in passenger transport market[7]:



The combination of low workloads of transport vessels and high costs of purchase and maintenance of them leads to high costs per passenger trip. These costs cannot be shifted in full to the customer since price would be not competitive in comparison to private transport by car. Moreover providing mobility to everyone in our society is a base target of our state; prohibiting prices are not wanted out of social and economical reasons of our society.

One Consequence is, that parts of public transport, especially the local public transport is heavily subsidised by the state. Nearly € 15 billions of taxpayer's money lowers the price for customers of public local transport (ÖPNV) and rail local transport (SPNV)[8].

Workloads are the most crucial point in this game, since a train or bus costs more or less the same, whether it is carrying one or two hundred passengers. So increasing workload is the key to outcome a vicious circle in public transport by which decreasing workloads lead to higher costs and thereby to higher subsidies and mostly also to higher prices, which again make the public transport less attractive. There are two possibilities for basic strategies to easy up this situation by initialising a positive feedback loop and thereby increasing workloads.

On the one hand government can raise car costs by taxes. Economical justification for this is the internalisation of external costs and the adequate charging of individuals with the costs of infrastructure. This would be a

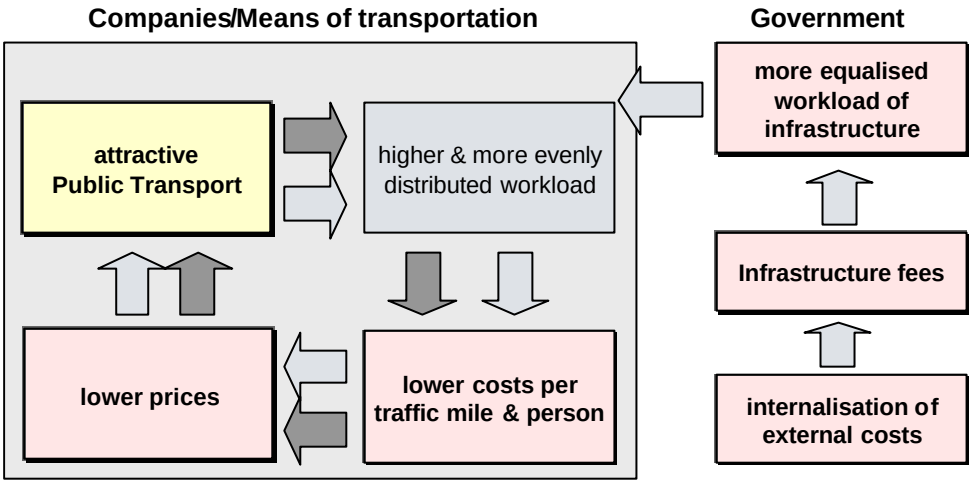
[5] See for a very detailed overview over development in public transport: Werkstattbericht Nr. 25 (1999)
[6] For a detailed analysis of mobility behaviour in Germany see Verkehrsministerium (2002)
[7] Source: "Verkehr in Zahlen (1998-2002)
[8] See for example Rönnau (2004)

"Push-Strategy" (people are pushed to public transport). But here resistances of public in times of increasing petrol and stagnating incomes would be great and end in the statement: "We don't want escape from the street, we want to be attracted by public transport with better products"[9].

So on the other hand public transport has to improve its products and overcome barriers of use. On account of this an innovative new product, which strengthen success factors and lower barriers is necessary and has to be developed. This would be a "Pull"-Strategy, which –if successful would prepare the ground for the "Push"-strategy.

The ideal case would be, if "Push" & "Pull"[10] would go hand in hand and with combined forces a better supply of public transport would generate lower necessary subventions. Aims of all-important stakeholders could be reached in this way:

Positive feedback loops initialised by an combined "Push" & "Pull" strategy[11]



Initial point of this process has to be an innovative product improvement. DB has to think about, how it can as the core player in the field of public transport support both strategies and thereby become the most important driver in establishing a sustainable public transport, which increase its revenues and margins.

For this a "new" or "upgraded" product is needed, whose comparative benefit attracts former private transport with a unique strategically positioning. But how is the positioning of public transport right now?

[9] See also Verkehrsministerium (2002)
[10] Push and Pull Strategies are defined and described for example in Pöschek (2000), S.8f
[11] Own draft

3. Strategic product positioning[12]

For any innovation, product positioning has to give an answer to the following questions[13]:

- Which product attributes are relevant for the customers
- How do customers perceive the own product in comparison to the competitors' products?
- Which positions are still unoccupied in the market place?

These questions have to be answered to develop an adequate product that fits customer needs and to show the strategic direction for further innovation.

3.1 What wants the customer?

Initial and crucial point of every product development is the question, what kind of product the customers want. So every new feature of a new product has to be measured against additional benefits customer gets by a new or upgraded product.

The question, what customer wants, when he has or want to make a trip is quite easy to answer and empirically affirmed[14]. He wants to:

- Come from A to B,
- As comfortable as possible,
- Mostly as quick as possible,
- For a reasonable and transparent price,
- With the most adequate mean of transportation,
- And last but not least without being forced to think to much about alternatives and next steps he has to do, when changing means of transportation

Because of this wishes relevant product features can be figured out[15]. These are:

- **Speed**: How long is the trip?
- **Availability**: When & where does my trip begin?
- **Comfort & Individuality:** How comfortable & individual is my trip?
- **Price** :How high are subjective costs and willingness to pay?
- **Decision Costs** :How complex is the decision and transaction in terms of mental pressure, possible alternatives, transparent ticketing, etc.?
- **Suitability** (Flexibility): How does the transportation mean fits to the special transportation needs in a particularly situation?
- **Image**: What image products you use have?

Out of these seven relevant product features three of them can be seen as fixed, since they can't be changed in the short run. One is additionally at least partly dependent of the others, namely image:

- **Speed** is fixed by the given infrastructure and the given frequency and availability of public transport.
- **Comfort** is fixed by given transport vessels and their comfort features, **individuality** is a unchangeable feature of public transport, since it is a mass transport mean by definition.
- **Image** can be seen as output of all features and represents the long-time overall benefit of all strengths of a product.

So four relevant and changeable product features remain, where innovation can take place: **Suitability (Flexibility), Availability, Decision Costs and price**.

---

[12] The whole method of strategic analysis for example in Welge (2003)
[13] See L8 / Chart 15 in "Innovation & Technology Management", Steinhoff/ Salomo (2004)
[14] See for example: Bundesverkehrsministerium (2002)
[15] Following factors represent most important empirically validated influence factores made out of different DB intern and extern studies, see for example: Bundesverkehrsministerium (2002)

3.2 Perceived product features of public and private transport with a focus on DB products

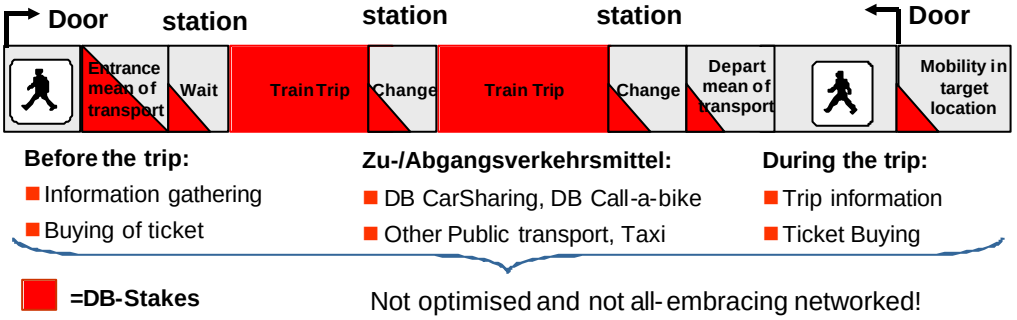
Product features are seldom completely unique, mostly there are substitutes and in the passenger transport sector there is one big and very competitive substitute to all kinds of public transport: the motorised individual transport mostly done by car. Advantages and strengths of car have to be seen in many crucial aspects:

A Car is "Easy-to-use"[16]

- **Availability**: normally directly in front of the door; available, if you have a driver license and a car
- **Speed**: On short or middle distances there are advantages in speed, if there are now barriers.
- **Flexibility**: complex „chains of ways" are possible, mobility in target location is guaranteed
- **Decision Costs**: Easiness to use: standardised handling of car and infrastructure
- **Comfort and individuality**: Package transport possible, short footways and privacy
- **Subjective Costs and willingness to pay**: subjective image advantages of private car

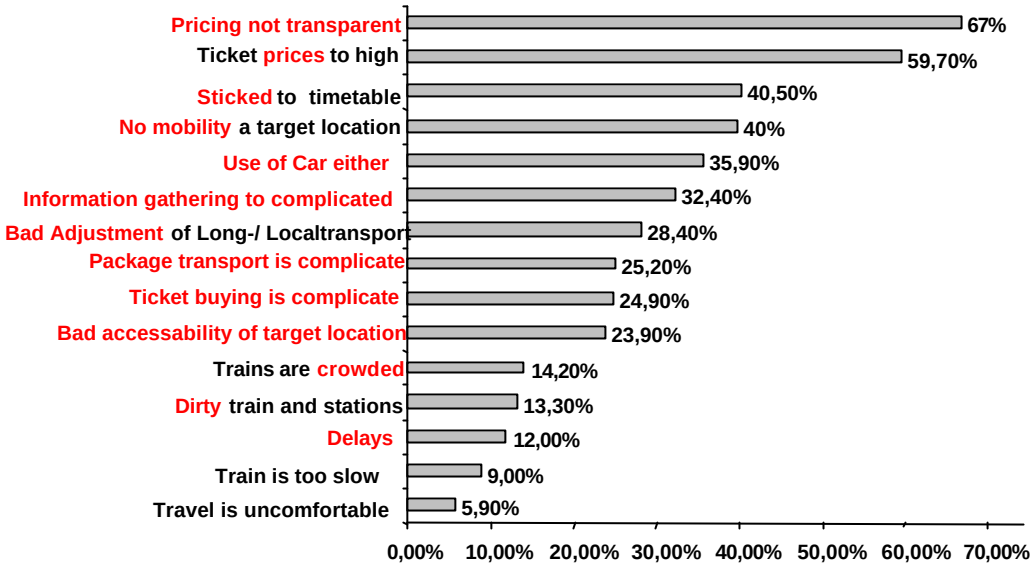
In comparison to that to go by public transport is a really complicate matter. Mostly the travel chain contains a number of different transportation means and according to this mostly many decisions have to be done, which often implies mental pressure:

Travelling with public transport[17]



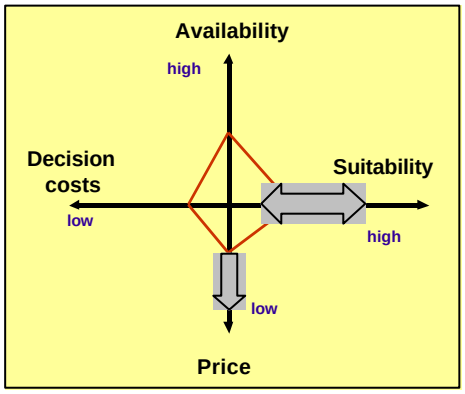
[16] Own draft
[17] Own draft

Restraints to use of public train transport in % (multiple nomination)[18] -

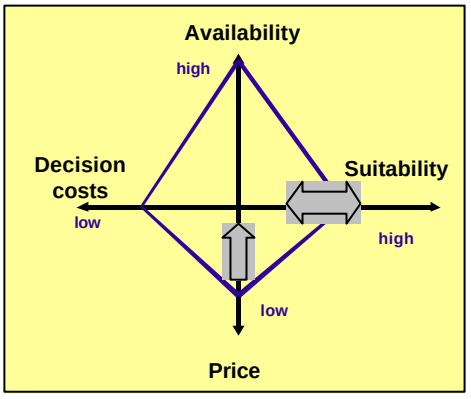


Comparing characteristics of private and public transport substantial strength and weaknesses are apparent:

Perceived characteristics of public transport[19]



Perceived characteristics of private transport (Car)[20]



Sketched here is only an average estimation of the whole group, volume of the diamond is corresponding with the overall benefit for the customer[21]. To visualising the variety of subjective estimations arrows are pinned in the positioning chart[22].

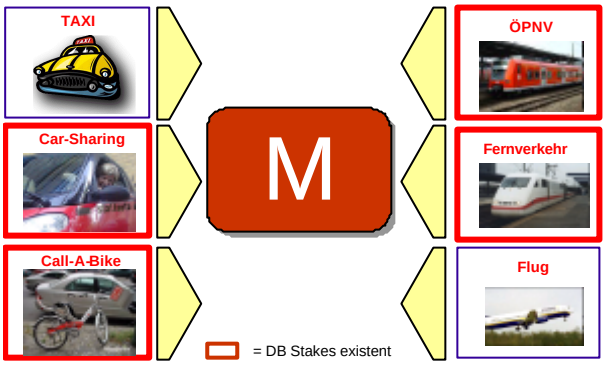
[18] DB Internal Report "Kontinuierliches Berichtssystem 2003" ; Confidential!
[19] Own draft, based on internal and external studies
[20] Own draft, based on internal and external studies
[21] Analysing of customers perceiving of product features and quality of the offers will concentrate on people, who have the choice to choose between public and private transport. This means they have an own car or a car is provided to them by a friend a related[21]. This group of people, which represent most of the population in Germany, the subjective perceived positioning of public transport, especially of local public transport (ÖPNV & SPNV) can be sketched on a positioning scheme. The individual perceived estimation can differ from this considerably for example in dependence of: Which kind of car is possessed in a household (Price); When this car is available for a specific person respectively how far away entrant points to the public transport system in terms of bus stations, railway stations, etc. are (availability). How often means of transportation have to be changed and how good experience with common interfaces like ticket automates are (Decision Costs); which kind of transportation mean is in a particularly situation optimal. A trip to IKEA makes a transported or van the ideal choice, meanwhile a party is best departed by taxi and to reach a football game the bus or underground is the best choice.
[22] **Availability** is a unique killing feature of a car as it is mostly not far away. Another comparative advantage of a car are very **low decision costs** when planning a trip. You don't have to think about a chain of transportation means with different price systems and interfaces at the changing points,

3.3 Which position is still unoccupied in the market place?

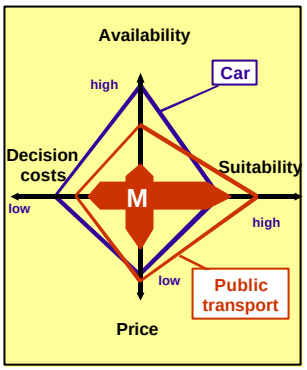
After this disillusioned analysis of comparative strengths and weaknesses question arises, what can be done to support a "Pull-strategy" and to offer a "new" attractive product to raise workloads and to prosper? How to take a unique position in market, with which you often thrill the customer more, than his own car does? The nearly perfect solution would be a product by which one you could shift comparative weaknesses of public transport to comparative strengths respectively to comparative innovation advantages (CIA).

Core of this product would be an integrated all-in-one offer to the customer, which would vanish public's transport weakness for the biggest part: It's an ambitious but not unrealistic…

Vision: An integrated "Mobilitätskarte" enables customers to "easy use" the most convenient mean of transportation in every particular situation[23]…



…for a competitive price. And thereby they have a real alternative to the car![24]



Summarised, the "Mobilitätskarte" would have the effect, that a product-bundle, visualised and operationalised in the "Mobilitätskarte", would give the customer a mobility advantage in many specific situations by offering the respectively best benefit for money. So he would buy it and often buy it even instead of a second car in the household.

To generate this overall benefit key features of the "Mobilitätskarte" have to be:

- You get a substantial discount on all public means of transportation, taxis and car rentals included (**Price**)
- The overall price is cheaper and the mobility benefit is higher than a second car for most households (**Price**)
- There is a through-ticketing. One card -respectively a ticket based on that card- fits all and at least there is no time to spend to handle login processes at interfaces like ticketing-machines. (**Decision Costs**)
- You can always choose the best mean of transportation you need in a particular situation, -a van for IKEA, a taxi for a party-, to reasonable costs (**Suitability, Flexibility**)
- Taxis, Bikes & Car Rentals are integrated in the concept and bridge the last mile to the customer (**Availability**).

---

you just go to your car, start it, drive (sometimes with a navigation system) to your target location and stop it. So it is really **"easy-to-use"**.
Last but not least **perceived costs** of car use are lower then the real costs are. This is due to the fact that most people only see the direct variable costs of trip for them, namely the petrol costs. Cost of purchasing and maintaining a car are not taken into consideration since they bought it either way. These costs are sunk costs; purchase was caused by unique features of a car like image (status symbol) and availability. Unfortunately prices of public transport seem subjectively quite high due to this fact.

[23] Own draft

[24] Own draft

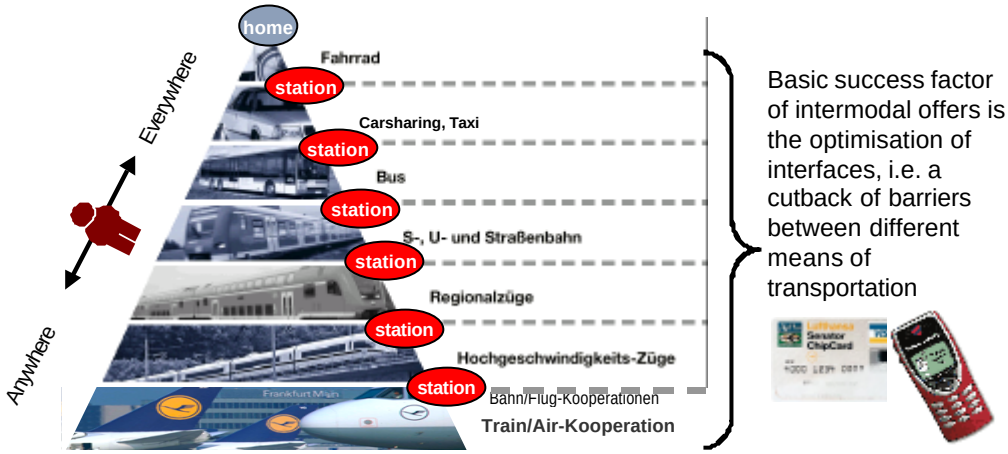
4. Possibilities of innovative action – "Mobilitätskarte"

4.1 The concept

From the view of DB "Mobilitätskarte" or MobilityCard is a quite ambitious term, interpreted differently by different people. In its most ambitious specification it describes a solution or more enthusiastic worded an innovation, which offers at least in parts a superior mobility to the customer apart from the use of the own car. In a more down-to-earth version a practical product is meant, by which perceived mobility of the customers is increased by adding extra features to a transport product[25].

Crucial to this product is the optimisation of interfaces in public transport to lower the critical barrier of high **decision costs**:

Integrated solution – interfaces are conquered easily – "Mobilitätskarte" / E-Ticketing as solution?



4.2 Barriers to implementation of a "Mobilitätskarte"

A development and implementation of an overall solution is facing many barriers, as well regarding to the development as regarding to implementation[26]. Since the product is a complex solution for a complex problem and has to be sold to a complex variety of people following barriers have to be overcome:

4.2.1 Technological barriers

- Before your trip starts you have to get information about best alternatives you have, to go by public transport. For this smart solutions have to be given to ease up the way for the customer to be conveniently informed. Since possible customers are different in their affinity to techniques, different possibilities have to be offered based on an overall database, which has to be maintained and administered.
- During the trip most customers have to change means of transportation. When changing a mean of transportation during a trip they need information at the interfaces about next steps to do: Where to go and where to rest? This information has to be provided in an easy understandable way. Which technological solution has to be chosen?[27]

[25] Many ServiceCards connected to the purchase of a new car call themselves "MobilityCard"
[26] External and internal barriers to innovation are quite important for all innovations and innovation processes; see also: Arthur De Little (2004) or Kocemir, S. (1996), S. 47ff
[27] Should it be an electronic one like PDA and / or Handy? Or a more traditional one likes a printed-paper with all information on it? Or both? For future development of mobile data services see also Arthur De Little (2004C)

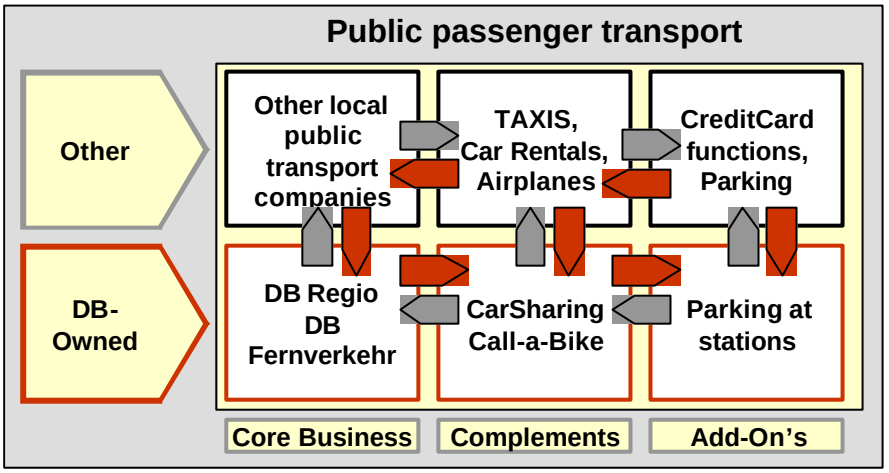
- You nowadays have mostly to buy a new ticket at interfaces of your trip at a counter or you have to deal with a –sometimes- unknown- ticketing automate. Here a "**Through-Ticketing**" would be the most convenient solution. One ticket fits all and legitimates the whole trip. But this implies further problems: What kind of ticket should it be? Which technological solution fits best?
- And after all this implementing a "Through-ticketing" implies, that the money, customers have paid for the trip, has to be gathered at one institution or company and has to be distributed between the suppliers. Which technological solution has to be chosen to handle this problem[28]?

4.2.2 Organisational barriers

Public transport in Germany is handled by thousands of different companies. These are private and public ones; a couple of them are both. Furthermore some of them get subsidies by the state, others don't. Some of them are combined in regional alliances for local public transport; others are completely standing on their own like taxi drivers:

- You are confronted with different pricing-systems, production-systems, organisations, motivations and so on. Thereby you have to deal with thousands of sub-contractors and find a fair agreement with each one of them.

Complex Interaction at interfaces is evident[29]



- There has to be one leading company or institution, which is administrator of the whole process and product. Deutsche Bahn as the main actor in public transport would be the best candidate out of obvious reasons: Know-How, market-Awareness, market presence, available accounting systems and many more. But acceptance of this would be quite low. Among other reasons this is because it would maybe add monopolistic power to a company whose long-lasting monopolistic power has been just smoothed out in the last years by deregulation and liberalization. Of course monopolistic power could be controlled, but the fear is there.

4.2.3 Customer barriers

Customer would be confronted with a really new product:

- Since stickiness to this product would be raised enormously by buying the "Mobilitätskarte" for a year or another defined time range, he would have to pay a reasonable but high price for "mobility for strongly discounted rates" in return. As long as he still has a second car in the household,

[28] Delayed introduction and initial chaos of the "Maut" implementation is a warning not only to the state.
[29] Own draft, arrows should just give an impression of possible interactions. Of course there are more.

which "has to" be used as well, threshold for buying an additionally "Mobilitätskarte" would be quite high.

- Emotionally thresholds have to be taken in consideration as well. New kind of mobility needs changes in behaviour.
- "Technology Handling" barriers are in action as well[30]. Especially if the "Mobilitätskarte" is based on handling new or upgraded technologies, adoption processes take time.

4.2.4 Financial barriers

Last but not least there are financial barriers in many ways, which cluster to a huge financial risk:

- As a huge amount of money has to be invested in interfaces and "one-face-to the customer" technologies, question arises, where this money could come from.
- It's not alone the pure amount of money, which has to be raised. Much more it's the risk, this money is faced with. Nobody knows whether the bunch of barriers -analysed above- can be conquered in a planed matter. There are thousand's of problems to be solved and much more many solutions are dependent from each other.
- Last but not least the cost risk is added by a substantial income risk. Does the customer accept the product and switch to it in a sufficient amount to refinance all investments at least in the long run. Since there are no really transferable benchmarks in the world, it's a risky undertaking. And nowadays neither the Deutsche Bahn nor the state or financing companies really like risky investments.

4.3 SWOT-Analysis of direct implementation of a "Mobilitätskarte" by DB

Summarizing analysis of developing and implementing an innovative "Mobilitätskarte", which as an almost perfect solution "pull" an remarkable share of people from the private to the public transport, we can draft following SWOT:

[30] For future development of mobile data services see also Arthur De Little (2004C)

Small SWOT-Analysis of complete development and direct implementation of an “Mobilitätskarte” by DB

Strengths	Weaknesses
➲ An all-embracing product to the customer ➲ A superior product to an second car in household ➲ additional state support probable	➲ high financial barriers ➲ high technological barriers ➲ high organisational barriers ➲ radical change in customer behaviour necessary

Opportunities	Threads
➲ Better mobility for the public possible ➲ All Products become more competitive ➲ Raising Workloads ➲ Leader in “Mobility”-Services	➲ Big financial risks ➲ Customers change behaviour to slowly ➲ Big deficits in first years ➲ Technological implementation in time not possible

It's obvious that for a private company like Deutsche Bahn this is not really an option. Because of to much and to big technological, organisational and last but not least financial risks Deutsche Bahn has to think about a smart step-by-step migration path towards "Mobilitätskarte", whereby every step has to be based on a dedicated set of requirements:

Classification of R&D Type (ideal case)	BahnCard + (Step by step)	"Mobilitätskarte" (all-in-one)
Probability of (technical) success	high	medium
Duration until readiness for market	short	long
Potential contribution to competitive advantage	limited	high
Permanence of competitive advantage	long	very long
R&D-type	Applic. development	KEY- R&D
Technology stage	Basic technology	KEY- technology

5. Recommend proceeding for Deutsche Bahn

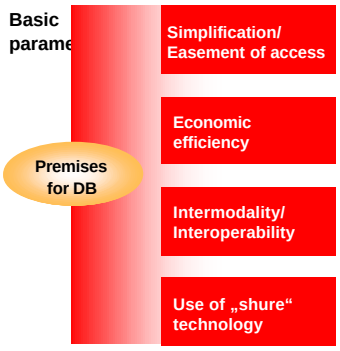
Deutsche Bahn would have many advantages of the „pull"-effect a real „Mobilitätskarte" has to the customer[31]. And moreover, it still has got a product, which is an ideal base for a successive proceeding: the "BahnCard". The "BahnCard" should be the initial point of development of a "Mobilitätskarte"[32]:

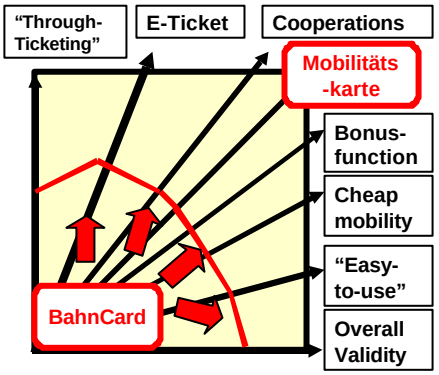
5.1 Strategical direction of future innovation

But risks and chances have to be balanced in every step DB does towards new features of "BahnCard". Restricted financial resources define conditions for new additional features ; a focussed direction of product innovations is necessary[33]:

When the DB earns money with it and surely create additional mobility value to customers[34]…

…it can gradually develop a "Mobilitätskarte" based on the recent "BahnCard"[35].



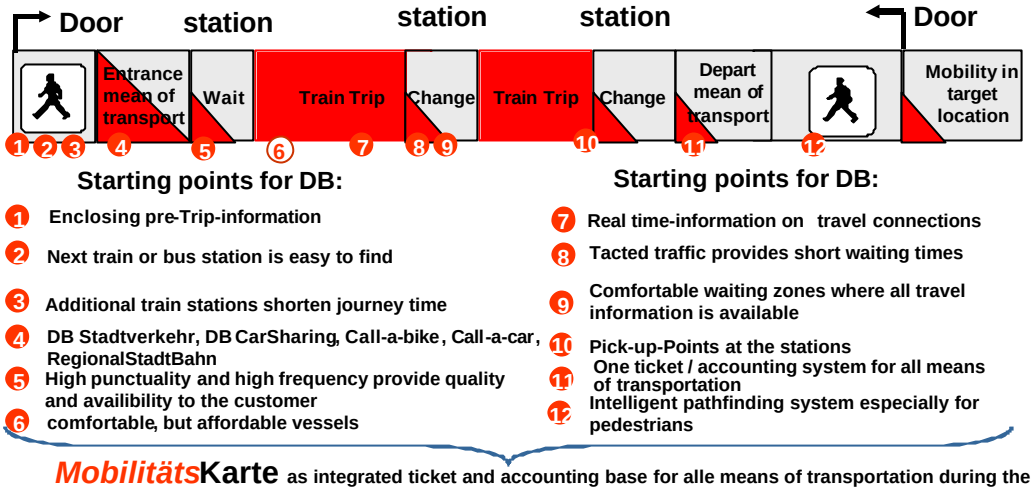


[31] See how to handle the expansion to a new market space in Cahn, Kim (2001)
[32] But It is also important to push marketing activities meanwhile to early reach critical mass of buyers of BahnCard to have scale effects and finally self-enforcing powers in adoption. How to push marketing activities can be seen for example in Bolze (2002)
[33] How innovation processes are in service companies and how to improve can be seen in Arthur De Little (2004B). Another good source for structured innovation processes is Pleschak (1996)
[34] Intern DB Chart
[35] Own draft

5.2 Starting points for internal product improvement

There are many possibilities to do next steps to improve the product "public transport" provided by "Deutsche Bahn". Many of them are developed, some are partly implemented and some are in the developing pipeline yet (see chart above).

Possible Starting points for product improvements[36]



5.3 Need for external co-operation and alliances

As shown above validity of a BahnCard is a crucial feature. As well it is the possibility of getting a discount on as many transport means of transport of an individual travel as possible. Nowadays complete stages of travel chain don't co-operate with Deutsche Bahn as for example taxi companies[37]. Here co-operation has to be sought by DB. Since products of these companies are typically complements to DB products a fair deal should be possible. Agreements with them are the key to make public transport more attractive to the customers and with it market potential will rise.

5.4 State support for interfaces, e-ticketing and bridges over last mile to the customer

Government is interested in shifting demand from private to public transport. As shown above, optimisation of interfaces, e-ticketing and overcoming of last mile to the customer are crucial for success.

Central success factor is the optimising of interfaces[38]

Crucial success factor of intermodal offers is the optimising of interfaces **i.e.** lowering barriers between different means of transportation

E-Ticket / „Mobilitätskarte"

germanwide **uniform technical Standards** to:

- **assure all over the country validity / low barriers**
- lower investion costs by scale effects

Subsidising of local public transport and of rail infrastructure is not sufficient. State has to think about subsidizing of -for example- taxis as well and it has to support investments in interfaces at least in regional areas.

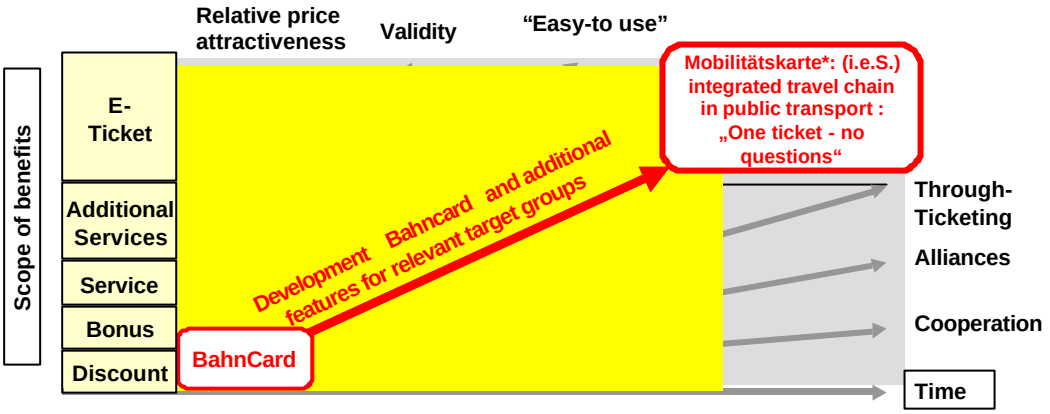
[36] Own draft
[37] Logic refers in a weakened way also to other passenger transport companies like car rentals, other public local transport companies and even airlines.
[38] DB Internal draft

5.5 Occupy definition of "Mobilitätskarte" and establish as <u>the</u> innovator

There is no clear definition of "Mobilitätskarte" yet[39]. A definition of constitutional elements and design of the offer has to be made along travel chains of customers. DB can occupy this innovation area as **the** innovator[40].

6. Conclusion

A step-by-step proceeding is proposed with DB as pacemaker. Based on the well-known BahnCard an evolutionary sustainable process has to be enforced by which relevant product features will be gradually added to the BahnCard[41].



Driver of this development are co-operations and alliances and based on these through ticketing, "easiness-to-use" and a comparative advantage is possible. Since resources are very restricted, a dedicated path in terms of features and investments has to be found out. Finally product is the "Mobilitätskarte" which offers a superior mobility to the customer in sense of: "One ticket- no questions!"

[39] In common understanding it's a mobility ticket valid for all means of public transport of an individual travel chain. But interpretations differ.
[40] See also Cahn, Kim (2001)
[41] For market oriented innovation see also: Clayton (2004)

7. List of literature

- „Arthur D. Little" (2004A); Study "Innovation Excellence 2004: Mit Innovation gegen Stagnation"; available via internet: www.adlittle.de ; 2004
- „Arthur D. Little" (2004B) ; Study „Innovation Excellence in Dienstleistungsindustrien 2004"; available via internet: www.adlittle.de ; August 2004
- „Arthur De Little" (2004C) ; Study „Mobile Economy 2004 - Entwicklungsperspektiven mobiler Datendienste"; available via internet: www.adlittle.de ; 2004
- Bolze, M. (2002) ; „Grundlagen für die Beeinflussung des individuellen Verkehrmittelwahlverhaltens durch Direktmarketing" ; available via internet: http://www.tu-darmstadt.de/fb/bi/ifv/vv/for/publik/S009.pdf
- Cahn, Kim and Maubrogne, Renée (2001) ; "Creating New Market Space" in "Ideas with impact" ; Harvard Business Reviews, 2001
- Drucker, Peter F. (1985); „Innovation and Entrepreneurship"; Harper Business, 1985
- Hauschildt, Jürgen (2004); „Innovationsmanagement" ; Vahlen, 2004
- Klein, Kurt (2004); "Personenverkehr in Deutschland mit besonderer Berücksichtigung des ÖPNV; lecture, available in the internet: http://www.uni-regensburg.de
- Kocemir, S. (1996); „Innovationsmanagement als Herausforderung für mittelständische Unternehmen"; Diplomarbeit; available via internet: www.diplomica.com ;1996
- Pöscheck , A. (2000) ; „Innovation und Innovationsmanagement" ; available via internet: www.poeschek.com ,(2000)
- Pleschak, F. & Sabisch H. (1996); „Innovationsmanagement" ; UTB , 1996
- Rönnau, H.-J. (2004); „Anforderung an die Verkehrsfinanzierung"; Presentation for SRL in June 2004 ; available via internet: http://www.srl.de
- Salomo / Steinhoff (2004) ; presentation "Innovation & Technology Management", IV. Intake WS 2004/2005; available at FHW-Berlin MBA Department
- Verkehrsministerium (2002) ; Study "Mobilität in Deutschland"; available via internet: www.kontiv2002.de (2002)
- „Verkehr in Zahlen" ; Statistische Bundesamt (2002)
- Welge, K. & Al-Laham, A. (2003) ; "Strategisches Management" ; Gabler , 2003
- Werkstattbericht Nr.25 (1999) ; „Aspekte zukünftiger Mobilität"; Sekretariat für Zukunftsforschung (1999)