The development of the Dresden tram into the backbone of public transport

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Member of the board
Director operations and human resources
DVB AG

We keep Dresden moving
DVB is the main mobility provider in Dresden

DVB in figures in 2010

| Employees | 1,683 |
| Apprentices | 150 |
| Routes | 12 tram routes, 28 bus routes, 4 ferry routes, 1 funicular, 1 suspension railway |

Ridership:
- passengers p. a. 145.7m
- growth compared to last year + 1.2m

Economic data:
- turnover: 100.7m EUR
- cost recovery rate (incl. infrastructure): 75.0%
- loss compensation: 39.4m EUR
- rides per inhabitant: 250

Fleet:
- 166 light rail vehicles (low floor)
- 18 Tatra tram cars (high floor)
- 145 buses (low floor)
- 5 ferry boots, 1 car ferry
- 4 cable cars

Network:
- 130 km, 71%
- 248 km, 29%
Dresden can look back on a long, uninterrupted tradition as a "tram city".

26.09.1872 Opening of the first horse drawn tram

6.07.1893 First electric tram in operation

23.07.1945 The tram is back in the destroyed city centre

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The Dresden tram system was worn out at the time of Germany’s reunification.
Service quality was only acceptable for captive-riders
The 1990s were decisive years for the Dresden tram

- Bad condition of the infrastructure
- 100m € gap in cost coverage p. a.
- Cost reduction scenario was discussed: conversion up to 50% of the tram network to bus
- But the Dresden public and the City of Dresden expressed their support for the Dresden tram
- Round table discussions resulted in the Dresden Transport Plan, passed the Dresden City Council in 1994
- A “pilot line” should show how to transform a traditional tram network into a modern light rail system

Dresden Transport Plan 1994:

“The tram is the backbone of the Dresden PT.”

“… stepwise development into a light rail system …”

“The route Gorbitz – City centre – Prohlis is initially intended for a Pilot Scheme Light Rail.”
Modernising a traditional tram system into a modern light rail system is a very complex process

**Important fields of action**

I Coordination of the linkage to politics and public administration
- Determination of functions, planning procedures, and financing responsibility

II Development of tram infrastructure
- As basis for the quality of network coverage and the product development

III Product development in the PT sector
- Implementation of customer expectations regarding to PT-quality and value for money

IV Restructuring of the company
- Customer-oriented structure and process optimisation
- Rationalisation
- Change in corporate culture

We keep Dresden moving
I. Changing of traditional tram systems requires a strong interaction between the spheres of politics, administration and the company

- middle and long term alignment of tram network development
- complexity of track modernisation within public road space
- difficulties concerning political promotion because realisation is possible only step by step and benefits are not known at once
Linkage between the spheres of politics and the market takes place in communicative planning procedures between the City of Dresden and the DVB.

**City of Dresden**
- Urban and traffic planning authority
- Responsible for the streets
- PT authority
- Owner (indirectly through TWD GmbH)

**Guidelines**
- Transport political,
- Finance political
- Environmental political
- City planning political
- Economical

**Tasks of planning:**
- System design
- Network planning
- Service planning
- Planning of Intermodal links

**Communicative planning process:**
- Analysis
  - Costs
  - Demand
  - Success

**Survey**
- Planning, PR, Promotion
- Realisation

**Dresdner Verkehrsbetriebe**
- Development of markets
- Infrastructure and product-planning for PT
- Customer communication, marketing, sales
- PT-operator
- Owner of trams, busses, ferries and cable cars
- Owner of tram infrastructure

**City council**
The PT-company needs to have the competence and resources to help with the design of the changing process for mobility in the city.

PT planning \[\rightarrow\] market research \[\rightarrow\] service design in PT \[\rightarrow\] shift planning \[\rightarrow\] sales \[\rightarrow\] …

DVB

PT management + marketing

operation + maintenance of rolling stock

PT infrastructure

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Financing of PT is ensured by the holding TWD
The company is 100% in municipal influence
Since DVB is sufficiently financed by TWD it is possible to get further funding for modernising infrastructure

Structure of mixed financing for investments:

<table>
<thead>
<tr>
<th>Federal government</th>
<th>Saxony</th>
<th>Dresdner Verkehrsbetriebe</th>
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<tbody>
<tr>
<td>municipality traffic financing law (GVFG) for projects with more than 50m €</td>
<td>Funds in line with the Saxon Investment Programme (LIP)</td>
<td>financing by depreciation / holding</td>
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II. The main focus of infrastructure development was on reconstruction
A complex measurement was the realisation of the „pilote line“ as a connection between two large residential areas with the city centre.

- Gorbitz
  - 1995 ca. 30 000 inhabitants
  - 2009 ca. 20 000 inhabitants

- Prohlis
  - 1995 ca. 20 000 inhabitants
  - 2009 ca. 12 000 inhabitants

Existing tram network

Extension planned or under construction

Pilot line

City centre

Residential areas Gorbitz, Prohlis
Realisation of the “pilot line” in partial stages – according to the progress of the joint planning between the City of Dresden and the DVB
Financing of the “pilot line”

<table>
<thead>
<tr>
<th>Source</th>
<th>Contribution</th>
</tr>
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<tbody>
<tr>
<td>Federal government</td>
<td>115m EURO</td>
</tr>
<tr>
<td>Saxony</td>
<td>90m EURO</td>
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<tr>
<td>Dresdner Verkehrsbetriebe</td>
<td>107m EURO</td>
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<tr>
<td>Dresdner Verkehrsbetriebe</td>
<td>25m EURO</td>
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<tr>
<td>Municipality traffic financing law (GVFG) for projects with</td>
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<td>more than 50m €</td>
<td>depreciation / holding</td>
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</table>

Total investment needed for pilot line = 222m EURO
The „pilot line” gave citizens and politicians an impression of what is possible in an existing tram network and should assist in further decisions in PT.

- Combined stop for tram and bus
- Stop with raised carriageway
- Intermodal stop
- Customer information
The positive environmental impact of green tracks is helpful for further modernisation of infrastructure of the tram system

- green tracks in Dresden (27 km = 100 000 m² more green for Dresden)
  - improve microclimate in Dresden
  - generate oxygen
  - reduce particular matter
  - reduce noise emission between 4 to 7 decibel
  - raise the quality of life in residential areas

- rain water does not trickle away
  - it is saved by green tracks via a special storage layer
  - as a result of this watering is a rare event

- cooling effect of green tracks
  - evaporate approximately 438 litre water per square meter and year
  - cooling capability of 27 600 000 kWh
The more difficult conditions for reconstruction of tram infrastructure requires innovative solutions and clear political guidelines.

- prioritisation of street space division
- innovative solutions for traffic organisation and for traffic facilities
- coordination for common realisation of road and tram network
DVB’s suggestions for network extensions led into a coordinated plan between the City of Dresden and the DVB.
III. Continuous product development is important for success in PT

- Percentage of direct routes: 65%
- Increasing the quality features concerning riding process

**High network density**
- 12 Tram-lines
- 27 Bus-lines
- 94% of all inhabitants live within 500 meters to the next stop

**Quality of service**
- Every 10 minutes **within the week**
- Every 15 minutes **at weekend**
- 24/7 operation

**Modal / Intermodal Change**
- Connection control with OCS **after 8 pm**
- Traffic light triggering

**Way / Time to the stop**
- Start
- Interchange
- Stop close to destination

**100% barrier free access**

**Stop close to destination**
- Way / time to the destination

**We keep Dresden moving**
We keep Dresden moving

Objectives:

- Holistic traffic optimisation
- Prioritisation of PT depending on the timetable
  no priority in case of early arrival, high priority in case of delay
- Improvement of secure connections due to visualisation and securing connections by means of operations control system and traffic lights
- Reduction of energy consumption and improvement of driving dynamics by means of driver assistance systems

Partners involved:

- City of Dresden
- Dresdner Verkehrsbetriebe AG
- University of Dresden

High level of service quality intends reliability of the PT-systems
The joint project „North-South corridor“ as part of rising reliability

Junction Nürnberger Straße
Areas of work of the partners within the project „North-South-corridor“

- Bus/tramway positioning data
- Operations control system
- Current PT situation
- Time remaining until next green stage dynamic connection services

**Multi-modal interface module**

- Public transport approaching modell
- Priority decision system
- Public transport approaching prognosis
- Current road traffic situation

**Traffic Control Centre**

- Traffic computer
- Traffic light controller
- Traffic flow detection

- Dresden University
- City of Dresden

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IV. Further key aspects of modernising the public transport system in Dresden had to be realised

- implementation of transport management and marketing functions within the company
- implementation of quality management
- improvements to services, vehicles and bus/tram stops
  - realising 100% barrier free access
- enhancement of customer relationship management and customer information
- establishment of an integrated transport network (VVO)
  - one timetable, one tariff, and one ticket independent of the companies
  - the integration of the railways, urban transport, and regional bus transport
- consolidation and further development of the DVB’s computer-aided operations control system (OCS)
- interaction of DVB’s OCS among individual companies in the entire VVO (“RBL Oberelbe”)

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Some results have been achieved

**Ridership**

<table>
<thead>
<tr>
<th>Year</th>
<th>Passengers (p.a.)</th>
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<tbody>
<tr>
<td>1991</td>
<td>120.0m</td>
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<tr>
<td>2009</td>
<td>145.7m</td>
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**Customer satisfaction**

<table>
<thead>
<tr>
<th>Year</th>
<th>Passengers (p.a.)</th>
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<tbody>
<tr>
<td>2000</td>
<td>2.94</td>
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<tr>
<td>2009</td>
<td>2.48</td>
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**Economic data**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost recovery rate (incl. infrastructure)</th>
<th>Loss compensation (€)</th>
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<tbody>
<tr>
<td>1991</td>
<td>24.4%</td>
<td>100.0m</td>
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<tr>
<td>2009</td>
<td>75.0%</td>
<td>39.4m</td>
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Impressions of modernisation

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Impressions of modernisation

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Final statement

- Only the interaction of city planning, politics, and PT companies leads to the success of public transport.

- For urban development planning the existing tram networks should be taken into account. The companies must actively accompany the process of planning.

- The PT service provider have to be customer-oriented in structure, processes, and culture.

- The preservation and expansion of public transport infrastructure requires steady financial accompaniment, the protection therefore lies in the responsibility of politics.
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Thank you.