

REUNIFICATION THROUGH TRANSPORT

Lessons from the German Unity Transport Projects
for the Korean Peninsula

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In Loving Memory of My Father.

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ABSTRACT

The intention of this research is to emphasize the challenges for transport infrastructure after the reunification in Germany and to create a useful action plan for the Korean peninsula with the help of this experience. In the first step the “Germany Unity Transport Projects” get described and analyzed in detail. Then a description about the current situation of transportation in North and South Korea follows. Useful lessons from Germany are projected and possible developments of transportation are presented for a reunification of Korea. It should show what kind of difficulties may occur while planning the reconnection of divided transport routes and that it is important to prepare beforehand. Several maps support the content and a survey of travelers to North Korea and spatial analysis give additional information which are exclusive for this research.

ZUSAMMENFASSUNG

Mit dieser Arbeit wird die Problematik der Verkehrsinfrastruktur nach der Wiedervereinigung Deutschlands aufgegriffen und aus den Ergebnissen Handlungsempfehlungen für die koreanische Halbinsel entworfen. Die „Verkehrsprojekte Deutsche Einheit“ werden detailliert beschrieben und die Veränderungen der Verkehrsinfrastruktur in Ostdeutschland werden präsentiert. Dann steht die aktuelle Situation der Verkehrsinfrastruktur in Nord- sowie Südkorea im Mittelpunkt. Hilfreiche Lektionen sollen aus Deutschland übertragen werden und am Beispiel eines möglichen Handlungsablaufs mit groben Planszenarien soll gezeigt werden, worauf sich die Verkehrsplanung in einem wiedervereinten Korea vorbereiten muss. Eine Vielzahl von Karten unterstützt die Beschreibungen, die dadurch verständlicher werden. Eine Umfrage unter Nordkorea-Reisenden und die räumlichen Analysen stellen zusätzliche Information dar, die in dieser Form bisher nicht vorzufinden sind.

서문

분단되었던 동독과 서독이 통일한 뒤 교통인프라를 어떻게 개선했는지를 알아보고 한반도에 어떻게 도움이 될 수 있는지를 논문주제로 하려고 한다. 통일독일교통프로젝트를 자세하게 설명하며 동독의 교통변화를 분석하고 의견을 수렴한다. 그 다음 남한과 북한의 교통상황 알아보려고 한다. 독일에서 배울만한 것을 알려주고, 한반도가 통일되면 어떻게 대처할 것인가에 대한 로드맵을 소개한다. 끝으로 가장 중요한 것은 한반도 통일후 교통개발시 어떠한 문제가 생길 수 있는지 분석하고 어떠한 방향으로 준비해야 할지에 대해 설명한다. 이 논문의 특징은 북한을 방문했던 많은 사람들의 의견을 기재하고, 다양하고 많은 지도로 내용을 보여준다.

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1 INTRODUCTION

1.1 DIVIDED NATIONS

Imagine that from one day to the other it is suddenly impossible to go to a place where you maybe lived or went to frequently. But you know that there are people who speak the same language, have the same culture and maybe they are part of your family.

Throughout history several nations were divided and their citizens experienced such a situation. Among them are, for instance, Vietnam and Yemen and probably the most popular cases are Germany and Korea. More importantly is that except Korea each of the mentioned countries overcame the division. But over the years it had consequences for a lot of areas. Among other consequences, deep scars were left for the transport infrastructure. Exactly on that problem this research sets the focus and all aspects are intended to be examined.

The title of this research consists of two parts. The first one is “Reunification Through Transport” which purposely leaves a lot of space for interpretation. It expresses the role of transportation in the process of reunification. For Germany, the content highlights the role of transportation until unity is gained. Considering the situation in Korea, events and projects which could lead to a reunification are meant with this title.

Second part of the title is “Lessons from the German Unity Transport Projects for the Korean Peninsula”. Germany set up a number of measures to overcome drawbacks. Mistakes or unused opportunities can lead to a vicious circle and in terms of such a great event like unification of two nations the results have consequences for millions of people. Therefore, it is important that Korea learns a lot as possible from Germany and their handling of transport reconnections.

This research goes beyond a simple connection of dots on a map. The intention is to apply conclusions of Germany’s case in combination with specific characteristics of Korea to create a reliable and useful guideline. It does not only give examples of what has to be done, it shows how it should be accomplished successfully.

1.2 STRUCTURE OF THESIS

This work is divided into six parts. The first and last chapters introduce and summarize the content of the research briefly.

The second chapter is actually a prologue to the research. Certain explanations and background information are required, which are given in that chapter. From the author's personal reason for the choice of this specific topic over basic problems of Korean unification it leads to the research design. It can be described as the conceptual part of this work. It finishes with an introduction of the main task of the thesis.

And it builds a bridge to chapter 3, which tries to analyze the German Reunification with a focus on transportation. The first part arranges the most important events in a chronological order. Then the 17 transport projects are going to be introduced in detail. Not only their characteristics but also their idea, goals, stakeholders and laws behind them are important to mention. Otherwise it would miss understanding, how the projects were accomplished so fast in the new states of Germany. The chapter is rounded up with an accumulation of statistics and opinions about the execution of the unity transport projects.

The fourth chapter goes with content about Korea to the other side of the globe and the first subchapter points out the transport situation of North and South Korea. Then the differences between Germany 1990 and Korea now are analyzed. With the help of a self-designed questionnaire additional information about transport in North Korea have been collected. The last part of the chapter four is about cross-border projects of North Korea with the South, Russia and China.

Proposals for usage of various corridors on the Korean peninsula are going to be introduced in the fifth chapter. Simply drawing lines in a map is not the goal of this final chapter. The first step is to collect the most important lessons from the reconstruction of German transport system. The second step is to analyze the corridors in their historic function versus their prospects after reunification. An analysis of transport network in Korea tries to show where problems could occur. There is not one solution for reconnections between the two Koreas. That is the reason why different strategies are going to be introduced and evaluated. At the end, it should be clear how to achieve a well-working, sustainable rail and road network for a great Korea.

1.3 COUNTRY PROFILES

Fact Sheet Germany

Official Name: Federal Republic of Germany

Figure 1: Flag of Germany



(source: CENTRAL INTELLIGENCE AGENCY 2012a)

Area (land):	357,022 km ²
Land boundaries:	3,790 km
Border countries:	Austria 784 km, Belgium 167 km, Czech Republic 815 km, Denmark 68 km, France 451 km, Luxembourg 138 km, Netherlands 577 km, Poland 456 km, Switzerland 334 km
Coastline:	2,389 km
Terrain:	lowlands in north, uplands in center, Bavarian Alps in south
Highest point:	Zugspitze 2,963 m

Population:	81,305,856 (July 2012 est.)
Population growth rate:	-0.2% (2012 est.)
Urbanization:	urban population: 74% of total population (2010)
Rate of urbanization:	0% annual rate of change (2010-15 est.)
Death rate:	11.04 deaths/1,000 population (July 2012 est.)
Life expectancy at birth:	total population: 80.19 yrs. male: 77.93 years female: 82.58 years (2012 est.)
Total fertility rate:	1.41 children born/woman (2012 est.)

GDP - per capita (PPP):	\$37,900 (2011 est.)
GDP by sector:	agriculture: 0.8% industry: 28.1% services: 71% (2011 est.)
GDP (purchasing power parity):	\$3.085 trillion (2011 est.)
Labor force - by occupation:	agriculture: 1.6% industry: 24.6% services: 73.8% (2011)

Railways:	total: 41,981 km standard gauge: 41,722 km 1.435-m gauge (20,053 km electrified) (2009)
Road:	total: 644,480 km paved: 644,480 km (includes 12,800 km of expressways) (2010)

(CENTRAL INTELLIGENCE AGENCY 2012a)

Fact Sheet North Korea

Official Name: Democratic People's Republic of Korea (DPRK)
조선민주주의인민공화국

Figure 2: Flag of North Korea



(source: CENTRAL INTELLIGENCE AGENCY 2012b)

Area (land):	120,408 km ²
Land boundaries:	1,671.5 km
Border countries:	China 1,416 km, South Korea 238 km and Russia 17.5 km
Coastline:	2,495 km
Terrain:	mostly hills and mountains separated by deep, narrow valleys; coastal plains wide in west, discontinuous in east
Highest point:	Paektu-san 2,744 m

Population:	24,589,122 (July 2012 est.)
Population growth rate:	0.535% (2012 est.)
Urbanization:	urban population: 60% of total population (2010)
Rate of urbanization:	0.6% annual rate of change (2010-15 est.)
Death rate:	9.12 deaths/1,000 population (July 2012 est.)
Life expectancy at birth:	total population: 69.2 years male: 65.34 years female: 73.24 years (2012 est.)
Total fertility rate:	2.01 children born/woman (2012 est.)

GDP - per capita (PPP):	\$1,800 (2011 est.)
GDP by sector:	agriculture: 20.8% industry: 48.2% services: 31% (2010 est.)
GDP (purchasing power parity):	\$40 billion (2011 est.)
Labor force - by occupation:	agriculture: 35% industry and services: 65% (2008 est.)

Railways:	total: 5,242 km standard gauge: 5,242 km 1.435-m gauge (3,500 km electrified) (2009)
Road:	total: 25,554 km paved: 724 km unpaved: 24,830 km (2006)

(CENTRAL INTELLIGENCE AGENCY 2012b)

Fact Sheet South Korea

Official Name: Republic of Korea (ROK)
대한민국

Figure 3: Flag of South Korea



(source: CENTRAL INTELLIGENCE AGENCY 2012c)

Area (land):	99,720 km ²
Land boundaries:	238 km
Border countries:	North Korea 238 km
Coastline:	2,413 km
Terrain:	mostly hills and mountains; wide coastal plains in west and south
Highest point:	Halla-san 1,950 m

Population:	48,860,500 (July 2012 est.)
Population growth rate:	0.535% (2012 est.)
Urbanization:	urban population: 83% of total population (2010)
Rate of urbanization:	0.6% annual rate of change (2010-15 est.)
Death rate:	6.38 deaths/1,000 population (July 2012 est.)
Life expectancy at birth:	total population: 79.3 years male: 76.12 years female: 82.7 years (2012 est.)
Total fertility rate:	1.23 children born/woman (2012 est.)

GDP - per capita (PPP):	\$31,700 (2011 est.)
GDP by sector:	agriculture: 20.8% industry: 48.2% services: 31% (2010 est.)
GDP (purchasing power parity):	\$1.554 trillion (2011 est.)
Labor force - by occupation:	agriculture: 7% industry: 23.6% services: 69.4% (2011 est.)

Railways:	total: 3,381 km standard gauge: 3,381 km 1.435-m gauge (1,843 km electrified) (2008)
Road:	total: 103,029 km paved: 80,642 km (includes 3,367 km of expressways) unpaved: 22,387 km (2008)

(CENTRAL INTELLIGENCE AGENCY 2012c)

2 CONCEPTION

2.1 ABOUT THIS THESIS

2.1.1 CHOICE OF THIS TOPIC

Actually, the author came across the German Unity Transport Projects (GUTP) on the research for material about another topic. Considering these projects as the focus of the final thesis was accompanied by the following reasons: author's interest in Korea and transportation, existing literature, basic ideals of human rights and about mobility.

Out of personal interest for transportation in South Korea and the acquired knowledge about geography in Germany it was clear that the author's final thesis intends to combine both of it. However, it was not easy to determine a specific topic even after the author experienced personally the high-advanced transportation methods in South Korea. In summer of 2011, the author could use his personal interests in an internship at Korea's biggest transport research institute. That experience was helpful to get an impression of the differences between Korea's and Germany's transportation.

Of course, there is a lot of literature and a relatively high number of dissertations about German Unification and prescription for Korea. In the author's opinion, the topic of reunification and counseling Korea is one of the most common tasks which require German expertise. Process of German reunification is already finished and so it is possible to learn from it. Instead of scenarios it is interesting to see what results specific decisions had in reality. Key for success in Korea is the analysis of the German reunification in combination with a description of status quo on the Korean peninsula and an outlook into the future (Kim et al. 2011, p. 6). However, this thesis does not simply add another case study of German reunification to that field. It is the first paper with a detailed focus on transportation construction as a consequence of reunification. It does not imply that other authors underestimate the meaning of rebuilding the transport infrastructure. But usually the description of it is way too short to use it effectively for a prospective process in Korea. Taking a closer look at the literature about these projects, most of it is written in German and so a good command of German is required. And at the same time a lot of literature about the Korean peninsula is of course in Korean and most intensive research gets conducted in

South Korea. The author's good command of both languages and the presentation of results in English make it legible for a broad audience.

For the author there is one more important reason for the choice of this particular topic: pursuit of human rights. It is widely known that North Korea's regime is violating basic human rights. Citing AMNESTY INTERNATIONAL USA (2012) North Korea carries out torture or other cruel treatment in prison camps or detention centers. Freedom of press does not exist and the media is controlled by the state. Related to this thesis, freedom of movement is also suppressed. North Korean citizens are not even allowed to travel within the country and especially not abroad without obtaining permission beforehand. Crossing the border illegally can mean the death penalty. (AMNESTY INTERNATIONAL USA 2012)

This is a clear violation of the Universal Declaration of Human rights article 13, which guarantees the "right to freedom of movement and residence within the borders of each state" (UNITED NATIONS 2012) and the right to leave his own and any country and to return to his country (UNITED NATIONS 2012). In the former German Democratic Republic (GDR) rights to travel abroad have been restricted as well. As the thesis will show later, people's action for regaining the right for freedom of movement was an important point in history and it opened the door to reunification. With the examination of the current situation in North Korea and presenting how the future could be, it should stress out the importance of reunification on the Korean peninsula. Mobility is not only a wish to move, it is beyond that an expression of independence and individuality. Through mobility it is possible to participate in society and it offers one a lot of chances. (ACATECH 2006, p. 7)

And at last, there are a number of events which give hope for change in North Korea. On December 19, 2011, state press of North Korea announced that country's leader Kim Jong-Il passed away (MANYIN 2011, p. 1). Succession of leadership comes along with opportunities to renew cooperation to North Korea and perhaps North Korea may open up for economic and political reforms.

These are the reasons, where the motivation for this topic comes from and the following work tries to accomplish them as far as it is possible. Just a vanishing of North Korea's regime would not solve these problems completely. Transition to a democratic system is a challenging task.

2.1.2 RELEVANCE

Almost instantly after settling for this topic, the author recognized one big weak point that has to be discussed beforehand: the how and when of Korean reunification. Confronting this issue can

answer the question if it is really relevant to make preparations for such an unpredictable event like reunification.

At the current situation it is not possible to prospect a specific time or even a specific method how it is going to happen. According to DEGE (1996, p. 40) it is very difficult to develop scenarios for a reunited Korea, because it is not possible to foresee when actually the reunification is going to happen and especially how it is going to take place.

Taking a look at how the preferred way of reunification should be, the last century showed three major types of unifications: First, armed troops or an overwhelming strong force can force an unification as it was the case in Vietnam. Second, a “peaceful socio-economic engagement in the course of which one side collapses and the stronger side absorbs the weaker” (CHOI 2011, p. 102), as seen in Germany, is possible. The third type is the Chinese way with Hong Kong and Macao, where a steady integration by mutual consent was proven to be successfully. (CHOI 2011, p. 102)

Just recently ROK president Lee Myung-Bak said in an interview that he does not want a collapse of North Korea. It would put a high burden on South Korea. Economic development is preferable beforehand and it should be possible for North Korea to be economic independent. (KBS WORLD 2012a)

However, for this scientific work, it will be assumed that the way of unification corresponds to the second or third possibility. The first type is excluded because it is in no way advantageous. An armed conflict would imply that infrastructure, cross-border connections are going to be destroyed and then prestigious large-scale projects would not help where the whole network has to be rebuilt. And usually Germany’s unification is the most often used example in discussion of a reunification of both Koreas (KIM et al. 2011, p. 41).

The second weak pillar of the thesis is that it is unknown how many times is left until unification.

Figure 4: Unification Clock



(source: PARK/ KIM 2011, p. 19)

There are various opinions about the time and in this part some of the most important are summarized.

In a three year-long project from 2009 to 2011 the Korea Institute for National Unification (KINU) tried to show on a simple way the answer to the complicated question: “When will unification occur and what will bring it about?” (PARK/ KIM 2011, p. 3) The presentation in form of a clock resembles intentionally the Doomsday Clock. The green clock represents the unification through a gradually

development of North Korea and it is based on agreements between the two Koreas. The blue clock shows the chance of a collapse of North Korea's system and absorption through South Korea. (PARK/ KIM 2011, p. 3)

If the clock reaches 12 o'clock, it means that the unification of Korea is accomplished completely (PARK/ KIM 2011, p. 9). However compared to 2009 the chance for an agreement set back from 4:19 o'clock to 3:31 o'clock. But the possibility for absorption was raised 2009 at 5:56 o'clock, 2010 it fell down to 5:20 o'clock and it grew back to 5:30 o'clock. (PARK/ KIM 2011, p. 19)

In the last few years there have been military attacks from DPRK against ROK like the sinking of the South Korean warship Cheonan and artillery attacks against civil island Yeonpyeong (MOU 2012, p. 4). These actions can be interpreted differently. Some South Korean politicians seem to believe that a collapse of North Korea may be soon (KELLY 2011, p. 459).

A news article by Yonhap News Agency cites Alexander Dynkin, who is the director of the Russian think tank "Institute of World Economy and International Relations", that the North Korean regime is going to collapse by 2030. Dynkin believes that the death of Kim Jong-Il brought Korea closer to reunification. As the main reason for a collapse he mentions the changes of the surrounding, particularly the market reforms of China and Russia. So North Korea is surrounded by market oriented and pro-democratic forces (except China). He assumes that the collapse might happen in the middle of 2020s. (LEE, HAYE-AH 2012)

The new successor of the regime in the North is Kim Jong-Un. Though he was in spotlight since a few years, there is still almost nothing known about him, not even his exact age. He might be in his late 20s and he went to primary school in Switzerland. The question currently is if he is able to maintain stability despite his inexperience. (MANYIN 2011, p. 2)

In account of the elite of North Korea, it is assumed that they want to keep the "status quo" (MANYIN 2011, p. 4).

Already ten years ago the Korea Chamber of Commerce and Industry (KCCI) published a report about expanding investments for the infrastructure. They emphasize that a "blueprint for the gradual building of infrastructure" has to be arranged. (KCCI 2002, p. 1)

South Korean government tried to avoid preparing plans because it could be misunderstood by North Korea as a threat. Before 2008 the "sunshine policy" improved relations between both Koreas but it was abandoned by the new president Lee Myung-Bak in 2008. (MANYIN 2011, p. 8)

Lee Myung-Bak put a hold on relations with North Korea because first of all he demands that the nuclear issue is settled and DPRK abandons its nuclear weapons program (MOU 2012, p. 2).

One of the latest discussions was about a fund to prepare for reunification. South Korea's ministry of unification believes that after a reunion costs for aid to North Korea would be a very big burden. (TORRY 2012)

Even though there are some problems, this thesis proves a high relevance. With these things in mind, efforts for the preparation of the time after unification are strongly needed. Current circumstances may trigger unanticipated events. In conclusion, it is important to think about the plans, even without to determine an exact time and without the ability to choose a way of reunification. This research sets standards for the transport infrastructure of a reunified Korea on the infrastructure and transport methods of South Korea which are given currently in the first decade of twentieth century.

2.1.3 EXPRESSIONS

As introduced in the first chapter, the first part of this thesis is about the large-scale transport projects after German reunification. In German they are called "Verkehrsprojekte Deutsche Einheit" and their common abbreviation is "VDE" (BMV 1993, p. 21). The Federal Office for Building and Regional Planning ("Bundesamt für Bauwesen und Raumordnung") translated it with "German Reunification Traffic Infrastructure Projects" (BBR 2005, p. 120). The German magazine "Der Spiegel" used the expression "German Reunification Transportation Projects" (WÜST 2011, p. 1). However, the official expression as used in the latest Federal Transport Infrastructure Plan 2003 ("Bundesverkehrswegeplan") is "German Unity Transport Project" (BMVBS 2003a, p. 7), so this official English expression is going to be used in the thesis. In conclusion the direct contraction is "GUTP".

If a reader wants to search the term in Korean literature, the corresponding expression for the GUTP is "통일독일교통프로젝트" (Kim et al. 2011, p. 68) and Federal Transport Infrastructure Plan is generally translated as "독일연방교통계획" (Kim et al. 2011, p. 66).

For the clarification between the two Koreas it is important to clearly distinct the expressions: Republic of Korea, which was established on August 15, 1948 (HILPERT 2010, p. 130), is the official name of South Korea and as a common contraction it is possible to use "ROK". The northern part is referred to North Korea or Democratic People's Republic of Korea since its founding on September 9 in 1948 (HILPERT 2010, p. 130). It is usually shortened as "DPRK". If the expression Korea is used in this work, it describes the regional area of the peninsula, which includes both states.

Expressions to name the former communist part of Germany range from East Germany to the “German’s Democratic Republic” with the short form “GDR”. West Germany includes the Western part of Germany between 1945 and 1990 and “Federal German Republic” with “FGR” describes the reunited Germany.

Each German state had a railway company. In the GDR “German Reich Railways” (“Deutsche Reichsbahn”) operated train services and in this thesis the abbreviation GRR is going to be used for it. In West Germany “German Federal Railway” (“Deutsche Bundesbahn”) existed before it was changed into “German Railway” (“Deutsche Bahn”) with their official initials “DB”. For this work, there is no difference between the expressions highway and expressway. Both are interchangeable and they refer to the ROK’s expressway and German “Autobahn”.

Because this topic covers literature in three languages (German, English and Korean) in some cases the Korean or German term is put in brackets behind English expressions, as soon as this particular expression appears for the first time. In bibliography names of Korean authors are changed to Latin letters by the “Revised Romanization of Korean” and of all authors the full name is written to avoid mix-ups. The same goes for in-text citations: If the surname exists multiple times, the full name is given in the text.

2.2 DESIGN OF SCIENTIFIC RESEARCH

To be able to begin a research it is important to determine first of all what kind of scientific method is the best choice.

Considering Germany, North Korea and South Korea as our specific research objects, the single-case study is best suitable research design. Although single-case studies are usually about a person, a group or an organization, they can also focus on a society or a culture. It is just important that the object of investigation is treated as a unit. The most important reason to choose a single-case study is that the phenomenon which is going to be analyzed is fairly unique and that they are not any kind of alternatives. (SCHNELL/ HILL/ ESSER 2011, pp. 241)

A further distinction of single-case study is through the way of gaining data. Information and research data can be gained directly by the researcher or existing data which was used in other researches for similar topics can be used. This last type of research design is called “secondary analysis” (SCHNELL/ HILL/ ESSER 2011, p. 243). Advantages are that the conductor of a

scientific work saves money and time, while the biggest disadvantage is the problem to find suitable data. (SCHNELL/ HILL/ ESSER 2011, p. 243)

A special type of secondary analysis is the macro-comparative study, where usually various nationals get compared with the help of selected indicators. In this thesis North Korea, South Korea, East Germany in 1990, West Germany in 1990 and Germany today are being compared with each other. (SCHNELL/ HILL/ ESSER 2011, p. 245)

Here some problems do exist, which have to be considered as well. Especially for this thesis, reliability and validity of indicators has to be doubted. Also it is difficult to compare data from different times. The surroundings, process of data survey or units could differ through changes in system or something similar. Some indicators depend strongly on factors like spatial distance and relationships to current (external) events. (SCHNELL/ HILL/ ESSER 2011, p. 246)

So this thesis is a single-case study with the support of secondary analysis of existing data. On this foundation the work attempts a macro-comparative analysis of the main objects.

After determining the research design the next step is to clarify characteristics of the scientific discipline that the research belongs to. Obviously, it belongs to geography because it focuses on a spatial issue of two geographical areas (Germany and Korea).

Yet there are many sub-disciplines in geography. All traffic related matters best matches to transport geography, because this sub-discipline focuses “about movements of freight, people and information. It seeks to link spatial constraints and attributes with the origin, the destination, the extent, the nature and the purpose of movements.” (RODRIGUE/ COMTOIS/ SLACK 2006, p. 5)

The origin of transport geography lies in economic geography and settlement geography. In the second half of the twentieth century functions like living, working, shopping, education, leisure and others underwent a spatial separation and so the traffic between the places, where these functions are performed, increased. In science transport geography gained importance and each decade had different approaches of it, which was influenced by the main problems of each decade. Nowadays transport geography is a problem orientated, independent discipline with a lot of links to other areas. (KAGERMEIER 2011, pp. 1046)

Hence transport is multidimensional with an historical, environmental, social, political and economic role. Transport fulfills a social role because it provides access to public places, cultural events, healthcare and welfare as well as it assists social interactions. Politics are an essential influence because they are the main source of investment and politics regulate the form of transportation. Mobility of the population gets subsidized and it has great influence on the economy and on job market. Transport is an “indispensable component of the economy”

(RODRIGUE/ COMTOIS/ SLACK 2006, pp. 3) and it creates important links between locations. From the view of the economy, transport is first of all a business. Construction of infrastructure, car manufacturing and other areas of transport industry are major factors. The contemporary trends are an increase in the demand and an expansion of infrastructure while reducing the costs. (RODRIGUE/ COMTOIS/ SLACK 2006, pp. 3)

Besides that core element of infrastructure should reflect demand by traffic users or as a conscious intention of governance to influence choice of transport methods (KAGERMEIER 1999, p. 72). Especially the last two functions are a driving force of the projects, which are going to be introduced later. Application of transport geography tackles all modes of transport like road, rail, aviation, bicycle, ship transport. Limitations of this work only allow a close look at rail and road, the most important transport methods for a reunited Korea and the GUTP.

This scientific research aims at taking a closer look at some indicators who can help to evaluate infrastructure projects.

One indicator is accessibility, referred as a “key element to transport geography” (RODRIGUE/ COMTOIS/ SLACK 2006, p. 27). High accessibility is favorable and it means that transportation is well-developed and efficient (RODRIGUE/ COMTOIS/ SLACK 2006, p. 27). Definition of accessibility is that it measures the capacity of a certain location or different locations to be reached by and structure of transport infrastructure is essential to determine accessibility (RODRIGUE/ COMTOIS/ SLACK 2006, p. 28). Everybody has access to transport, but each one’s “accessibility varies according to one’s location within the transport system” (RODRIGUE/ COMTOIS/ SLACK 2006, pp. 5). Later, a closer look at the spatial structure of transport infrastructure can give hints where deficits dominate.

Another possible indicator is traffic volume. In transport geography the paradigm dominates that constructions should have the intention to satisfy demand by users (KAGERMEIER 2011, p. 1052). In case of Germany, each highway of the GUTP had a predicted amount of traffic for the year 2010. Due to lack of data and limitations of investigation it is nearly impossible to calculate traffic flow in a reunified Korea. With this indicator in mind, only Germany’s prediction and real outcome may be investigated. But an evaluation in terms of bad or good is difficult, because traffic can have always two directions: Peripheral regions can reach a center easier and cheaper, but a center can also reach them better and supply the periphery with their products. So the local market and industry get harmed. Conditions of competition are a combination production costs and transport costs. A bad infrastructure can be like a protection of the local industry. (WIELAND 2007, p. 385)

In terms of transport, distance is not equal to time because, whereas the distance stays constant, time varies due to the technology, road conditions or some other factors. In Geography, distance is a uniform attribute, while time is relative. (RODRIGUE/ COMTOIS/ SLACK 2006, p. 5)

For the area of transport planning absolute and relative barriers can be observed. Absolute barriers are geographical features that prevent any kind of movement. Relative barriers are features whose existence forces friction to some extent on the movement. (RODRIGUE/ COMTOIS/ SLACK 2006, p. 9)

Generally the opinion exists that great economic effects follow investments in transport infrastructure (WIELAND 2007, p. 379). And this opinion was applied in the guidebook of the GUTP which expresses

willingness for investments from companies depends mostly on transport infrastructure (BMV 1993, p. 38). Indeed, transport infrastructure is an important, necessary requirement, but it does not produce growth and productivity. It just makes it easier. For example in developing countries most of the investments of a government are used for infrastructure. Government has to enhance economic incentives through transport infrastructure. (WIELAND 2007, p. 380)

These indicators will appear in various sections of the research. Supplementary, there are some theories which are worth to take a look at even if the extent of usage in this thesis might be quite small.

Government has the main responsibility for infrastructure and a special expression for these investments is “social overhead capital” (SOC). The whole concept of SOC is valuable for this thesis. According to AHN (2003a, p. 55) it can be divided into three concepts: The first concept sees SOC as an indirect resource, whose purpose is to support production by using direct resources. Secondly, SOC delivers public goods and supply which are crucial for living and most important it does not follow trends of market. The third concept is that SOC represents public resources and the government has solitary right to set up projects involving SOC. (AHN 2003a, p. 55)

A scientific paper by CHA/ KANG (2011) mentions that there is a tipping point, a point where “you stop diverting scarce resources and focus them more on longer-term restructuring” (CHA/ KANG 2011, p. 30). And these long-term projects will show lower financial benefits in short-term. It was proved by history that there is a large gap between what recommendations are made by experts and what actions are executed by governance. This implies that the tipping point is virtually only politically determined. (CHA/ KANG 2011, pp. 30)

Table 1: Used Indicators

▪ Accessibility
▪ Traffic volume
▪ Barriers
▪ Travel Time
▪ Economic Development

(source: made by author)

This theory can be useful if the research accomplishes to find the tipping point in German reunification process and then the results can get transferred for Korea.

The last point of this subchapter is the discussion of what scale is going to be used. One of the best skills of geographers is that they can work with various scales. As the size of the work restricts the scope of research and the introduced transport projects in Germany are nation-wide project, the scale of this thesis corresponds to the national level. The scale is fairly small and so individual region cannot be taken into consideration. Some routes have international importance, specifically in the case of the Korean peninsula. Current processes afford sometimes a look over the border to neighbors China and Russia. Political opinions by USA and Japan are also heating up discussions, but due to limitations they cannot be examined.

2.3 APPROACH TO SCIENTIFIC WORK

2.3.1 PROBLEM OF DATA, SOURCES AND RELIABILITY

Certain difficulties which appeared while retrieving data for this topic are the center of discussion in the next section. It includes a detailed description of data sources, information about some institutes and reliability in context of North Korea.

The implementation of the GUTP started around twenty years ago and most of the literature is from the period between 1990 and 1999. Electronic resources are rare and literature had to be retrieved in an intensive library search. Germany's Federal Ministry of Transport released quarterly brochures about the latest progress of the GUTP. It was a good way to follow the process and to understand how they presented the projects to the broad public.

For the chapters concerning the Korean peninsula, only literature and electronic resources from the last five to seven years are relevant. In such a fast developing state like South Korea, data gets outdated quickly. In contrast to that, older material about infrastructure in North Korea was acceptable due to the lack of sources.

This problem just reveals basic orientation of the thesis: Analysis of what happened in the past in Germany and research about what is going to happen in the future on the Korean peninsula.

All these mentioned problems take up a whole different dimension if it is about North Korea which is often titled as "hermit kingdom" (KELLY 2011, p. 463). First of all, it is impossible to get any information directly from North Korea, for example from their government or other official

organizations. So the biggest problem is the acute lack of information. In regards of this situation, any information which was not older than five years could be seen as new. And then the problem was that it was impossible to verify them. The broad majority of topics and projects concerning North Korea are very politically dominated and so they change with legislature periods and global political events. For example, Georg W. Bush called North Korea a part of the “axis of evil” (BUSH 2002), which was a total breakoff of relations compared to the previous work by Bill Clinton or the South Korean government at that time (CHA 2002). And it’s the same with cross-border projects for transport infrastructure as it was mentioned in a previous subchapter that transportation has a political sphere (refer to chapter 2.2).

Figure 5: Logo of Korea Transport Institute



(source: KOTI 2012)

During a two months stay in Seoul, the author received a lot of direct help from two research institutes: The first one was the Korea Transport Institute (KOTI, 한국교통연구원) and the second was the

Korea Institute for National Unification (KINU, 통일연구원).

The best source for transport data about the Korean peninsula is KOTI. Besides a big library there was also a “Center for Northeast Asia and North Korea Transport Studies” (동북아·북한 연구 센터). Since 2001 this center exists and their function is to collect and offer data about transport in Northeast Asia as well as to conduct researches and analysis about them (CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012a). From there the author received a map about North Korea’s transport infrastructure (see next page) which was referred as the map with the latest information and most current state of knowledge but it was from 2008. This center for studies about transport in North Korea gave the author an insight into materials which focused primarily on transportation. They have a special library just about transportation in China, Russia and North Korea.

Figure 6: Center about North Korea



(source: CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012a)

Figure 7: Logo of KINU



(source: KINU 2012b)

The second institute was KINU, established in 1991, with the intention to develop national capacity for unification (KINU 2012a). Even if there was not so much about transportation,

their online resources gave basic information about policies and projects.

There have been also several other research institutes like Korea Research Institute for Human Settlements (KRIHS, 국토연구원) or ministries like Ministry of Unification (MOU, 통일부) or Ministry of Land, Transport and Maritime Affairs (MLTM, 국토해양부) who offered through their web pages a lot of electronic resources.

Figure 8: Newest Map about North Korean Transportation



(source: CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2008)

portals proved to be completely useless. None of them was complete and some files showed roads where there have not been any. So the information of this map had to get digitalized by the author. But because this map is not made with geographic information system software the routes are not on their exact spatial position. So a second map with exactly determined routes was used in combination to this one. The author chose a map of United Nations (see next page). Both maps contain different information. The networks were used as it is shown in the map above and the alignment of routes is adapted from the map of United Nations.

With this final thesis, the author completes his undergraduate course of geography. A work in that field of study is unimaginable without displaying any maps. But that's also the next big problem:

Quality of map was not sufficient enough for this usage. Good maps have been either in German or Korean but not in English. For instance, on the left there is the Map from the Center for North Korea Studies. As it was told to the author, it contains the latest update on infrastructure. Shapefiles of North Korea's roads and rail which were offered on geographic information

Figure 9: Map of DPRK



Map No. 4163 Rev. 2 UNITED NATIONS
January 2004

Department of Peacekeeping Operations
Cartographic Section

(source: UNITED NATIONS 2004)

North Korea and many other national (GOOGLE 2012).

In the bibliography there is a section with the exact sources of all shapefiles and geospatial information as well as in each map.

This thesis requires some basic knowledge about Korea and Germany to understand some things fully. With a focus on transportation there are only some aspects described. Knowledge about economy of South Korea and what is left of economy in the North may be also helpful. It cannot be provided due to limitations of research duration and length of the work.

For Germany OpenStreetMap (OSM) offered data of sufficient quality via third party websites like CLOUDMADE (2012) and DENKFABRIK (2012). The shapes of countries are from GADM (2012). Topographical data is from NASA (2012's Shuttle Radar Topography Mission (SRTM) with a resolution of 30 meters. It is used to show topographical conditions in Germany and Korea and to discuss the relief as a barrier to transport routes. For verification of routes the use of Google Earth was very helpful. Recently Google updated the satellite imagery with high resolution pictures of

2.3.2 QUESTIONNAIRE

Previously the difficulty to get data about North Korea was explained. A solution for this problem was to gain direct information from people, who have been in North Korea as a tourist. Therefore the author intended to collect impressions of tourists about rails and roads as an addition to the scientific researches and official papers.

How to find people and contact them, was at first not easy. Just searching the web with keywords did not deliver sufficient results. More than a few travel blogs did not exist and contact information usually have not been published. As an alternative the photo community Flickr proved to be a good solution. People publish pictures that they have shot on their trip. Through tags about location it was possible to find travelers to DPRK. And so it was even possible to see who set a focus on transportation. Often the photos had information like date and place. To contact somebody was also easy by Flickr's messaging system.

The first contact explained the purpose of this final thesis and intention of the following questionnaire. If people answered affirmatively, e-mails with an attached document containing the questions was sent to them. After receiving the filled out document, answers have been summarized and used in a separated subchapter. Before publication summary of question was sent for confirmation to each contributor.

The questionnaire had around 15 questions, divided into three sets. But in some cases the questions have been adjusted to suit the persons travel inquiry. Whereas most of the travelers entered North Korea by air plane, some entered/left by train. Some visitors had a personal interest in trains. The first section was about the person's journey and the questions have been:

How many times have you been to North Korea? When was the last time that you have been to DPRK and for how long?

How did you enter the DPRK each time? If you didn't enter by airplane, can you describe your experience of the cross-border connections briefly?

Where did you travel within DPRK and what method(s) of transport did you use?

How many hours took each bus/ train ride within DPRK?

Assuming from various reports, overland travel takes very long in DPRK. What do you think is the reason for this?

According to your observation what is the main mode of transport for long-distances for North Korean citizen in DPRK? Why?

The next set of questions focused on the railway in North Korea:

As far as you have observed what conditions are the railways in?

Did the train break down unexpectedly along the way? Or did the train stop for a longer period of time because of something else?

*Have you seen some constructions on the rails?
If so, did it seem to be for repairs or extension?*

If you took a train, was it fully occupied? And how many trains operated on the line that you have taken?

In your opinion, with what country (or a decade of a country) is the North Korean railway comparable? What characteristics resemble each other?

And the last couple of questions retrieved answers about the road network.

What conditions are the highways and roads in DPRK in?

Was it safe to drive on the streets? Did you experience accidents, conflicts with other road users (esp. conflicts between different modes of transport)?

*Have you seen some constructions along the roads?
Like paving of streets, repairing of holes or building of completely new asphalt roads?*

Do the North Korean roads resemble any other national where you have been?

At the end there was a request to add anything the person wants to mention. Some people put links to news articles or some other related information about Korea.

Twenty three people have been contacted and fourteen people answered affirmatively with willingness to answer my questions. After sending the questionnaire, nine people returned it filled out. All communications took place via e-mail. A summarization of the answers is going to be presented in the fourth chapter.

2.4 MAIN QUESTION

Until now, the methodical part of the research was examined without specifying the topic or the content. There are several questions, which are accompanying the author throughout the work.

The purpose of this thesis is to analyze the GUTP and to project their pattern on the Korean peninsula. Basically, it means that a situation, which happened in the past, is going to be projected and compared to an event, which may happen in the future.

The main hypothesis, which has to be proved and filled with content, is: If a Korean reunification occurs in a similar way like it happened in Germany, then the German experience about large-scale transport projects is useful for restoring connections between the two Koreas.

Germany faced the problem that capacity of the current cross-border connections was not sufficient enough after reunification. Their special solution for this problem was the GUTP.

And on the way to do verify the hypothesis, it is essential to analyze the situation of transport networks in Germany before and after the reunification process. A detailed examination of the projects is needed with help of the following questions: What events led to reunification and what role did transportation play? What happened in Germany after reunification? To fully understand the logic behind the GUTP and why this procedure was undertaken, knowledge about what the GUTP, their intention and goals are necessary. Some indicators may help to give answers to questions like: What changed through the GUTP? Did accessibility improve through the GUTP? And more importantly is the question in what dimensions it did happen.

Then the thesis moves from the German perspective to a description of South Korea's and North Korea's transport infrastructure. What are their characteristics? How do the current situations differ from each other and from the situation in Germany of 1990? Also an examination of current cross-border connections gives hints what is still left to do after reunification.

Finally, conclusions of the GUTP and lessons for Korea can be discussed. The final result is an action plan, whose intention is to show what transport infrastructure measures have to be take in case of a Korean reunification.

3 GERMANY'S CASE

3.1 WAY TO REUNIFICATION

3.1.1 SITUATION UNTIL 1989

In the beginning of the twentieth century the transportation network was radial focused on Berlin. Over the years railroad network was improved, but it got decreased quantitatively as the trend moved towards private motorization. Highways were built all over Germany in the same extent as the rails have been reduced. (KAGERMEIER 1999, p. 72)

Germany at that time was divided as a consequence of the Cold War. The western sectors were governed by France, United Kingdom and the USA. All three sectors were merged to the Federal Republic of Germany (FRG) on May 23 in 1949. The German Democratic Republic (GDR), controlled by the USSR, was established on October 7 within the same year. (HILPERT 2010, p. 129)

By that division, for example, 47 railroads have been affected (NUHN/ HESSE 2006, p. 73). Already a year later the Soviet Union started the closure of their occupied zone. In 1952 the establishment of a socialistic system in the GDR was completed and they minimized the border-crossings into the West to twelve, four of them have been street connections. (HUBER 2011, p. 6)

So there have been only a few places where it was possible to cross the border into the east. Also the transit corridors from West Germany to West Berlin decreased to a limited number. In 1961, the GDR started to build the wall on the Inner-German border and along with this process a lot of rail tracks were dismantled. Passenger and freight transport suffered badly from division. (HOLZHAUSER/ STEINBACH 2001, p. 128)

Summarizing the events, construction of the wall in 1961 cut off a lot of connections and it lead to a worsening situation of transport between East and West Germany (HUBER 2011, p. 7). Taking a look at statistics, the number of vehicles crossing the border fell from 198,000 in 1961 to 74,000 in 1962 (VERKEHR IN ZAHLEN 1991, p. 282).

West Germany had 2,110 km of highways and East Germany had 1,375 km in the first years after 1945. Then West Germany started to enhance constructions and 1965 there have been 3,024 km, 1970 it grew to 4,110 km and until 1980 it doubled once more to 8,198 km. (NUHN/ HESSE 2006, p. 46)

After the GDR finished paying off war reparations, the first investments went into railroad infrastructure. The intention was to secure transport ways for lignite, which was the main domestic energy source. Extension of road network was insignificantly small. Two characteristics dominated: (1) high traffic volume of freight transport in a very ecological and economical way and (2) collective passenger transport. Although there were a high demands for cars, waiting periods have been very long and so most people had to rely on public transport and railway. (GATHER 2001, pp. 3)

Problems of the East German road network have been damages of road surface, lack of city bypasses and capacity limitations of bridges. The rail network had too old signal- and safety techniques, sections with worn-out tracks where it was only possible to operate with low speed and also capacity problems with bridges. (HOLZHAUSER/ STEINBACH 2001, p. 128)

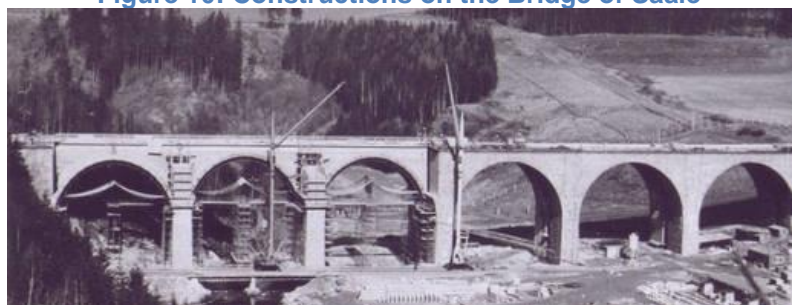
In the meantime transport infrastructure of West Germany focused on the following three points according to KAGERMEIER (1999, p. 72): (1) North-South axis of highway and high-speed rail (HSR); (2) strengthening of the integration to West European neighbors; (3) equal living conditions in all parts of Germany according to the Federal Spatial Planning Act ("Bundesraumordnungsgesetz") of 1965. Besides that construction of highways were focused on closing gaps in the network (NUHN/ HESSE 2006, p. 46).

Role of cross-border projects stayed trivially small, which is somehow in contradiction to the rise of border crossings. From 1975 to 1988 the number of vehicles which crossed the border grew to a constant figure of around 2.5 million per year (VERKEHR IN ZAHLEN 1991, p. 283).

One of the few cross-border projects, which have been accomplished, was the reconstruction of the bridge over the river Saale from 1964 to 1966. (HUBER 2011, p. 7)

First improvement for the road connections between East and West Germany was possible through the agreement about the opening of four new border crossings for passenger transport into the GDR from June 15, 1973. This was just a

Figure 10: Constructions on the Bridge of Saale



(source: SCHLEIZ OTZ 2012)

small step, but over the next twelve years four projects for roads have been achieved:

- **1975:** total reconstruction of Berlin – Helmstedt expressway for 260 million DM
- **1978:** construction of Berlin – Hamburg highway for 1.2 billion DM

- **1980:** construction of the bridge over Werra near Eisenach for 268 million DM
- **1985:** total reconstruction of parts from the expressway A 9 for 148 million DM

The last project contained a total renewal of the Saale bridge which was mentioned earlier. All of these projects were later once more part of the GUTP. (HUBER 2011, p. 8)

So far only road projects have been mentioned, although there was probably an even more important cooperation between the East and West on rail: In 1986 the government of West Germany initiated talks about a speed rail from Hannover to Berlin. A group of experts from both nations came together to work out a plan and it was even possible for the West German side to examine locations for the rail lines in the part across the border in the GDR. At first the cooperation was very distant but with the fall of the inner-German wall in 1989 the work became easier and planning duration was shortened. Especially this project is a pioneer to the GUTP and its success. (HUBER 2011, p. 9)

3.1.2 GERMAN REUNIFICATION

This subchapter cannot show the whole process until the reunification. It emphasizes the importance of transportation and shows the consequences if citizens fight for the right of free movement.

During the second half of 1980 the president of the Soviet Union Mikhail Gorbachev introduced a number of reforms which led directly to a transformation of whole Eastern Europe. One important historical event was, that in July 1989 when a large number of people occupied West German embassies in Budapest, Prague and Warsaw, as well as the American embassy in East Germany. On September 30, the Foreign Minister of Germany Genscher announced that the departure of these refugees has been granted. With trains of the German Reich Railways 5,500 East Germans left Prague and 800 people boarded a train from Warsaw through East Germany to the West. Those events marked the start of a mass refugee of 100,000 and more. (AHN 2005, p. 135)

Another big influence were the Monday demonstrations. Each week East Germans went out on the streets of East Berlin, Leipzig and other cities to raise their voice for free votes, freedom of press and freedom to travel with the chant "We are the people!" ("Wir sind das Volk!"). (AHN 2005, p. 137)

Politicians of the GDR had to react, but even the lift of some restrictions to travel has not been enough for the East German citizen. Undoubtedly the most important day was on November 9, when the politburo announced that all citizens are granted the right to travel and that the borders will be opened. It meant that citizens could directly go through border checkpoints to West Germany. As a reporter asked, when it would take effect, the spokesman said “effective immediately”. (AHN 2005, p. 138)

After these words the wall between the two states fell and it was clear, that it is not going to take long before the two states would be reunited. As introduced in subchapter 2.2, this was the tipping point for politics: From this moment long-term investments for the benefit of people and economy had to be developed and executed.

Federal Chancellor Helmut Kohl visited Dresden on December 19 and 20, 1989, for a meeting with the current president of the GDR Hans Modrow. The topic of their discussion was the transportation situation. It was clear that decisions had to be made quickly. They agreed to set up a committee named “Transportation Routes” (“Verkehrswege”). This committee existed of members from the East German Ministry of Transport and the Federal Ministry of Transport. Their tasks were categorized into three groups: closing of gaps, examination of backlog and planning of additional construction. (HUBER 2011, p. 11)

The most urgent task in the last months of 1989 was the restoration of border crossings. Often local companies had torn down border barriers without official permission. Most gaps have been closed until 1991. It was achieved so fast because prewar plans have been used. (HUBER 2011, p. 11)

The second task was in fact an intention to

Figure 11: Railway construction near Eisenach



(source: DER SPIEGEL 1992b, p. 86)

ensure traffic safety and maintenance of road network (HUBER 2011, p. 12). This is a more complex task and it resembles already basic structure of the GUTP.

3.1.3 EARLY SITUATION AFTER REUNIFICATION

How was the situation of transportation directly after reunification in Germany?

Figure 12: "Don't forget that you are still driving through Germany."



(source: MITTELDEUTSCHE ZEITUNG 2012)

The picture on the left shows how masses of cars are driving towards the West, while a sign lets the drivers know that they are still in Germany. Obviously, the capacity of that highway was not high enough to cope with the demand. This subchapter explains briefly this situation and it explains some backgrounds.

The opening of the border in 1989 was a big surprise and the existing train schedule could not cope with it (NLPB 1991, p. 79). That's

why railway companies took measures like reinforcement of trains with additional wagons to the highest possible length. From November 12, 1989, additional trains operated through the Inner-German border until the first station on the other side. And even some unused rail tracks were reactivated. (NLPB 1991, p. 80)

The situation of the transport network in the newly reunited Germany was relatively bad. 1990 an article in the magazine "Der Spiegel" describes the situation in detail: Train tickets sold out a week in advance and for example the train from Cologne via Hannover to Berlin was already fully booked in Hannover. The tracks in the new federal states have been in a bad condition, therefore trains had to drive under 100 km/h. A train ride from Hannover to Berlin took 4 hours 12 min in 1990 (BMVBS 2011, p. 10). The majority of the rail network needed electrification and in the Eastern part still a lot of diesel-locomotives operated, who were built in Rumania or Russia. (DER SPIEGEL 1990, p. 96)

Traffic on the highway A 2 doubled in just one year and everyday over 60.000 vehicles used the two lanes for each direction. Travel time on highway and country road was comparable, because highways have been jammed so much that the driving speed was low. Before the reunification it was possible to reach Berlin much faster. A bigger concern was the safety of the roads: On some routes the number of accidents tripled. The alternatives, trains and airplanes, have been booked out in advanced. (DER SPIEGEL 1990, p. 92)

The Federal Ministry of Transport estimated that traffic between east and west got ten times bigger from 1990 to 1992 (BMV 1992b, p. 11).

1990 Federal Chancellor Helmut Kohl promised a rapid recovery of the economy in the new states of Germany. He called them „flourishing landscapes“ (“blühende Landschaften”) and in the next year he said that he expected a second economic miracle (“Wirtschaftswunder”). (LESSENICH 2010, p. 2)

Table 2: Road conditions in East-Germany at the time of reunification

Street Category	Good Condition, only repair needed		Bad Condition, reconstruction urgent	
	Area in Million m ²	Proportion in %	Area in Million m ²	Proportion in %
Expressways	17.042	56.1	13.317	43.9
Federal Roads	63.647	78.0	17.981	22.0
Country Roads	106.701	59.3	73.214	40.7
Local Roads	122.528	32.0	259.910	68.0
in total	309.918	46.0	364.422	54.0

(source: GEBHARDT 1994, p. 189)

The left figure shows an evaluation of road types in terms of good or bad condition. A slightly larger proportion of expressways was in a rather good condition. Four thirds

of federal streets were also in a good condition. (GEBHARDT 1994, p. 189)

But condition is not the only essential factor. Capacity of roads for instance is also very important. In correspondence to a growing demand, which happened of course after the reunification, capacity of roads has to be extended with more lanes, wider roads and so on. It was estimated that 40 % of road bridges had a restricted carrying capacity (HÖPFNER/ KNÖRR 1992, p. 7). Bridges had to be reconstructed or their structure ensured.

In 1990 German highways had a share of 5 % of total length but around 30 % of traffic volume was handled by this road type. It highlights their importance and function as a relief of traffic for other roads is inferable. (BMV 1992a, p. 21)

Traffic capacity per person was in the GDR in terms of railroads much higher than in West Germany (HÖPFNER/ KNÖRR 1992, p. 170). But only 25 % of the network was electrified (SCHNELL/ HARTMANN 1990, p. 1185). Looking at 1988, an average of 8,200 passenger-kilometer (pkm) was done by motorized vehicles per person in the East and in West Germany it was 12,000 pkm per person for the same year. That's a difference between both nations of around 30 % and level of the GDR was comparable to West Germany in 1974. (HÖPFNER/ KNÖRR 1992, p. 171)

Freight transportation was higher in the GDR than in West Germany. Freight transport capacity was around 4730 ton-kilometer (tkm) per citizen and in Germany it was only at 4360 tkm. (HÖPFNER/ KNÖRR 1992, p. 181)

A survey with 500 managers of industry, construction sector and trade in the old states came to the result that over 80 % set the priority in improvement of telecommunication. On the second

place around 50 % urged for an improvement in transport infrastructure. (GEBHARDT 1994, p. 189)

Lower level of motorization in the GDR rose to West German standard in a couple of years. In the GDR were only 274 private cars per 1000 inhabitants in 1990. Three years later there were 420 cars per 1000 inhabitants. (NUHN/ HESSE 2006, p. 49)

In terms of traffic infrastructure all regions of the GDR except East Berlin and Leipzig were under the average of Germany. Problems of the infrastructure were ranging from bad condition of roads, outdated railway signals to capacity limits of bridges, junctions and routes. (DEITERS 2000, p. 118)

This draws a quite depressing image of infrastructure in East Germany. An overall improvement had to be done but privileges of some specific corridors probably formed the projects which will be introduced in the next part.

3.2 GERMAN UNITY TRANSPORT PROJECTS

3.2.1 IDEA AND GOALS

After reunification, the Federal Ministry of Transport placed priority on the development of transport infrastructure in the new federal states (BMV 1993, p. 7). At an early stage it was acknowledged that German reunification and establishment of a European market caused a shift from north-south traffic flow to west-east traffic flow and Germany would become transit country no. 1 (BMVBS 2011, p. 2).

On April 2 in 1991, the government approved the final draft for the GUTP with an investment volume of 56 billion DM (28.6 billion Euros/ 35.7 billion US dollar) which was a milestone for further progress. So the basic structure which did not change fundamentally after 1991 was set and acceleration and organization of planning and financing were determined. (HUBER 2011, p. 13)

Figure 13: Logo of German Unity Transport Projects



VERKEHRSPROJEKTE DEUTSCHE EINHEIT

(source: BMV 1993, p. 1)

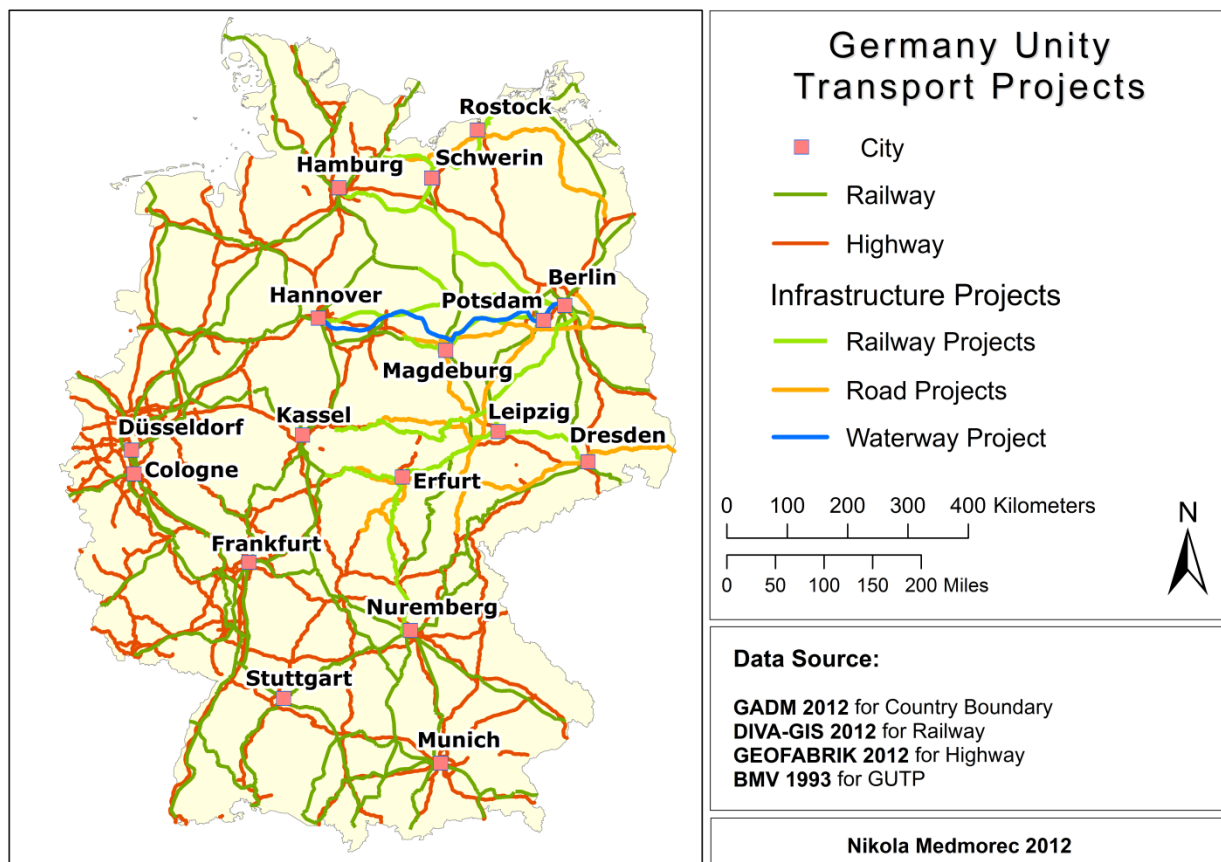
Later the investment volume was raised to 38.7 billion Euros (48.3 billion US dollar) and from 1991 to the end of 2010 around 30.7 billion Euros (38.4 billion US dollar) have been invested. 1.4 billion Euros of their total volume of 1.9 billion Euros (2.4 billion US dollar) was invested into the waterway. Railway projects have a fund of 20 billion Euros (25 billion US dollar) and 14.6 billion Euros have been used. Street projects are with 14.7 billion Euros close to their target of 16.8 billion Euros (21 billion US dollar). (BMVBS 2011, p. 2)

That means that almost 60 % of investments were for environmentally friendly transport methods like railway and waterway (DEITERS 2000, p. 118).

According to the FTIP '92 it was intended to realize all GUTP and other infrastructure measures until 2010 (BMV 1992a, p. 30.). Of the seventeen projects nine were completed until the end of 2010. (BMVBS 2011, pp. 3)

The map beneath shows the GUTP and the overall transport infrastructure as it exists today.

Figure 14: GUTP and Germany's transport infrastructure

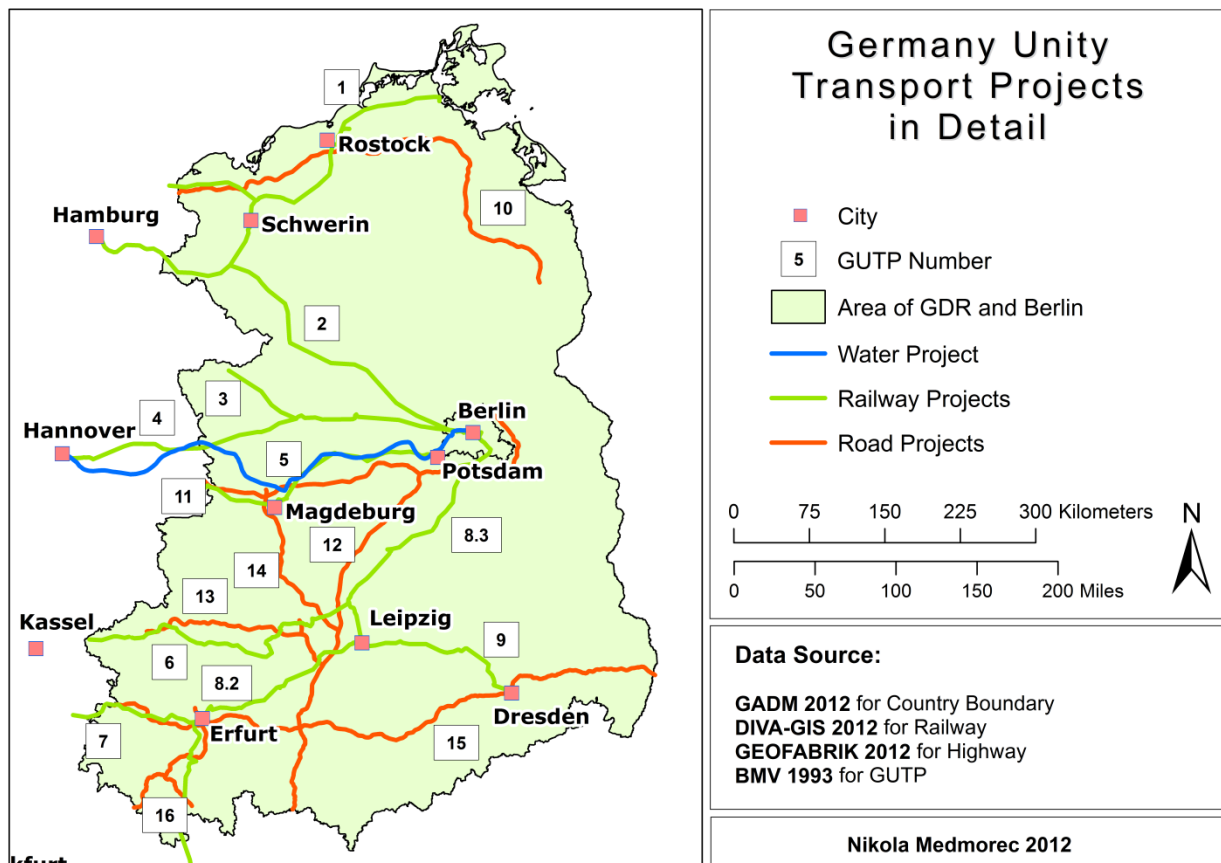


(source: made by author)

Germany has around 42,000 km of railway and nearly half of it is electrified (CENTRAL INTELLIGENCE AGENCY 2012a) but this map focuses on the lines where Germany's high-speed train Intercity-Express (ICE), an Intercity (IC) or an Eurocity (EC) operate. Total road

length is 644,480 km and this map shows the 12,800 km expressway (CENTRAL INTELLIGENCE AGENCY 2012a). In the context of all of Germany the map expresses very well how the GUTP extended the east-west axes. Most of the routes lead to Berlin. The next map provides a better overview of the projects.

Figure 15: GUTP in Detail



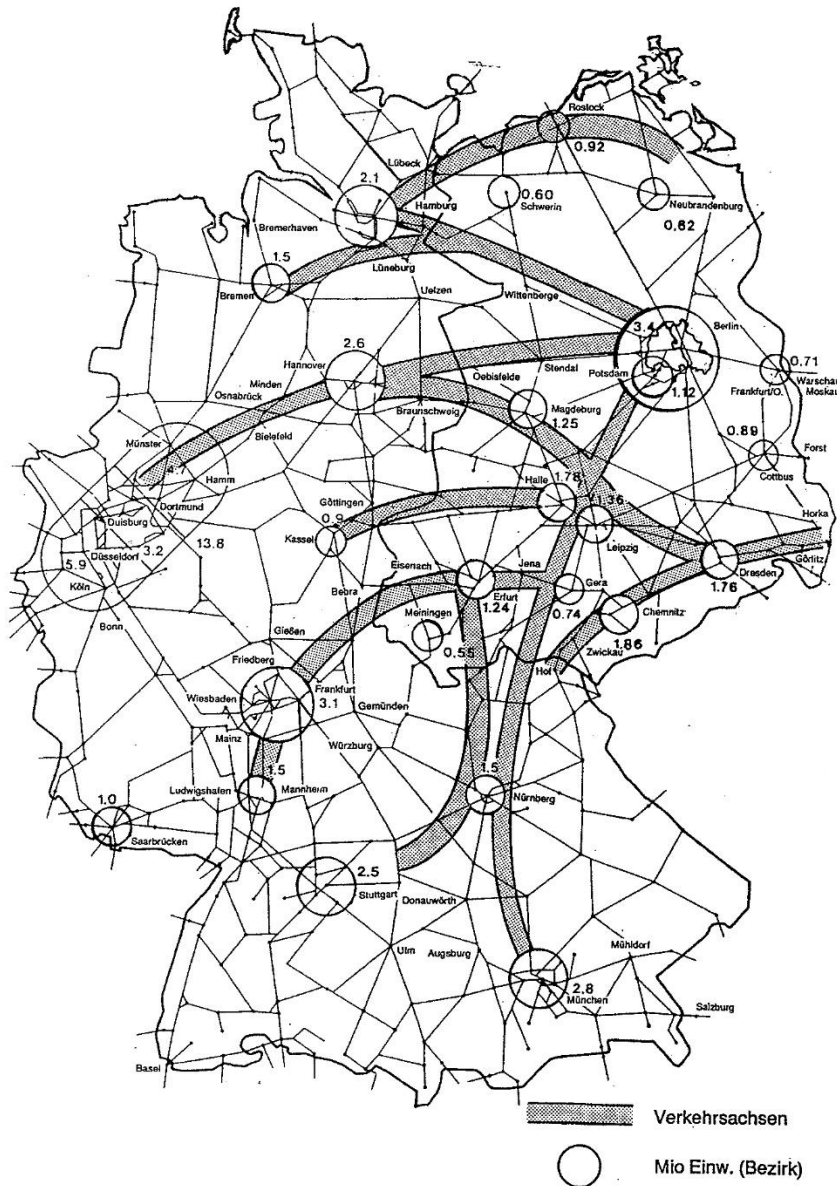
(source: made by author)

Project numbers 1 to 9 are railway projects, 10 to 16 are road projects and number 17 is the only waterway project. This map also shows that the GUTP are not exclusively only in new states and Berlin. Some are heading to the next major city like Hamburg, Hannover or to Nuremberg in the old federal states.

The rail projects intended to construct 571 km of new tracks and to modernize or to extend 1559 km (KIESLICH/ KLEINSCHMIDT/ LÖBACH 1992, p. 14). In comparison to that 844 km new roads have been constructed and 1086 km of driving lanes were renewed (KIESLICH/ KLEINSCHMIDT/ LÖBACH 1992, p. 15).

The Federal Ministry of Transport was solely responsible for determining traffic routes (BRANDENBURGER/ BAUMBACH 2011, p. 32). The right figure shows the first concept of the routes by the committee of Transport Routes. It seems to be a logical outline of routes to East Germany.

Figure 16: Concept of Axis in 1990



(source: HUBER 2011, p. 23)

and haulage times the GUTP tried to improve locations in the eastern states of Germany and to increase accessibility (DEITERS 2000, p. 118). After reunification the number of traffic related deaths grew by 80 % from 1991 to 1992 (BMV 1992b, p. 12). Main cause for accidents was human failure (alcohol, inadequate speed, wrong behavior to pedestrians) (BMV 1992b, p. 7). Obviously, this number was too high and therefore safety measures in the new states were

Germany. Important regional centers in combination including the number of their inhabitants were taken into account and Berlin as the biggest and most important city at that time stands out slightly. There are also two to three corridors with another direction. This plan contains traffic axis without a specification for road, rail or waterway.

The road projects featured a lot of new routes, whereas the majority of railway projects improved existing routes. (LUTTER 1992, p. 2)

The goal of the GUTP was to increase Germany's transport capability up to 30 % (BMV 1992a, p. 40).

Through reduction of travel

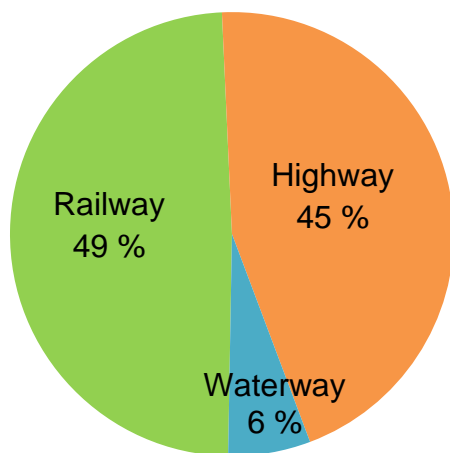
necessary. Traffic infrastructure was the cause for a suppressed economic development in East Germany since the end of the 1980s. (DEITERS 2000, p. 117)

The Federal Transport Infrastructure Plan (FTIP) of 1992 was the first transport infrastructure plan for reunified Germany. Compared to the decades before, the Ministry of Transport had a larger area they were responsible for and at the same time the conditions and requirements of the transportation network changed (BMV 1993, p. 13). The GUTP were passed in anticipation of the FTIP '92 a year before (DEITERS 2000, p. 118). Two of the four main goals targeted the transition of the new six federal states: overcome the consequences of a divided Germany and a divided Europe; fast improvement of the infrastructure in the new federal states and equalization to West German standards. The two other goals have been the strengthening of the European market and to ensure financial support for environmental friendly transportation method like rail and shipping. (BMV 1992b, p. 5)

The measures of the FTIP are influenced by international transport networks and international traffic flows (BMV 1992a, p. 12). East-West connections had to be reactivated with a higher volume of demand than ever before (BMV 1993, p. 13).

Generally, the most important functions of the FTIP are two-fold: (1) it predicates statements about overall integrated traffic prospects for all methods of transport and (2) it evaluates the urgency and profitability of projects with the help of standardized criteria. (BMV 1992a, p. 10)

Figure 17: Share of Investments in FTIP '92



(source: NUHN/ HESSE 2006, p. 53)

The shift towards railroad transportation is expressed with the high proportion of investment focusing on railroad projects. Also the FTIP '92 contains a high number of new constructions due to the gaps and missing links between East and West Germany. (NUHN/ HESSE 2006, p. 53)

The FTIP '92 evaluated the GUTP once more and the project's urgency and need were confirmed. (BMV 1992a, p. 20)

Germany agreed to invest a total amount of 435.5 billion DM (277.9 billion US dollar) in transport infrastructure until 2012. 242.6 billion DM (154.6 billion US dollar) were for the construction and extension of routes and 210.9 billion DM (134.1 billion US dollar) for maintenance. Additionally around 76 billion DM (48.5 billion US dollar) were used as financial aid for community roads. 39 % of the investments were put into the states of the former GDR. The main focus of investments in railways was in maintenance of substance,

modernization (particularly for German Reich Railways) and extension of HSR networks. For Germany's highways the investment funds went to the extension of existing routes, increase the lanes of highways to six or more lanes and enlargement of the total highway network. (BMV 1993, pp. 14)

Skipping forward to the latest FTIP in 2003, there was a review of FTIP '92 and a progress update of the GUTP. Generally, costs have been assumed to be lower than in reality. This was particularly the case in the new states of Germany. Focusing on the GUTP, FTIP '03 notes that by end of 2001 35 billion Euros (43.7 billion US dollar) have been invested. Six of nine rail projects and two of seven road projects progress at that time. (BMVBS 2003, pp. 7)

3.2.2 STAKEHOLDERS, INITIATORS AND EXECUTIVES

This chapter intends to introduce groups and individuals, who played an important role in the planning and execution of the GUTP.

With two exceptions there have never been such large-scaled transport projects in Germany. Before that there were only the Würzburg to Hannover HSR-link project and the Rhine-Main-Danube water canal construction that were of similar scale. (BBR 2005, p. 3)

Figure 18: Minister of Transport Krause



(source: DER SPIEGEL 1992b, p. 86)

The most important individual was Günther Krause with his role as Federal Minister of Transport from 1991 to 1993. The picture on the left shows him with the slogan "New ways needs the nation. Now!" of the GUTP.

He pushed the projects politically forward. Already in February 1991 he presented results and plan sketches to the transport committee of the German parliament. In his speech he described the GUTP as a key milestone in order to merge old and new states. (HUBER 2011, p. 13)

In the western states of Germany tasks of highway construction were only about small extensions or minor additions to the road network (BBR 2005, p. 3). The structure of the state administration in the old states was about to change, because the

demand for new projects was so low. In contrast to that, the former GDR administration was not able to execute projects of such dimensions on their own. Despite a lack of planning capacity it would not make sense to build up structures in the eastern states which have to be downgraded after ten or twenty years. This was the reason, why temporarily existing planning societies were founded. (BBR 2005, p. 4)

The next milestone was the establishment of privately organized planning societies. This was very helpful to accomplish the goals of GUTP. Responsibility of projects was given to them and they could manage it on their own (MÄNGEL 2011, p. 5).

For railway construction and modernization the company “Planning Society Railway Construction German Unity” (PRGU, “Planungsgesellschaft Bahnbau Deutsche Einheit mbH”) was founded by Deutsche Bahn on August 15, 1991. On the right the picture shows (from right to left) Peter Reinhardt, director at the Federal Ministry of Transport, Heinz Dürr, head of Deutsche Bahn, and Hans Klemm, director of German Reich Railways (MÄNGEL 2011, p. 4). The German government supported this move, because they wanted to complete all rail constructions faster, better and cheaper than usual. It was a commercial company with less than 200 experienced employees, who had to supervise 1200 experts in planning offices and construction companies. Eight of nine GUTP railway projects have been managed by them. One exception was the speed train from Hannover to Berlin (mentioned earlier in chapter 3.1.1). PRGU was decentralized with branches in Berlin, Dresden, Erfurt, Leipzig and Schwerin. (BMV 1993, p. 121)

In the 1980s Germany started with the first HSR tracks. At the time of reunification German government prepared for a reform of the state-owned rail company with the goal to modernize, increase effectiveness and make innovations easier. (MÄNGEL 2011, p. 2)

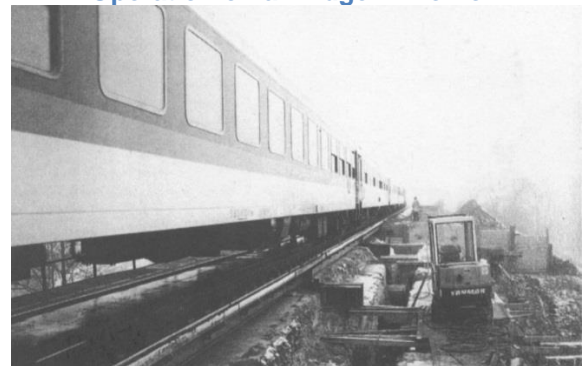
This resulted in a rationalization of the rail network and the number of tracks in train stations was decreased. New standards for bridges and

Figure 19: Meeting of Stakeholders



(source: MÄNGEL 2011, p. 4)

Figure 20: Parallel Constructions and Operation on a Bridge in Börzow



(BAUFELD 1993, p. 651)

tunnels were enforced. Modern computer technique was also implanted. The GUTP no. 8 helps to test the “European Train-Control-System”, a new pilot project in supervision of train networks in Europe. (MÄNGEL 2011, p. 5)

One task of PRGU was to manage land usage and land acquisition (as short-term lending, buying or special usage). For instance, the role of PRGU was to contact land owners and to discuss the details of the contract. (PB DE 1994, pp. 2)

Until the end of 1993 PRGU had already completed 300 km of railway, 15 % of the total projects. More than half of the contracts for planning and construction went to companies located in the new states. 40 % of all planning contracts and 70% of construction contracts have been given to them. (BAUFELD 1993, p. 649)

And in 1995 seven of nine rail projects were in the process of construction and 625 km of railway have been modernized. (BMV 1995, p. 4)

The other company dedicated to railway construction was the “Planning Society Speed Rail Construction Hannover – Berlin” (“Planungsgesellschaft Schnellbahnbau Hannover – Berlin mbh”). It was also a subsidiary of Deutsche Bahn and it exists since August 1990. Their task was only the supervision of planning and construction of railroad from Hannover to Berlin. (BMV 1993, p. 122)

Road projects have been managed by the company “German Unity Expressway Planning and Construction” (GUEP, “Deutsche Einheit Fernstraßenplanungs- und –bau GmbH”). It exists since October 1991. In five states GUEP took over the management and local head offices have been in each state capital. (BMV 1993, p. 123)



(source: DEGES 2011, p. 1)

GUEP was established on October 7 1991 with the mission to realize the GUTP with quality and cost levels similar to constructions in old federal states but in a shorter time. Their task was to plan investments and budget, acquire land, make contracts with construction companies, manage construction process and evaluate the project afterwards. Advantages of the privately organized GUEP are as follows: the company’s mission is exactly portrayed and duration is clearly determined. There is high flexibility when hiring employees. And these employees are highly qualified people with experience in all kinds of different areas. The last point is that evaluation of success is engendered by maintaining a clear company structure. GUEP proved to be efficient, so they even manage projects beyond the GUTP. (BRANDENBURGER/BAUMBACH 2011, p. 31)

The waterway project was supervised by the “Water and Shipping Directorate East” (“Wasser- und Schifffahrtsdirektion Ost”). It is part of the German “Water and Shipping Administration”. Founded on October 3 1990, it has sole responsibility for this project number 17. (BMV 1993, p. 124)

There was one more company with the name “DB Projekte GmbH Knoten Berlin“ with the mission to modernize transport infrastructure in Berlin. The “S-Bahn” (metro system) of Berlin was renewed. The international transport network was expanded and stations were restored, investing overall 20 billion DM in the process. (BMV 1997, p. 4)

3.2.3 ACCOMPANYING LAWS

The completion of the GUTP would not have been possible in such a short period without a special legal framework. There have been two laws that accompanied the projects. The first one was the law accelerating the planning of transport routes (“Verkehrswegeplanungsbeschleunigungsgesetz”) and the other one was the law for investment measures (“Investitionsmaßnahmengesetz”) (BMV 1993, p. 7). Procedure of planning was changed fundamentally by these two laws. Without going into detail, their main principles are presented in the following.

There was a need for short planning durations and fast execution of constructions in the new states of Germany. The main reason was that the economy should be competitive with the old federal states as fast as possible. Although a dense transport network already existed, its condition was terrible. Transportation was in a state of emergency, as the number of traffic-related deaths was much higher than in West Germany. Improvements of traffic infrastructure had to be completed fast. Planning durations of twenty years or more were not acceptable. (BMV 1993, p. 25)

However in Germany, large-scale projects usually take long. This would not have been bearable for the states of the former GDR. So the idea of putting up special laws whose scope of application was restricted to the new states was a good way to solve this problem. (BMV 1992b, p. 8)

At first, the law accelerating the planning of transport routes was limited until 1999 for railways and until 1995 for roads and waterways (BMV 1993, p. 25). The duration of this law was extended multiple times and at last it was useable until December 2006 (BMJ 2006, p. 1).

One major point of this law was that the route is determined by the government, represented through the Federal Ministry of Transport. This was possible for the eastern states as well as for routes in the western states. (KIESLICH/ KLEINSCHMIDT/ LÖBACH 1992, p. 8)

Furthermore, public participation in the planning process was changed. Usually, there are two phases with public participation, one at an early stage and one official phase after the first version of a plan was released. The law made it possible to omit the first phase of public participation. However, the official phase of public participation remained compulsory in the planning process and alternative routes had to be introduced as well. Citizens who were affected by the plan could still express their objections. (BMV 1993, p. 26)

Usually, constructions have to undertake an examination of environmental compatibility ("Umweltverträglichkeitsprüfung"). The law for accelerating the planning also shortened the procedure of that examination. (KIESLICH/ KLEINSCHMIDT/ LÖBACH 1992, p. 7)

The last difference was that law suits against plans of the GUTP have been handled directly by the Federal Administrative Court (BMV 1993, p. 27). The main reason behind this idea was to quickly reach legal certainty. This would not be possible otherwise, as the courts of the new German states did not have enough experience with federal laws and therefore, the law suits would have taken too long. (BMV 1993, p. 28)

One problem of the new constructions was that the acquisition of land had to be done fast. Expropriation became possible even if the ownership of the land was not determined. Moreover, this law allowed a temporary possession already in the expropriation procedure. Construction permissions were granted faster and the requirements were that nearly nobody was affected negatively and that an examination of environmental compatibility was made. Generally, the changes have been minimal. The only difference was the reduction of duration of some specific steps in the planning process. (BMV 1993, p. 28)

Secondly, the law for investment measures is based on the fact that the German reunification was an exceptional circumstance. Due to this, the federal lawmakers and not the local administration could determine the details of each plan. (HUBER 2011, p. 14)

Sections of the planned constructions were directly approved by the law for investment measures. Its purpose was to enhance the improvement of the transport infrastructure in the new German states. With a fast completion of the projects, the new federal states should be integrated quickly into the European transportation networks. Private planning companies took over the task of planning. The concerns of the citizens and ecological concerns had to be taken into account. (BMV 1993, p. 37)

This law was only used if the construction process of a specific project was not sufficiently accelerated by the law accelerating the planning of transport routes presented above. Its use was supposed to be exceptional and time advantages had to be justified. It was used for several sections of some GUTP. (BMV 1993, p. 38)

The law for investment measures can be interpreted as an extreme option, because it allows that a project or parts of a project are regarded as a law. This implies that all other official procedures are not necessary. The Federal Ministry of Transport handles the whole planning process on its own and the states can only participate through legislative bodies like the Federal Council (“Bundesrat”). (KIESLICH/ KLEINSCHMIDT/ LÖBACH, p. 8)

Both laws have been heavily discussed but the result proves their success (NUHN/ HESSE 2006, p. 58). The laws are focusing on the most complicated measures in a planning process and they are trying to ease them. Complexity is removed without losing steps which are important to reduce mistakes, complaints or ecological harm. A lot of steps in the planning procedure have been tightened to save time (BMV 1993, p. 27). In the previous chapter, main actors have been introduced and in the opinion of the author, application of these laws can be justified already by the fact that planning of the GUTP was done by highly skilled professionals.

3.2.4 OVERVIEW OF PROJECTS

- Project No. 1: Lübeck/Hagenow Land - Rostock - Stralsund

The first project of the GUTP has the intention to improve tourism and economic development of the northeastern coast area. And it creates a connection to the Baltic Sea and further to Scandinavia. It also connected Mecklenburg-Vorpommern’s capital Schwerin to Hamburg. (BMV 1993, p. 47)

Table 3: Details about Project No. 1

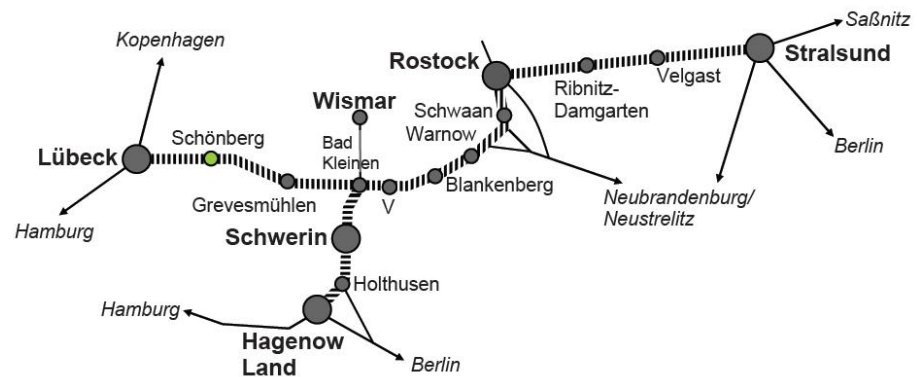
Length (in km)	Type	Status	Costs (in Mio. €)
250	Extension	In Progress	861

(source: BMVBS 2011, p. 6)

Through this project it became easier to get from Schwerin to Berlin by rail (BMVBS 2011, p. 6). After modernization of that railway travel time from Hamburg to Stralsund was reduced from originally 4 h to 2 h 30 min by a speed of 120 to 160 km/h. On top of the partial extension with a second track this project contained construction of 18 km rail to overcome a gap in the network. (BMV 1993, p. 48)

Currently an IC operates on this route with a travel time from Hamburg to Stralsund of around 2 h 40 min (DEUTSCHE BAHN 2012).

Figure 22: Project No. 1



(source: BMVBS 2011, p. 5)

- Project No. 2: Hamburg - Berlin

On this historical important rail link between Hamburg and Berlin speed rails operated already before the Second World War. Trains like “Flying Hamburger” (“Fliegender Hamburger”) and “Rail Zeppelin” (“Schienenzepplin”) needed less than two hours for this distance.

Table 4: Details about Project No. 2

Length (in km)	Type	Status	Costs (in Mio. €)
270	Extension	Completed	2,678

(source: BMVBS 2011, pp.7)

However the quality of this line worsened during the decades of Cold War in Germany and trains needed around four hours. (BMV 1993, p. 51)

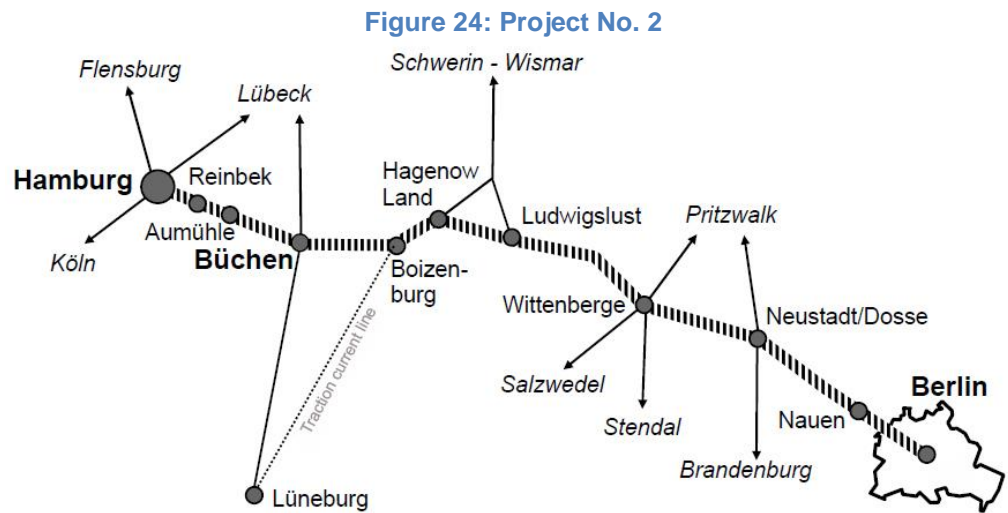
As a project of German Unification it was important to restore the fast connection and to reduce travel time to a minimum. This line was important for regional and international traffic. The route was double-tracked, but the causeway had to be renewed. The bigger problem was the desolate condition of rail bridges, pedestrian bridges and road bridges. 159 bridges had to be repaired and six tunnels were modernized. (BMV 1993, p. 52)

Figure 23: Rail Zeppelin



(source: AUTOWALLPAPER 2012)

Both cities Hamburg and Berlin are economically very important. The international importance explains through the establishment of a connection between nationals in (South-)Eastern Europe to the ports of North Sea. (BMVBS 2011, p. 7)



(source: edited version of BMVBS 2011, p. 6)

One part of modernization was the remodeling of 27 train stations (BMV 1993, p. 52). Extension was conducted in two steps: With the first step tracks

should have been restored so far that a train could run with 160 km/h (and sometimes with up to 200 km/h). The second step improved the possible speed to 230 km/h and so ICE trains could drive the distance from Hamburg to Berlin in 96 minutes. This project is fully completed and in service since 2004. Causeway was exchanged until middle of 2009. (BMVBS 2011, pp. 7)

According to the newest schedule of DEUTSCHE BAHN (2012) an ICE needs 1h 40 minutes on this line from Hamburg to Berlin.

- **Project No. 3: Uelzen - Salzwedel - Stendal**

This rail line was constructed in 1873 to transport goods to the ports at the North Sea coast. The extension includes an improvement to a speed of 160 km/h, complete double-track and electrification. The goal was to reduce the travel time to 122 min from Hamburg to Berlin via Uelzen. (BMV 1993, p. 55)

Table 5: Details about Project No. 3

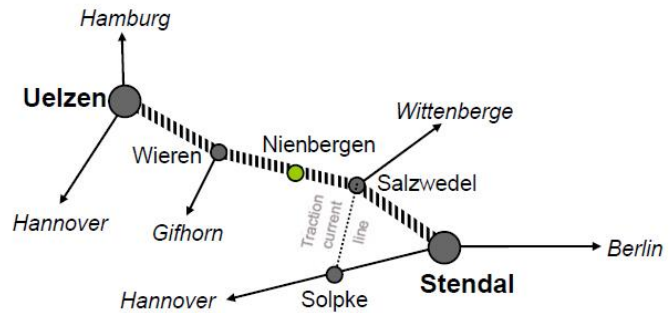
Length (in km)	Type	Status	Costs (in Mio. €)
113	Extension	Completed	318

(source: BMVBS 2011, p. 9)

The high costs can be explained by the work that had to be done: noise barrier along 18.5 km, 56 road overpasses, 35 rail bridges and 98 railway culverts. (BMV 1993, p. 56)

Electrification was the first task which was completed until 1997 and it is in use since 1999. Double-tracking was not done, but if the demand rises, FTIP '03 contains measures of building a second track. (BMVBS 2011, p. 9)

Figure 25: Project No. 3



(source: BMVBS 2011, p. 9)

- Project No. 4: Hannover - Stendal - Berlin

It is a part of the European HSR network Paris - Brussels - Aachen - Cologne - Hannover - Berlin with the prospected extension to Warsaw and Moscow. Project no. 4 intendeds to increase the operation speed up to 250 km/h. (BMV 1993, p. 58)

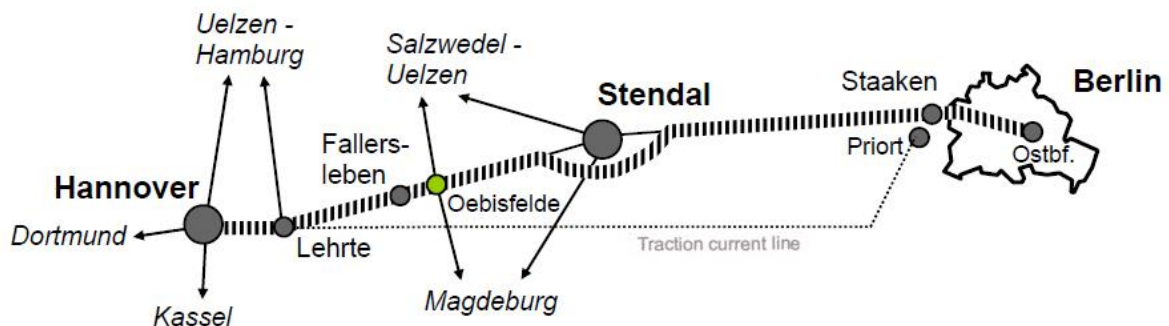
Table 6: Details about Project No. 4

Length (in km)	Type	Status	Costs (in Mio. €)
264	Construction/ Modernization	Completed	2,678

(Source: BMVBS 2011, p. 10)

The travel time should be reduced to 1 h 44 min (BMV 1993, p. 59). HSR operates since 1998 on this route (BMVBS 2011, p. 10). Currently trains like ICE are operating on this line every hour. A trip from Hannover to Berlin takes 1 h 40 min (DEUTSCHE BAHN 2012).

Figure 26: Project No. 4



(source: BMVBS 2011, p. 10)

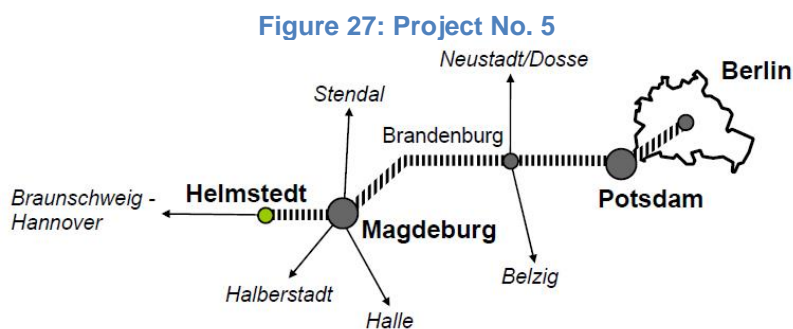
- Project No. 5: Helmstedt - Magdeburg - Berlin

Potsdam has the oldest train station among all capitals of the new German states which is still in use. It shows that this route has a valuable history. The route goes through Lower Saxony, Saxony-Anhalt and Brandenburg. The distance from Helmstedt to Berlin may be traveled within 100 min by a speed of 160 km/h. For the part in Brandenburg a detailed examination about the environmental impact was made until December 1992. (BMV 1993, p. 62)

Table 7: Details about Project No. 5

Length (in km)	Type	Status	Costs (in Mio. €)
163	Extension	Completed	1245

(source: BMVBS 2011, p. 11)



(source: BMVBS 2011, p. 11)

Modernization of this track was already in 1995 completed (BMVBS 2011, p. 11).

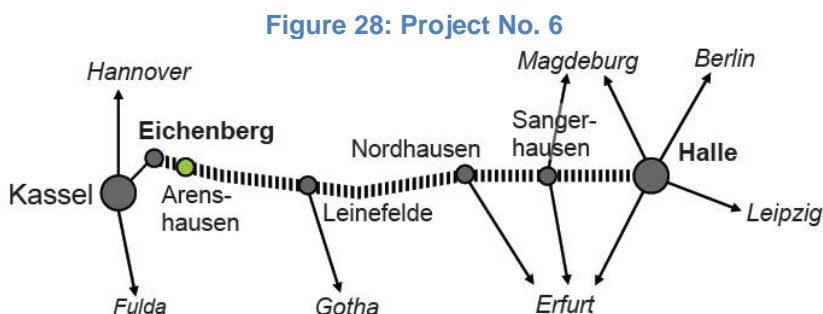
- Project No. 6: Eichenberg - Halle

This route had to be modernized to restore the freight transport between the industrial area of Ruhr and the central German area. With a speed of 120 km/h, double-tracks and electrification the transport could be more efficient. (BMV 1993, p. 65)

Table 8: Details about Project No. 6

Length (in km)	Type	Status	Costs (in Mio. €)
170	Extension	Completed	271

(source: BMVBS 2011, p. 12)



(source: BMVBS 2011, p. 12)

This project was completed as the first GUTP among all of them in August 1994. (BMV 1994, p. 7)

- Project No. 7: Bebra - Erfurt

The rail line from Hessen to Thuringia's capital Erfurt was to be modernized for a speed of up to 200 km/h. (BMV 1993, p. 68)

It is a part of West-East connection from Frankfurt to Dresden. (BMVBS 2011, p. 13)

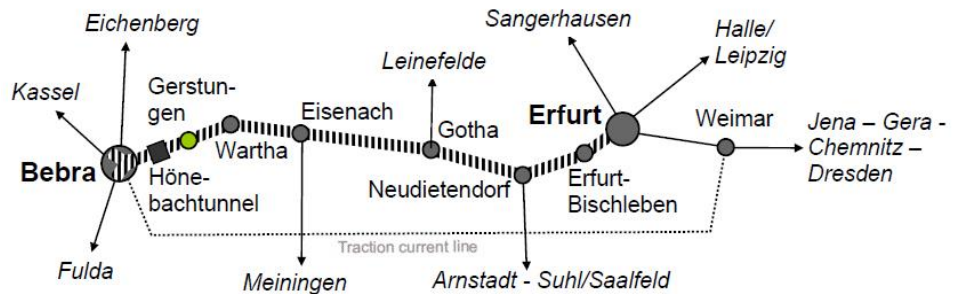
Since May 1995 trains with a maximum speed of 160 km/h are driving on this road (BMVBS 2011, p. 13)

Table 9: Details about Project No. 7

Length (in km)	Type	Status	Costs (in Mio. €)
104	Extension	Completed	913

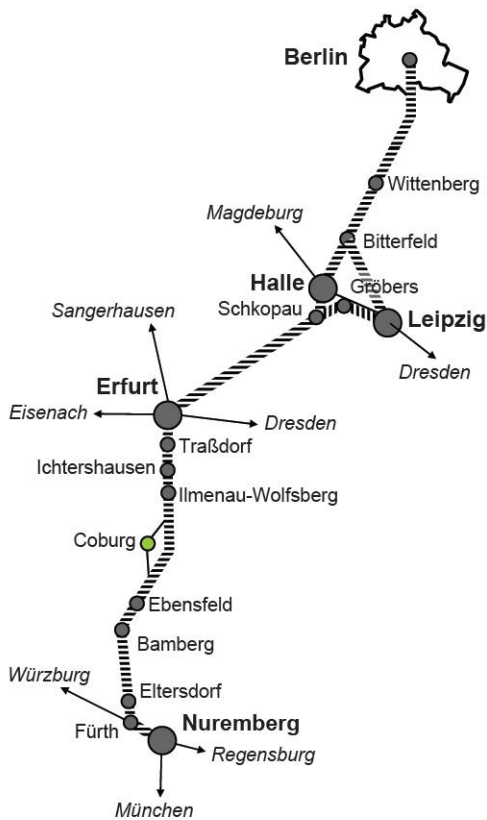
(source: BMVBS 2011, p. 13)

Figure 29: Project No. 7



(source: BMVBS 2011, p. 13)

Figure 30: Project No. 8



(source: BMVBS 2011, p. 14)

- Project No. 8: Nuremberg - Erfurt - Leipzig/Halle - Berlin

In difference to other projects, this one is divided into three parts. Each part is going to be introduced separately.

It tries to be an environmental friendly approach of transportation and it is the main south-north axis of eastern Germany for freight and passenger transport. It is project no. 1 of Trans European Network from northern Italy via Austria, Munich and Berlin to Scandinavia. (DB PROJEKTBAU 2010, p. 1)

It is a very important connection between the economic centers of South Germany, Center Germany and the area of Berlin. All together the construction and extension costs over 15 billion DM. Travel time is going to be shorted to 4h 45

min from Munich to Berlin or from Nuremberg to Berlin to 3h 30 min. (BMV 1993, p. 80)

The graphic on the left shows the whole project no. 8.

- Project No. 8.1: Nuremberg - Erfurt

The main part of this project is executed in Bavaria. 118 km are going to be build there for a highly efficient, powerful connection between the two cities. The goal is to operate regularly an ICE from Munich to Berlin on this very promising route. (BMV 1993, p. 71)

Freight transport on rail is getting a direct connection between North and South Germany by a speed of 160 km/h. (BMV 1993, p. 72)

The role of Erfurt as a rail hub will be improved by this project. From Erfurt a train will depart in every direction. (BMV 1993, p. 75)

Table 10: Details about Project No. 8.1

Length (in km)	Type	Status	Costs (in Mio. €)
198	Extension/ Construction	In Progress	5,201

(source: BMVBS 2011, pp. 14)

Figure 31: Overview of GUTP 8.1



(source: VDE8.1 2012)

Numerous valley bridges and tunnels have to be built. Until 2011 four tunnels and twelve viaducts have been finished (BMVBS 2011, p. 15).

- Project No. 8.2: Erfurt – Halle/Leipzig

This completely new constructed railway is part of a very important route to Berlin. The original line was not sufficient enough and the maximum of the capacity was too easily reached. A construction of a new railway, which can be used by ICE, was easier to build than to modernize the existing one. The travel

Table 11: Details about Project No. 8.2

Length (in km)	Type	Status	Costs (in Mio. €)
114	Construction	In Progress	2,738

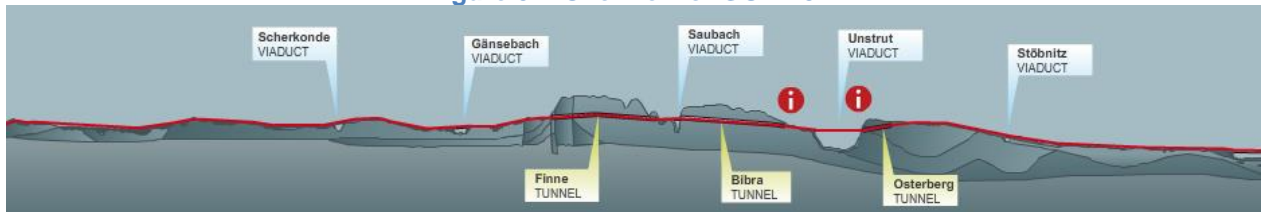
(source: BMVBS 2011, pp. 14)

time is reduced from 83 min to 31 min (from Erfurt to Halle) and from 76 min to 39 min (Erfurt to Leipzig). (BMV 1993, p. 77)

Passenger transport can be handled by a speed of 250 km/h and good transport by 160 km/h. (BMV 1993, p. 78)

Trains operating on this part are passing through three tunnels and over several viaducts. The longest bridge is 8.6 km and it goes over the valley of Saale and Elster. Tunnels are the Finnetunnel with 6.9 km, Bibratunnel with 6.5 km and Ostbergtunnel with 2.1 km. (BMVBS 2011, p. 15)

Figure 32: Overview of GUTP 8.2



(source: VDE8.2 2012)

- Project No. 8.3: Halle/Leipzig – Bitterfeld - Berlin

From Leipzig to Berlin the InterCity is going to take only 1h 26 min instead of 2h 5 min (BMV 1993, p. 80). This section operates trains with a speed of 200 km/h since Mai 2006 (BMVBS 2011, p. 15).

Table 12: Details about Project No. 8.3

Length (in km)	Type	Status	Costs (in Mio. €)
155	Extension	Completed	1,653

(source: BMVBS 2011, pp. 14)

- Project No. 9: Leipzig - Dresden

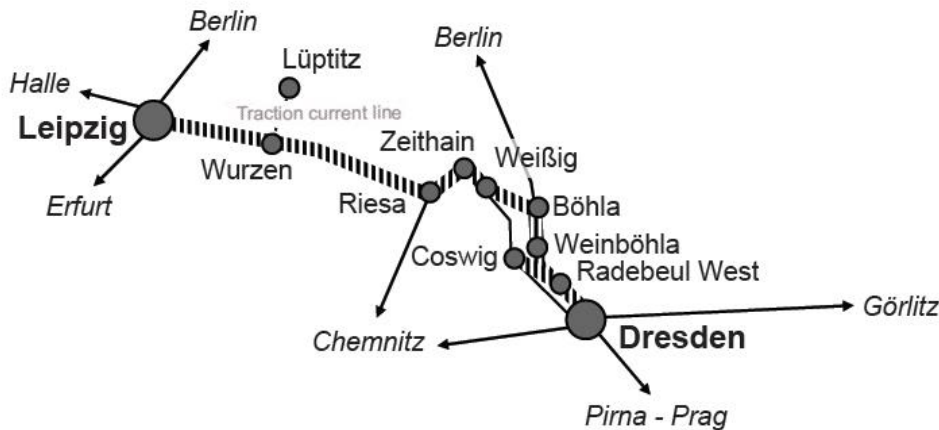
Dresden had to be connected to the Trans-European Network. Therefore 41 km of new tracks had to be installed. The connection from Leipzig to Dresden improved so well, that trains need only 45 min with a speed of around 200 km/h. 2000 meter long tunnel “Kockelsberg tunnel” was built for this project. (BMV 1993, p. 86)

Table 13: Details about Project No. 9

Length (in km)	Type	Status	Costs (in Mio. €)
117	Extension/ Construction	In Progress	1,451

(source: BMVBS 2011, pp. 17)

Figure 33: Project No. 9



Railroad between Leipzig and Riesa is completed and so traveling time of trains from Leipzig to Dresden is around one hour. (BMVBS 2011, p. 17)

(source: BMVBS 2011, p. 17)

- Project No. 10: A 20 - Lübeck - Stettin

Table 14: Details about Project No. 10

Length (in km)	Type	No. of lanes	Costs (in Mio. €)
323	Construction	4	1,900

(source: BMVBS 2011, p. 19)

With project no. 10 the section about highway projects starts.

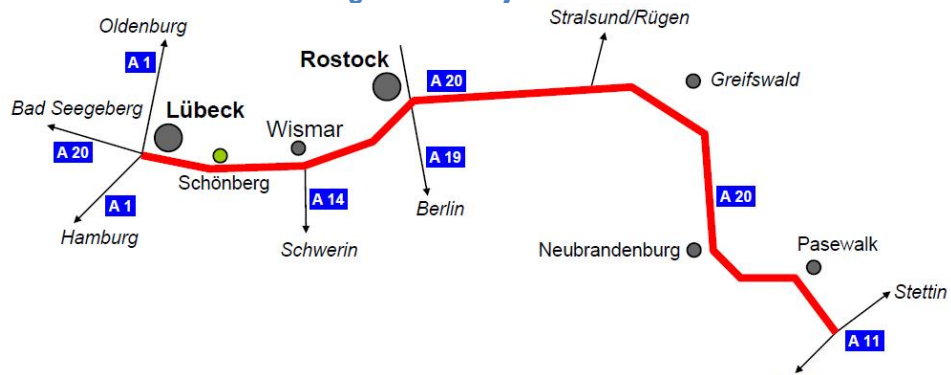
The complete new construction of the highway A 20 goes through Mecklenburg-Vorpommern.

It aims to connect the area of the East Sea with the West German and European transport network. Another function is as a transit route from West to East Europe. For the region it should relief the traffic from other routes. (BMV 1993, p. 89)

In addition to this unity project the federal transport infrastructure plan contains extensions through A 21 (BMV 1993, p. 90)

This project was highly criticized because A 20 had to cross a bird sanctuary on 70 km. Alternatives would have been even more harmful and economically insufficient. (BBR 2005, S. 26)

Figure 34: Project No. 10



(source: BMVBS 2011, p. 19)

Europe Union agreed to this project after a detailed examination of route alternatives and an environmentally acceptable solution of construction (BBR 2005, S. 27). Since December 2005 this highway is open for traffic (BMVBS 2011, p. 19)

- Project No. 11: A 2 - Hannover - Berlin & A 10 - Berliner Ring (South- und Eastring)

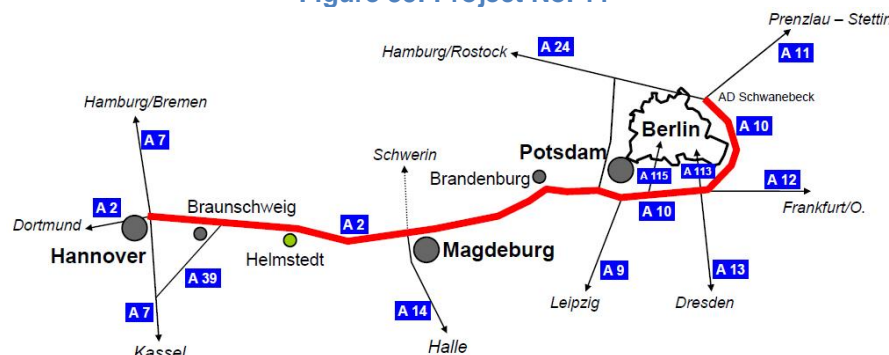
Table 15: Details about Project No. 11

Length (in km)	Type	No. of lanes	Costs (in Mio. €)
331	Extension	6	2,330

(source: BMVBS 2011, p. 20)

On a combined length of 322 km long, highways A 2 and A 20 are going to be adjusted to bear the traffic flow, which was projected for 2010. And the area of Berlin gets a connection to the populated areas of Ruhr and Rhine.

Figure 35: Project No. 11



(source: BMVBS 2011, p. 20)

Before 1990 the A 2/ A 10 was the main transit route from West Germany to Berlin and so it was really busy. The risk of traffic jams had to be minimized while the security of road has to get higher. (BMV 1993, p. 93)

Extension to six lanes of A 2 is complete and A 10 is completed except 5 km. (BMVBS 2011, p. 20)

- Project No. 12: A 9 - Berlin - Nuremberg

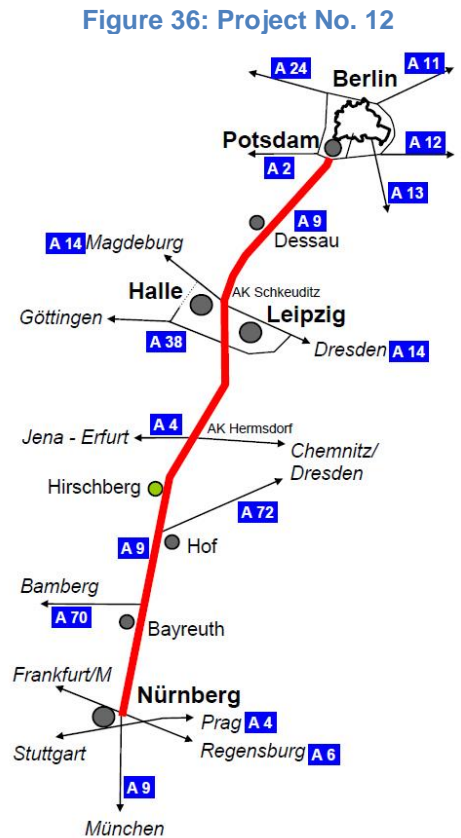
Table 16: Details about Project No. 12

Length (in km)	Type	No. of lanes	Costs (in Mio. €)
372	Extension	6	2,900

(source: BMVBS 2011, p. 21)

This route became a project of the GUTP because it is an important North-South-connection from Berlin and the new states to the Southern German regions. It also connects Austria and Italy. (BMV 1993, p. 97)

In Bavaria, Saxony-Anhalt and Brandenburg it was completely extended to six lanes. In Thuringia two thirds of the project is completed. (BMVBS 2011, p. 21)



(source: BMVBS 2011, p. 21)

- Project No. 13: A 82/ A 140 - Göttingen - Halle

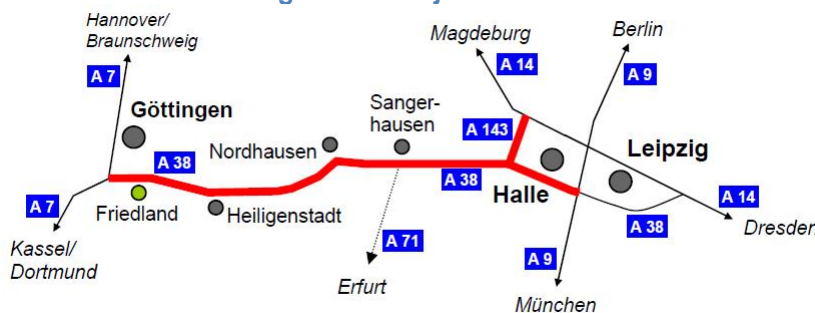
Table 17: Details about Project No. 13

Length (in km)	Type	No. of lanes	Costs (in Mio. €)
209	Construction	4	1,800

(source: BMVBS 2011, p. 22)

The idea of this motorway is to build a direct connection between high dense regions. Also the function is to relief traffic from federal streets. (BMV 1993, p. 101)

Figure 37: Project No. 13



(source: BMVBS 2011, p. 22)

State of project is that A 38 is complete since end of 2009. Some sections of A 143 are still in construction. (BMVBS 2011, p. 22)

- Project No. 14: A 14 - Magdeburg - Halle

Table 18: Details about Project No. 14

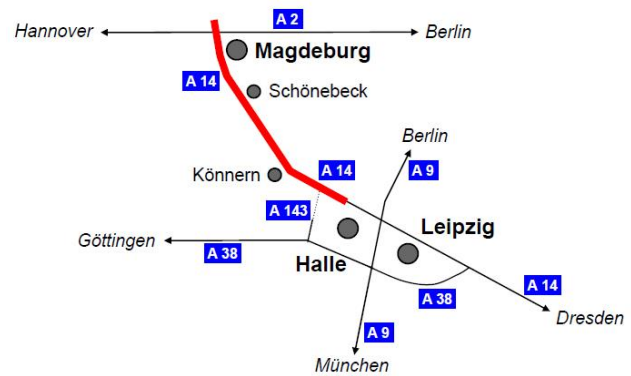
Length (in km)	Type	No. of lanes	Costs (in Mio. €)
102	Construction	4	650

(source: BMVBS 2011, p. 23)

Realization of this project has nationwide effects (BMVBS 2011, p. 23). Traffic from numerous streets through cities can be relieved. (BMV 1993, p. 103)

It is the first road project of the GUTP which was completed. November 2000 it was opened for traffic. (BMVBS 2011, p. 23)

Figure 38: Project No. 14



(source: BMVBS 2011, p. 23)

- Project No. 15: A 44: Kassel - Eisenach & A 4 Eisenach - Görlitz

Table 19: Details about Project No. 15

Length (in km)	Type	No. of lanes	Costs (in Mio. €)
457	Extension/Construction	4/6	4,600

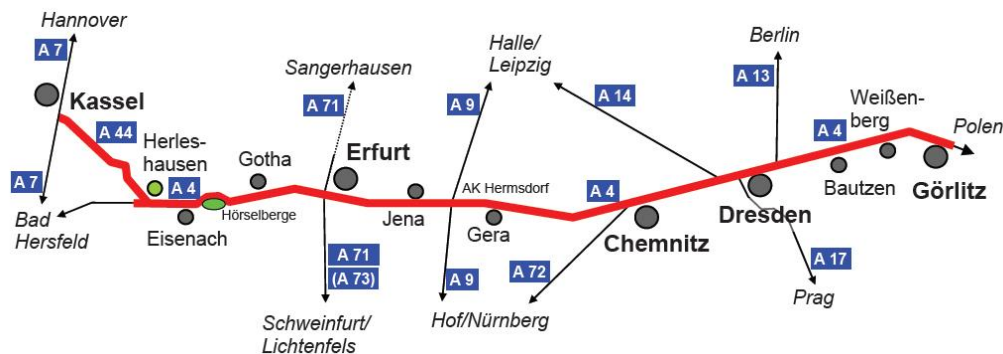
(source: BMVBS 2011, pp. 24)

(HUBER 2011, p. 6). This highway is most important for the international traffic between east and west (BMV 1996b, p. 3).

It builds a connection to Poland's industrial areas. (BMV 1993, p. 106)

The plans for this road have been made already in 1970, but because of the political situation it could not be realized before

Figure 39: Project No. 15



(source: BMVBS 2011, p. 24)

Of 457 km 380 km (349 km as extension, 31 km as new construction) have been finished. For instance, the last section between Dresden is already in use. Due environmental issues some sections are still in planning process. (BMVBS 2011, pp. 24)

Figure 40: Old (right) and new highway track (left) for A 4



(source: BBR 2005, p. 22)

- Project 16: A 71 - Erfurt - Schweinfurt & A 73 - Suhl - Lichtenfels

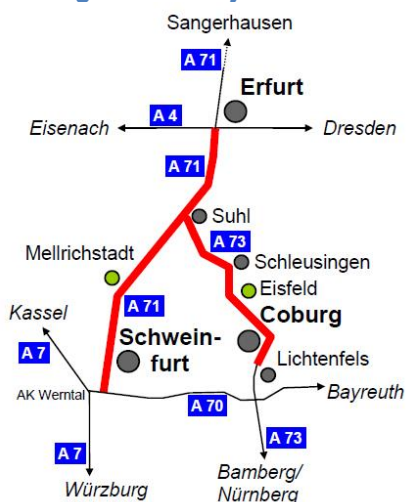
Table 20: Details about Project No. 16

Length (in km)	Type	No. of lanes	Costs (in Mio. €)
222	Construction	4	2,650

(source: BMVBS 2011, p. 26)

The purpose of this highway is to reach the South Thuringia easier from Bavaria and other parts of Southern Germany. It should support the highways A 7 and A 9 in means of handling the traffic volume. (BMV 1993, p. 111)

Figure 41: Project No. 16



(source: BMVBS 2011, p. 26)

Parallel to this highway was the HSR constructed. Formal process takes in Bavaria longer because jurisdiction of GUTP's special laws does not work there. (BMV 1993, p. 112)

Constructions of the GUTP No. 16 started as last project of German reunification on April 16, 1996 (BMV 1996a, p. 2). And with July 2008 this GUTP was completed (BMVBS 2011, p. 26).

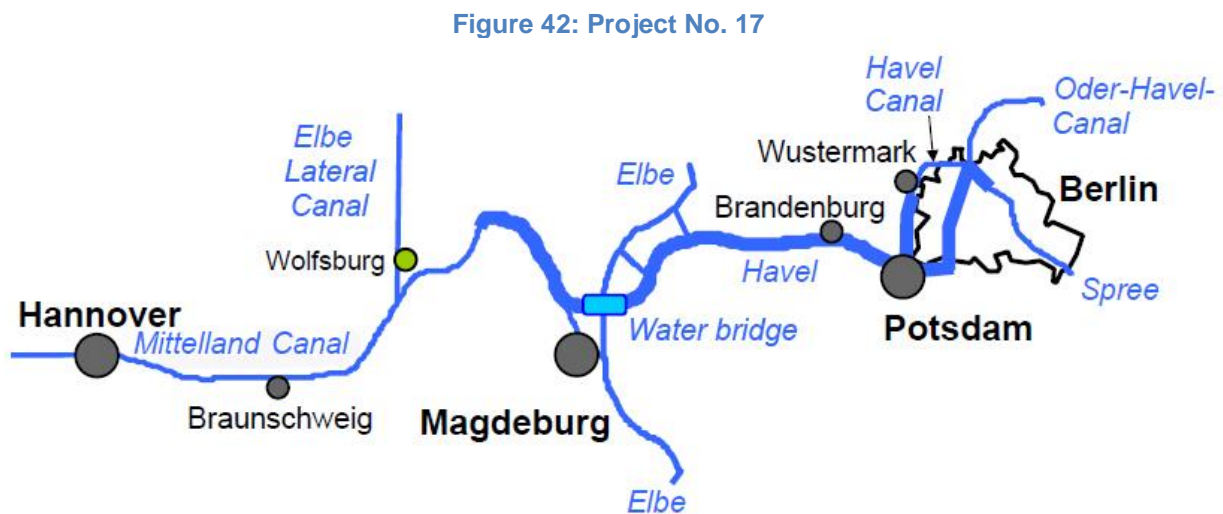
- Project 17: Waterway Hannover - Berlin

The goal of this project was to achieve a safe, economical and environmentally friendly connection from Berlin to the German ports of North Sea. This waterway was built in 1938 and the dimensions are not suited for modern freight ships. An extension of 80 km of the Mittelland Canal was planned. The canal was not wide enough to allow high transport volume. (BMV 1993, p. 114)

Table 21: Details about Project No. 17

Length (in km)	Type	Costs (in Mio. €)
280	Construction	1,906

(source: BMVBS 2011, pp. 27)

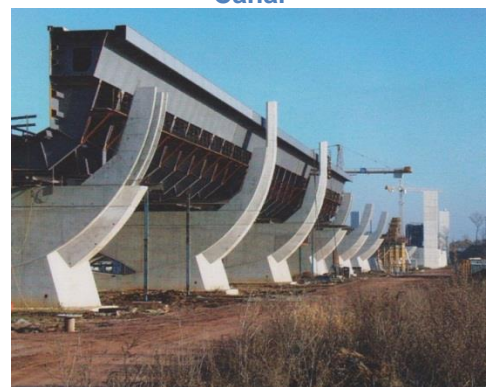


(source: BMVBS 2011, p. 27)

Freight transport by ship had a share of 25 % at the time of reunification in West Germany and in East Germany only 3 % of goods were transported by ship. (BMV 1992b, p. 12)

Large freight ships with 2,000 tons or a ship with two barges with maximum of 3,500 tons could pass over through this canal. The plan sees a completion of this project until 2015. (BMVBS 2011, pp. 27)

Figure 43: Construction of Water Canal



(source: BBR 2005, p. 20)

3.3 ANALYSIS

3.3.1 EFFECTS THROUGH THE GUTP

A look at results of various studies attends to evaluate the GUTP within this chapter.

Generally, Germany's unity initiated a transition, in which consumption and daily habits of East Germans adjusted quickly to their western fellows. A concealed demand for private vehicles was satisfied after a short period of time. Decentralization of production and suburbanization (first retail business, than housing and other services) happened as well. Today, there is no difference of mobility behavior between East and West Germany. Participation in transport, distances by motorized individual transport per person and day are almost identical in old and new states of Germany. Travel time is 10 % higher in the East due to a higher distance for commuting to their work place. Especially in the case, if somebody lives in the former border area and his company is in West Germany, travel time is much longer. (GATHER/ KAGERMEIER/ LANZENDORF 2008, pp. 46)

Another incomparable fast development was that East Germans reached the level of car ownership in five years of 1989 to 1994, which was reached by West Germans in fifteen years. (DEITERS 2000, p. 124)

Table 22: Development of Passenger Transport (prospected and real)

Passenger Transport (billion pkm)	1988	1991	2010	2010 (real)
Private transport	647	703	838	904.7
Railway	62	53	88	84
Aviation	14	16	34	61.6
Public Transport	87	78	110	103.7

(source: BMV 1992a, p. 14; BMVBS 2011c, p. 219)

rails was expected to increase and in the FTIP '92 it was assumed that it is going to stay relatively close to the development of road freight. But in reality it is even under the value of 1988. Shipping freight was expected to double from 1991 to 2010, but it stayed at the same level. Road freight grew enormously (twice the expected value).

FTIP '92 set up prospects about development of passenger transport and freight transport. For passenger transport the development was quite exact. Just air flights had a bigger boom than expected. But the difficulty of prospects shows the table no. 23 about freight transport. Cargo transport on

Table 23: Development of Freight Transport (prospected and real)

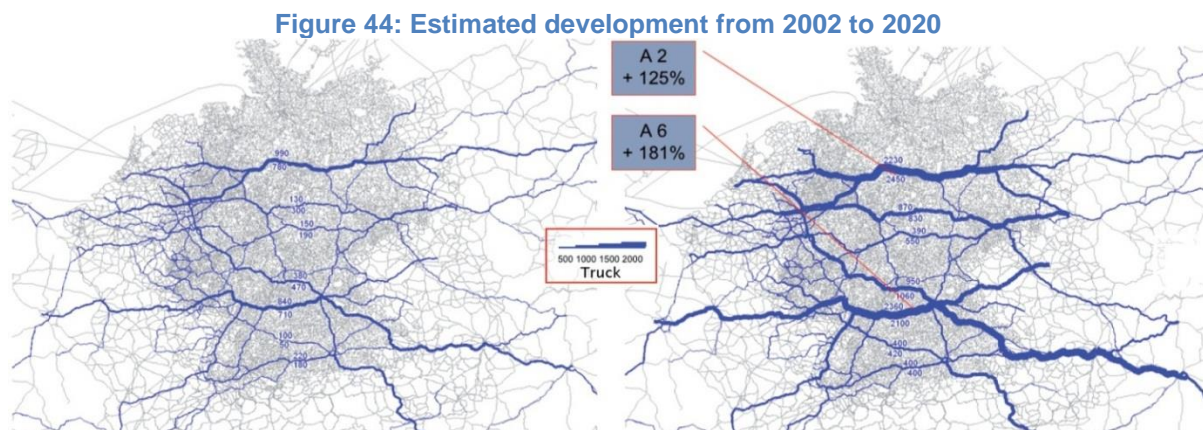
Freight Transport (billion tkm)	1988	1991	2010	2010 (real)
Road freight	122	163	238	434.1
Rail freight	125	86	194	107.3
Inland shipping	63	63	116	62.3

(source: BMV 1992a, p. 14; BMVBS 2011c, p. 245)

Actually, the forecast for freight traffic on roads was already reached in 1997. Calculations for railway and inland shipping were so wrong, because politically the hope that environmentally friendly transport methods succeed was big. (DEITERS 2000, p. 123)

Federal Highway Research Institute (“Bundesanstalt für Straßenwesen“) conducts traffic surveys and they offer statistics to each highway on their web page. The latest available figures are about traffic flow in 2009. It contributes to verify if the GUTP’s highways reached the demand (prospected for 2010) which was predicted in 1991. In theory traffic infrastructure should adapt to the (existing or predicted) demand. Whereas most of the projects accomplished their prediction, only project no. 10 and 12 have been behind the prediction. The expected amount of traffic for project no. 10 was 40,000 to 60,000 vehicles per day (vec/d) on main part (Rostock to Lübeck) and 18,000 vec/d on the extension to Prenzlau for 2010 (BMV 1993, p. 89). Until 2009 average traffic flow for the main part was 33,353 vec/d and on the next part drove 9770 vec/d (BAST 2012). Project no. 12 is slightly behind its expectations. Whereas 60,000 to 75,000 vec/d were predicted (BMV 1993, p. 97), in 2009 traffic volume was at 53,821 vec/d (BAST 2012). Usually the range of predictions was 20,000 vec/d. So it is much easier that predictions and real outcome could match.

One goal of the GUTP was to prepare for an increase of traffic from west to east. First of all in the German context but with a deeper look into the future it was expected that traffic between West European and Eastern European countries would increase. A research by ACATECH (2006, p. 27) simulates the development of traffic volume for the next years. There is an increase of traffic at the northern East-West axis to 125 % which is much smaller than the southern axis. There, for the southern states of Germany is a heavy demand for infrastructure.



(source: ACATECH 2006, p. 27)

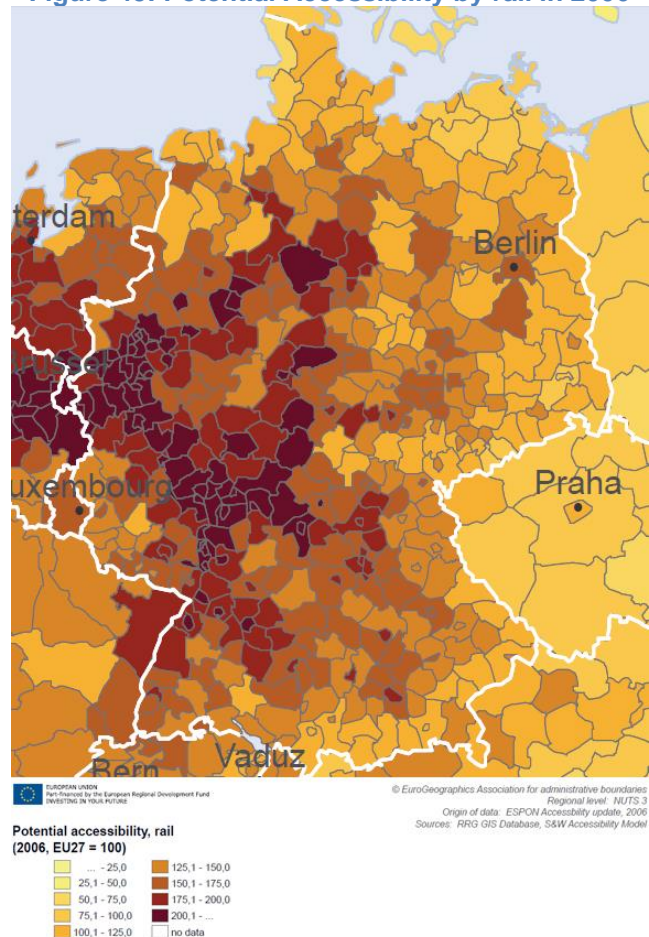
Later it will be criticized that investments should be put into areas with high population density of the old states instead of the states of the former GDR.

Another indicator that was introduced in detail was accessibility. It is quite good measurable and a comparison over time illustrates improvement or decline. Referring to rail projects of the GUTP, the accessibility and shortage of travel duration developed very differently for each region. It depends mainly on the relative length in the rail network. In West Germany the accessibility is still above average and the GUTP, even with the spatial focus on the new states, helped to improve it only slightly. Some regions in East Germany experienced thanks to the GUTP a big improvement of their accessibility. Nevertheless the best connected regions are along the “Blue Banana” which is the main axis of European industry and politics. Some regions are at the periphery of Germany and their accessibility lacks far behind border regions of North- and South Germany. Berlin is well reachable by train and there is a kind of accessibility wedge, a corridor that becomes narrower into the east. Without these measures the disparities between the regions would become bigger. (HOLZHAUSER/ STEINBACH 2001, p. 129)

The European Union made a research to show how easy someone from one NUTS 3 region can reach another region. Data was taken from 2001 to 2006 (ESPON 2009, p. 4). A main observation was that accessibility of rail grew 13.1 % between 2001 and 2006. Road accessibility grew only 7.4 % over the same period of time (ESPON 2009, p. 5). The map shows in light colors that accessibility is low and in dark brown color areas with accessibility above average. Clearly results in the West are better. The historic corridor of “blue banana” shows the best results whose impact reaches also the middle of Germany. Along corridors to Berlin results are at least average or fairly above. Berlin is with his important function in the German context well provided. In the North the accessibility is very poor.

There is a calculation about accessibility of Germany’s twelve largest agglomerations from each district capital (“Landkreishauptorte”), once for roads and once for rail. Especially, rail projects improved situation of most districts better

Figure 45: Potential Accessibility by rail in 2006



(source: modified from ESPON 2009, p. 11)

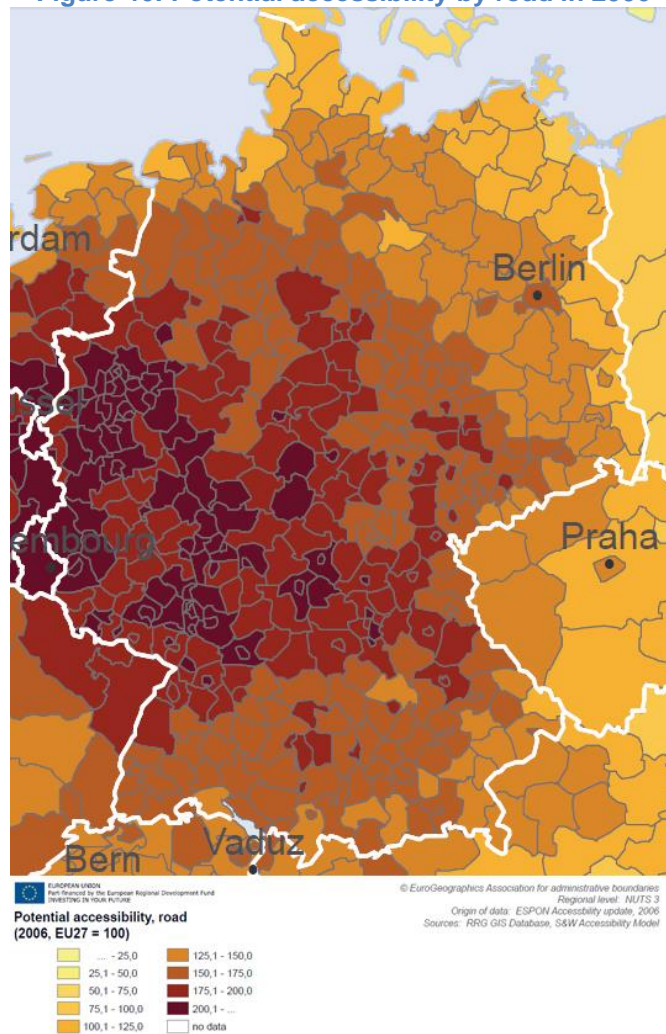
than road projects. Average travelling time is shortened between 33 to 100 minutes. It has also impacts for the West German states in the amount of 10 to 30 minutes. Most effective rail projects are: no. 2 (Hamburg - Berlin), no. 4 (Hannover - Berlin) and no. 8 (Nuremberg - Berlin). The last one is the most effective with improvements of over one hour. (LUTTER 1992, p. 2)

For road projects a change in accessibility was also noticeable. Highways A 9, A4, A 2 and A 10 have improved accessibility well, whereas A 20 influences are rather small. Every important economic center can be reached faster. In European context the general level of accessibility got better though there is still a drop towards East Europe. (HOLZHAUSER/ STEINBACH 2001, p. 130)

Taking a look at the results of ESPON 2009 for roads it shows for Germany overall good results. Accessibility in some marginal regions is in comparison not as good as in the core regions but still above average of EU 27. There is still space for improvements, particularly because connections to Poland and other eastern neighbors gain importance.

Road projects have only marginal improvements. The GUTP no. 10 with the construction of A 20 has the best improvements, but the consequences are very negative (LUTTER 1992, p. 2): Highways leads through structural weak and rural areas. Agglomeration Hamburg - Lübeck pulls young, highly qualified people. Other people are commuting over long distances to work there. Tourism on the Baltic Sea profits one side, but the highway paves the way for big masses of car-oriented, short-time travels. So improvements of rail in this area would be favorable. (LUTTER 1992, p. 4)

Figure 46: Potential accessibility by road in 2006



(source: modified from ESPON 2009, p. 14)

In summarize, the railway projects show higher effects than highway projects. If all rail projects are completed, then travel duration between two destinations would get 28.2 minutes shorter. For example, the new HSR route from Hannover to Berlin saves 10.6 minutes and Nuremberg to Berlin 12.7 minutes. Taking building costs into account, route from Halle to Eichenberg has the highest effect on the network. Road constructions reduced travelling time for 12 minutes on average. Thanks to the GUTP, within 2 to 6 hours of travel time by car are up to 20 or 30 % people more reachable, even 50 % of the population in Mecklenburg-Vorpommern is significantly better reachable. (DEITERS 2000, p. 120)

But roads have a “ubiquitous character” (DEITERS 2000, p. 120). They can accelerate economic development or they can lead to commuting and migration. High qualified, young people profit out of it. Locations near the GUTP axis attract investments more than others. Completion of the GUTP reduced difference between East and West but it did not remove it completely. (DEITERS 2000, p. 121)

The GUTP had also a stimulation of economic competitiveness of eastern regions as a goal. GNP per capita grew in East Germany from 50 % to 71 % in the period from 1991 to 2008. Living standards are, as it was mentioned at the beginning, in all ways completely similar between the East and the West. (LESSENICH 2010, p. 3)

But income of East German households is only 77 % of West Germany and since 1995 wages are only at 80 % of West Germany and until today, unemployment is twice as high as in old federal states (LESSENICH 2010, p. 5). Of course, infrastructure alone cannot be blamed for this. Also the next chapter is going to show some opinions about the GUTP and show that they contributed in a positive way to East Germany.

3.3.2 OPINIONS ABOUT THE GUTP

Critics are usually directed to some projects and as this subchapter is going to show, overall the GUTP are complimented with success.

For instance, the GUTP no. 8 with HSR from Nuremberg to Berlin is under criticism that it has no benefits for the area of former inner-German border. Improvement of local transportation and regional networks would be more important. (KOCH 2010, p. 2)

The most criticized road project among the GUTP was possibly no. 10: construction of highway A 20 through Mecklenburg-Vorpommern. This is the state with the lowest population density in Germany (BUND 1999, p. 1). Prognoses believe that number of inhabitants decreases around 8 %

in that state and number of labor force decreases by 18 % until 2020 (ACATECH 2006, p. 29). Some said that personal interests of transportation minister Krause who comes originally from that state played a significant role. Plans for this highway have been made 1930. Due to this project nature got destroyed and one of the last largely coherent landscapes got divided. And only thousand permanent jobs have been created. It is arguable if domestic business had more damages than benefits through the new road connection. (BUND 1999, pp. 1)

On top of that, A 20 has a bad side-effect on other areas: commuting and migration was enhanced and companies were motivated by the project to move companies to Poland. (DEITERS 2000, p. 121)

However, it is expected that traffic increases on federal highway A 20 despite a drop of inhabitants. The reason is that amount of travelled kilometers increases more than traffic volume decreases. (ACATECH 2006, p. 29)

Overall, it can still be evaluated positively. It became easier to reach medium-sized and large cities (Hamburg, Lübeck, so on) to perform a job there while staying living in rural parts (of Mecklenburg-Vorpommern) where broad job opportunities do not exist. A better solution would be to enhance economic development there. (ACATECH 2006, p. 30)

For the matter of railroad, the improvements of east-west only reached the level, which existed before the Second World War. Best improvements were made for train connections with a southward direction. (KAGERMEIER 1999, p. 72)

In 1992 German magazine "Der Spiegel" wrote a story about the newest FTIP with the title "Back to the Stone age" ("Zurück in die Steinzeit"). It criticized the new plan and minister Krause. The minister of transport always claimed that most of the infrastructure investments were spent for the new states of Germany. However, the FTIP from 1992 had the target to construct 7842 km new roads in the old states and only 3741 km in the former GDR. Just highways construction dominated in the new states. At the end, the magazine quotes transportation research scientist Mr. Schallaböck with "Who sows streets, harvests traffic.". (DER SPIEGEL 1992a, p. 65)

Some road projects already need repairs. But the bigger problem is that the economic development in East Germany is still far behind West Germany. (GERBER 2009, p. 47)

Planning and execution of the GUTP did not consider demographic changes. It was assumed that the fertility in the new states would rise after the transition. A study came to the result, that the streets and rails are not used in a sufficient way. Some projects have been made in areas, where the number of inhabitants steadily shrinks. The investments should have been put into the infrastructure of the Western part. The areas of Hamburg, Ruhr area, Rhine-Main area, Stuttgart

and Munich, because only there is an increase in traffic expected. (HEUSER/ REH 2007, pp. 248)

Yet development of migration and birth rate are very complex processes. Scenarios have to be designed and trends are only possible to notice with long-term data. Reunification was still in progress and East Germany's transition was like an experiment with unknown factors.

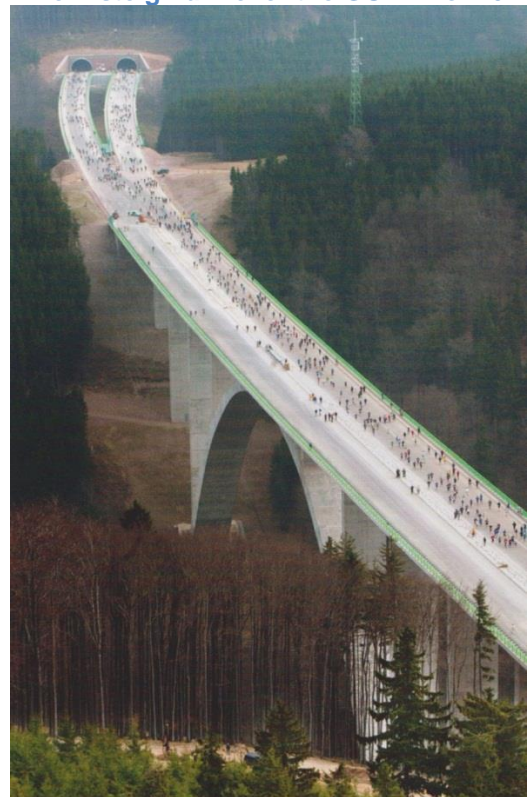
For Saxony HEINEMANN (2010) evaluated railway projects no. 8.3 and 9 of reunification for the period of 1991 to 2006 (HEINEMANN 2010, p. 52). Project no. 8.3 is successful with its connection to the new main train station of Berlin, big decrease in travelling time and high traffic volumes (HEINEMANN 2010, p. 53).

Similar success was reached through the GUTP no. 9: Before 1995 there was no continuous express line between Dresden and Leipzig and the number of passengers was only around 350,000. With the service of a regional express amount of passengers grew to 3.5 million until 2005. Travel duration was shortened to 60 minutes between Leipzig and Dresden and ICE-trains are operating on an hourly basis. The number of passengers increased around 6.25 % from 1999 to 2001. (HEINEMANN 2010, pp. 55)

Some interpret the measures by the new laws as a complete exclusion of public participation (KIESLICH/ KLEINSCHMIDT/ LÖBACH 1992, p. 7). Nonetheless, public participation existed for the planning procedure. People, who were negatively affected by the plan, had legal possibilities to express themselves. The Ministry of Transport published frequently information paper about the progress of the GUTP and like the picture on the right shows, there were opening events for the public.

Reunification initiated a fast, fundamental transformation in Germany. While private cars and freight transport by trucks increased exceptionally, public transport sector and railway freight volume lost big shares. In 1992 trucks were on the first place of important long-distance carriers after rail lost around 66 % freight volume. Probably this development was

Figure 47: Opening for Citizens at the Rennsteig Tunnel of the GUTP No. 16



(source: BBR 2005, p. 13)

enhanced by suburbanization of living as well as shopping and collapse of East Germany's industry. (DEITERS 2000, p. 117)

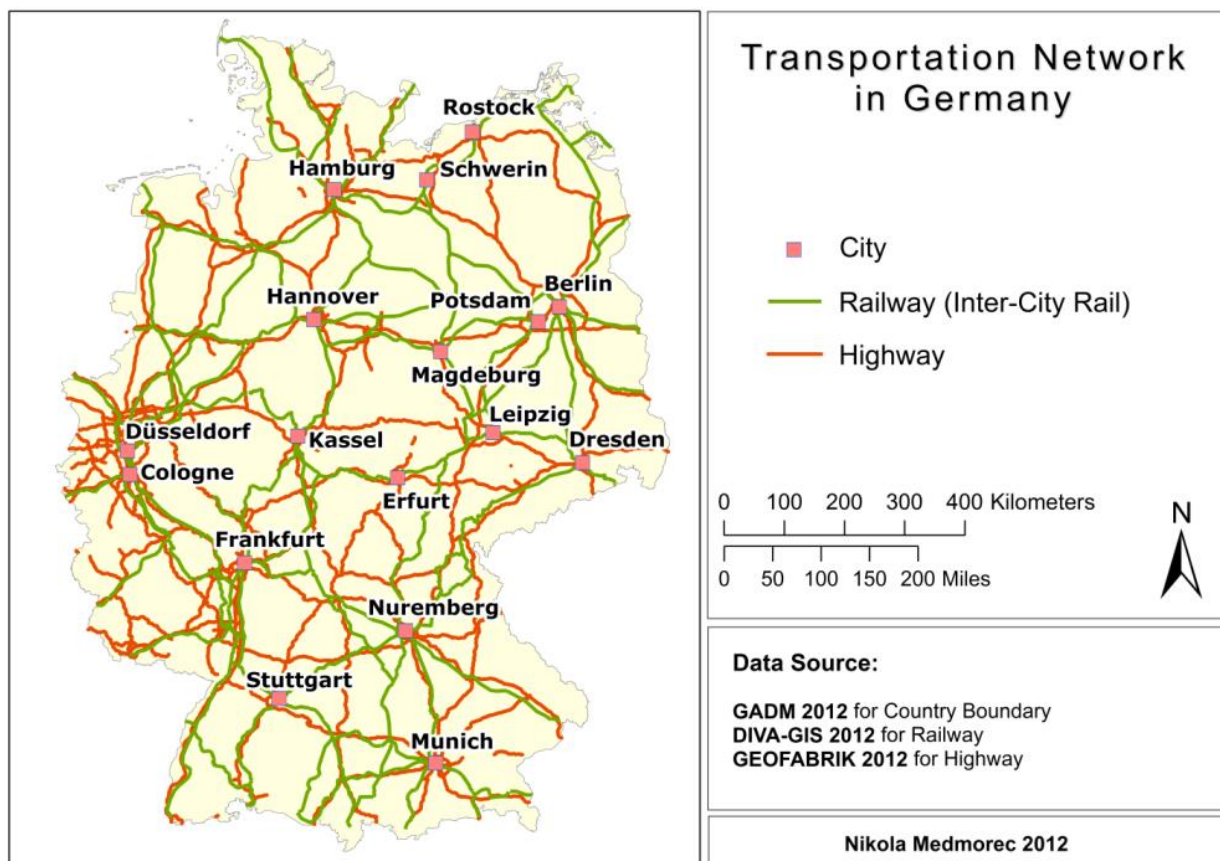
The GUTP came along with special laws to shorten duration of planning and construction. Main reason for a special legal framework and use of planning companies was to shorten the project duration. Assuming that a normal plan takes up to twenty years, it would be not bearable for East-Germany's economy. But observations from Bavaria and North Rhine-Palatinate showed that average planning time for rail and road takes ten years and execution of it takes around six years. Delays happen often because of discussions in political-administrative area, financial questions and missing consensus of society. (KIESLICH/ KLEINSCHMIDT/ LÖBACH 1992, p. 9) However, in a review from GUEP about street projects it is estimated that planning duration took in average between 1.5 and 2 years, planning approval procedure also 1.5 to 2 years and construction took around 3 to 4 years (BRANDENBURGER/ BAUMBACH 2011, p. 35). With this outstanding result the whole model of GUTP with the special laws, their planning societies and the political support (especially for funding) shows that it is a success.

The former Minister of Transport Wolfgang Tiefensee said 2008 that the investments have been very useful and effective. The GUTP are one of the most valuable developments for the future of Germany. Germany's location in middle of Europe is secured thanks to these projects. Jobs in construction sector were made permanently and travelling time was shortened a lot in benefit for commuters. Through the European context highway A 20 is increasing its importance as an international transport route for economic relations to East Europe. (GERBER 2009, pp. 46)

The current Minister of Transport, Construction and Urban Development Peter Ramsauer thinks also positive about the GUTP. The achievements since 1991 have been "enormous" (BMVBS 2010) and he calls the transport routes "arteries" (BMVBS 2010), which have been reconnected, and new ones have been added. After reunification travelers were frustrated by the weak transport infrastructure. Now travel time was reduced and most of the projects are in service. Germany proceeds successfully with the projects by using PPP for the first time. According to Ramsauer the government will push ahead the completion of the GUTP until 2017. (BMVBS 2010)

Today transportation infrastructure in Germany does not show any kind of historic division. The GUTP and other measures by the FTIP '92 seemed to have healed all scars. Germany has a complex transport network with a sufficient number of north-south axes as well as west-east axes. Beneath there is a map with the current situation of transport networks in Germany. The majority of cities are well connected by rail and highway. East Germany's highways have a clear focus on Berlin but it does not directly mean that it is a big detour for drivers. All in all, the division was clearly overcome and German citizen are able to use a fully functional transportation network in Germany.

Figure 48: Transport Network Today in Germany



(source: made by author)

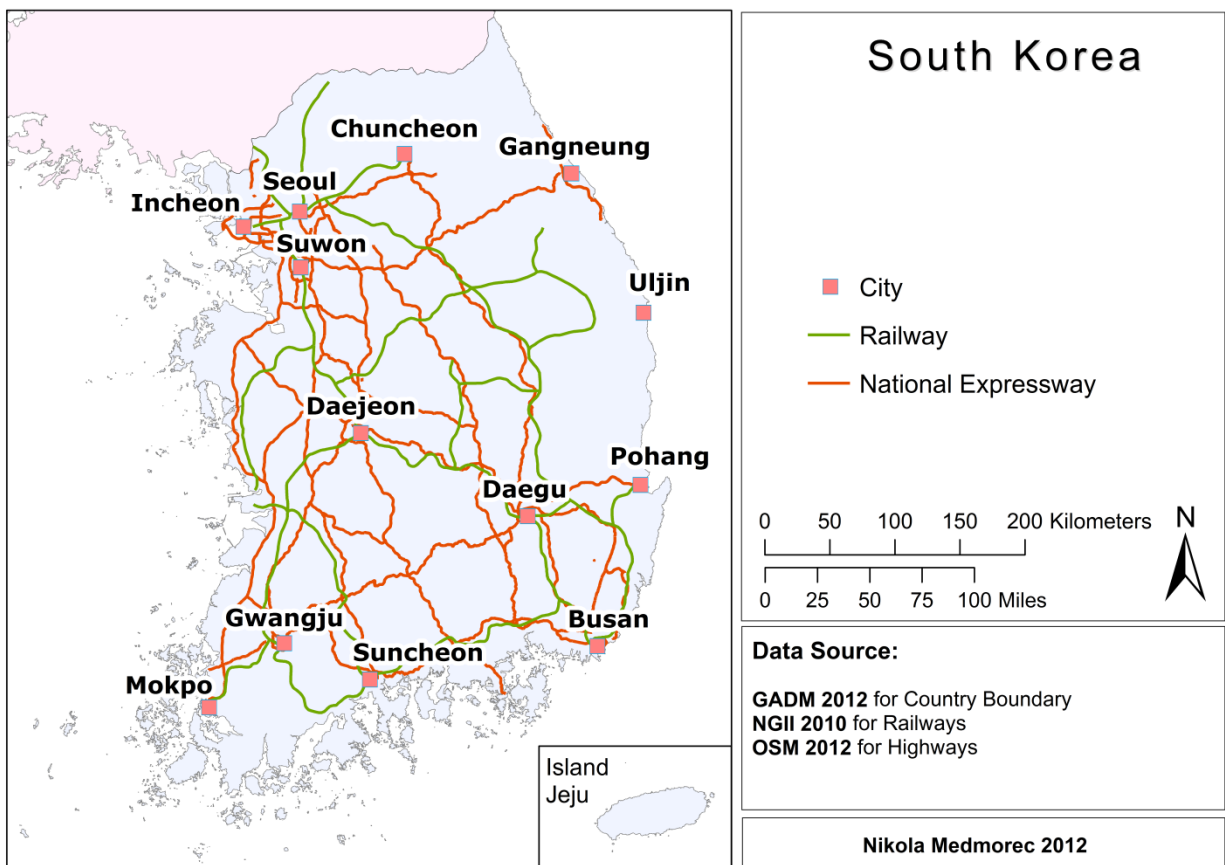
4 THE KOREAN PENINSULA

4.1 INTRODUCTION TO TRANSPORT IN KOREA

4.1.1 SOUTH KOREA'S TRANSPORT SITUATION

Total length of South Korean rail road is 3,381 km and road length is 103,029 km (CENTRAL INTELLIGENCE AGENCY 2012c). The following map shows how railway and expressway currently spread over South Korea.

Figure 49: Transport Situation in ROK



(source: made by author)

In 2009 the share of investment was 57.2 % for road, 29.3 % for rail, 13.1 % for sea and only 0.4 % for air. A shift in investment is planned until 2020 to 50 % for rail and only 40 % for road transport. (HONG 2011, p. 9)

Since 1960 infrastructure in Korea developed rapidly. The first constructions after the Korean War have been possible through financial foreign aid. With five-year development plans infrastructure was gradually developed. But it was not enough to keep pace with the fast economic development. Investments into infrastructure were pretty high with up to 8 % of GNP. (RO 2002, pp. 2)

But 1990 transport infrastructure was though an intensive development still not sufficient enough for South Korea’s economy. A rise in car usage caused congestions whose costs reached up to 20 % of total highway user costs. (RO 2002, p. 6)

South Korean roads are classified into seven categories following the legal classification or their functional purpose. The following table contains the classification and the exact definition for the two types of outer-city streets by Korean road law. (MLTM 2010, p. 16)

Table 24: Road Classification

Type of Road	Definition
National Expressway 고속도로	Roads used exclusively by motor vehicles for high speed transportation linking major urban areas
National Highway 일반국도	Roads linking important urban areas, ports and harbors, airports and tourist resorts

(source: MLTM 2010, p. 16)

Other types of road are metropolitan city road (특별 · 광역시도), provincial roads (지방도), city roads (시도), county roads (군도) and district roads (구도). But they are not significantly important for this topic. The national expressways and highways have the function that both of them link the most important urban areas, while provincial and county roads build connections to sub-centers within each province. As the current road network shows, the north-south direction of expressways and highways is further developed than the east-west direction because of topographical conditions. (MLTM 2010, p. 17)

Observed by the author, maximum speed limit on expressways is 120 km/h and 80 km/h on other roads outside cities. Around 71 % of national expressways have four lanes, 13% have six lanes, 11 % have eight lanes and others have two lanes (MLTM 2010, p. 17). Currently, Korea has 31 national expressways with a road length of 3,776 km (MLTM 2010, p. 18)

Generally, most of the Korean expressways have fees for usage. Tolls are collected by three kinds of systems: One system is the Automated Toll Collection System, where the fee is paid at a tollgate with a ticket which has information about starting point (and so about travel distance). Next one is the Electronic Toll Collection System with the name “Hi-pass” where payments are

possible without stopping at tollgates. It was established in June 2000. The last system is a pre-paid method of “Hi-pass”. (CHO/ LEE/ KWON 2009, p. 5)

South Korea plans to build a network of expressways with a length of 6,160 km by 2020. The master plan contains 9 axis from west to east and 7 axis south-north. The purpose of this network is to increase the accessibility. Access to an expressway should be able from anywhere in ROK within 30 min and any region should be reached within a half day from departure. (CHO/ LEE/ KWON 2009, p. 1)

Railroads cannot compete with roads in quantitative statistics. Length of South Korean rail network is 3557.3 km by information of the latest statistical yearbook of the Korean railway company Korail. Of that

total length there are 1763 km with double-tracks and 1794.3 km with single-tracks. (KORAIL 2011, p. 20)

2004 South Korea became the fifth nation with a HSR. The high-speed train “Korea Train Express” (KTX) operates

on the two lines: (1)

Seoul - Busan and (2) Seoul - Mokpo. (SHIN 2005, p. 5)

Feasibility studies were made from 1973 to 74 and 1978 to 81, but the plan of the route Seoul - Busan was not released until 1990. One characteristic was that this “new line would be exclusively used for passenger services” (SHIN 2005, p. 6), while freight transport would be handled on conventional lines. (SHIN 2005, p. 6)

Construction was done in two phases: first phase was new construction of a railroad to Seoul to Daegu,

electrification of Daegu to Busan and electrification of Seoul to Mokpo until 2004. The second phase was about new construction of Daegu to Busan, completed in 2010. Costs were expected

Table 25: Comparison of Corridor Seoul-Busan

	Construction Costs (in million Korean Won)	Transport Capacity (1000 Passenger/Day)	Travel Time
Highway	262	250	5 hours 20 min.
HSR	382	520	1 hours 56 min.
Other Double-Track Rails	250	275	3 hours 50 min.

(source: modified by Shin 2005, p. 7)

Figure 50: KTX-II Sancheon



(source: RAILWAY GAZETTE 2010)

to be around 12 trillion Korean Won (11 billion US dollar) but already 2004 predictions have been corrected to 20 trillion Korean Won (18.2 billion US dollar). (SHIN 2005, p. 6)

From the current perspective, it can be said that the project was successful and even the high costs were it worth. Everyday around 110,000 passengers use KTX (HONG 2011, p. 4). In South Korea transport efficiency is extremely good. Comparing travel duration, traveling with KTX is almost four times more efficient than to travel by car or bus. (SHIN 2005, p. 7)

The intention behind the HSR project was to support balanced regional growth. The global competitiveness of domestic economy should be enhanced. (SHIN 2005, p. 1)

The Seoul – Busan (or Kyeongbu-HSR-line) line is 412 km and there are nine stations along the way. The average distance between stations is 58.9 km. Due to mountainous topography 46 % of the distance is traveled in tunnels and 26 % on bridges. (SHIN 2005, p. 10)

Table 26: Major Rail Lines in ROK

Name of Line		Route	Length (in km)
Commercial Lines	Kyeongbu-Line	Seoul - Busan	441
	Kyeongui-Line	Seoul - Sinuiju (DPRK)	486
	Honam-Line	Daejon - Mokpo	253
	Chungbuk-Line	Jochiwon - Chungju	115
	Jeolla-Line	Iksan - Yeosu	185
	Jungang-Line	Cheongnagri - Kyeongju	387
HSR	Kyeongbu-HSR-Line	Seoul - Busan	424

(source: KR 2012)

The second generation of KTX, the KTX Sancheon is in use since March 2010. With a speed of 300 km/h it operates on the line from Seoul to

Busan, Daejon to Mokpo over Gwangju and since 2012 from Seoul to Yeosu. (RAILWAY GAZETTE 2010)

Already the next high-speed train, which has a maximum speed of 430 km/h and an operation speed of 370 km/h for passenger transport, is in development. This one could reduce traveling time from Busan to Seoul to 90 min. (RAILWAY GAZETTE 2012)

South Korea is mostly surrounded by water and only borders with North Korea, which makes international land transport of goods and people under the current state impossible. But to enhance exchange with neighbors like China gives authorities the pressure to work on new ideas. Since several years the idea of an undersea tunnel to China and to Japan exists and the feasibility is heavily discussed. This would mean that a tunnel of at least 340 km between China and South Korea and a tunnel of 222 km length from Busan in Korea to Japan would be attempted to construct into deep sea for HSR and vehicles. (KOH 2010)

4.1.2 TRANSPORTATION IN NORTH KOREA

After the Korean War, North Korea was after Japan the second most dynamic economy in East Asia in the decades of 1960s and 70s. It began to decline in the 1980s and with the events of the 1990s (1991: dissolution of Soviet Union; 1994: death of Kim Il-Sung) maneuvered DPRK to a political and economic crisis. Natural disasters caused even a famine. (DUCRUET/ ROUSSIN/ JO 2009, p. 3)

Figure 51: Transport Infrastructure in DPRK



(source: made by author)

The map about transport infrastructure shows around 5,250 km of main rail lines and the most important roads (highway and roads level 1) of the total road network, which is totally around 25,550 km long (CENTRAL INTELLIGENCE AGENCY 2012b). Near Pyongyang there is Nampo with the main port on North Korea's west coast, a highway lead to this town (DUCRUET/ ROUSSIN/ JO 2009, p. 11). Quite interesting is that all cities are located near the coast or close to China. Probably, fishing is a crucial part of their daily lives and border region benefit from exchange with China. Hyesan is a town near Mountain Baekdu, the highest mountain on the Korean peninsula and a famous tourist spot.

North Korea classifies its roads into seven categories. The first category is highway and then the other categories are roads from level 1 to level 6. There are six highways with a total length of 661 km. Only 232 km of that are covered with asphalt or concrete. The roads level 1 exist out of 10 lines and it is 2,289 km long with 40 % paved surface. But only 5 % of roads belong to the first two categories (highway: 1.2 % and road level 1: 3.8 %). (CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012b)

Table 27: Highways of North Korea

Route	Length	Lanes (width of road)	Surface
Pyongyang - Wonsan	196	2 - 4 (20 m)	concrete
Pyongyang - Kaesong	162	4 (19 m)	asphalt
Pyongyang - Hyangsan	119	4 (24 m)	concrete
Pyongyang - Nampo	44	4 (20-24 m)	concrete
Wonsan - Onjeongri	107	4 (14 m)	concrete
Pyongyang - Kangdong	33	4 (18 m)	concrete

(source: CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012b)

The highway from Pyongyang to Wonsan with a length of 186 km is the most important connection from the west to east coast. It was opened in 1978. Eastern highway from Wonsan to Onjeongri which leads to the tourist destination Mountain Geumgang (refer to 4.4.1) has an important function as transport route for goods like seafood. (CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012b)

The second longest highway goes from DPRK's capital to Kaesong, a southern border town. It was constructed from November 1987 to April 1992. It is a transport route for grain, coal, metal, lumber, cement and many other things. Opened in 2000, Nampo highway is the newest highway. (CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012b)

North Korea sees the road network as a valuable factor of economic development and improvement of the

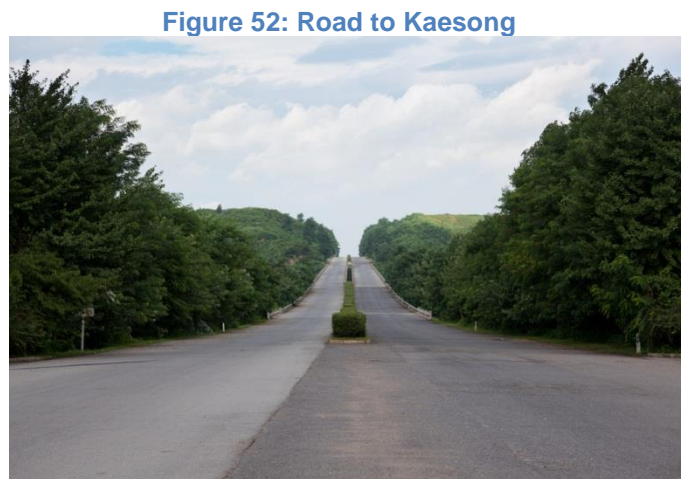


Figure 52: Road to Kaesong

(source: PEDDLE 2010)

live of citizens. And probably more important is that North Korea believes that it is important for victory in a war, because so “coordination between front line and the home front” (AHN et al. 2004, p. 139) is better, movement of military is greater and so on. KIM Il-Sung, first leader of DPRK, taught that roads should solve problem of accessibility in mountain areas and initiate industrialization in rural areas and not intrude agricultural areas. (AHN et al. 2004, p. 139)

However, the condition of roads today is different and in a sad way, it reflects North Korea's economy. Around 20 % of the roads are paved and most of the roads are quite narrow (JEONG 2007, p. 5). Due to poor road conditions the maximum speed of most roads is 50 km/h (LEE/SEO/ CHUNG/ LEE 2011, p. 4). More information about condition is coming later in subchapter 4.3.

The railroad network is around 5,250 km long and 80 % is electrified (CENTER FOR

Table 28: DPRK's rail network

Route	Length (km)	Travel Duration (in hours)	Average Speed (km/h)
Pyongyang – Tumen	847.5	20:56	40.5
Pyongyang - Sinuiju	225.1	3:45	60
Changyeon – Manpo	508.4	14:08	36
Pyongyang – Pyongraseon - Hyesanjin	728.7	18:32	39.3
Pyongyang – Manpo – Hyesanjin	445.4	19:20	23
Pyongyang – Pyongkang	377.7	10:50	34.9
Pyongyang – Huicheon	176.2	5:32	32

(source: CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012c)

NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012c). There are ten main lines, which are shown in the map at the beginning of this subchapter and on secondary level ninety branch lines exist (AHN et al. 2004, p. 129).

In fact, 90 % of cargo transport and 60 % of passenger traffic is handled on rails. The first rails have been

constructed by Japanese during the colonial period at the beginning of the twentieth century. Kim Il-Sung said that the railways are the national arteries and that the railway system is comparable to the blood circulation in our body. Continuous operation of the railway will result into high productivity of industry and agriculture. (AHN et al. 2004, p. 126)

In 1977 Kim Il-Sung paved the way for the direction for the transportation system. He proposed a centralized and containerized transportation system with a good connection between transport systems. His desire was to improve the rail system and its transport ability. So electrification, automated signals, production of railroad cars and even new tracks were intended. The motive for this was the belief that improvement of railroad ensures a stable and consistent development for the nation's economy. (AHN et al. 2004, p. 127)

Transport capacity increased through

Figure 53: Work on rails in North Korea



(source: RAMSTAD 2012)

new, improved facilities and equipment in 1980s, but after economic problems in 1990s rail transport is stagnant. (AHN et al. 2004, p. 129)

So North Korea's rail succeeded quickly as the main transport method and the streets function as support. But there are problems like: railroad ties are corroding, railway underground (causeways) are sinking, tunnels, bridges, engine of locomotives are so worn out, that the maximum speed is between 20 to 60km/h and it comes to breakdowns frequently (JEONG 2007, p. 5)

Average speed of North Korea's western rail line is around 40 km/h (NAH 2009, p. 115). These days situation got so worse that roof riding is a common occurrence. An article by DailyNK quotes a North Korean source with the information that only one train per week operates on the line Pyongyang – Tumen. Before 2000 there was a daily service and then it was reduced to three times per week. Such a bad transport situation was previously during a big famine in the 1990s in North Korea. Again the economic situation is bad and there is a severe electric shortage. This is the reason for a decreased service. (CHOI 2012)

Before the Korean War there have been six rail lines to China and one crossing to Russia. Through the war three of the lines to China were destroyed. The still existing connections are Sinuiju to Dandong, Namyang to Tumen, and Manpo to Jian; and the Russian line from Khasan. (AHN et al. 2004, p. 129)

Briefly the international lines are going to be introduced. The first route to China is commonly referred to as Trans-China-Railway (TCR).

Table 2929: K27 Schedule to Pyongyang

City name	Local Time of Arrival	Local Time of Departure
Beijing	-	5:30 pm
Dandong	7:17 am	9:35 am
Sinuiju (DPRK)	10:45 am	2:15 pm
Pyongyang	7:30 pm	-

(source: SEO 2011, p. 305)

Saturday a North Korean locomotive depart from Beijing. The line has the name K27 and it starts at 5:30 pm in Beijing. On the left the timetable shows the most important stops. The two hour halt at the Chinese border town Dandong is due to customs and border controls as well as the four hour halt

There is only one international train passenger route in North Korea. The service goes from North Korea's capital Pyongyang to China's capital Beijing. (SEO 2011, p. 305)

Every week Monday and Thursday a Chinese locomotive and every Week Wednesday and

Table 30: K28 Schedule to Beijing

City name	Local Time of Arrival	Local Time of Departure
Pyongyang	-	10:10 am
Sinuiju	3:20 pm	5:13 pm
Dandong	4:23 pm	6:31 pm
Beijing	8:31 am	-

(source: SEO 2011, p. 305)

after crossing the river Yalu to Sinuiju. As K28 the trains go back to Beijing every week Wednesday and Saturday lead by a Chinese locomotive and Monday and Thursdays with a North Korean locomotive. (SEO 2011, p. 305)

The connection from Sinuiju to Dandong reopened since October 1983 and at first, it was only operated by China. Total length of the line from Pyongyang to Beijing is 1,347 km. (AHN 2004, p. 128)

Total travel duration for K27 is 25 hours and for K28 it is 23 hours. Assuming that the difference is only through the controls, which take up to two hours more on the entrance to North Korea than leaving it, the effective travel time (when the train is operating) is around 19 to 20 hours. There is no information about regular train services to Russia except that a train from Pyongyang to the border with Russia takes around 21 hours. (CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012c)

The impression dominates that DPRK has no capital for investments into infrastructure or companies (HERTKAMPF 2007, p. 71). In conclusion, it is obvious that importance lies on land transport and so transport system seems to orientate strongly on the Soviet style of transport system. Similarly, it focuses on heavy industries, mining and agriculture. And that leads directly to road damages: Transport of heavy goods plus a lack of maintenance worse them rapidly. (ROUSSIN/ DUCRUET 2007, p. 8)

4.2 COMPARISON GERMANY 1990 AND KOREA NOW

German experience can be only used for Korea, if indeed similarities exist (HILPERT 2010, p. 127). For this reason this chapter examines the difference and similarities between Germany and Korea, briefly about general areas and in detail for transportation.

First, a look at the differences: Shortly after the division, the two Koreas fought a war in which about one million people were killed. In contrast to that, both Germanys never fought against each other. (LANKOV 2012)

In comparison of North and South Korea today and Germany at the time of reunification, one of the first things one gets aware of is the fact that the population of North Korea is considerably larger than East Germany's. And the second fact is that the North Koreans are much poorer than the East Germans were in 1990. In reference to the same criteria South Koreans are less wealthy than West Germans were. (KELLY 2011, p. 457)

The competition of the Cold War between Europe and USSR knew about the important meaning of East Germany's position in central Europe. Subsidies went to the eastern part of Germany to directly compete with the fast-driven development in West Berlin. North Korea never gained as much importance as East Germany to the Soviet bloc. Concerning infrastructure, labor productivity, health care, transportation and many other areas, North Korea is also in a worse situation than East Germany. The DPRK hides maybe most of the information about the bad conditions and therefore, it could be more severe than how it is estimated now. (KELLY 2011, p. 463)

Differences in the living standard between East and West Germans were not as remarkable as it is in Korea. East Germany had a per capita GNP of one half or one third of the GNP in West Germany in 1989. North Korea's per capita GNP is assumed to be 15 or 40 times less than the per capita GNP of South Korea. (LANKOV 2012)

It is difficult to answer the question how well the South Korean government is politically prepared for reunification. According to KELLY (2011, p. 464) the South Korean political system is less mature than the West German. "South Korean parties are shallow, personalized, and change names quickly" (KELLY 2011, p. 464) Democracy exists in South Korea since 1988 and the state capacity to manage the unification seems to be still missing. A reunification could be overwhelming to the peninsula and North Korea could develop into some kind of semi-annexed limbo similar to the West Bank. (KELLY 2011, p. 464)

Neither East Germany nor West Germany had nuclear weapons. Unfortunately, the case in Korea is different and it is one major issue of discussion. North Korea's possession of these weapons is a threat to its neighbors (respectively Japan and ROK). (HILPERT 2010, p. 132)

On the international scale, the USA of 1989 is not comparable to today. USA has become weaker, has a large financial debt and an overload of spending for military. This leads to a rising Chinese influence on the northern part of the Korean peninsula. After the USSR collapsed, China is getting stronger and is even expanding. Its interest in North Korea is much higher than the USSR's in the GDR. First of all, North Korea has a direct border to China. Secondly, the international political environment makes North Korea to some kind of a buffer for China against democratic nations like South Korea, Japan and USA. (KELLY 2011, p. 465)

Another big difference is that exchange of information existed in Germany, whereas in Korea (especially from the North Korean perspective) information cannot be exchanged. East Germans were able to watch West German media like TV and radio. In North Korea media is highly suppressed and any external media is blocked out. (LANKOV 2012)

Also, even if in a restricted way, it was possible for East Germans to travel abroad. A few million West Germans came regularly to the GDR. (LANKOV 2012)

Now follows a view at the general similarities. With the end of the Second World War Korea and Germany were each divided in an artificial way. Under the background that this situation is temporarily the nations fought in an intensely competitive way with the partner. All try to gain permanent constitutional legitimacy as the real Korea or real Germany. (KELLY 2011, p. 461)

Germany was divided into East and West, while Korea was divided along the 38th parallel (HILPERT 2010, pp. 129).

North Korea and East Germany are communist states with corrupted elite, who are not able to build a system where they goods are produced for the sufficiency of their citizen. The DPRK took East German's model of a brutal secret police ("Stasi"). Another similarity is that both communist states are much poorer than their partners and so they stand under a big pressure to change the political and economic system. This also implies that the flow of information has to be restricted and the borders had to be illegal to cross. (KELLY 2011, p. 461)

As for the international relations South Korea and West Germany had a close relationship to the USA and its democratic allies. They enjoy legitimacy through them and they would contribute to Germany's safety. On the opposite, North Korea and East Germany were almost completely dependent on an external patron. North Korea keeps close contact with China and periodically changing to Russia. To keep the regime alive, militarization is pursued. (KELLY 2011, p. 462)

One similarity is also the geopolitical position of both countries. Germany is in the middle of Europe and Korea is between China, Japan and Russia - three major powers in the region. Therefore, both nations have been abused as a battleground for international conflicts. (HILPERT 2010, p. 128)

After the description of differences and similarities of many areas, the author attempts to focus on the transport infrastructure and tries to highlight specific characteristics.

East Germany's population was only one fourth of West Germany, whereas in Korea there are 20 million North Korean to 48 million South Korean. This makes the burden much bigger for Korea and costs per capita will be higher. In Germany a relatively small number of people had to be integrated and the area of the GDR had a manageable size. North Korea's area is bigger than South Korea (even bigger than GDR's area). This also means that infrastructure for a much bigger portion of land and a bigger portion of inhabitants has to be set up.

Standards of transportation have to be reformed and different measures than in South Korea have to be applied for the North. It is not exactly known how the population is spread over DPRK. After reunification, an exact census has to grasp spatial distribution of citizens. If the population is concentrated on specific areas, it is a good chance for HSR services. Due to long distances routes have to be longer, infrastructure (not only transport) has to be built at high expenses.

Table 30: Transport Infrastructure in 1990 in Germany and on Korean Peninsula now

Indicator		West Germany	East Germany	South Korea	North Korea
Population	Population (million)	62.500	16.434	48.860	24.589
	Area (km ²)	248,843	108,178	99,720	120,408
	Population Density	245.4	151.9	489.9	204.2
Streets	Length of Streets (km)	173,700	47,200	103,029	25,554
	Street Density (km/1000 inhabitants)	2,844	2,872	2.109	1.039
	Street Density (km/km ²)	0.698	0.436	1.033	0.212
Highways	Length of Highways (km)	8,721	1,850	3,776	661
	Highway Density (km/1000 inhabitants)	0.143	0.113	0.077	0.027
	Highway Density (km/km ²)	0.035	0.017	0.038	0.005
Railway	Length of Railway (km)	27,000	14,035	3,381	5,242
	Rail Density (km/1000 inhabitants)	0.442	0.854	0.069	0.213
	Rail Density (km/km ²)	0.108	0.130	0.034	0.044

(source: for West-/East-Germany: GATHER 2001, p. 7; for South Korea: CENTRAL INTELLIGENCE AGENCY 2012c, MLTM 2010, p. 18; for North Korea: CENTRAL INTELLIGENCE AGENCY 2012b, CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES 2012b)

Streets and highways seem to be sparse in North Korea. Street density in East Germany was higher than in the old states, just the condition was not on a comparable high level. In Korea, the problem is a lack of quality and quantity of North Korean roads. In contrast, South Korea is very motorized and has a well-developed road network. German highways were on a similar level with each other in terms of highway density in relation to inhabitants. In comparison to Germany, South Korea has fewer expressways but it has still a far better road network than North Korea. It can be assumed that similar to the GUTP large-scale projects after Korean reunification are going to contain a lot of new motorway constructions. The statistics are showing outstanding numbers about railroad in DPRK. There is a wide-spread network and almost twice as much as in the South. However, in relation to the area it is still far less than in Germany, where also the eastern rail road density dominated. For a country which was one fourth of the size of its western neighbor, the rail network was only half as long as theirs was in 1990. As it was mentioned, it was a time when Germany had to modernize the rail system for the whole country, not only for the new states. In ROK there are the KTX, modern rail controlling systems and high standards. Upgrading North Korea's rail network to this standard is going to be expensive.

4.3 EXPERIENCES FROM NORTH KOREA

This chapter focuses on the experiences about transport in North Korea of random travelers. At first, the author describes his own experience of a trip to the restricted area near DMZ.

On April 4 of this year the author went to the area of Dorasan at the Inner-Korean border. After a one hour train ride from Seoul to the end of the Kyeongui-Line in Munsan another train had to be boarded for ten more minutes to Dorasan Station which is the last station before North Korea. The station and streets are all part of cross-border projects whose development is explained in the next subchapter.

The author could take a direct look at the southern part of the unification highway (or Asian Highway no. 1), a four lane road in a rather good condition. As the picture on the left shows the two directions are clearly separated and the whole highway has lamps. This highway leads to border control which looks like a tollgate or a border station anywhere else.

The columns of the destroyed rail bridges are still standing and a new bridge with only single-track rails was built next to it. The train slowed down while

entering the restricted area and drove in a decent speed until the final stop. It seemed to be out of security reasons because the train ride was still very smooth and straight aligned.

The Dorasan station has two big halls, one waiting hall with information desks and tourist information. The other is equipped with x-rays and luggage scanner to handle international

departure. At first, the station seems prestigious and modern. But the functionality is subordinated to the political, symbolical meaning. In comparison to other stations in South Korea, it is very simple and it has only one floor. All constructions in this area felt like they are only temporary. After a reunification this place would lose its function and except of domestic trains other trains may not serve this question.

Figure 54: Highway No. 1



(source: made by author)

Figure 55: Old Bridge



(source: made by author)

Figure 56: Dorosan Station

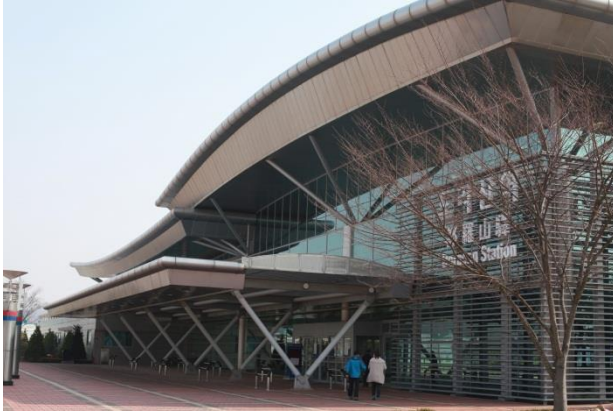


Figure 57: Guards at the Entry of Tracks



Figure 58: International Area of Dorosan Stn.



Figure 59: Guided Tours to Border Stn.



(source: made by author)

German professor of geography D. visited North Korea several times from 1988 to 2008. Once in 1996 he counted 18 vehicles (12 trucks and 6 cars) during a two-hour trip from Pyongyang to Kaesong. Due to the acute shortage of fuel, trucks have been converted to run on wood. On his last trip 2008, twelve years after this observation the conditions have not changed very much. The number of trucks seems to have increased while the number of passenger cars decreased. One major problem of the rail network seems to be that it is completely single-tracked. For example in August 1990 a train ride from Pyongyang to the Russian border took 23 hours. His train had to wait for more than 2 hours for a freight train going into the opposite direction. Train left Pyongyang at 10:13 am and arrived at the Korean-Russian border at 9:16 am on the following day. Mr. D. considers sharp curves, steep grades and numerous tunnels as some of the reason for low speed of trains. Railroads are electrified but lack of electricity lead to frequent blackout. To prevent halts in service, North Korea uses old steam locomotives. On the international train to Beijing Mr. D. witnessed technical problems which caused many hours of delay.

The pavement of the expressway from Pyongyang to Wonsan consists of uneven concrete and many tunnels have no light and no ventilation. Other expressways which have been built later are in a better condition with straight lanes, clear divided lanes and a tunnel for each direction. Mr. D. assumes that the very thin pavement is a major problem. Damage is often caused by heavy rains. Therefore he doubts that these highways are able to bear a high amount of traffic with lots of cars and heavy trucks. Construction and repair of roads is mostly done with primitive methods. North Korean army laid stones by hand for the understructure of highways and repairs are made by large group of people (mostly women) with simple tools. Road accidents did not occur during his trips, mainly because traffic is too sparse and too slow.

Another German traveler was four times in North Korea and his last experience is from September 2011. Mostly he took the bus as the usage of trains or other public transport is highly restricted for foreign visitors. From Sinuiju to Pyongyang it was possible because it is an international line. Normally it took him around six hours. The train ride on an exclusive train for foreigners from Pyongyang to Hyangshan took the whole day. To the question why overland travel takes so long, he assumed that there are various reasons from electricity shortages, constructions, insufficient track condition and old locomotives. On some sections trains have to slow down. Some freight transport is still handled by steam locomotives. Over the time he believes that he saw an improvement in railway. DPRK invested in new locomotives, coaches and tracks. Some used diesel locomotives from Europe and China were imported as well as some locomotives were upgraded with new engines by domestic companies. This results in an increase in traffic, especially freight traffic on the lines Sinuiju to Pyongyang over Kuijang and between Hamhung, Chongjin and Wonsan. Back in 2003 his train to Beijing stopped several times due electricity shortages but several next times traffic ran slowly but fluent. Long distance trains are often crowded and very unreliable due delays or cancellations. Railway of DPRK resembles in his opinion the system of China or Russia more than twenty years ago.

Road conditions are also getting better. Through flood damages roads have been in bad condition but it was getting better thanks to fast repairs. Travelling on the roads was safe and the busses drove with high speed through towns and villages. Vehicle traffic is still low, but even there was an increase noticeable for him. He would compare North Korean roads with China ten years ago.

For the second time was Mr. F., an US citizen, in April 2012 for a trip in North Korea. Compared to his last trip in 2011 he did not see any major changes in transport infrastructure. This time he encountered more repairs on the side roads which were executed by help of primitive methods.

Figure 60: Impression of Railway in DPRK



(source: submitted by F.)

Focusing on rail transport overall it was in a fair condition. Rail tracks and passenger trains looked well, stations and crossing poles have been in various conditions. Passenger trains have been fully occupied. He learned for instance that there is twice per day a train scheduled from Pyongyang to Nampo and Hamhung. Overall, the rail infrastructure was found to be better than roads. DPRK'S railway system resembles

Serbia's rail in terms of functionality, militarization and historical importance for propaganda.

Highways are in rough condition but it is bearable through the lack of traffic. Worst experience for him was the highway to Kaesong. Parts of the highway have been partially closed with barricades due to huge holes in the streets. Repairs have not been conducted at all. While driving for forty minutes on the highway from Pyongyang to Nampo, he saw that this wide highway with ten lanes was in a bad condition and there were several large potholes. The highway from Pyongyang to Wonsan was in a better condition and it took around 3.5 hours to reach the city on the east coast. Continuing from Wonsan on a road of the classification level 1 to Hamhung it took four hours. In his opinion overland travel did not take too long. Travel duration was reasonable, but in more remote parts conditions might be worse.

His guides told him that a travel to Mountain Baekdu, which lies in the more northern part North Korea, near the border to China, takes four to five days by train and up to two weeks by car from Pyongyang. One point of his travel itinerary was cancelled due to bad weather. It can be assumed that some roads are only passible with good weather conditions.

Mr. U. from Austria took the Trans-Siberian railway to North Korea's capital Pyongyang in 2008. His wagon went all the way from Moscow to Pyongyang. This last section took thirty hours which means that average speed had to be around 30 km/h and possible maximum speed between 50 and 60 km/h. Reasons are first of all bad track condition and then curves on the route limited the speed a little because it passes through mountainous areas. Inside DPRK trains is the only mode for long-distance travels and how limited it even is, demand is very high.

Mr. H was three times in North Korea and he has a special memory involving transportation from his trip to North Korea: His driver drove on the wrong side on the highway from Pyongyang to Kaesong, because the conditions have been worse on the other side. Highways, despite that they are paved, the condition is very bad. Cracks, potholes, frost heaves, steep grades and an

uneven surface. On each of his trips to DPRK, he witnessed a road accident. One involved a bicyclist, another one was a collision of a truck and a pedestrian and a child falling of a tractor. Overall DRPK's roads are comparable to rural India (Rajasthan and Punjab) or rural western China. Through his trips he realized that there is no real traffic culture in DPRK. He observed that roads are used for all kinds of activities besides transportation.

The international train is divided into sections for foreigners and for Koreans whose section was fully occupied and loaded with luggage. Travel companions told Mr. Homer that a rail travel experience can be compared to a second-class train rides in India, Vietnam or Thailand twenty years ago.

Mr. S is a tour operator who organizes tours for rail fans. Till 2007 he arranged railway tours through DPRK.

Like everybody else, he sees the railroad as the main transport method for long distances. He assumes that the centralized train system gives the state more control and citizens can be monitored easier than by other modes. Although North Korean need to acquire travel permits before leaving their hometown trains are very crowded. Mr. S. has seen worse rail systems than North Korea's. It resembles the rail condition of China in the 1950s.

Highways and other roads are in a rather good condition. Traffic is safe on the roads without conflicts due to the low number of vehicles. But roads are not capable for intensive use of heavy trucks. Condition of roads is likely similar to remote areas Patagonia or China (before 2000). In comparison with some areas in India roads look quite good.

Another traveler also remembers four hours from Pyongyang to DMZ. Roads of Pyongyang have been in a far better shape than roads outside city. His impression was that the roads in the western part of North Korea have been better than the northeastern ones. He confirms that the number of vehicles on the roads was very low everywhere in North Korea. This was the most surprising thing about North Korean traffic for him.

4.4 NORTH KOREA'S CROSS-BORDER PROJECTS

4.4.1 SOUTH KOREA

With this, and the following two subchapters, a special form of international cooperation will be introduced. As it will be shown these cross-border projects are giving impulses to large-scale

infrastructure projects which cross the border. There is no equivalent subchapter about South Korea, for the reason that the geographical position with only one direct neighbor limits the possibilities.

Historically, Korea had the role of being a bridge between China and Japan (LEE/ OUELLETTE 2007). Nonetheless, the Korean War, which lasted from 1950 to 53, worsened the transportation network on the Korean peninsula. The train tracks between North and South Korea which were not destroyed during the war have been removed purposely. (RAILWAY TECHNOLOGY 2012)

Technically, Korea is still at war since no peace treaty has been made between the North and the South (HILPERT 2010, p. 131). North and South Korea are divided by the demilitarized zone (DMZ), which is a 4 km wide buffer zone (2 km on each side) along the border. Mines have been distributed all over this area and the strip is guarded by around two million soldiers on both sides. (RAILWAY TECHNOLOGY 2012)

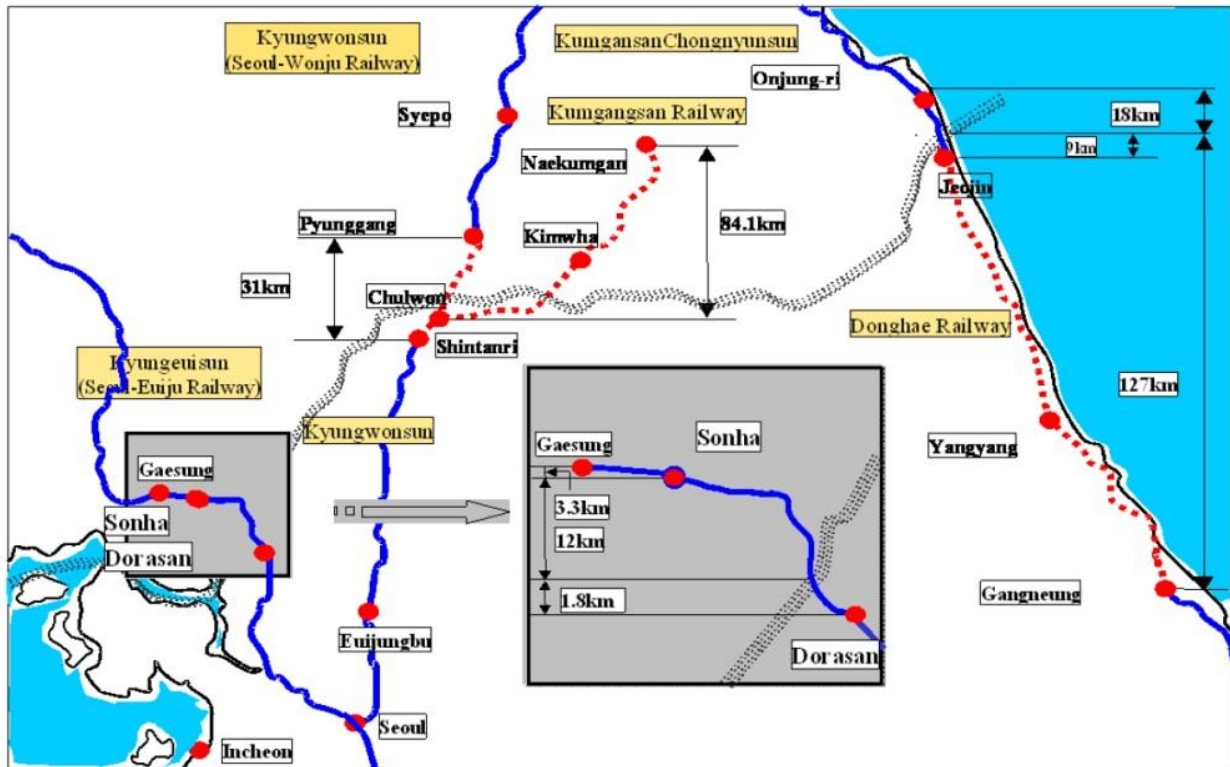
Cross-border projects are one way to improve relationships between North and South Korea, and to bring peace to the Korean peninsula. The impulse for the reconstruction of the Kyeongui-Line came from North Korea and they also showed interest in the possibility of operating services through DPRK to Russia (later discussed in subchapter 4.4.2 about Russia). (AHN 2003b)

In the late 1990s the two Koreas started with some broad forms of cooperation and reconciliation. The reconnections of railroad tracks between the two countries were topics of active discussion at the Inter-Korean Summit in June, 2000. (VORONTSOV 2010, p. 152)

The result was a treaty, signed by former ROK president Kim Dae-Jung and DPRK's former head of state Kim Jong-Il, about close cooperation on all levels of society (WERNING 2007, p. 109).

The plans concerning the reconnection of railways and roads became concrete in 2000 and construction took place between 2002 and 2003 (RAILWAY TECHNOLOGY 2012). In September of 2002 the construction began at the DMZ. For the railway connection the first task was the removal of landmines expanding 1.8 km alongside the west track and 2 km alongside the east track. This procedure was completed in December of the same year. In 2003 the conclusion of negotiations between North and South Korea resulted in an agreement to provide the construction projects in the DPRK with equipment and materials. In 2003 North Korea completed the mine clearance on the west connection after they declared the transportation sector as "one of the main battlefronts for economic construction" (AHN 2003b) the previous year. (AHN 2003b)

Figure 61: Overview of Cross-border Projects at DMZ



(source: LEE, SUNG-WON 2010, p. 17)

As the figure shows, two of four possible rail crossings exist. The Kyeongui-Line in the west and the Donghae-Line on the east coast are the only reconnected railways. There are two more connections across the border; one is from Sintanri to Mountain Geumgang (84.1 km on Geumgang-Line) and the second one is a gap in the Kyeongwon-Line between Sintanri over Cheolwon to Pyeongkang (31 km). In 2007 construction of a 9.2 km long section in the south begun and it is scheduled to finish until December 2012, which would reduce the gap in the line to 22 km (FRDB 2011).

As far as the discussions regarding train operations, there was widespread agreement in many areas. For the eastern route 27 km of rail construction was scheduled. 18 km are on the North Korean side to Onjongri, where it would connect to North Korean rail, and 9 km are in South Korea as far as Taejin. At the time of this writing that is where the rails end. As now there is no eastern rail corridor in South Korea. If the eastern route is constructed, it could serve as a solution for freight transport to deliver goods from Busan Port to Taejin. (AHN 2003b)

A news article by BBC (2007) describes in detail the historic day when, for the first time in more than fifty years, trains crossed through the DMZ. Passenger trains from both nations carried 150 selected passengers for this symbolic event. The Unification Minister of that time, Lee Jae-Joung, emphasized that it was a turning point for the relationship between North and South Korea and it opened chances for reunification. Back then the trains drove from Munsan, a city in South Korea, to Kaesong in North Korea. (BBC 2007)

Figure 62: North Korean train welcomed in South

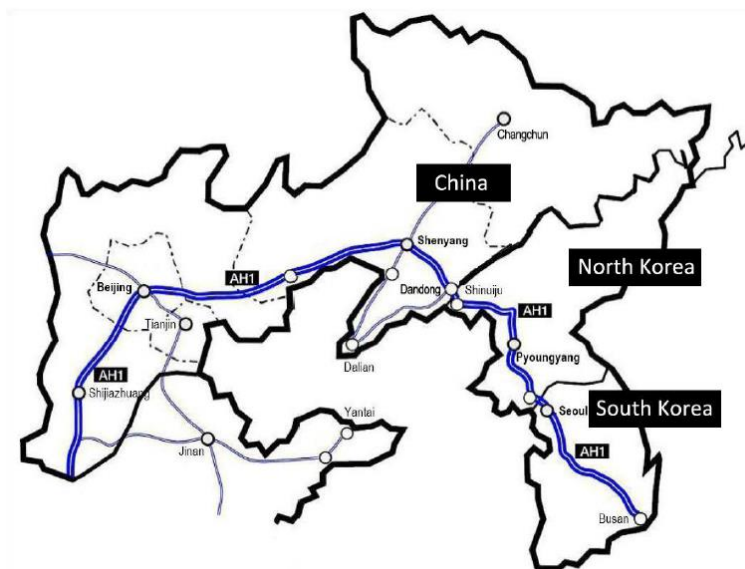


(Source: photo by JUNG, YEON-JE in: CHOE 2007)

Following the opening ceremony, inter-Korean freight trains ran from Dorosan Station in the ROK to Panmun Station in DPRK five times a week with no service on weekends. If there was a sufficient amount of goods, the train would have up to 12 cars. The service operated 222 times before it was suspended on November 28th in 2008, because North Korea put new restrictions on overland travel. During the operation time 235 tons of materials were exported from the ROK to DPRK and 75 tons of goods were imported. (MOU 2010, p. 97)

Generally, there are seven possible road connections between the North and the South. Two of them were also part of these cooperation projects and so they are on the same corridors.

Figure 63: Asian Highway No. 1



(source: LEE/ SEO/ CHUNG/ LEE 2011, p. 3)

(SUNG/ KIM/ AHN 2005, p. 25)

Parallel to the Kyeongui-railway line, there was the extension of the expressway no. 1. To DMZ it is a four-lane road and then it is until Panmun a two-lane road. The total length of this road connection up to Kaesong is 12.1 km. The road on the east coast has only two lanes but the project contained 24.2 km. Both projects were completed until end of 2004. In the first twelve months after completion on the western road

15,314 vehicles crossed the border. (SUNG/ KIM/ AHN 2005, pp. 17)

The road projects are also ideas from the 1958 United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) to enhance economic effects in East Asia. The distance per road from Seoul to Sinuiju is 465 km and to Pyongyang it is 224 km. The Asian Highway No. 1 leads from Busan over Seoul and then to Pyongyang and Beijing, which is 1348 km away from Seoul. (LEE/ SEO/ CHUNG/ LEE 2011, pp. 1)

If these connections are open to public, than this newly built rail connections and highways could transport annually 4.3 million passengers over the border (WERNING 2007, p. 110).

Second major project between the ROK and the DPRK took place at Mountain Geumgang located on the eastern part of the Korean border as a tourism project. Since February 2002 an overland route opened to a resort which includes a hotel and some recreational facilities. (YOON/ YANG 2005, p.13)

All projects were undertaken by Hyundai Asan, a business arm of the Hyundai conglomerate. It all started with a trip to North Korea by the Hyundai founder Chung Ju-Yung in 1989 and the first project was about tourism to Mt. Geumgang, which is located in North Korea near the South Korean border. The company Hyundai Asan was founded in 1999. (HYUNDAI ASAN 2012a)

2004 Hyundai Asan and North Korea's Asia-Pacific Peace Committee agreed to lease an area of

Figure 64: Development plan



(source: HYUNDAI ASAN 2012c)

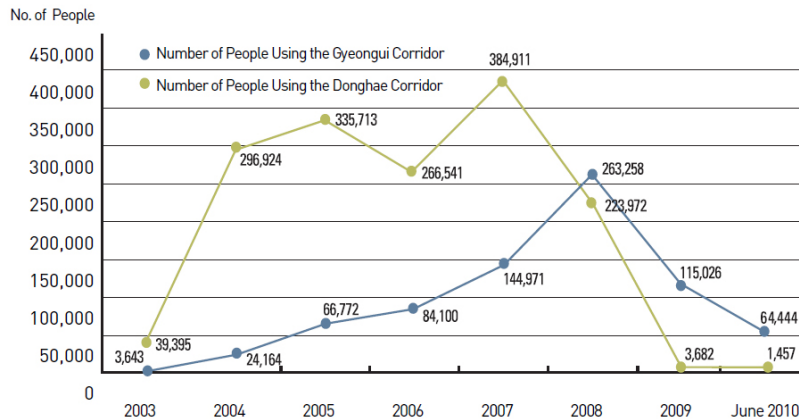
66.1 km² for the next fifty years (WERNING 2007, p. 109). But in the second chapter, it was introduced that a government should hold the exclusive rights for jurisdiction over infrastructure. In the example of Hyundai Asan, all cross-border project and results of the survey show that the regime of Kim Jong-Un is not able to provide a sufficient standard of transport infrastructure.

This development plan shows that the project is not only limited to a mountain. On a strip of 109 km almost a dozen

development zones exist. Geumgang is the greenest, most southern point. (HYUNDAI ASAN 2012c)

From 2004 to 2009 around 300,000 tourists went to Mt. Geumgang (NAH 2009, p. 112). On July 1, 2008, a South Korean tourist was shot by North Korean army at Mt. Geumgang and for that reason all tours have since then been suspended (MOU 2010, p. 94). Afterwards in 2010 North Koreans confiscated most of the properties and the workers were expelled (MOU 2010, p. 95). In recent news is said that Chinese travel agencies are offering tours to Mt. Geumgang starting from the middle of June (KBS WORLD 2012b).

Figure 65: Number of People Crossing the DMZ



(source: MOU 2010, p. 96)

After 2002 it was possible to cross the border thanks to the cross-border cooperation. The Donghae Corridor was used for tourism to Mt. Geumgang. Unfortunately, the decline is as sharp as the opening of it was. Without its main function, this eastern corridor is not currently used at all. The Kyeongui Corridor is still important for the special economic zone of Kaesong, which is going to be introduced next.

The last and most popular project on the inner-Korean border is the Kaesong Industry Complex (KIC). Actually the roads and railways which have been described above also have the purpose to connect Kaesong to South Korea's transport network. Kaesong was a very important city in history and it was even the capital for several centuries until 1392 (BAE/ RICHARDSON 2011, p. 237).

Construction of basic infrastructure, such as running water, sewage, electricity and communication was mainly South Korea's responsibility (KIM 2007a, p. 63).

The KIC is a role model for a project that has stability as its priority, even if conflicts between the North and South become tense. According to latest statistics 123 South Korean companies operate in the complex and in 2011 the annual production value was 400 million US dollars. (MOU 2012, p. 13)

The monthly wages have been 50 US dollar (in 2007) and it rose to 57.88 US dollars (in 2009) (MOU 2010, p. 84).

Since Lee Myung-Bak became the president of South Korea 68 companies with 23,529 North Korean workers have been employed there. Until January 2012, the number of workers grew up to over 50,000 North Koreans. (MOU 2012, pp. 14)

But it was planned that as of 2012 around 730,000 North Koreans work in the KIC (WERNING 2007, p. 110).

Figure 66: Entry to North Korea



(source: TAGESSCHAU 2012)

Most of the goods, which are produced in the KIC, are produced in rather small quantities and so transport by trucks is the most efficient way. While the train line was open, the trains operated sporadically because of that reason. A specific amount of goods had to be accumulated until it was profitable to transport it by rail. The second reason why truck transport is

preferable is that the majority of the goods have Seoul or Incheon's port as destination, which is less than 100 km away. (MOU 2010, p. 97)

The next problem is that currently North Korea's SEZ are not competitive in comparison to Chinese or Vietnamese SEZ due to geographical disadvantages. Kaesong is an exception thanks to its orientation southwards and good rail and road connection to South Korea. Mostly small and medium-sized companies from South Korea are active in Kaesong. (KIM 2007a, p. 63)

All these projects are part of a priority shift from only security to concentrating on more economic priorities in North Korea. It is essential for survival of the regime. South Korea has changed from simple cooperation in trade to large scale investments into North Korea. Both countries are profiting from it. A trend towards an integrated region in Northeast Asia is possible to feel, even if the structure is still unclear. Korea has to regain its historical role. (LEE/ OUELLETTE 2007)

Such a project helps to reduce the economic gap between both Koreas and it would reduce the costs of reunification. And moreover reconnection of transport routes comes close to a symbolic finish of the Cold War on the Korean peninsula. (KIM 2007b, pp. 104)

4.4.2 RUSSIA

Russia has a significant influence on security and stability of the Korean peninsula. This role may become stronger if a reunification takes place. Cooperation between Russia and North Korea or South Korea exists thanks to mutual relations. Russia may probably gain a strategic partner with a reunified Korea. (PANOV 2011, p. 121)

Russia shares only a fairly short border of 18 kilometers with North Korea and during the Soviet era there had been close relations to the elite of North Korea for many decades. Nowadays, Russia tries to keep normal relations with both Koreas. Trade between Russia and DPRK consists to 80 % of exchange between border regions. (PANOV 2011, p. 123)

On April 2nd 2012 North Korea announced that they are going to start freight transport with Russia from October this year. Four years ago constructions began to reconnect and double-track a railroad in the northeastern border region of Rason and it was completed in October 2011. The goal of this project is to handle shipments for Europe at the North Korean port. (YONHAP NEWS 2012a)

Figure 67: Celebration of Reopening of Russia-DPRK Line



(source: NISHIMARU 2011)

The first train drove on a 52 km long route between Khasan in Russia to Najin in October 2011. The biggest difficulty was the different gauges and now the trains can run on mix-gauges tracks across the border. In 2001 Kim Jong-Il and Vladimir Putin agreed on this joint venture and the plan was to invest 259 million US dollar for railway and port. (NISHIMARU 2011)

This project is a pilot project for the plans to reconstruct the eastern route of the Trans-Korean railroad (TKR) (VORONTSOV 2010, p. 164). The relationship to Russia was not very good for a long time. Since 1984 Russia and North Korea did not hold any summit. But with Putin the situation changed and several meetings (three until 2003) have been arranged. Probably Russia started an interest “in mutual profits from a connection of the TKR to the Trans-Siberian Railway” (AHN 2003b).

Serious efforts have been made in 2002. DPRK set the foundation work for the extension of Trans-Siberian railway (TSR) to North Korea. In cooperation with railway officials from Russia,

North Korea's railway company said that the eastern parts of North Korea, from the border to Wonsan, have been under survey. (AHN 2003b)

Even meetings of Russia, ROK and DPRK took place. The first time they met was in April 2004 and at the second trilateral meeting with officials of each railroad administration the project of the TKR was the main topic. (VORONTSOV 2010, p. 164)

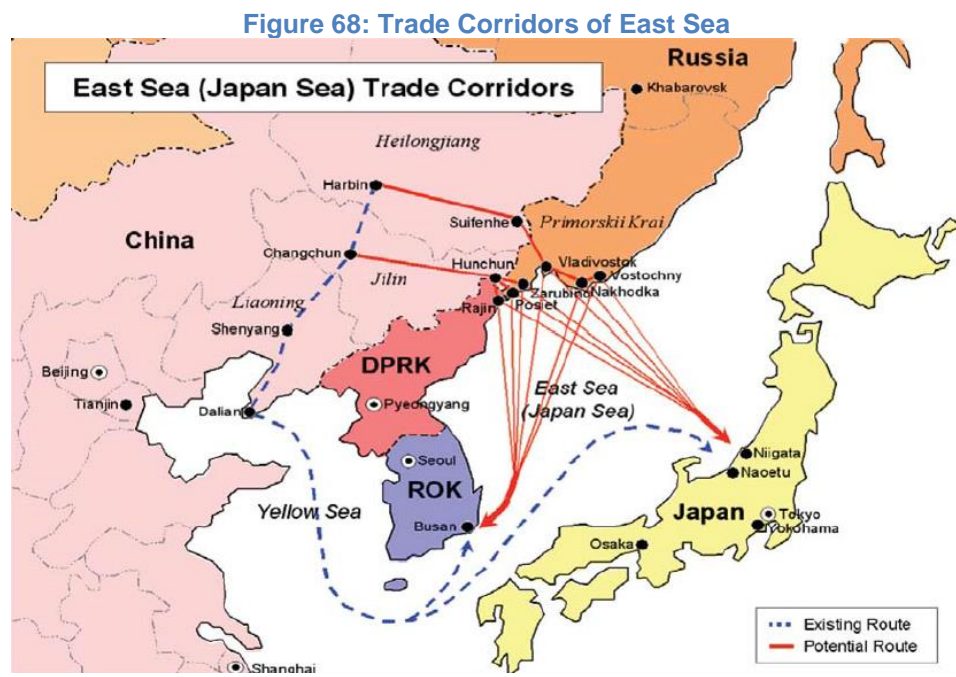
This route could be one of the most secure and cheapest ways to transport freight from Korea to Europe. Compared to the forty to forty-five days a container ship needs, a train from Busan in South Korea via Russia to Europe would take between thirteen and fifteen days. (VORONTSOV 2010, p. 150)

Quoting a Russian-Korean work group who examined the eastern route from the Russian border to DMZ comes to the result that reconstruction of it would cost between 2.5 and 3 billion US dollar. Adding to this sum costs for energy supply and purchase or production of new rail cars would come up. (VORONTSOV 2010, pp. 163)

Problems of this project include high costs, different business systems in North Korea and Russia and a political risk. First of all, "peace, security and stability" (VORONTSOV 2010, p. 154) have to be ensured and only then this concept could be realized much easier and faster. (VORONTSOV 2010, p. 154)

DPRK's military has the control over the ports of North Korea (DUCRUET/ ROUSSIN/ JO 2009, p. 5). The ports are quite small and without sufficient amount of equipment, so cargo has to be unloaded by hand

(DUCRUET/ ROUSSIN/ JO 2009, p. 9). But as the map shows, there are a lot of chances for potential routes. More about this topic



(source: UNESCAP 2006, p. 59)

On top of that there is one more project between Russia, DPRK and South Korea. Russia's Gazprom and South Korea's Gas Corporation intend to deliver Russian natural gas through North Korea. ROK would be able to satisfy natural gas consumption by 20 % of natural gas for the next thirty years. Moreover, it would reduce import prices in Korea. (PANOV 2011, p. 128) This plan is also still supported by the new leadership in North Korea (YONHAP NEWS 2012b)

4.4.2 CHINA

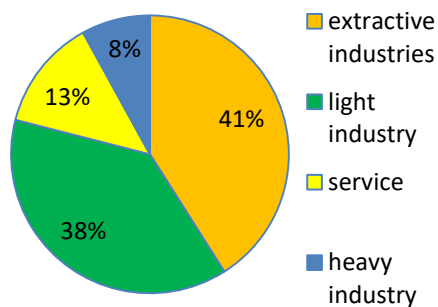
North Korea has a tight bound with China and evidently China is DPRK's "economic lifeline" (THOMPSON 2011, p. 14). DPRK is internationally isolated and only through the alliance with China during the Cold War and through common political heritage a string of partnership still exists (THOMPSON 2011, p. 16). Its aid and investments guarantee the regime's survival. The former chairman Kim Jong-II strongly hoped that the economic exchange with China would help to develop North Korea's economy and improve the lives of its people (AHN 2010, p. 128). The motivation of China is grounded on geopolitical importance as much as strategic interests. Especially for the northeastern regions of China the DPRK and its ports play an important role. (THOMPSON 2011, p. 3)

The investments of China can be divided into two classes (according to AHN 2010, p. 128):

1. development of mineral resources
2. development of infrastructure for international transport

From 2003 to 2009 China invested a total sum of 98.3 million US dollar. But it is relatively low compared to investments of China to South Korea (1.2 billion US dollar), Thailand (273 million US dollar) and to Mongolia (890.7 million US dollar) for the same period. The problems that

Figure 69: Sectors of Joint Ventures



(source: Thompson 2011, p. 4)

China is facing in North Korea are rent-seeking, an oppressive system and poor infrastructure. (THOMPSON 2011, pp. 3)

On the left there is a graph with the sectors of the joint ventures, which were established between 1997 and 2010. Most of these companies come from the neighboring regions. (THOMPSON 2011, p. 4)

Accession of the WTO in 2001 (THOMPSON 2011, p. 21) and the implementation of "Zouchuqu" ("Go Abroad") policy (THOMPSON 2011, p. 16) required a bigger demand of supply for Chinese companies. One source

for materials is represented by North Korea. It has very large reserves of coal, iron ore, limestone and magnetite. Mining plus manufacturing marked 34.6 % of North Korea's GDP in 2008. A report of Goldman Sachs estimates the value of deposits being about 140 times the GDP of 2008. After 2002 the import of coal from North Korea increased due to rising production costs in China. Coal production is regularly hindered by "lack of electricity and shortage of spare parts" in North Korea (THOMPSON 2011, p. 22), which can be solved by Chinese investments. (THOMPSON 2011, pp. 21)

Last year Chinese state television reported that in June 2011 Chinese tourists were able to participate on a self-driven tour through the hermit kingdom. It was the first time ever that something like that was possible. All of the 100 Chinese tourists entered DPRK with jeeps which were strongly required due to the bad conditions of road. (CHIN 2011)

The best example for China's involvement in DRPK is the "Chang-Ji-Tu"-Plan. Behind the expression "Chang-Ji-Tu" stands the "Changchun-Jilin-Tumen Regional Economic Development Pilot Zone". This is an economic zone, which implies the most northeastern regions of China and the port of Najin (also called "Rajin") in North Korea. (THOMPSON 2011, p. 32)

Figure 70: China's Chang-Ji-Tu Plan



Totally the zone is around 73,200 km² large and 11 million people live there. This is 40.7 % of the population of the whole Jilin province and 90 % of the production factories are located in that zone. And 60 % of the province's GDP is made there. (SEO/ ROH 2012, p. 9)

The five-year plan of Jilin Province from 2011 to 2015 clearly expresses China's interests in the port of Najin and an increasing cooperation with

(source: LEE, YOUNG-HOON 2011, p. 1)

neighbor countries Russia and North Korea. (LEE, YOUNG-HOON 2011, p. 1)

Business investments in North Korea's transport infrastructure are mainly for port and cargo load and unload. One section is the rebuilding of connections of rail and road to the port with the goal to raise the profit and lower the costs for the companies. 2005 China decided to develop a project to integrate the North Korean port via roads to China (AHN 2010, pp. 129).

At the end of 2009 “Chang-Ji-Tu” project was officially announced. So far, the progress is quite astonishing: A highway from Changchun to Hunchun, a city near the border to North Korea, was built until September 2010 and a HSR on the same route is scheduled to be completed by 2014. Until June 2010 a bridge over the Tumen river from Quanhe in China to Wonjongri in North Korea was repaired. Distance from Quanhe to Hunchun is only 39 km on a completely new road. In 2011 the construction of a pavement and the extension of a 67 km road from Quanhe to Rason began. In an agreement between North Korea and China in 2010 was settled that China invests 2 billion US dollar into the SEZ of Najin-Sonbong and in return DPRK gives them mining rights. January 2011 was the first time that the road via Hunchun to Najin was used to transport coal to Shanghai. (LEE, YOUNG-HOON 2011, p. 1)

“Chang-Ji-Tu” project implies the chance for a cross-Korean railway linkage to Russia, China and Europe as a transcontinental railway for passenger and freight transport. In fact, it was stimulated by United Nations Development Programme (UNDP) since 1990. Instead of working together, each Russia and China have bilateral projects with North Korea China leads the infrastructure project as initiator while North Korea and Russia assist actively. Especially the strong bond between North Korea and China leads to a change in transport infrastructure. (SEO/ ROH 2012, p. 8)

A total amount of twelve projects are under the lead of China and seven of them are linked with construction of routes to North Korea. The investment volume is 15.4 billion Yuan (2.4 billion US dollars). (SEO/ ROH 2012, p. 9)

With the purpose of achieving regional development in China transport routes to neighbor countries are necessary. (SEO/ ROH 2012, p. 10)

Therefore China’s region Jilin intends to put a lot of money into the connection of several cities and the port of Najin, which lies around fifty kilometers away from Tumen. (THOMPSON 2011, p. 33)

North Korea has initiated some measures to profit from it: Rason city was named a special municipality with special economic and trade zone laws and eight areas in DPRK are designated as special economic zones to attract foreign investors. (SEO/ ROH 2012, p. 10)

Figure 71: Busy Port of Najin



(source: GOOGLE EARTH 2012)

The nations concerned failed to reconcile their differences and resolve the funding problem. (SEO/ROH 2012, p. 8)

Reactions of experts to large investments by foreign states in North Korea are diverse: While some think it may lead to economic reforms and an opening of DPRK, others have doubts because the latest history showed that most of the projects experienced a lot of troubles. (LEE, YOUNG-HOON 2011, p. 1)

Feasibility of this project seems to be very good. China's strong motivation with the intention of balanced regional growth and North Korea's attempt to revive its economy by foreign investments are raising the possibility of a successful realization of this project. (LEE, YOUNG-HOON 2011, p. 3)

This project shows that under current circumstances planning takes too long. In 1990 this project started and right now the first signs of execution appear. After a reunification such a slow progress would be unbearable.

Instead of a bridge North Korea "remains a barrier" (DUCRUET/ ROUSSIN/ JO 2009, p. 4) to nations like South Korea, Japan and China. Each of them would prefer to use an overland railroad connection like TSR or TCR. (DUCRUET/ ROUSSIN/ JO 2009, p. 4)

Until now, China acts far more active than North Korea. Perhaps it is still not clear, how much DPRK is willing to support this project and how much they are able to support it at all. Maybe in a similar case like cross-border projects with South Korea, their partner needs to provide them with machines and construction material.

Besides a detailed description of cross-border projects of China and North Korea, this subchapter showed the potential of North Korea. As a country with valuable resources it is obvious that construction of a well-working freight transport can have great benefits for economic development.

5 ACTION PLAN

5.1 LESSONS FOR KOREA

Beforehand, it has to be mentioned that German Reunification had no example to lean on. Such an event with such characteristics happened for the first time in modern history. The risk for making mistakes was huge. Fortunately, the outcome was positive and this subchapter is going to show that Korea can learn a lot of Germany's Reunification.

In general, referring to CHA/ Kang (2011, p. 6) there are two principal types of lessons for a reunification in Korea: The first type is that Korea should avoid doing the same mistakes that other countries did. And the second type is to prepare the unification rather on a conceptual level, because a lot of factors are not possible to determine beforehand.

This subchapter looks at the first type of lessons and a concept is made out of these lessons in the following subchapters. Lessons for Korea are about the experience in terms of costs, duration, migration and, of course, mistakes.

Germany's case showed that reunification first of all needs one valuable resource: time (TORRY 2012). Considering the duration of GUTP, they have been executed in a remarkable speed. As it was presented in chapter 3, consensus of politics and society is the most important factors for a fast realization of projects (KIESLICH/ KLEINSCHMIDT/ LÖBACH 1992, p. 10).

Currency Union was introduced too early in East Germany and it led to a collapse of industry and unemployment (TORRY 2012). That was a clear mistake which has to be avoided in Korea. Examining North Korea's economy and enhancing their advantages on the market is the lesson which they have to get out of this point.

Another general lesson is that in Germany solidarity tax was a helpful tool to fund transfer payments and it could be useful in Korea as well (TORRY 2012). The economy has to be revived with financial aid. Parts of it have to come from foreign countries. Clearly, North Korean citizens would benefit a lot from reunification. If North Korea just opens his economy its economy would grow 12 % annually. Currently there is a 40-fold difference between the income of North and South Korea. An open, global integrated economy could reduce this gap down to 3.2 fold in 40 years. (LEE, MIN-JI 2012)

And that is simply in case of an open economy. However, unification with the economic strong ROK and a market transition together would have higher potential for growth.

South Korea's potential for long-term growth faces troubles through demographic changes. It has extremely low birthrates and the world's fastest aging nations. North Korea's demographic structure and potential for development would ease the problem and lift South Korea's development. (LEE, MIN-JI 2012)

It should be not mistaken that North Korea's high birthrate of 2.01 children per woman (CENTRAL INTELLIGENCE AGENCY 2012b) is a chance for problems of South Korean society. In Germany, there was a sharp decline of births in the new states and they adjusted to West Germany very fast. It can be assumed that it happens similar on the Korean peninsula. Even if it is still under the rate to maintain the population at the same level reports of United Nation say that the population of North Korea is expected to grow to 26 million until 2030 (KBS WORLD 2012c).

Costs are a major point in the discussion of reunification. The output gap (difference between north and south) exists in a quite large dimension. On top of that the amount of domestic private and public savings is also regionally extremely different. Thus the ability to attract foreign capital may be quite important. (BLUM 2011, p. 25)

As observed in the previous chapters, North Korea and East Germany share many structural characteristics and a logical conclusion is that the costs of reunification in Korea can be expected to be no less than as high per person as it was in Germany. (KELLY 2011, p. 462)

Germany invested around 6 % of their GDP, for North Korea the southern part may have to invest 24 % of GDP, which is nearly an unbearable load (BLUM 2012). North Korea is far behind East Germany of the 1990s in terms of development of almost every area and the second risk is that North Koreans are much poorer than the East Germans were (KELLY 2011, p. 463).

German politics does not use directly the expression "unification costs" because there a lot of intangible costs and each amount of money that went into an area of reunification. Therefore it is impossible to find out the exact sum of costs. (KIM et al. 2011, p. 60)

Through solidarity tax, agreements ("Solidarpakt I/II") and more funding sources around 500 billion Euros have been accumulated and probably 1 trillion Euros for social welfare was given to citizens of the eastern states. (KIM et al. 2011, p. 64)

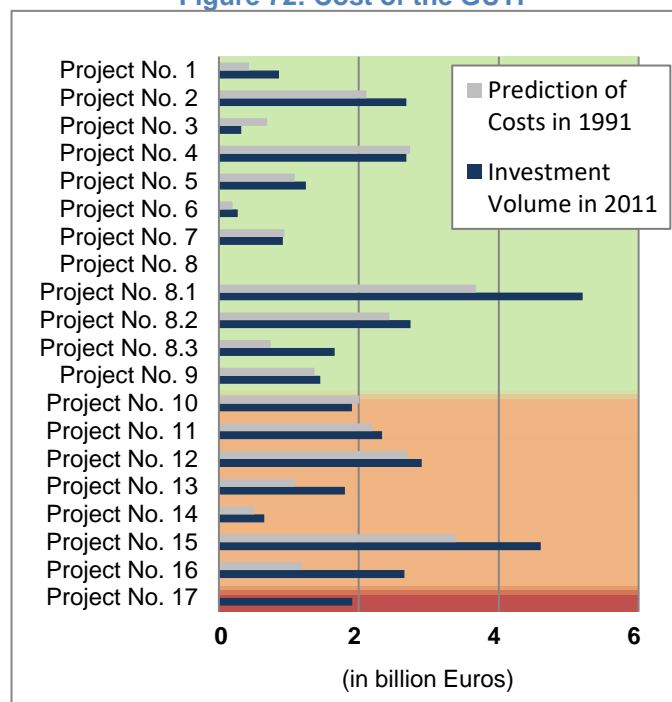
This was a look at the general costs and it showed that the matter of costs is a big burden that the reunited nation has to shoulder to move on to a prosperous future. On the next pages lessons for costs in the area of transportation

It is widely believed that a sudden collapse would burden Korea with high costs which have to be used to develop industry and agriculture and improve living standards (HENRIKSEN/ LHO 1994, p. 2). For instance, Korea Development Institute projected in the early 1990s that a sudden unification would cost around 250 to 300 billion US dollar (PARK, YOUNG-KYU 1993, p. 38).

German experience about costs and specifically about costs of GUTP gives some hints for Korea. An investment of one billion DM creates and secures 12,500 jobs (BMV 1996b, p. 2). As mentioned, in 1991 the GUTP were accepted with a volume of 28.6 billion Euros and later it was raised to 38.7 billion Euros. Depending on the project the costs developed in various ways, some grew more than others. (HUBER 2011, p. 13)

The next figure is inspired by KAGERMEIER (1999, p. 72) and it tries to show the difference between predicted and real costs. Green background expresses road projects, orange background stands for motorways and the red one is the waterway, where data of 1991 is missing. Majority of projects stayed close to their prediction but some have got even up to twice as expensive as expected. The project no. 5 and 16 show the highest difference between prediction and real investment outcome.

Figure 72: Cost of the GUTP



(source: BMV 1993, pp. 47; BMVBS 2011, pp. 7)

Out of this comparison Korea can learn the lesson that prediction of costs may help but the result can always differ from their prediction. An improvement of transport infrastructure reduces costs, which are aggregated through congestions, driving distance, driving speed and traffic capacity (KIM et al. 2011, p. 59). Besides under current condition, it is clear that bad condition of infrastructure will limit economic development (PARK, YOUNG-KYU 1993, p. 39). Probably more important is the fact that cost of reunification is going to depend on how efficient the investments are going to be spent (MO 1994, p. 51).

It is essential to “find the balance between short-term expediency and long-term reconstruction” (CHA/ KANG 2011, p. 9). Improving the lives of its citizen feels to be urgent and so the immediate support works on the expense of projects for the long run. Besides it is very important

that projects are carried out successfully from early on. It promotes the legitimacy of the whole national and so it wins support national and international. (CHA/ KANG 2011, p. 9)

Germany invested a lot into the stability and development of the new states, regardless of the weaker economy in the East (PARK et al. 2011, pp. 120). This fact and the whole paragraph implied the message that costs are a high burden, but it is not an obstacle, which hinders two nations completely from a reunification. If the chance for reunification appears, politics should not hesitate because they have to look at the funding first. The researched showed (especially in this subchapter) that the process of merging two nations sets free a lot of resources for growth.

There are various opinions about migration after a reunification. "If wealth doesn't come to North Korea, North Koreans will come to the wealth." (TORRY 2012) This is a logical assumption and it would occur in combination with a high unemployment rate, low birthrate and right-wing extremism among remaining inhabitants (TORRY 2012). That was the case in some parts of East Germany.

Germany's experience shows that there have been two waves of East-West migration: the first one was between 1989 and 1990 and the second migration wave begun in 1997. The first one was motivated by uncertainties before unification. And at that time "a window of opportunity" (HEILAND 2004, p.176) allowed people to leave the GDR. Later the second wave was due economic stagnations in the East and more job opportunities in the West. (HEILAND 2004, p. 188)

The question is, if it is going to occur in a similar way in Korea with North-South migration. By now, there are no direct opportunities for DPRK's citizen to go to South Korea. In time of a political change, which means towards unity, migration might be open and as a lesson from Germany, Korea should prepare for an exodus of North Koreans. And the next lesson is that economic growth and a vision for prosperity (in a long-term) supports people from leaving there. Southern part of Korea would have difficulties to absorb, feed and give jobs to these mass of North Korean people (HENRICKSEN/ LHO 1994, p. 2). That is why an optimal solution is a slow-paced loosening of the totalitarian political grip, expanding market economy before reunification (HENRICKSEN/ LHO 1994, p. 3)

That is not the only imaginable scenario, there are several more. It is rather possible that waves of migration are not going to take place because: (1) "people cling to their home, regardless of how dire the conditions" (CHA/ KANG 2011, p. 17) and (2) lack of experience in local or international migration. Under the current regime movement is strictly restricted and some people were forced to move so some other place inside of DPRK. This group is likely to be a problem and in need of assistance. (CHA/ KANG 2011, p. 17)

Probably the only major mistake in the plans of the GUTP was that they did not expect such dramatic demographic changes in East Germany. And as it was explained in the chapter about the GUTP, some processes have even been stimulated by the new transport ways. It is not easy to avoid such side-effects, but at the end the positive impacts dominate over the negative ones. Hereby, the lesson for routes in North Korea may be that it should not guess too much demand. Applying standards of infrastructure from the South does not imply to assume same standards for capacity and traffic flow. Predictions should not be influenced by political thoughts of steady grow. Instead, calculations have to be done with more exact outcomes, even if it may extend the planning duration. Later it will save construction and maintenance costs.

East German citizen were well aware of the suppression they experienced and they expressed the demand for freedom of travel and other things in form of the Monday protests. In North Korea the situation is far more severe. Citizens are extremely oppressed and they cannot travel independently through their own nation. The strict isolation made the North Korean unaware of their situation, their strong ideology and the wrong image of the world (DEGES 1996, p. 40). Integration of North Koreans into a democratic, capitalist system is a much greater challenge.

Korea can learn some minor things from best-practice examples of the GUTP to improve effectiveness: workgroups consisting out of experts from different area; cooperation between engineers and architects, between engineer offices and construction firms; concepts for planning of special areas procedures and finally special methods to choose a construction company. (BBR 2005, p. 58)

Establishment of planning societies was a successful model in Germany and it could be used very well for reconstruction of transport in North Korea. Financial situation in North Korea is bad and so the flexibility and capacity for planning of each region is low (PARK et al. 2011, p. 121). Planning societies could take over the responsibility for planning and execution.

Probably the most important lesson is to find out how and when it is time to initiate large investments for long-term infrastructure (CHA/ KANG 2011, p. 31). In a reunification process matters of transport infrastructure have a high priority. While the two Germans discussed how to reunify, a special committee worked on plans for transportation infrastructure. Though in FGR an infrastructure plan for whole area was scheduled for 1992, the GUTP have been released a year earlier.

At the end Korea's reunification could be more challenging than it was in Germany. Cost per capita could be more expensive, risk of institutional problems after reunification has a higher risk and international atmosphere is more severe than in 1990. (KELLY 2011, p. 462)

Germany's challenges after reunification and solutions for problems are very helpful for Korea (MO 1994, p. 51).

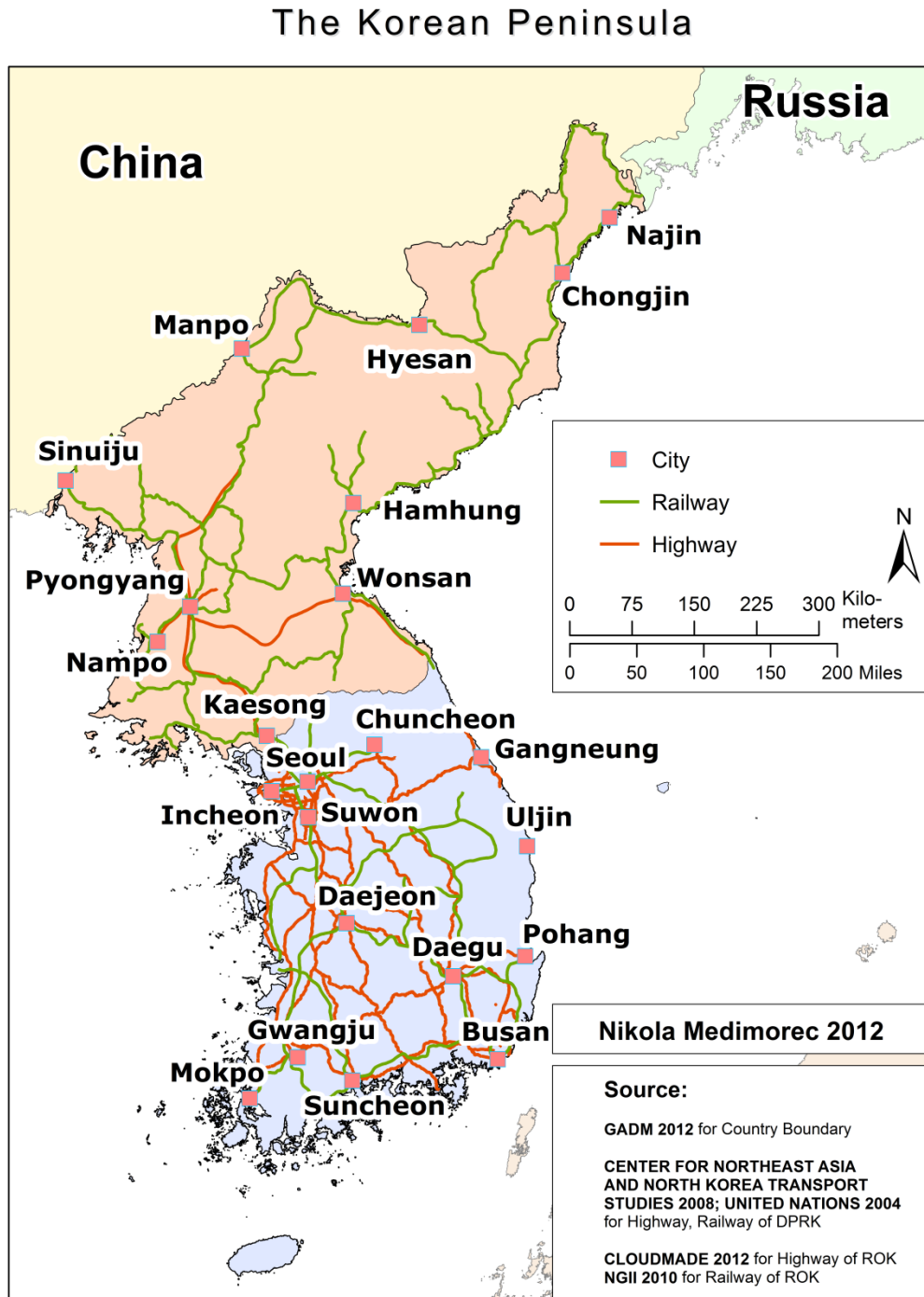
What happened in Germany is generally assessed as the good example. In conclusion, Germany increased three geopolitical features through reunification: size, population and power. (TORRY 2012)

The third chapter showed that unification sets unimaginable resources free. Political movement, adjustment of living conditions and consents for constructions happened in such an incomparable dimension. Lessons of Germany's example show that a reunification is not easy and a reunification in Korea bears a lot of risks. But "a future without unification is surely even less attractive" (LANKOV 2012).

With these lessons in mind an action plan for a possible reunification in the near future can be set up. The next two chapters are going to give some useful clues and suggestions for that.

5.2 ANALYSIS OF CORRIDORS AND TRANSPORT

Figure 73: Map about Transport Infrastructure on the Korean Peninsula



(source: made by author)

The map above shows the transport infrastructure of both Koreas together. Their characteristics could not be more different. This subchapter tries to analyze what was discussed until now with the help of various other maps and theories.

Unification projects in Germany showed that the first look goes at the corridors, which existed historically, currently and may develop in the future. Looking at Germany, majority of projects were along existing routes and some had a very important role in history. On the peninsula historic corridors have to be evaluated if their importance is still as big as it was once. Maybe industrial structure changed or shift of transport modes made some routes inefficient. Besides main corridors of long-distance traffic are traditionally always in the center of focus by transport policy and transport planning (NUHN/HESSE 2006, p. 242). This means, that a look over the border is essential. To do so, a map from UNITED NATIONS (2011) with the whole railway network of Asia gives some good insights.

Figure 74: Trans-Asian Railway network with corridors



(source: UNITED NATIONS 2011)

For the Korean peninsula there are two rail corridors visible. The first corridor of the Korean peninsula is on the western side along populated cities like Seoul, Kaesong and Pyongyang. In its extension over Sinuiju it functions as an international route to China. DPRK's industrial cores are in Sinuiju and Pyongyang, which would be a great benefit for their development. The second corridor is along the eastern coast. But on the east coast of South Korea is no rail, neither a

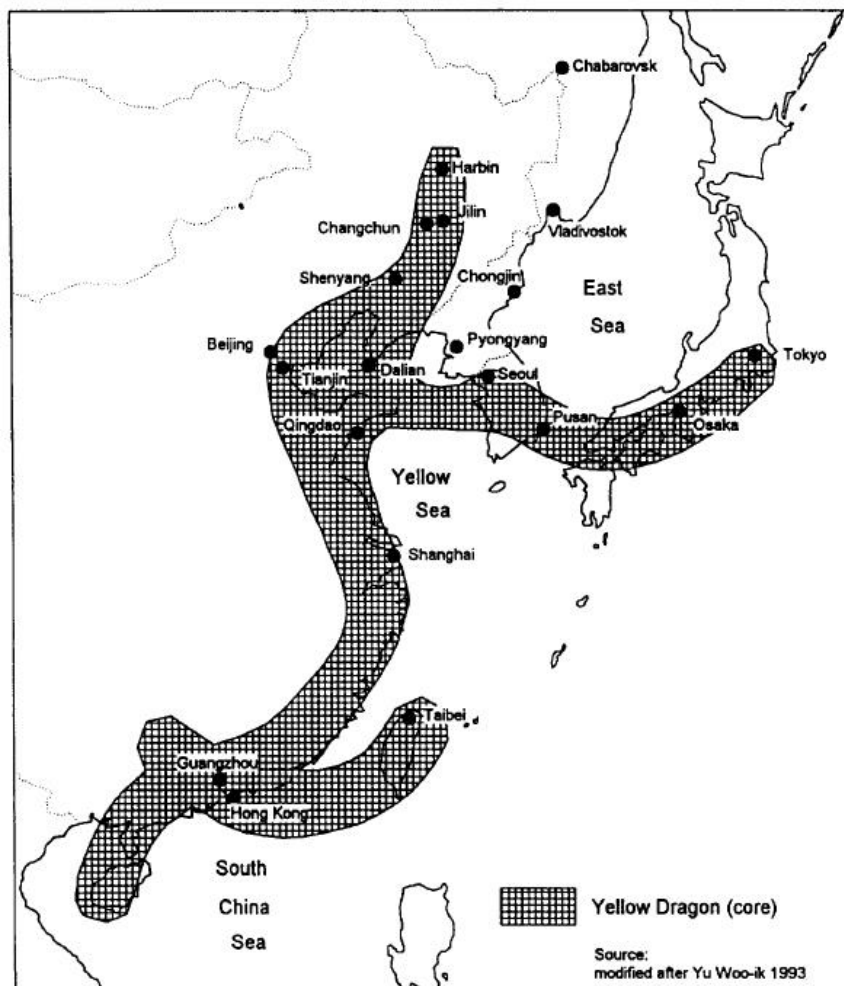
highway. Construction of an eastern, direct route to Busan would need around 300 km of new rails and ten years of construction in South Korea. (AHN 2003b)

Also VORONTSOV (2010, p. 157) does not regard this as a serious option. Evidently, it is a consideration of costs, distance and construction duration.

So there are two possible corridors. One leads on the eastern side as the TSR to Russia and the other one is the TCR along the western coast to China. Which of these two routes might be more important in terms of freight traffic and passenger traffic?

To answer that question two concepts about international main corridors and their relationship to

Figure 75: East Asia's "Yellow Dragon"



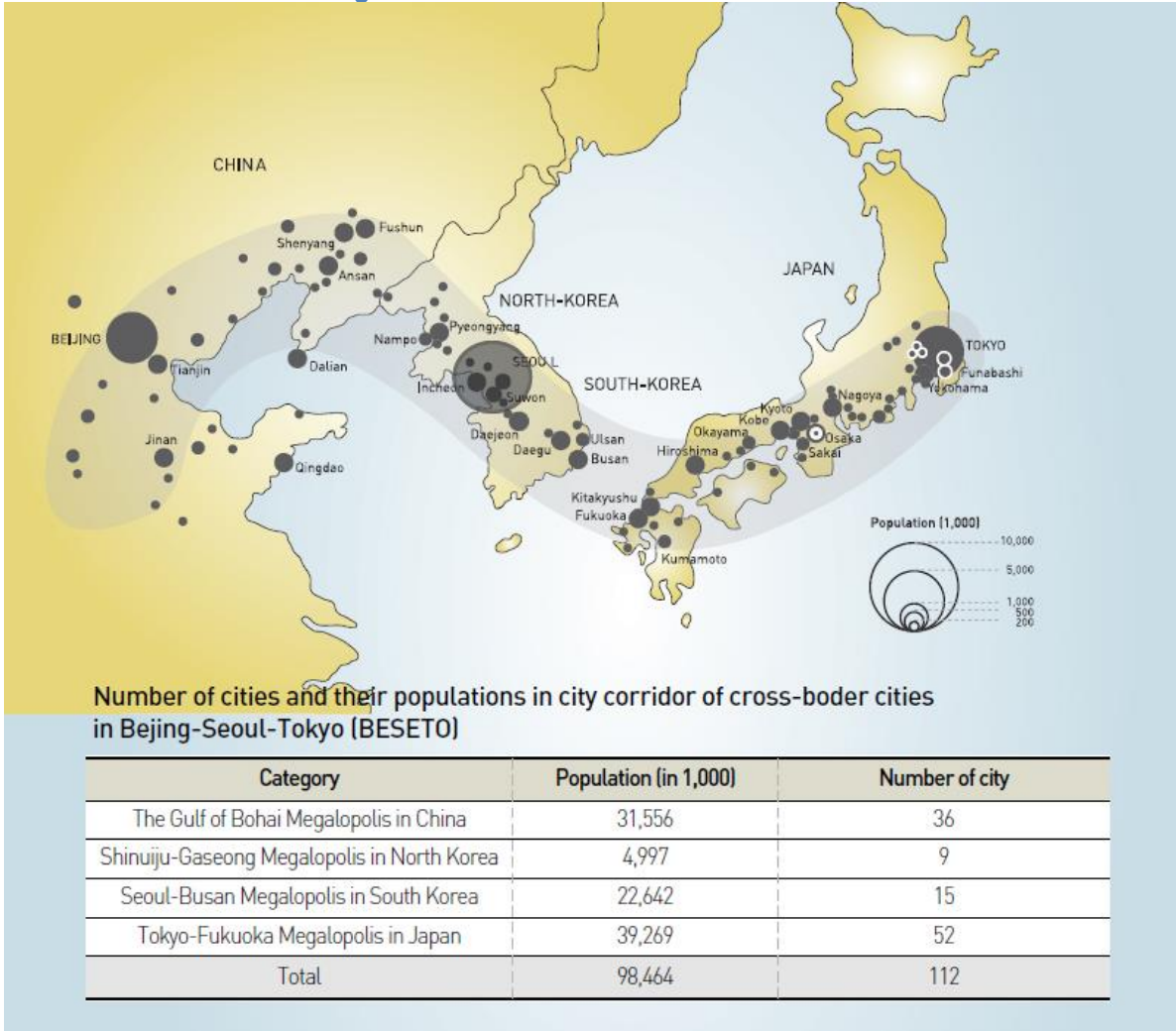
(source: DEGE 1996, p. 42)

the Korean peninsula. DEGE (1996, pp. 41) believes that North Korea will become the economic, political and cultural periphery of the South Korean core. In the style of the "blue banana" in Europe, East Asia's industrial and financial cores form the "yellow dragon". The figure on the left shows the shape of a dragon and North Korea lies clearly in the outskirts. But as it was proofed in the chapter about German reunification, a complete makeover of infrastructure can surmount disadvantages

of such a location. (DEGE 1996, pp. 41)

A different answer gives us a look at another concept with the focus on the big capitals Tokyo, Seoul and Beijing. It forms an unlikely different economic corridor.

Figure 76: Economic corridor in East Asia



(source: PAIN 2010, p. 46)

The figure does not only show major cities, it also contains a corridor with the highest proportion of inhabitants. It can be observed that the portion of North Korean population along this economic corridor is relatively small. With nine cities and around five million inhabitants it does not even come close to the number of inhabitants of Seoul. However, this concept shows that the western route, namely the Kyeongui-Line with an extension to China and Beijing, would be more important for Korea. As it is well known, on the eastern corridor there are only several port cities of North Korea and then after the border with Russia is only Vladivostok. So until now the western route can be considered as the main corridor.

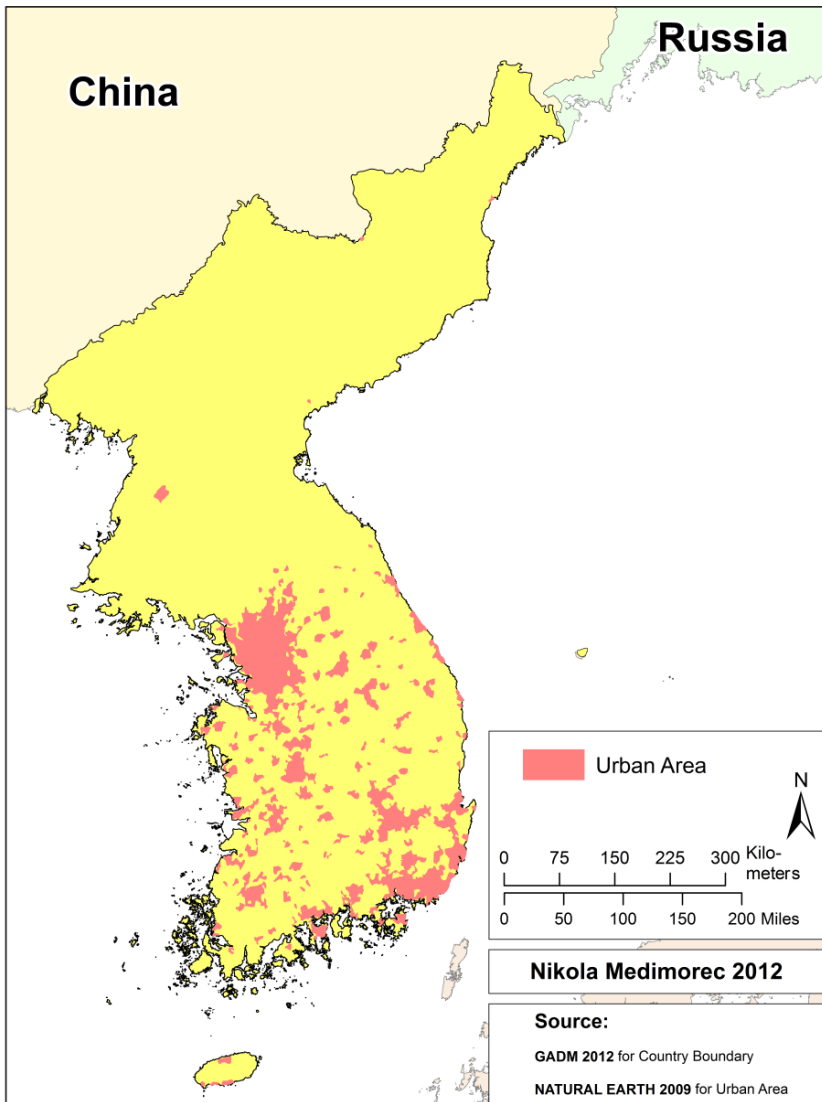
The most valuable section of that main corridor is probably going to be the section from Seoul to Pyongyang. As the capital of the DPRK it is further developed than other parts of the North and investments there may be more efficient and lucrative. Passenger traffic between Seoul and Pyongyang will be likely very high. Distance between the two cities is around 220 km via

Kaesong. Currently, it was reported by travelers, that travel duration from Pyongyang to Kaesong takes between three and five hours.

One more map shows the outstanding role of Pyongyang. If an area has a dense human residence, then it can be described as urban area.

Figure 77: Map of Urban Areas

Urban Area of Korean Peninsula



(source: made by author)

Looking at the map, it is clear that population density differs extremely between the northern and southern part of the Korean peninsula. The DPRK has according to numbers from CENTRAL INTELLIGENCE AGENCY (2012b) a population density of 204 inhabitants /km², while South Korea has around 490 inhabitants /km² (CENTRAL INTELLIGENCE AGENCY 2012c). Except Pyongyang there are only a few bigger cities in the coast areas. The North of Korea is almost totally blank. Seoul and the cities around make it to a big metropolitan area. Now, the border restricts Seoul to grow northwards. In the southeastern end there are other big cities like Busan, Daegu and Pohang, which generate together the second biggest urban area of Korea.

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Topography is an indicator, which reveals where problems for large-scale projects can occur.

Just looking at the relief, it is obvious that costs for constructing roads and railways are much higher than in the flat areas of East Germany because North Korea is very mountainous (PARK 1993, p. 38). There are physical barriers for west-east axes and it may conclude that these axes are going to concentrate on the best passes to go through. The area around the west coast is favorable for all methods of transport because that area is very flat.

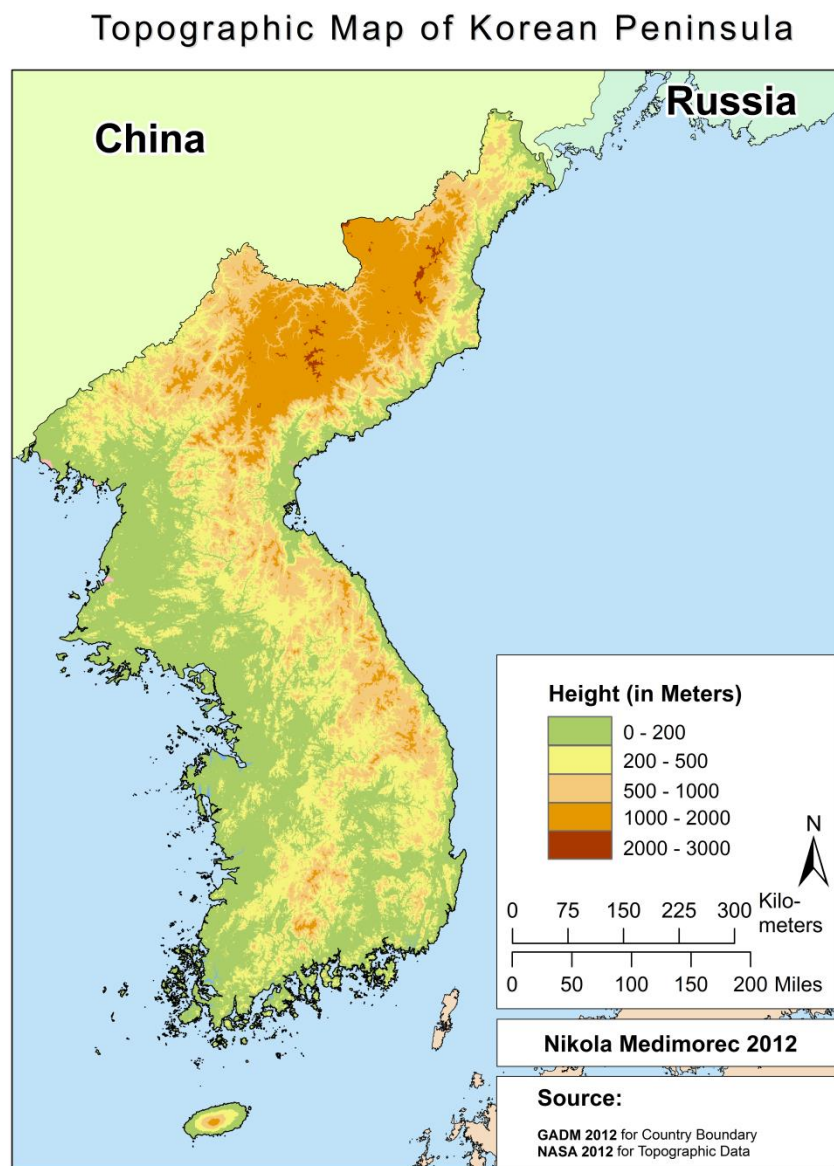
Looking back at Germany, project no. 8 was under a lot of criticism, more than any other rail project. It is still in construction and so expensive mainly due to the topographic reasons.

But project no. 8 shows

that a high number of tunnels and viaducts do not hinder constructions for a railway.

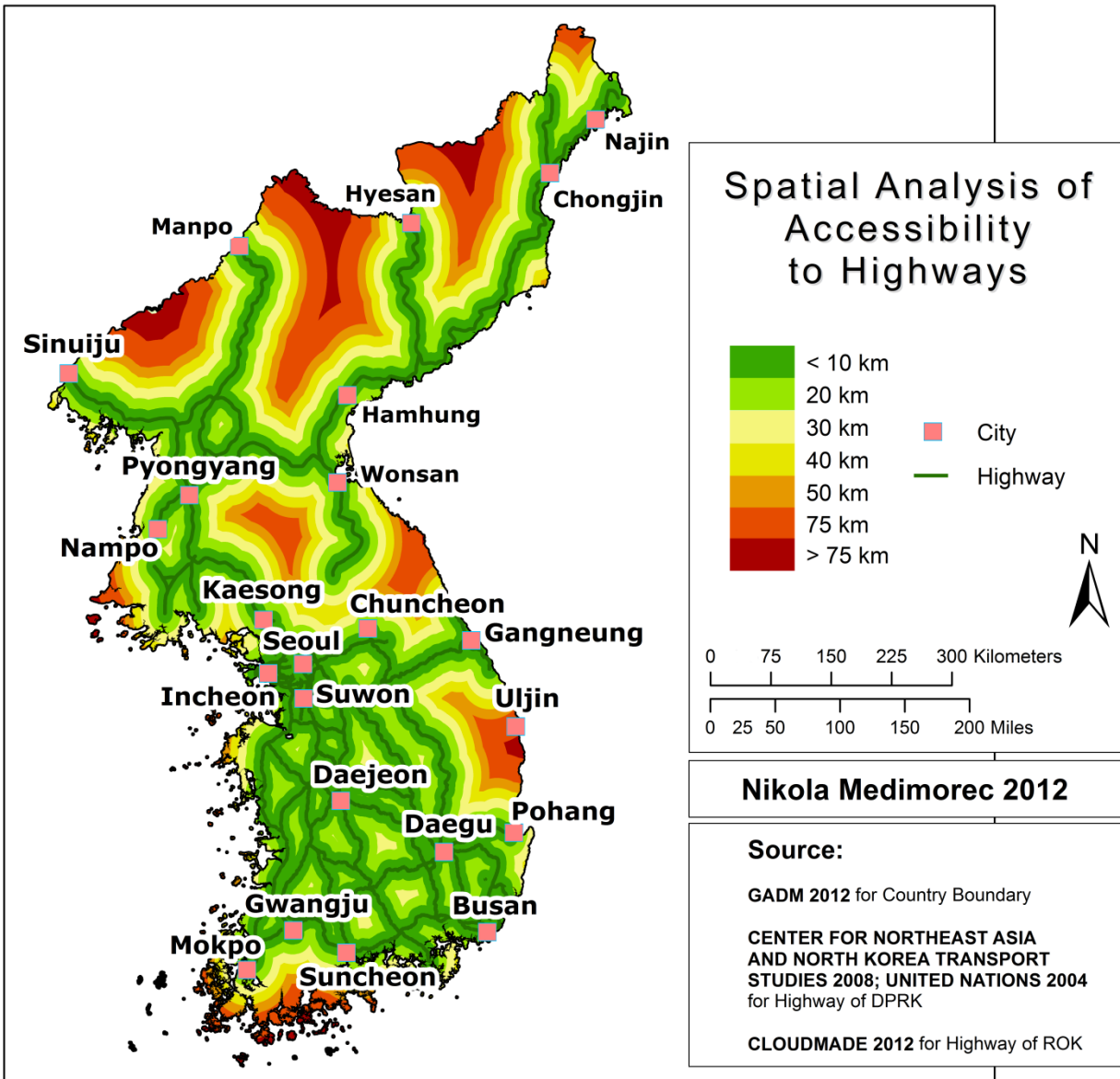
A way to analyze the accessibility of transport infrastructure is to look how well the network spreads over the national area. Each citizen has to get to a motorway or railway. If the distance is too high, accessibility is bad. A network with a high density gives the users more choices and it shortens travel duration immensely. The following map shows the analysis of highways. For DPRK the roads level 1 was used instead of highways because they spread all over the North.

Figure 78: Topographic Situation



(source: made by author)

Figure 79: Analysis of Roads



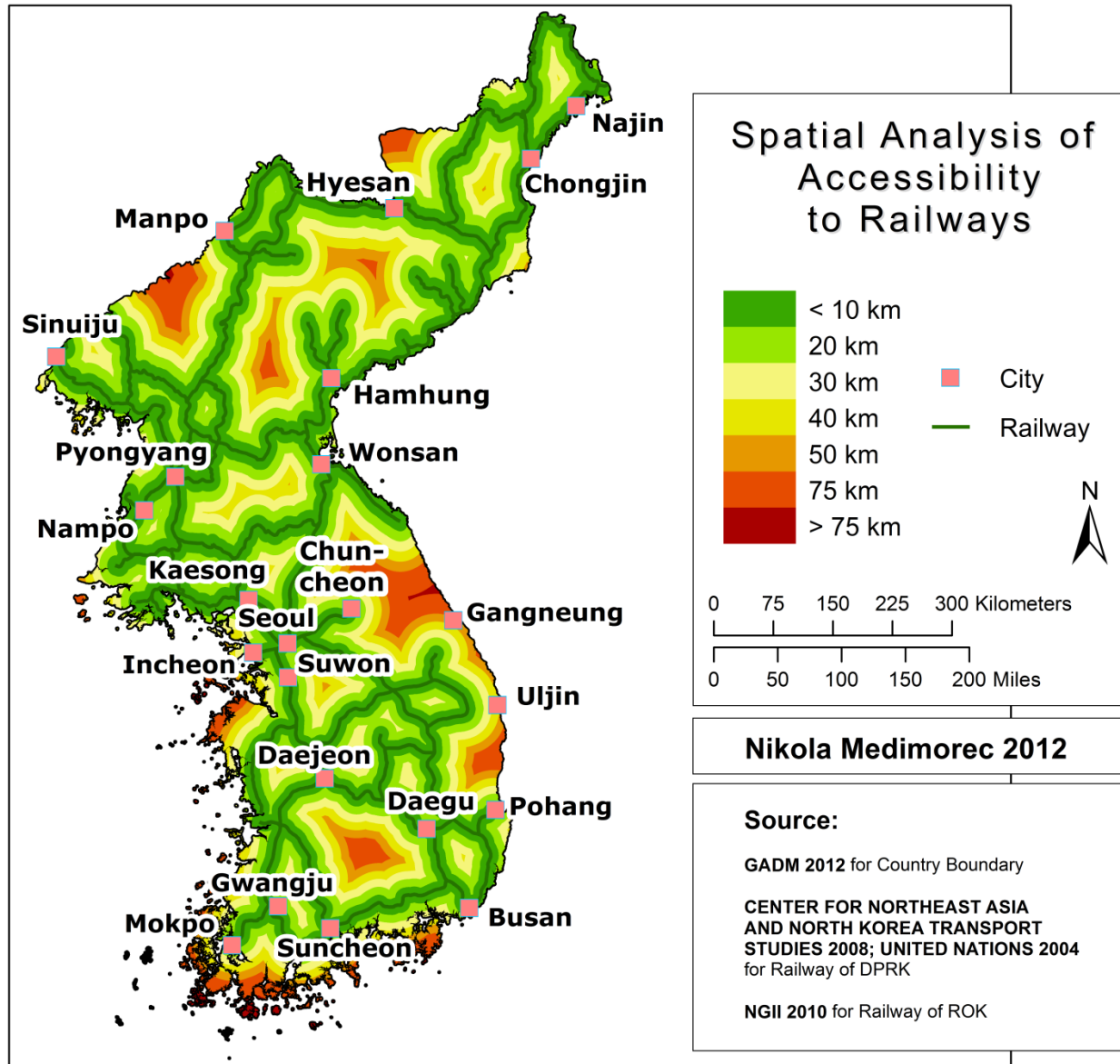
(source: made by author)

This map shows that the situation of road network is much better in ROK than in DPRK. Except for peripheral areas on the east coast and on the southern end of the Korean peninsula the closest highway lies usually within a distance of 30 km. In North Korea there are three large regions which are far-distant (over 75 km) to main roads and one area between Wonsan, Pyongyang and Kaesong has also a poor accessibility with no main road in 50 to 75 km distance. Expressways in South Korea have the goal that each citizen should be able to reach an expressway within 30 min as it was mentioned earlier. Assuming that average speed of spur routes is between 60 to 80 km/h in ROK, the distance to the next expressway has to be less than 40 km away (or preferably 30 km). Looking at the spatial analysis, it seems that this goal is

fairly reached for the main urban areas and center regions of South Korea. After unification it has to be debated, if the same standard (expressway within 30 min) can be adapted to the North.

The second map contains accessibility to railways and it shows a rather different situation.

Figure 80: Analysis of Railway



(source: made by author)

North Korea has quantitatively a very good railroad network and this map proves the good accessibility. The service goes through all regions of the DPRK. At the eastern coast of South Korea the accessibility is still under average, specifically near the border to North Korea there is a small area with a very bad access. And in the southern part of South Korea density of rails does not seem high enough. The subchapter 4.4.1 about cross-border projects between DPRK

and ROK showed that there is a big gap in the network on the eastern border. A project was realized without any further connection to South Korea's railroad network.

It was introduced earlier that South Korea has a limited number of railroads. This also means that in case of a reunification domestic problems appear. For instance the railway network of Seoul metropolitan area is primarily focused on passenger transport and already under current circumstances fully occupied. New traffic flows of freight or passengers cannot be handled by the current railroad capacity and there is a lack of rolling stock with diesel haulage. (VORONTSOV 2010, p. 161)

5.3 STRATEGY AND POSSIBLE DEVELOPMENT

The last part is divided into two parts: At first, there is a collection of suggestions for South Korea, what they can do for the transport infrastructure on the way to unification. Second, the highlight is on the time after reunification and what kind of development could be possible and favorable.

Cross-border projects are a good way to prepare for the reunification even through the reconnection of two railway lines and motorways South Korea showed how difficult it is to cross the DMZ and build infrastructure in that area. Moreover, the cooperation with North Korea is under the current circumstances more difficult than ever before in the last two decades.

SOC was introduced in the methodical part of this thesis and for the current situation on the Korean peninsula it can be used as a new way of indirect aid. Instead of supplying the North with goods or money, South Korea could influence the situation positively by expanding SOC to the DPRK. It means that until reunification South Korea tries to construct infrastructure in the DPRK. As it was done with the cross-border projects it guarantees stability and security upon reunification. (YOON/ YANG 2005, p. 25)

In Germany, the cooperation for the speed rail between Hamburg and Berlin gave extreme valuable experiences for the GUTP. A similar planning style was adopted by the planning societies for railways and roads.

So an essential suggestion is that despite of political conflicts around the nuclear issue the reconnection of the Kyeongwon-Line to Pyeongkang through the middle of the peninsula has to be pushed forward. As it was shown, construction of 5 km in this terrain took around five years and the left gap of 22 km should not wait until the reunification occurs.

And on top of that South Korea has to prepare blueprints for economic and sustainable development of the DPRK after unification now. This has to be done on a long-term perspective. (YOON/ YANG 2005, p. 24)

For South Korea it is currently only possible to pursue short-term infrastructure projects at the DMZ. Anything else may take a lot of time and financial resources. Unfortunately, it is impossible to ensure a transcontinental transit without obstacles or any high risks. So promotion of plans for development of the western and eastern routes through North Korea is only made by a minority of politicians, businessmen and experts. (VORONTSOV 2010, p. 162)

There is one more important reason, why it is essential to prepare for reunification as much as possible: reducing costs of the reunification. They can be shortened if economic development is brought to the DPRK beforehand. Cooperation projects like Kaesong or Najin are a big help for both Koreas. North Korea can offer a lot of labor and South Korea's capital can be used to initiate growth. This is going to create important synergy effects. (LEE, MIN-JI 2012)

Clearly, there are a lot of obstacles in realizing a fully connected transport network under the current circumstances. Missing consents between both Koreas is the origin of most problems. Now, it is the point to take a look at the time when this obstacle disappears and Korea is reunited as a democratic state with a capitalistic economy. The following thoughts are mainly influenced by the German experience and the results of the GUTP. An important requirement is that the will to reunite and adjust South Korean standards in the North.

Before thinking about any possible plan drafts, it is important that a discussion on the political level sets up goals and organizes the whole process. Ministry of Land, Transport and Maritime Affairs in South Korea has to respect the political bodes of DPRK who supervised transportation. Plans have to be discussed with a mutual respect of each other. Even if the southern side has detailed plans prepared, evaluation by former authorities in the North might lead to improvements of these plans or at least it is going to increase their will to participate. Local experts can help to avoid problems in the construction process. Germany politicians decided to invest the majority of funds in environmentally friendly transportation methods like ship transport and railway. Possible goals for the transportation network in a reunited Korea in the style of the GUTP (BMV 1993, pp. 21) could look as following:

- Strengthening of the economic development in the North
- Upgrading infrastructure to make locations in the North attractive for companies
- Integration of citizens from the northern Korean states
- Ensuring transportation on the Korean peninsula and connections to China and Russia
- Fast and economic transport of goods and people

That is a suggestion for the goals, which could be set by politicians. Goals have to be discussed and only then it can be examined how the goals may be reached. Then it is important to prepare a special legal framework in a similar way like it was done in Germany. The Korean economy is highly competitive and with a strong neighbor like China, backlogs of economy in the North have to be overcome quickly.

Creating a reliable master plan with realistic predictions of traffic development is probably a big challenge for Korea. Even German transportation experts could only predict a vague number of traffic demands for each highway. Data about traffic flow is impossible to survey, because inside of North Korea exists almost no traffic and exports/imports are very limited. It can be assumed that a reunification would cause more drastic changes than it happened in East Germany. The same difficulties do not allow that this research goes any further.

Besides the prediction of traffic it is important to predict the costs of renewing transportation infrastructure. The German lesson explained that costs are a factor which has to be faced and it has to be thought about it beforehand as well as about traffic demands. NAH assumes that modernization of the western corridor to China would cost around 1.3 billion US dollar and the western route may cost 2.4 billion US dollar (NAH 2009, p. 116). Another research comes to the result that modernization of rail roads would need investments in volume of 2.4 billion US dollar (KIM 2007b, p. 105). A third opinion believes that long-term investments for construction and extension of North Korean road network would cost 11 billion US dollar and for rail network with double-tracking and modernization Korea would have to pay around 6.3 billion US dollar (LEE et al. 2008, p. 111). Costs do not seem to have a limit.

If North Korea's transport infrastructure is developed to the level of South Korea 1980, it might cost 118 billion US dollar. At that time transportation in South Korea was just about to overcome poverty. (LEE, SUNG-WON 2010, p. 18)

Between 12.5 % (KIM et al. 2011, p. 64) and 50 % (MO 1994, p. 51) of investments for the North might be used for improvements of the infrastructure. This shows how difficult it is to determine the costs. In subchapter 3.2 the costs of the GUTP and also about the all measures for infrastructure were introduced. Of total investments for transportation infrastructure around 30 % came through the GUTP. So in conclusion, Korea's twin of the GUTP might be settled at least around the similar proportion.

Likewise Germany put priorities in three steps after reunification (closing of gaps, examination of backlog, planning additional construction (HUBER 2011, p. 11)), there is a suggestion to put priorities as shown in the left box for transportation in Korea. As it was mentioned several times,

Table 31: Priorities for Transportation

- | |
|---|
| 1. Connection of South and North Korea |
| 2. Development of Harbor Facilities |
| 3. Extension of Korea's Traffic Network |
| 4. Connections to China and Russia |
| 5. Development of Airport Facilities |

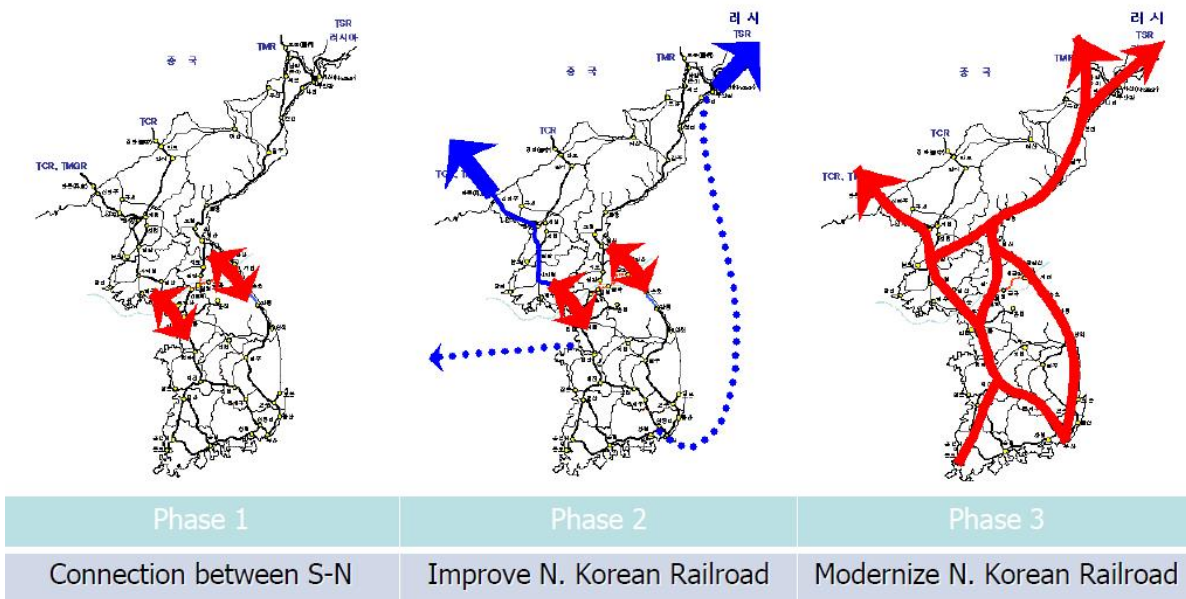
(source: LEE et al. 2008, p. 11)

the first step about closing of gaps is partially completed. And then the development of harbors is suggested, something that is not really discussed in the thesis, because it is only a solution for freight transport. Usage of ports can be accomplished with simple measures. After reunification shipping of goods may be a solution until the railways are

developed. But overland transportation is more valuable than water ways, even if it takes a lot of time to develop (LEE/ OUELLETTE 2007). The value of inner-Korean transport network is higher than connections to Russia and China. The least priority is given to aviation.

One strategy about improving the North Korean railway network after unification and preparing the North for economic competitiveness was made by the Korea Railroad Research Institute. The strategy is divided into three phases: The first phase focuses on connections between the North and the South. Besides at that phase it aims at a minimal maintenance of North Korean railways. This is already completed with the line to Kaesong and the cross-border connection on the East Sea. (NA 2009, pp. 114)

Figure 81: 3 Phases for Railroads Development in DPRK



(source: NA/ KWON/ PARK n.d., p. 10)

Phase two intends to improve North Korean rail with the goal to expand transportation business and connect Russia and China better to the Korean peninsula. It also demands that China and Russia get stronger involved. Agreements with them have to involve South Korea and North Korea. Evidently, this step is currently in progress. The last phase aims at a complete modernization of the railway network. This step implies that North Korea opens himself up for international transport. Infrastructure has to be built for a long-term and network on the Korean peninsula is as important as the whole network of Northeast Asia. So the possibility of the Eurasian land bridge should be accomplished from Europe to the southernmost point of Korea. (NA 2009, pp. 114)

The third phase could be Korea's transport projects. It resembles the GUTP and modernization of North Korea's railroad has to be divided into several large-scale projects. The collapse of East Germany did not mean that all train services were put on hold. Train rides increased immensely and two reactions followed instantly: increase of the rail stock in service and adjustment of time-tables between the East and the West. In Korea similar events can take place. DPRK's rolling stock is at present worn out and too old, but until new trains and wagons are manufactured, most of them have to stay in service. All constructions of the Phase 3 have to take place while the service is in full operation on the existing tracks.

For the development of a functional transportation network it is important to establish a hierarchical urban system in the reunified Korea. Seoul is currently the financial and political capital of South Korea and a reunification could only strengthen its role. Hierarchically it is going to lead over other strong regional centers like Daegu and even over the North Korean capital Pyongyang. Under them smaller centers will exist. (DEGE 1996, p. 42)

It will be not easy to find a new role for Pyongyang. Many resources are poured into Pyongyang and in that city live 10 % of North Korea's populations (FOSTER-CARTER 1994, p. 45). The Unification Treaty of Germany declared Berlin as the capital of Germany and discussion about the place of the parliament and government would be handled after the establishment of reunification (BMJ 1990, p.2). So Berlin's function in the future was determined very early. Even if it was never directly mentioned, the GUTP support Berlin's role as the capital and this explains why most of the GUTP are heading to Berlin. Likewise, it may be in Korea that the decision is made politically. Without going into detail, there are usually four possibilities mentioned as a prospective capital, for instance in BAE/ RICHARDSON (2011, pp. 238). Nevertheless, Seoul would benefit a lot of reunification, which was stated above, and the locations of all political and economic headquarters are already there. Hierarchical order of cities influences the transportation network, but political measures have to take care that no city experiences

disadvantages. In the previous subchapter the map about urban areas showed that the amount of urban areas in North is much smaller than in the South. The German process taught that a lot of structures adjusted very quickly and so it may be the case in Korea as well. Urban areas are going to develop quickly along the main corridor and probably, the cities near industrially important places are going to grow.

The previous chapters showed that the DMZ is an impassable barrier. The number of crossing possibilities is very limited and the area is full with land-mines. It is shorter than the inner-German border but the fortification is much stronger. Removing these land-mines takes time. This situation also implies that it might be easy to control and limit the flow of people. So at first, migration to the South is going to be hindered physically. Secondly, the government can restrict crossings far easier. This would be in contrast to the basic ideology of free movement and human rights, which should be guaranteed in a democratic, reunified Korea. The responsible ministries have to secure the safety of people, who want to cross the border, and they have to increase the number of crossings to fulfill the demand of transport users. Main routes can be part of the transport projects of Korean unity and others are just simple ways through the former DMZ. The simple ways are going to enhance local exchange and connection, whereas the large-scale transport projects aim at the connection of main regions of the North with core regions of the South.

After considering the western route as the main corridor in the previous subchapter, realization of HSR would be very important on that route. An upgrade to HSR and effective freight transport has to be accomplished fast. It would become the first international route with a KTX. The suggestion of KTX running from Seoul over Pyongyang to Sinuiju and perhaps even further to Beijing would immensely shorten travel duration. From currently 20 hours, travel time between Pyongyang and China's capital could be shortened to five or six hours, if a KTX could operate under full speed on the distance of 1,347 km. Double-tracking of the complete distance would be necessary.

Undoubtedly the Kyeongui railway line would be a corridor for freight as well. There are a few big cities along the way and the international airport at Incheon and industrial facilities of Kaesong are lying there (LEE/ OUELLETTE 2007). Currently, there is a highway and road level 1 from Kaesong to Pyongyang, but there is no further extension of the highway to Sinuiju. This has to change quickly after reunification.

Definitely, HSR and highway would be very prestigious projects, where the search for funding and investment would be easy. Such projects would also show China how important it is for Korea that the connections between each other are restored. Trade would be boosted, political

stress relieved and the roads would bring along new chances. Kaesong, introduced in chapter 4.4.1, will fall under the influence of Seoul metropolitan area and people will probably commute to Seoul for work or do business (FOSTER-CARTER 1994, p. 45). It also lies on the main corridor to the northern part and it can be first stop of a KTX from Seoul to the direction Pyongyang. The mass of Seoul's urban area would expand and Kaesong would become another satellite city around Seoul.

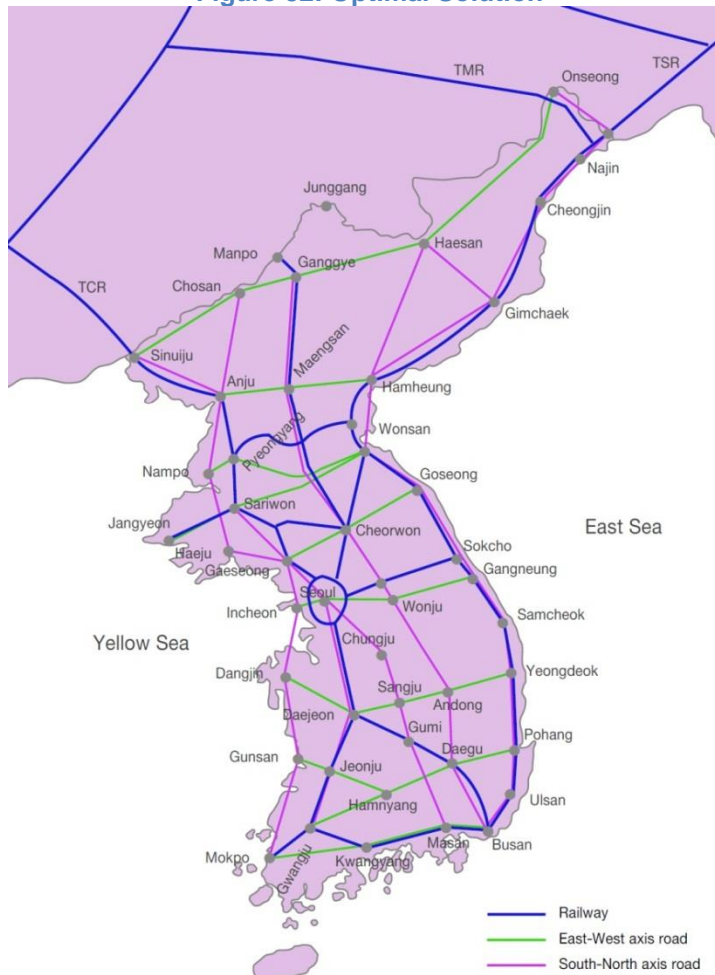
Modernization and extension on the eastern corridor should not be forgotten. The distance from Pyongyang to the border of Russia is over 800 km. Out of this fact, a HSR and highway could overcome the physical barrier of distance. But feasibility has to be examined in detail due to the high number of tunnels which are needed to pass through mountainous areas on the way to the east coast. Population is not very dense. There are some important regions with economic potential, like the subchapter about China's intentions proved it. Probably, a HSR on the first section to Wonsan and Hamhung makes more sense than a full extension up to Russia.

The spatial analysis showed that there are improvements in several regions of North and South Korea strongly needed. There are still some weak points in the expressway networks and railroad networks of both Koreas. In West Germany there was already a fully developed transportation infrastructure, especially the highway network was very well developed for national transportation. The case is different in South Korea and it is far more severe in North Korea than it was in the GDR. The main result of the analysis for Korea was that the situation of the railroad network is better than the situation for the main roads and highways. This means that evidently more new road constructions have to be done than rail track constructions. Completely new highways have to be added to the networks. For instance, one more highway through the middle of the peninsula from Chuncheon to Pyongyang would already have a big impact and all central regions would have a good accessibility. Then there would be only left problems in marginal regions. Railroads have to be just extended with a second track.

The east coast is not well developed due to reasonable doubts like feasibility with low economic power, low population density and very mountainous area. The GUTP no. 10, the highway through Mecklenburg-Vorpommern was highly criticized as it was shown before. Plans for that highway have existed for a long time but because this area has similar characteristics like Korea's east coast (except the topography) it was not realized. In other words, under normal circumstances highway A 20 may not have been built. In the special period of unification and as a part of the package of politically highly favored transport measures carrying out was much easier. From a similar stand point east corridor is also likely to be possible to accomplish.

Criticism, costs and construction duration could be held to a minimum on that way as the German experience showed it. It is just an example for the patterns of the GUTP and it does not imply that it should be applied like this. In the opinion of the author, feasibility and purpose of the transport infrastructure projects are major points of consideration.

Figure 82: Optimal Solution



(source: LIM 2010, p. 4)

fulfill all requirements for well-balanced growth of all regions. Accessibility of each city would be relatively comparable high. But the GUTP focused on some regions along chosen, historical important and prosperous corridors and they have not been the solution for the total network. Other instruments like the FTIP worked on the modernization of the whole network and it contained also projects with less importance or less urgency.

In subchapter 5.1 it was emphasized that planning should stay on a conceptual level and it should not go too far into detail. The reasons (lack of information, unknown date and type of reunification) have been discussed intensively. So as an alternative scenario, which adapts the

The map on the left shows a concept for transport infrastructure on the Korean peninsula, which can be entitled as the optimal solution. It is the most favorable scenario of infrastructure development. It would accomplish the goal to make every expressway reachable within 30 min. Considering railway the only big difference is the construction of a rail connection on the east coast and a track from Cheonwon through middle of northern Korea until Manpo. It would function like a new, center corridor on the peninsula.

For roads also three corridors exist for the south-north direction. They might show the highest traffic volume for international traffic. Axes of east-west are supporting intra-national traffic.

The main intention of this plan is to

pattern of GUTP, the author created this possible concept about the most important large-scale projects of transportation. These are the most important routes, which have to be developed between the North and the South. Similar to Germany, the first plans just contain corridors.

There is also not yet a distinction between railways and roads. The GUTP were mainly focused on routes to Berlin. In contrast to that, the most important directions should connect Seoul with important places like Pyongyang, Sinuiju and Wonsan. In the opinion of the author, it is not only urgent to restore high-qualitative north-south connections, but as well routes with a high potential inside the northern territory have to be among the Korean transport projects after reunification. On the eastern corridor the projects reach until Uljin quite far into the South. Development of this route would not make much sense, if an extension over Pohang to Busan is missing. But the upper part has to be built fast with the help of a special framework. Additionally, an extension to Najin could be considered because from Najin connections to Russia and China will be well developed in few years.

Figure 83: Possible Concept



(source: made by author)

A vision of the Korean peninsula in 2040 was made briefly by PARK/ KIM (2010) at KRIHS. A sharp decline of population due low birth rates, an aging society and immigration of foreigners are going to be part of the demographic changes. It is expected that by then North and South Korea are reunited to one nation and this large territory would imply a greater influence on international stage of politics and economics. Of on the main strategies is to link economies of South and North Korea and transportation routes have to be improved. Invention of high speed maglev train with a speed of 700 km/h would make any place on the peninsula reachable within one hour. (PARK/ KIM 2010, pp. 1)

To realize such a vision various efforts are needed, which have to be done step after step. The most important step has to be reunification.

6 CONCLUSION

Achievements of German Reunification were great in terms of transportation. The accomplishments do not end by a simple reconnection of routes. The whole transport network of East Germany was modernized and the mobility of East Germans was lifted to the same level of mobility that West Germans have. It was an urgent task and execution of major projects happened undoubtedly very fast. The speed of planning and construction of the GUTP is incomparable with other large-scale projects.

Reunification of Korea is going to a big challenge. Probably it is going to be the biggest challenge in the Post-Korean War time that South and North Korea have to face. Risks have to be as aware as chances, but at the end a proper management of the transition may judge how possibilities turn out.

This research highlighted that preparations are necessary. And they have to be done now. With cross-border projects and special economic zones an important part of preparation is done. There are still areas, which can be developed, and at least one more border-crossing could be reconnected between the two Koreas. Unfortunately, preparations are only possible to a certain extent.

Further steps towards reunification have to be made, because only a reunified Korea can set free the potential of its transportation network. DPRK does not have the ability to maintain its transport network and a worsening of infrastructure comes along with a worse situation of living conditions of DPRK's citizen. If South Korea gains a land access, the economy would receive a big push and new possibilities for ensuring the wealth of South Koreans may emerge.

The last concept has primarily the focus to show how to think while planning the routes. Therefore, it was just discussed very briefly. Such a planning process has to be initiated in an early stage of reunification.

What does the future hold for Korea? Of course, it is very uncertain but it will definitely be a very interesting future with a lot of opportunities.

BIBLIOGRAPHY

BOOKS

AHN, BONG-ROCK (2005): Die Wiedervereinigungsfrage Koreas unter der Berücksichtigung der deutschen Erfahrungen. Dissertation, Free University of Berlin, Germany.

AHN, BYUNG-MIN/ LIM, JAE-KYUNG/ WON, DONG-WOOK/ KIM, SUN-CHUL/ NOH, SANG-WOO/ LEE, OK-NAM (2009): 2008 동북아 · 북한교통. 주요동향과 현안분석. 2008 Transport in North Korea and Northeast-Asia: Important Trends and Analysis. KOTI, Goyang, South Korea.

AHN, BYUNG-MIN/ LIM, JAE-KYUNG/ SEO, JONG-WON/ KIM, SUN-CHUL/ LEE, OK-NAM/ LEE, JONG-KYEOM/ NOH, SANG-WOO (2011): 2010 동북아 · 북한교통. 동향과 현안분석. 2010 Transport in Northeast-Asia and North Korea: Trends and Analysis. KOTI, Goyang, South Korea.

BAE, CHANG-HEE C./ RICHARDSON, HARRY W. (2011): Options for the capital of a reunified Korea. – In: BAE, CHANG-HEE C./ RICHARDSON, HARRY W.: Regional and Urban Policy and Planning on the Korean Peninsula. Glos, UK. P. 230-241.

BBR (2005): Best-Practice-Beispiele von Verkehrsbau- und Hochbaumaßnahmen des Bundes in den neuen Ländern. Expertenessays, Projektbeispiele, Handlungsempfehlungen.

BMV (1992a): Bundesverkehrsverswegeplan 1992. Bonn, Germany.

BMV (1992b): Verkehrsprojekte Deutsche Einheit. Für wirtschaftlichen Aufschwung. Für sichere Arbeitsplätze. Für Verkehrssicherheit und Umweltschutz. Second Edition, Bonn, Germany.

BMV (1993): Verkehrsprojekte Deutsche Einheit. Projekte, Planungen, Gesetze, Argumente. Bonn, Germany.

BMV (1994): Verkehrspolitik 1994. Bonn, Germany.

BMV (1995): Aktuell. Verkehrsprojekte Deutsche Einheit. First Issue, 1995. Bonn, Germany.

BMV (1996a): Aktuell. Verkehrsprojekte Deutsche Einheit. Second Issue, 1996. Bonn, Germany.

BMV (1996b): Aktuell. Verkehrsprojekte Deutsche Einheit. Fourth Issue, 1996. Bonn, Germany.

BMV (1997): Aktuell. Verkehrsprojekte Deutsche Einheit. First Issue, 1997. Bonn, Germany.

BMVBS (Eds.) (2011c): Verkehr in Zahlen 2011/2012. Hamburg, Germany.

CHOE, HYONDOK/ DRESCHER, LUTZ/ WERNING, RAINER (Eds.) (2007): Korea. Entfremdung und Annäherung. Cologne, Germany.

CHOI, JIN-WOOK (Eds.) (2011): US-China Relations and Korean Unification. KINU, Seoul, South Korea.

DEITERS, JÜRGEN (2000): Traffic infrastructure, car mobility and public transport. In: MAYR, ALOIS/ TAUBMANN, WOLFGANG (Eds.): Germany Ten Years after Reunification. Leipzig, Germany. Pages 117-137.

GATHER, MATTHIAS/ KAGERMEIER, ANDREAS/ LANZENDROF, MARTIN (2008): Geographische Mobilitäts- und Verkehrsforschung. Studienbücher der Geographie. Stuttgart, Germany.

GATHER, MATTHIAS/ KAGERMEIER, ANDREAS/ LANZENDROF, MARTIN (Eds.) (2001): Verkehrsentwicklung in den Neuen Bundesländern. Erfurt, Germany.

GEBHARDT, FRIEDER (1994): Wirtschafts atlas Neue Bundesländer. Erfurt, Germany.

HEINEMANN, REINHARD WOLFGANG (2010): Dokumentation und Bewertung der Infrastruktur-Investitionen Sachsens im Verkehrsbereich 1991 bis 2006. Schlussfolgerungen und Handlungsempfehlungen für eine weitere Verkehrs-Infrastruktur-Finanzierung und Förderung. Dissertation an der Universität Kassel, Germany.

HENRIKSEN, THOMAS H./ LHO, KYONGSOO (1994): One Korea? Challenges and Prospects for Reunification.

HERTKAMPF, DORIS (2007): Nordkorea: Erste Schritte zur Öffnung. – In: CHOE, HYONDOK/ DRESCHER, LUTZ/ WERNING, RAINER (Eds.): Korea. Entfremdung und Annäherung. Cologne, Germany. P. 66-72.

HOLZHAUSER, ANDREA/ STEINBACH, JOSEF (2001): Auswirkungen der „Verkehrsprojekte Deutsche Einheit“. – In: INSTITUT FÜR LÄNDERKUNDE: Nationalatlas Bundesrepublik Deutschland. Verkehr und Kommunikation. Volume 9, P. 128-131. Leipzig, Germany.

HÖPFNER, ULRICH/ KNÖRR, WOLFRAM (1992): Motorisierter Verkehr in Deutschland. Energieverbrauch und Luftschadstoffemissionen des motorisierten Verkehrs in der DDR, Berlin (Ost) und der Bundesrepublik Deutschland im Jahr 1998 und in Deutschland im Jahr 2005. Berlin, Germany.

INSTITUT FÜR LÄNDERKUNDE (2001): Nationalatlas Bundesrepublik Deutschland. Verkehr und Kommunikation. Volume 9. Leipzig, Germany.

JORDAN, AMOS A. (1993): Korean Unification. Implications for Northeast Asia. Washington, D.C., USA.

KAGERMEIER, ANDREAS (1999): Verkehrsprojekte fördern die deutsche Einheit. – In: Nationalatlas Bundesrepublik Deutschland. P. 72-73. Heidelberg, Berlin, Germany.

KAGERMEIER, ANDREAS (2011): Verkehrsgeographie. – In: GEBHARDT, HANS/ GLASER, RÜDIGER/ RADTKE, ULRICH/ REUBER, PAUL: Geographie. Physische Geographie und Humangeographie. Second Edition, Heidelberg, Germany. P. 1044-1060.

KERN, THOMAS/ KÖLLNER, PATRICK (Eds.) (2005): Südkorea und Nordkorea. Einführung in Geschichte, Politik, Wirtschaft und Gesellschaft. Frankfurt, Germany.

KIESLICH, WOLFGANG/ KLEINSCHMIDT, VOLKER/ LÖBACH, WILFRIED (1992): Verkehrsprojekte „Deutsche Einheit“. Umweltauswirkungen der geplanten Verkehrsstrassen im Osten Deutschlands. Dortmund, Germany.

KIM, KYU-RYUN/ HWANG, BYEONG-DEOK/ KIM, KYEONG-SEOK/ PARK, IN-HYE/ BAE, BYEONG-IN/ LEE, DONG-HYE/ LEE, SANG-JUN/ JEON, HYE-WON/ JU, JAE-U/ HONG, SUN-JIK (2011): 통일 비용 · 편익 연구의 새로운 접근: 포괄적 연구요소의 도입과 대안모색.

통일연구원, 서울. New Approach of Research about Reunification's Costs and Benefits: Introduction to Comprehensive Research Elements and Alternative Ways. KINU, Seoul, South Korea.

- KIM, YEON-CHUL (2007a): Neuer Kurs – neue Strategien? Zur aktuellen Wirtschaftsentwicklung und –reform in Nordkorea. – In: CHOE, HYONDOK/ DRESCHER, LUTZ/ WERNING, RAINER (Eds.): Korea. Entfremdung und Annäherung. Cologne, Germany. P. 51-65.
- KIM, YEON-CHUL (2007b): Wirtschaftspolitik in Süd- und Nordkorea – von der Konfrontation zur Kooperation. – In: CHOE, HYONDOK/ DRESCHER, LUTZ/ WERNING, RAINER (Eds.): Korea. Entfremdung und Annäherung. Cologne, Germany. P. 91-108.
- KWON, YOUNG-IN/ AHN, BYUNG-MIN/ LIM, JAE-KYUNG/ WON, DONG-WOOK / KIM, SUN-CHUL/ NOH, SANG-WOO/ LEE, OK-NAM/ LEE, JONG-KYEOM (2010): 2009 북한 · 동북아 교통: 동향과 분석. 2009 Transport in North Korea and Northeast-Asia: Trends and Analysis. KOTI, Goyang, South Korea.
- MLTM (2010): 한국의 길. Roads in Korea. MINISTRY OF LAND, TRANSPORT AND MARITIME AFFAIRS. Seoul, South Korea.
- NLPB (1991): Niedersachsen – vom Grenzland zum Land in der Mitte. Schriftenreihe der Niedersächsischen Landeszentrale für politische Bildung. Hannover, Germany.
- NUHN, HELMUT/ HESSE, MARKUS (2006): Verkehrsgeographie. Paderborn, Germany.
- PAIN, KATHY (2010): The Emerging Metacity in North Western Europe and Policy Ramifications for Sustainable Transport Networks. In: MO, CHANG-HWAN/ KIM, YOON-HYUNUG (Eds.): The Emerging Cross-Border Mega-City Region and Sustainable Transportation. KOTI, Goyang, South Korea. P. 2-47.
- PARK, JONG-CHEOL/ HEO, MUN-YOUNG/ KANG, IL-KYU/ KIM, HAK-SEONG/ YANG, HYEON-MO/ JEONG, SUN-WON/ JEONG, EUN-MI/ CHWA, EUN-SEOK (2011): 통일대비를 위한 국내과제. 남북합의통일 마스터플랜. National Task for Preparing of Unification. Masterplan for Unification of South and North Korea. KINU, Seoul, South Korea.
- PARK, YOUNG-HO/ KIM, HYEONG-KI (2011): 2011 Unification Clock. When Will We See a Unified Korea? KINU, Seoul, South Korea.
- PANOV, ALEXANDER (2011): Russia's Role and Position on Korean Unification. In: BAE, JUNG-HO (Eds.): Korean Unification and the Positions and Roles of the Four Neighboring Powers. KINU, Seoul, South Korea. Pages. 111-129.

- PB DE (1993): Schneller planen. Schneller bauen. Schneller fahren. Germany.
- PB DE (1995): Karte Schienenverkehrsprojekte Deutsche Einheit. Baudurchführung im 1. Halbjahr 1996. Germany.
- PB DE (1995): Verkehrsprojekt Deutsche Einheit - Schiene - Nr. 8. ABS/NBS Nürnberg-Erfurt-Halle/Leipzig-Berlin. Zahlen und Fakten. Germany.
- RODRIGUE, JEAN-PAUL/ COMTOIS, CLAUDE/ SLACK, BRIAN (2006): The Geography of Transport Systems. New York, USA..
- SCHNELL, PETER/ HARTMANN, WOLFGANG (1990): Ost-West-Verkehr. Prognosen, Angebotsbilder und Maßnahmen im Personenverkehr. - In: Die Bundesbahn 12/1990. P. 1185-1188.
- SCHNELL, RAINER/ HILL, PAUL B./ ESSER, ELKE (2011): Methoden der empirischen Sozialforschung. 9. Edition., Munich, Germany.
- SCHÖLLER, OLIVER/ CANZLER, WEERT/ KNIE, ANDREAS (Hrsg.) (2007): Handbuch Verkehrspolitik. First Edition, Wiesbaden, Germany.
- SUNG, NAK-MOON/ KIM, YEON-KYU/ AHN, BYUNG-MIN (2005): 남북연결 도로. 철도의 교통수요 및 비용분석 연구. Analysis of Traffic Demand and Cost of Inter-Korean Connecting Roads and Railways.
- VERKEHR IN ZAHLEN (1991): Verkehr in Zahlen 1991. Germany.
- VORONTSOV, ALEXANDER (2010): The Russia-to-Korea Railroad Connection Project: Present State and Prospects. In: BAE, JUNG-HO (Eds.)/ FEDOROVSKIY, ALEXANDER N. (2010): Russian National Strategy and ROK – Russian Strategic Partnership in the 21st Century. 2010 년도 KINU KOREA-RUSSIA 민간전략대화 및 국제적 공동연구. Seoul, South Korea. P. 147-172.
- WERNING, RAINER (2007): Traumfabrik des Friedens und gemeinsamen Wohlstands? - Der Gaeseong Industrial Complex. – In: CHOE, HYONDOK/ DRESCHER, LUTZ/ WERNING, RAINER (Eds.): Korea. Entfremdung und Annäherung. Cologne, Germany. P. 109-111.

INTERNET RESOURCES

ACATECH (2006): Mobilität 2020. Perspektiven für den Verkehr von Morgen. Schwerpunkt: Strassen- und Schienenverkehr. URL: http://www.acatech.de/fileadmin/user_upload/Baumstruktur_nach_Website/Acatech/root/de/Publikationen/Projektberichte/Mobilitaet_2020_werb.pdf.pdf

AHN, BYUNG-MIN (2003b): The Role of the Trans-Korean Railway in N.E. Asia Transportation Corridors. URL: http://www.schillerinstitute.org/conf-iclc/2003/bd_schw/ahn.html

AHN, CHOONG-YONG (eds.)/ AHN, BYUNG-MIN/ CHO, MYUNG-CHUL/ DONG, YONG-SEUNG/ HONG, IHK-PYO/ HONG, SOON-JICK/ KIM, CHUL-WHAN/ KIM, KEUN-SIK/ KIM, WOON-KEUN/ KIM, YOUNG-YOON/ LEE, CHAN-WOO/ LEE, CHOON-GEUN/ LEE, JONG-WOON/ LEE, SAM-SIK/ LEE, SEOG-KI/ PARK, SUHK-SAM/ YOON, DEOK-RYONG (2004): North Korea Development Report 2003/04. URL: <http://www.kiep.go.kr/include/filedown.jsp?fname=DEEP200401.pdf&fpath=Pub0201&NO=131818&FNO=659>

AMNESTY INTERNATIONAL (2012): North Korea Human Rights. Human Rights Concerns. URL: <http://www.amnestyusa.org/our-work/countries/asia-and-the-pacific/north-korea>

BAST (2012): Automatische Zählstellen 2009. URL: http://www.bast.de/cln_030/nn_472414/DE/Aufgaben/abteilung-v/referat_v2/verkehrszaehlung/Aktuell/zaehl__aktuell__node.html?__nnn=true

BBC (2007): Korean trains in historic link-up. BBC. URL: <http://news.bbc.co.uk/2/hi/asia-pacific/6664091.stm>

BLUM, ULRICH (2011): Can Korea Learn from German Unification? IWH-Diskussionspapiere, No. 3. URL: <http://www.iwh-halle.de/d/publik/disc/3-11.pdf>

BLUM, ULRICH (2012): Die Kosten für Koreas Einheit. Wiedervereinigung und die Integration Nordkoreas ist eine Aufgabe für ganz Asien. URL: http://www.welt.de/print/die_welt/wirtschaft/article13842993/Die-Kosten-fuer-Koreas-Einheit.html

BMJ (1990): Vertrag zwischen der Bundesrepublik Deutschland und der Deutschen Demokratischen Republik über die Herstellung der Einheit Deutschlands (Einigungsvertrag). URL: <http://www.gesetze-im-internet.de/bundesrecht/einigvtr/gesamt.pdf>

BMJ (2006): Gesetz zur Beschleunigung der Planungen für Verkehrswege in den neuen Ländern sowie im Land Berlin (Verkehrswegeplanungsbeschleunigungsgesetz). URL: <http://www.gesetze-im-internet.de/bundesrecht/verkpbg/gesamt.pdf>

BMVBS (2003): Federal Transport Infrastructure Plan 2003. Laying the foundations for the future of mobility in Germany. URL: <http://www.bmvbs.de/cae/servlet/contentblob/29172/publicationFile/244/federal-transport-infrastructure-plan-2003.pdf>

BMVBS (2010): Presentation of German Unity Transport Projects. URL: http://www.bmvbs.de/SharedDocs/EN/Pressemitteilung/2010/253-presentation-transport-projects.html?linkToOverview=EN%2FPress%2FPressReleases%2Fpress-releases_node.html%3Fgtp%3D50278_list%25253D6%23id58994

BMVBS (2011): Sachstandsbericht Verkehrsprojekte Deutsche Einheit. Stand Mai 2011. URL: <http://www.bmvbs.de/cae/servlet/contentblob/68032/publicationFile/40050/sachstandsbericht-verkehrsprojekte-deutsche-einheit-stand-mai-2011.pdf>

BRANDENBURGER, DIRK/ BAUMBACH, BODO (2011): DEGES – von der Einheit in die Zukunft. – In: DEGES (Eds.): 20 Jahre. 1991 – 2011. Wege sind unser Ziel. Band 2. Pages 29-39. URL: http://deg.es.de/app/so.asp?o=/_obj/807451A6-CDC4-4D50-92DA-8C1C3D02EE68/outline/20J_DEGES_Bd2.pdf

BUND (2002): Kritik am Bundesverkehrswegeplanes 1992. URL: http://vorort.bund.net/verkehr/themen/themen_7/files/8645_kritik_bvwp_1992.pdf

BUSH, GEORG W. (2002): State of the Union Address (January 29, 2002). Miller Center. URL: <http://millercenter.org/president/speeches/detail/4540>

CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES (2012a): 센터개요. Summary about Center. URL: http://www.nk-koti.re.kr/about/about_02.

CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES (2012b): 북한교통개요. 도로. Summary about Transport in North Korea. Streets. URL: http://www.nk-koti.re.kr/northkorea/northkorea_01.asp?country=A&method=F

CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES (2012c): 북한교통개요. 철도. Summary about Transport in North Korea. Railway. URL: http://www.nk-koti.re.kr/northkorea/northkorea_01.asp?country=A&method=E

CENTRAL INTELLIGENCE AGENCY (2012a): The World Factbook: Germany. URL: <https://www.cia.gov/library/publications/the-world-factbook/geos/gm.html>

CENTRAL INTELLIGENCE AGENCY (2012b): The World Factbook: Korea, North. URL: <https://www.cia.gov/library/publications/the-world-factbook/geos/kn.html>

CENTRAL INTELLIGENCE AGENCY (2012c): The World Factbook: Korea, South. URL: <https://www.cia.gov/library/publications/the-world-factbook/geos/ks.html>

CHA, VICTOR D. (2002): Korea's Place in the Axis. Foreign Affairs. URL: <http://www.foreignaffairs.com/articles/58008/victor-d-cha/koreas-place-in-the-axis>

CHA, VICTOR/ KANG, DAVID (2011): Challenges for Korean Unification Planning. Justice, Markets, Health, Refugees, and Civil-Military Transitions. An Interim Report of the USC-CSIS Joint Study. The Korea Project: Planning for the Long Term. URL: http://csis.org/files/publication/111221_Cha_ChallengesKorea_WEB.pdf

CHIN, JOSH (2011): Video: Chinese Road Trip in North Korea. The Wall Street Journal China. URL: <http://blogs.wsj.com/chinarealtime/2011/06/16/video-chinese-road-trip-in-north-korea/>

CHO, HAN-SUN/ LEE, JUN/ KWON, YOUNG-IN (2009): Current Issues and Prospects of Toll Expressway in Korea. URL: http://www.jstage.jst.go.jp/article/eastpro/2009/0/76/_pdf

CHOI, SONG-MIN (2012): Schedules Cut, Roofriding Returns. URL: <http://www.dailynk.com/english/read.php?catald=nk01500&num=8780>

DB PROJEKTBAU (2010): Nürnberg–Berlin Abschnitt Ausbaustrecke. Nürnberg–Ebensfeld Streckenkarte. URL: http://www.vde8.de/media/public/downloads/VDE-81_Ausbaustrecke_Nuernberg-Ebensfeld/01_81_ABS_Nuernberg-Ebensfeld_Streckenkarte.pdf

DEGE, ECKART (1996): North and South Korea in the Eyes of a German Geographer: A Comparison of Spatial Structure. 대한지리학회지 제 31 권 제 2 호. Pages 29-43. URL: <http://kgeography.or.kr/publishing/journal/31/02/26.pdf> (Retrieved 24 May 2012)

DEGES (Eds.) (2011): 20 Jahre. 1991 – 2011. Wege sind unser Ziel. Volume 1. URL: http://deg.es.de/app/so.asp?o=/_obj/3B1C1975-F513-487C-AAD2-4A62AF4FE6B8/outline/20J_DEGES_Bd1.pdf

DESTATIS (2012): Verkehrsleistung. Güterbeförderung. URL:
<https://www.destatis.de/DE/ZahlenFakten/Wirtschaftsbereiche/TransportVerkehr/Gueterverkehr/Tabellen/Gueterbefoerderung.html?nn=50914>

DEUTSCHE BAHN (2012): Reiseauskunft. URL: <http://reiseauskunft.bahn.de/bin/query.exe/d>

DUCRUET, CESAR/ ROUSSIN, STANISLAS/ JO, JIN-CHEOL (2009): Going West? Spatial Polarization of the North Korean Port System. URL: http://hal.archives-ouvertes.fr/docs/00/45/85/87/PDF/Going_West5.pdf

ESPON (2009): Territorial Dynamics in Europe. Trends in Accessibility. Territorial Observation No. 2. URL: <http://www.espon.eu/export/sites/default/Documents/Publications/TerritorialObservations/TrendsInAccessibility/to-no2.pdf>

FRDB (2011): 경원선 남북연결. Kyeongwon-Line Connection between South and North. URL:
<http://frdb.wo.to/197.htm>

GOOGLE (2012): Imagery Update: Week of February 20th. Google Lat Long Blog. URL:
<http://google-latlong.blogspot.com/2012/02/imagery-update-week-of-february-20th.html>

HEILAND, FRANK (2004): Trends in East-West German Migration from 1989 to 2002. In: DEMOGRAPHIC RESEARCH. VOLUME 11, P. 173-194. URL: <http://www.demographic-research.org/Volumes/Vol11/7/11-7.pdf>

HUBER, JÜRGEN (2011): Der weite Weg zu den Verkehrsprojekten Deutsche Einheit. Von der Trennung zur Einheit. – In: DEGES (Eds.): 20 Jahre. 1991 – 2011. Wege sind unser Ziel. Volume 2. Pages 3-28. URL: http://deg.es.de/app/so.asp?o=/_obj/807451A6-CDC4-4D50-92DA-8C1C3D02EE68/outline/20J_DEGES_Bd2.pdf

HONG, SOON-MAN (2011): Korea's Experience on High-Speed Train and Suggestions for GCC Countries. URL: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CFQQFjAA&url=http%3A%2F%2Fwww.iktissadevents.com%2Ffiles%2Fevents%2Fgtrc%2F1%2Fpresentations%2Fd1-s4-soonman-hong.pdf&ei=cpG7T__wDM7b4QS9m4ndCQ&usg=AFQjCNE6vLjbMRJAXbwqQp6UxttGqQ1dxQ&sig2=BGUSs8CBSSSTPXJvXgyZBw

HYUNDAI ASAN (2012a): Brief History. URL:
<http://www.hdasan.com/english/company/history.jsp>

HYUNDAI ASAN (2012b): Large-scale SOC project in North Korea. URL:
<http://www.hdasan.com/english/others/soc.jsp>

HYUNDAI ASAN (2012c): Mt. Kumgang. Development Project. URL:
http://www.hdasan.com/english/tourist/kumgang_develop02.jsp

JEONG, HYEONG-GUN (2007): 남북 경제공동체 형성을 위한 북한의 SOC 개발 및 기대효과.
URL: <http://www.kiep.go.kr/include/filedown.jsp?fname=%C1%A607-40%C8%A3.pdf&fpath=Pub0301&NO=179424&FNO=309>

KBS WORLD (2012a): Lee: NK's Economic Independence Must Precede Reunification. URL:
http://world.kbs.co.kr/english/news/news_Po_detail.htm?No=90486

KBS WORLD (2012b): Chinese City to Begin Tour to N. Korea's Mount Geumgang. URL:
http://world.kbs.co.kr/english/news/news_In_detail.htm?No=90421

KBS WORLD (2012c): VOA: UN Says N. Korean Population to Reach 26Mln by 2030. URL:
http://world.kbs.co.kr/english/news/news_Po_detail.htm?No=88029

KCCI (2002): Expand Social Overhead Capital (SOC) to Continually Strengthen
Competitiveness. URL: http://english.korcham.net/sub02/report_view.asp?nKey=73&searchfield=&searchtext=

KIM, KYOUNG-SOO (2010): The Geography of Korea. URL:
http://www.land.go.kr/document/info/eng/The_Geography_of_Korea.pdf

KINU (2012a): President's Greeting. URL: http://www.kinu.or.kr/eng/about/about_01_01.jsp

KOCH, KLAUS C. (2010): Alle Wege führen nach Berlin. Verkehrsprojekte Deutsche Einheit.
URL: <http://www.sueddeutsche.de/auto/verkehrsprojekte-deutsche-einheit-alle-wege-fuehren-nach-berlin-1.22832>

KOH, YOUNG-AAH (2010): Korea considers underwater tunnels to China, Japan. The Korea Herald. <http://view.koreaherald.com/kh/view.php?ud=20100923000325&cpv=0>

KORAIL (2011): Rail Statistic Yearbook 2010. 2010 철도통계연보. URL:
<http://info.korail.com/ROOT/cambo-view.cambo?page=1&programid=10&boardid=32&lang=kor&listnum=10&category=>

KR (2012): 주요철도건설연혁. History of Major Rail Constructions. URL:

http://www.kr.or.kr/service/situation/Rail_history.do

KWON, YOUNG-IN (2010): Development and Operation of the Intermodal Transport Corridors for Road in Korea. Draft Version. URL: http://www.unescap.org/ttdw/common/TIS/CorridorStudy/EGM_Uiwang/18.KOTI_ppt1.pdf

LANKOV, ANDREI (2012): Lessons from Germany. The Korea Times. URL:

http://www.koreatimes.co.kr/www/news/nation/2012/05/304_111348.html

LEE, BACK-JIN/ SEO, MIN-HO/ CHUNG, IL-HO/ LEE, YUN-SUK (2011): Impacts of Connecting Highways between North and South Korea on International Travel Demand: Asian Highway 1 Route. URL: http://www.jstage.jst.go.jp/article/eastpro/2011/0/94/_pdf

LEE, HAYE-AH (2012): N. Korea to collapse by 2030: Russian expert. Yonhap News. URL:

http://english.yonhapnews.co.kr/n_interview/2012/01/17/93/4801000000AEN20120117006100315F.HTML

LEE, MIN-JI (2012): N. Korea to grow up to 12 pct under open economy: report. Yonhap News.

URL: <http://english.yonhapnews.co.kr/northkorea/2012/02/02/86/0401000000AEN20120202002200320F.HTML>

LEE, SANG-JUN/ KIM, SUNG-IL/ KIM, GEUN-YONG/ AHN, HONG-KI/ JO, JIN-CHOEL (2008):

한반도 공번영을 위한 국토분야의 대응방안. Territorial development policies for mutual benefit and common prosperity of the Korean peninsula. URL: <http://library.krihs.re.kr/upload/publication/publication/RR2008-31.pdf>

LEE, SUNG-WON (2010): Integrated Transport and Logistics Infrastructure Development for Northeast Asia: With Special Emphasis on Korean Peninsula. URL:

<http://intranet.imet.gr/Portals/0/UsefulDocuments/documents/02279.pdf>

LEE, SU-HOON/ OUELLETTE, DEAN J. (2007): The 2007 Inter-Korean Summit and Its Implications for Northeast Asia. URL: <http://www.nautilus.org/publications/essays/napsnet/forum/security/07088LeeOuellette.html>

LEE, YOUNG-HOON (2011): Feasibility of the 'Chang-Ji-Tu' Plan and North Korea's Economic Reform. Korea Focus. URL: http://www.koreafocus.or.kr/design3/Essays/view.asp?volume_id=111&content_id=103609&category=G

LESSENICH, STEPHAN (2010): Die Kosten der Einheit. Bundeszentrale für politische Bildung. URL: <http://www.bpb.de/files/49SFY2.pdf>

LINK, HEIKE (1997): Financing Rail Projects in Germany. Creating Modern Infrastructure. URL: http://www.jrtr.net/jrtr11/pdf/f30_lin.pdf

MÄNGEL, SIEGFRIED (2011): Die Bahn – ein technisch höchst komplexes System, etwas für Könner. URL: <http://www.unternehmerverbaende-rhein-wupper.de/fileadmin/media/PDF-Dateien/Die%20Bahn%20-%20K%C3%B6nner%20und%20Kenner.pdf>

MANYIN, MARK E. (2011): Kim Jong-il's Death: Implications for North Korea's Stability and U.S. Policy. URL: <http://www.nkeconwatch.com/nk-uploads/KJI-death-policy-options-CRS.pdf>

MEYERHOFF, JÜRGEN/ PETSCHOW, ULRICH/ SOETE, BIRGIT (1995): Die Wirtschaftlichkeit des Verkehrsprojektes Deutsche Einheit Nr. 17. Eine Untersuchung unter besonderer Berücksichtigung der Kosten-Nutzen-Analyse der Bundesverkehrswegeplanung und ökologischer Folgekosten. URL: http://www.ioew.de/uploads/tx_ukioewdb/IOEW_SR_091_Wirtschaftlichkeit_Verkehrsprojekt_Deutsche_Einheit_17.pdf

MOU (2007): The Road to Korean Unification. URL: <http://eng.unikorea.go.kr/CmsWeb/tools/board/downAttachFile.req?fileId=FI0000099864>

MOU (2010): White Papers on Korean Unification. URL: <http://eng.unikorea.go.kr/CmsWeb/tools/board/downAttachFile.req?fileId=FI0000099563>

MOU (2012): The Republic of Korea's Policy toward North Korea. URL: <http://eng.unikorea.go.kr/CmsWeb/tools/board/downAttachFile.req?fileId=FI0000104715>

NA, HEE-SEUNG (2009): 단계별 남북. 대륙철도 구축방안과 한.러 철도협력. In: 한국 시베리아연구 제 13 권 1 호. P. 107-131. Pragmatic Trans Korean Railway Linkage and the Prospect of Transportation Cooperation between Korea & Russia. URL: http://w2.pcu.ac.kr/~korsib21/nonmun/09_13_1/09_13_1_4.pdf

NA, HEE-SEUNG/ KWON, TAE-SOO/ PARK, JUNG-JOON (n.d.): Strategy of Trans-Korean Railway Transportation and Development of International Corridors. URL: http://www.unescap.org/ttdw/common/TIS/CorridorStudy/EGM_Uiwang/10.ROK_ppt.pdf

NISHIMARU, DAISUKE (2011): Rail link between Russia and North Korea repaired. The Asahi Shimbun. URL: <http://ajw.asahi.com/article/asia/AJ2011101414514>

PARK, YANG-HO/ KIM, SUN-HEE (2010): Korea's Territorial Vision and Strategy Toward 2040. - In: KRIHS Gazette Space and Environment, Vol. 40, 2010. URL: <http://www.krihs.re.kr/english/mailpdf/GAZETTE40TH.pdf>

RAILWAY GAZETTE (2010): KTX-II ready to enter service. URL: <http://www.railwaygazette.com/nc/news/single-view/view/ktx-ii-ready-to-enter-service.html>

RAILWAY GAZETTE (2012): Experimental 430 km/h high speed train unveiled. URL: <http://www.railwaygazette.com/nc/news/single-view/view/ktx-ii-ready-to-enter-service.html>

RAILWAY TECHNOLOGY (2012): North Korea-South Korea Railway. URL: <http://www.railway-technology.com/projects/north-south-korea/>

RO, JAE-BONG (2002): Infrastructure Development in Korea. URL: <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan008650.pdf>

ROUSSIN, STANISLAS/ DUCRUET, CESAR (2007): The Nampo-Pyongyang corridor. A strategic area for European investment in DPRK. URL: http://hal.inria.fr/docs/00/45/97/51/PDF/Roussin_Ducruet_NPC_revised.pdf

SHIN, DONG-CHUN (2005): Recent Experience of and Prospects for High-Speed Rail in Korea: Implications of a Transport System and Regional Development from a Global Perspective. URL: <http://escholarship.org/uc/item/5wn7600s.pdf>

THOMPSON, DREW (2011): Silent Partners. Chinese Joint Ventures in North Korea. URL: http://uskoreainstitute.org/wp-content/uploads/2011/02/USKI_Report_SilentPartners_DrewThompson_020311.pdf

TORRY, HARRIET (2012): Lessons From German Reunification. The Wall Street Journal Asia. URL: <http://blogs.wsj.com/korearealtime/2012/01/10/lessons-from-german-reunification/>

UNESCAP (2006): Integrated International Transport and Logistics System for North-East Asia. URL: http://www.unescap.org/ttdw/Publications/TIS_pubs/pub_2434/integrated_2434_full.pdf

UNITED NATIONS (2012): The Universal Declaration of Human Rights. URL: <http://www.un.org/en/documents/udhr/>

YONHAP NEWS (2012a): N. Korea, Russia to start cross-border freight train service in October. Yonhap News. URL: <http://english.yonhapnews.co.kr/news/2012/04/02/0200000000AEN20120402005600315.HTML>

YONHAP NEWS (2012b): N. Korea's new leadership backs gas pipeline project: Russian envoy.
URL: <http://english.yonhapnews.co.kr/news/2012/02/02/0200000000AEN20120202010900315.HTML>

MAGAZINES

AHN, BYUNG-MIN (2003a): Social Overhead Capital. – In: AHN, CHOONG-YONG: North Korea Development Report 2002/03. P. 55-82. URL:
<http://www.kiep.go.kr/include/filedown.jsp?fname=OTRS200303.pdf&fpath=Pub0201&NO=131805&FNO=646>

BAUFELD, MICHAEL (1993): Schienenverkehrsprojekte Deutsche Einheit. - In: Die Deutsche Bundesbahn 9-10/1993. P. 649-651.

DER SPIEGEL (1990): Immer zu. – In: Der Spiegel 50/1990. P. 92-97.

DER SPIEGEL (1992a): Zurück in die Steinzeit. – In: Der Spiegel 25/1992. P. 62-68.

DER SPIEGEL (1992b): Selber Überrascht. – In: Der Spiegel 51/1992. P. 83-88.

ECKEY, HANS-FRIEDRICH/ HORN, KLAUS (2000): Die Angleichung der Verkehrsinfrastruktur im vereinigten Deutschland zwischen 1990 und 1999. Overcoming Disparities in Transport Infrastructure in the Reunited Germany between 1990 and 1999. – In: Raumforschung und Raumordnung 5, 2000. P. 373-381.

GERBER, W. (Hrsg.) (2009): Die Verkehrsprojekte Deutsche Einheit. Eine kleine Bilanz nach 20 Jahren Infrastrukturausbau. – In: Geographie Heute. Issue 273. P. 46-47.

HILPERT, HANNS GÜNTHER (2010): A Comparison of German and Korean Division: Analogies and Differences. – In: International Journal of Korean Unification Studies, vol. 19, no. 1. P. 126-156.

KELLY, ROBERT (2011): The German-Korean Unification Parallel. In: The Korean Journal of Defense Analysis. Vol. 23, No. 4. P. 457–472. URL:
http://www.kida.re.kr/data/kjda/02_Robert%20Kelly.pdf

LASCHKE, BÄRBEL (1998): Investitionen in die Verkehrsinfrastruktur begünstigen die Wirtschaftsansiedlung in Ostdeutschland. – In: Raumforschung und Raumordnung 5/6, 1998. P. 406-413.

LIM, JAEKYUNG (2010): Transportation-Related Policy Suggestions for the Promotion of Reconciliation and Cooperation between South and North Korea. – In: KOTI World Brief, Vol. 2, No. 10. P. 2-4.

LUTTER, H. (1992): Verkehrsprojekte Deutsche Einheit. Erreichbarkeitseffekte Straße – Schiene im Vergleich. BfLR-Mitteilungen 3/92.

SEO, JONG-WON (2011): 중국 국제열차 운영 현황. China's International Train Present Operation. – In: AHN, BYUNG-MIN/ LIM, JAE-KYUNG/ SEO, JONG-WON/ KIM, SUN-CHUL/ LEE, OK-NAM/ LEE, JONG-KYEOM/ NOH, SANG-WOO (2011): 2010 동북아 · 북한교통. 동향과 현안분석. 2010 Transport in Northeast-Asia and North Korea: Trends and Analysis. Goyang, South Korea. P. 299-308.

SEO, JONG-WON/ ROH, SANG-WOO (2012): China's Chang-Ji-Tu Pilot Zone Development Policy and Related Changes in the Transport and Logistics System in Northeast Asia. – In: KOTI World Brief, Vol. 4, No. 34. P. 8-11.

YOON, DAE-KYU/ YANG, MOON-SOO (2005): Inter-Korean Economic Cooperation for North Korean Development: Future Challenges and Prospects. – In: Asian Perspective, Vol. 29, No. 3. Pages 5-30.

MAPS

BMV (1993): Verkehrsprojekte Deutsche Einheit. Projekte, Planungen, Gesetze, Argumente. Bonn.

CENTER FOR NORTHEAST ASIA AND NORTH KOREA TRANSPORT STUDIES (2008): 북한의 교통 개념도. Key Map of Transportation.

CLOUDMADE (2012): Downloads. URL: <http://downloads.cloudmade.com/>

http://downloads.cloudmade.com/asia/eastern_asia/north_korea#downloads_breadcrumbs

http://downloads.cloudmade.com/asia/eastern_asia/south_korea#downloads_breadcrumbs

http://downloads.cloudmade.com/europe/western_europe/germany#downloads_breadcrumbs

DIVA-GIS (2012): Download data by country. URL: <http://www.diva-gis.org/gdata>

GADM (2012): Global Administrative Areas. URL: <http://www.gadm.org/>

GEOFABRIK (2012): Download Area. URL: <http://download.geofabrik.de/>

<http://download.geofabrik.de/osm/europe/germany/>

NATURAL EARTH (2009): Urban Area. URL: <http://www.naturalearthdata.com/downloads/10m-cultural-vectors/10m-urban-area/>

NASA (2012): Shuttle Radar Topography Mission. URL: <http://www2.jpl.nasa.gov/srtm/>

NGII (2010): Korea and Vicinity. National Geographic Information Institute. URL: http://www.ngii.go.kr/en/popup/map_asia.jsp

UNITED NATIONS (2004): DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA. URL: <http://www.un.org/Depts/Cartographic/map/profile/korean.pdf>

PICTURES

AUTOWALLPAPER (2012): Schienenzepelin. URL:

<http://www.autowallpaper.de/Wallpaper/images/BMW/BMW-Innovationen/flugmotoren/Schienenzepelin-.jpg>

CHOE, SANG-HUN (2007): Korean Train Crossing Seen as Sign of Progress. URL: http://www.nytimes.com/2007/05/17/world/asia/17cnd-korea.html?_r=1

KINU (2012b): KINU CI. URL: http://www.kinu.or.kr/about/about_05_01_04.jsp

KOTI (2012): KOTI CI. URL: <http://www.koti.re.kr/intro/promote.asp?mCode=010301>

MITTELDEUTSCHE ZEITUNG (2011): Vor 20 Jahren war Schluss in Zwickau. URL: <http://www.mz-web.de/ks/images/mdsBild/1300342802452l.jpg>

PEDDLE, TOM (2010): Road to Nowhere. URL: <http://www.flickr.com/photos/tpeddle/4955633843/sizes//in/set-72157624859055564/>

SCHLEIZ OTZ (2012): Von der Reichsautobahn zum Zeugnis der Einheit. URL: <http://schleiz.otz.de/web/lokal/leben/detail/-/specific/Von-der-Reichsautobahn-zum-Zeugnis-der-Einheit->

TAGESSCHAU (2012): Wirtschaftsboom in Südkoreas Industriekomplex in Nordkorea. URL: http://www.tagesschau.de/ausland/korea286-magnifier_pos-1.html

UNITED NATIONS (2011): Trans-Asian Railway Network. URL: http://www.unescap.org/ttdw/common/TIS/TAR/images/tarmap_latest.jpg

VDE8.1 (2012): Germany Unity Transport Project 8. URL: http://www.vde8.de/likecms.php?site=site.html&siteid=10053&function=set_lang&lang=en&x=8&y=7#&desc=VDE+8.1+NEW+LINE+Ebensfeld+-+Erfurt%3A+Environment&site_html=&n1=3&n2=6&

VDE8.2 (2012): Germany Unity Transport Project 8. URL: http://www.vde8.de/likecms.php?site=site.html&siteid=10053&function=set_lang&lang=en&x=8&y=7#&desc=VDE+82+NBS+UMWELT&site_html=&n1=5&n2=6&t