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# The Trans-European Transport Network

A closer look at Policy Failure and the effects of Path Dependence

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# Abstract

There is a trans-European transport network policy on the supranational level that aims to connect Europe with efficient, sustainable, safe and economically viable cross-national transport infrastructure. Because of this, one could expect EU funding to focus on rail infrastructure, as it has proven to be a low polluting, cost effective and an efficient mode of cross-national transport. However, as of today, and since the policy's adoption in 1996, there has been a disproportionate amount of funding focusing on road infrastructure, which has been shown to be highly polluting, expensive, and relatively inefficient for cross-national transport. This discrepancy is explored through the theoretical perspective of *policy failure* and *path dependence* and approached through a mixed methods methodology. My findings show that the Trans-European transport network, or the TEN-T policy, should be considered as a partial policy failure, since it has not completed the projects it set out to construct, and that one reason for the lacklustre development of the European rail network could be the Union's path dependence on road infrastructure.

Key words: The Trans-European transport network, policy failure, path dependence, mixed method

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# 1 Introduction

The European Union is arguably the most ambitious and the most powerful supranational institution in the world. The Union was founded in 1952, with the ratification of the treaty of Paris and the establishment of *the European Coal and Steel Community* (ECSC). The ECSC laid the groundwork for the Union we know today, and initially it had an economic focus, with an underlying goal of promoting peace on the European continent (European Union 2023). Through economic integration, the ECSC would make the European powers dependent on each other, through greater interconnectivity of their national markets, making it impossible for them to wage war against each other without significant economic loss (European Union 2023). With the success of the ECSC, the institution quickly expanded and changed its name in 1957, with the treaty of Rome, to *the European Economic Community* (EEC) (European Union 2023). The supranational institution now had its own parliament, and it became clear that the scope of the institution had grown substantially. In 1993, the EEC was finally renamed to its present day name, *the European Union* (EU), with the signing of the Maastricht treaty (European Union 2023). The European Union has experienced significant growth since its founding and consists today of 27 member states, its own parliament, commission, central bank, currency and much more. Most impressively, European law now stands above national law for all member states (European Union 2023). A feat no other supranational institution has been able to achieve.

With the expansion of the European Union, the scope and budget of the Union has grown with it. The Union's interest areas have grown to cover a wide range of topics. One of the major areas it has taken an interest in is cross-national transportation infrastructure, including railway, road, water and air-travel (European Commission 2023-a). To promote these types of cross-national infrastructure projects, the Union adopted the *Trans-European Transport Network* policy (TEN-T). TEN-T was first established in 1990 but has changed and evolved in certain practical matters since then (European Commission 2023-a). Additions were made as recently as December 2022, however, the main goal remains the same: To close gaps, remove bottlenecks and technical barriers, as well as to strengthen social, economic and territorial cohesion in the EU (European Commission 2023-b).

This is interesting as it is the first ever attempt at a unified approach towards continental transport connectivity. Obviously, the European Union does not cover the entire European continent, but a significant part of it. It could be compared to the American interstate highway system, however, that project never crossed any national borders, and only included a single mode of transport: the car (FHWA 2022). Considering that the American interstate highway system has been called the greatest public works project in the history of human civilization (FHWA 2022), the completion of the TEN-T project would comparably stand as one of the major achievements of human engineering, planning and feats of cooperation and coordination.

However, in recent years the European Union has been criticised for their lacklustre role in promoting and investing in alternatives to car-centric infrastructure. Some argue that, even though the Union and the TEN-T policy has the stated ambition to develop and to construct a robust European rail network, the majority of investments funnel into road infrastructure projects. Even in 2021, the year the Union declared as “*the European Year of Rail*” saw little to no shift towards higher investments in rail infrastructure projects, when compared to road infrastructure investments, and mostly worked to highlight the dysfunctional European rail network (Investigate Rail 2021-a). It could be argued that the TEN-T policy is currently more similar to the American interstate highway system, and its car-centric development, than it aims to be. *Investigate Europe*, a team of journalists from 11 different European countries have criticised the Union and its member states for not only prioritising road infrastructure, even though both supranational and national politicians have been promising increased rail investments for the last 20 years, but for hindering its development as well (Investigate Europe 2021-b)

This is important because how we, as societies, approach transportation has widespread complications and effects on how the world around us is formed and how we live as individuals and as a collective (Taylor & Francis 2023). The decisions we make and the modes of transportation we decide to prioritise have an immense impact on how the cities we live in develop and expand (Taylor & Francis 2023). Through a simple look around on google earth and its 3D rendition of the world, it becomes apparent that cities around the world have strong

similarities but equally as strong differences. Some clear examples of this could be discovered if we were to zoom in and compare Houston, USA and Vienna, Austria. The US has a more car-centric approach to transportation, which is noticeable since Houston has highways that go through it, is flatter, contains a lot more lower density and a more noticeable contrast between the centre and the periphery. Austria has on the other hand put more emphasis on public transportation, walking and biking, meaning that their cities, such as Vienna, contain more medium/high density, cover less area and are generally more mixed use. In addition to the layout of a city, the design of the transportation network impacts the health of its citizens, the economic prospects of the area, its environmental impact and the social atmosphere of the region (Taylor & Francis 2023).

The consequences of prioritising certain modes of transport over others is a topic that will be covered later on in the thesis. This works as a short introduction to the importance of the transport sector and as a motivation as to why I have decided to dedicate my thesis to this topic. However, it has become clear through previous research that certain modes of transport fit certain situations. Depending on the goals and ambitions of the TEN-T policy, their investments and developments should follow a certain pattern. This leads to the main focus of this thesis: An evaluation of the TEN-T policy and a possible explanation for its development.

## 1.1. Research question

1. To what extent should the TEN-T policy be considered as a policy failure?
2. To what extent can the theory of path dependence provide an explanation to the development of the TEN-T policy?

How these research questions will be approached and answered will be covered in the theory and methodology sections. However, first I present a background and a deeper look into the TEN-T policy.

## 2 Background

In 1990, the member states of the European Economic Community, the predecessor to the European Union, made the decision to establish a Union wide transportation network to improve the compatibility of their shared internal market and its interrelation with the global market (European Commission 2023-a). Yet, it took six years for the Union to adopt these guidelines and in its adoption, they were revised to make up a master plan quite similar to the TEN-T policy we have today. This plan has been revised multiple times over the years, however, the core idea remains the same (European Commission 2023-a). One of the core ideas of this master plan was the division of the TEN-T policy into two distinctly divided sections:

**The Core Network:** Divided into nine different core networks corridor, which consists of the most important connections, linking the most important nodes. Each corridor is run by a head coordinator, which is nominated by the European Commission. Aims to be completed by 2030 (European Commission 2023-b).

**The Comprehensive Network:** Covers all European regions and includes less crucial nodes. Aims to be completed by 2050 (European Commission 2023-b).

The comprehensive network is certainly an integral part of the completion of the TEN-T policy, however, for this thesis, the Core network will stand at the centre of attention. It would be too difficult to judge if the Comprehensive network should be considered as a policy failure or not, since it is scheduled to be completed in 27 years. On the other hand, the core network is ripe for criticism, since its due date is considerably closer.

### 2.1 Summary of TEN-T's goals and objectives

We briefly mentioned the stated goals of the TEN-T policy, however Regulation (EU) No 1315/2013 covers this in greater detail. It is a 128 page document that provides guidelines for the

development and the implementation of the TEN-T policy (European Commission 2023-b). For simplicity's sake, I've summarised them into four different categories:

### **Transport Efficiency**

The new transport network has the ambition to reduce international traffic congestion and to make travel for both passengers and freight faster, safer and more seamless across the Union (Regulation (EU) No 1315/2013).

### **Economic**

TEN-T aims to develop an economy boosting transport network through establishing a competitive, resource efficient and multimodal intercontinental web of transport infrastructure (Regulation (EU) No 1315/2013).

### **Integration**

The hope is that as travel and trade becomes easier, more efficient and faster, European integration, through social and territorial cohesion, will be strengthened (Regulation (EU) No 1315/2013).

### **Environmental**

The development of the trans-European transport network is a key factor in reaching the Union's goal of reducing carbon emission from the transport sector by 60% by 2030 and 90% by 2050, when compared to 1990 emission levels (Regulation (EU) No 1315/2013).

These goals will be the centre piece in my analysis and will be referenced to throughout the essay. I will argue that considering these goals, there is a misalignment when it comes to the transport infrastructure projects the Union today, and previously has chosen to prioritise their funding on. Additionally, I will provide recommendations for fixing this, by going through these goals one by one and evaluating the most fitting mode of transportation for cross-national travel. However, the *Integration* part of the goals will be excluded. This is done because the stated goals concerning integration are rather vague and deserve an entire thesis on its own. It is beyond the scope of this paper. Additionally, as stated in the introduction, the TEN-T policy is concerned with four different types of transportation modes: railway, road, water and air-travel. However,



since travel by water is a rather niche mode of transportation on a continental scale, this too will be excluded from the analysis.

## 2.2 TEN-T priority projects

To reach these goals the TEN-T committee arranged a list of 30 priority projects (European Commission 2023-a). These projects were identified with the help of the Union's member states, and are viewed as crucial steps for the completion and realisation of the TEN-T policy. Of these 30 key priority projects 18 are railway projects, 5 are road projects, 3 are mixed rail-road projects, 2 are inland waterway transport projects, 1 airport and 1 refers to a motorway of the sea (European Commission 2023-a). Some examples of these projects that are either completed or under construction would be priority project 27: *Rail Baltica*, The priority project 7: *the Balkan motorway axis* and priority project 10: *Malpensa airport* (INEA 2022-a). Below, I will deep-dive into these projects and provide some detail to give context on the type of infrastructural transportation projects that the TEN-T policy typically chooses to finance. The reason I highlight these three projects is that they are archetypes and work as great representations of the TEN-T policy and its ambition.

### 2.2.1 Rail Baltica

Rail Baltica is a railway project linking Finland, Estonia, Latvia, Lithuania and Poland. It is currently under construction and a part of the North Sea Baltic TEN-T corridor (Rail Technology 2022). It is the only railway connection from the Baltic states to Poland and the rest of the Union. From its most northern point, in Helsinki, the capital of Finland, it connects through a rail ferry to Tallinn, the capital of Estonia. There are ongoing plans and investigations looking into the possibility of building a tunnel to connect the two capitals, but a decision is yet to be made concerning the matter. The project aims to construct a high speed railway passenger service passing through Tallinn, Pärnu, Riga, Riga Airport, Panevezys, Kaunas, Vilnius and Warsaw (Rail Technology 2022).

The project is largely funded with EU funds. The total cost is planned to reach 5.8 billion euros, with 85% being covered by the European Union (Rail Technology 2022). The remaining 824 million euros are proportionally covered by Estonia, Latvia and Lithuania depending on rail track length that passes through each country. The total line length of the railway will be 870 km: 213 km passing through Estonia, 265 km passing through Latvia and 392 km passing through Lithuania (Rail Technology 2022).

There will be high speed passenger service between the Baltic capitals every 2 hours and between Tallinn - Warsaw and Tallinn - Vilnius four times per day. Two night-trains will run between Tallinn and Berlin, truly connecting the Baltic states to the rest of the European Union (Rail Technology 2022). The passenger trains are designed to reach a top speed of 249 km/h and will run on electrified double track with a standard European gauge of 1435 mm (Rail Technology 2022). Leading to a significant reduction in commuting times between the Baltic capitals, making it a highly competitive mode of transport.

In addition to the passenger service, there will be significant improvements to the freight network as well. Firstly, the Rail Baltica project will directly connect the three major seaports in the area: Helsinki, Tallinn and Riga (Rail Technology 2022). Secondly, it will construct new and modern, or upgrade existing, freight terminals in Muuga, Pärnu, Salaplis (Rail Technology 2022). Thirdly, with these infrastructural improvements, freight trains will now have a max length of 1050 m and a top speed of 120 km/h. It is estimated that this will enable 13 million tons of cargo to be transported and lead to more effective trading with other European countries (Rail Technology 2022).

This in turn leads to a significant reduction in CO2 emissions, as the trains will be 100% electrified and will most likely result in a significant reduction in private car trips and the need for long distance truck shipping (France24 2019).

### 2.2.2 The Balkan Motorway Axis

The Balkan motorway axis is a TEN-T project that aims to improve the road network in the Balkan region, more specifically in the countries of Greece, North Macedonia, Bulgaria, Romania and Hungary (TEN-T 2004). The initial plan called for two new motorways to be constructed. The first one would consist of four-lanes and run from east to west for 780 kilometres to connect the port of Igoumenitsa with Kipi on the Greek-Turkish border. The second one, ranging from four to six lanes, would run from the south to the north for 800 kilometres, linking Patras to Promahon (TEN-T 2004). However, these plans were expanded to connect even further northern connections to improve the connectivity between the neighbouring countries.

The project was funded by the participating nation states and the European Union. The Union covered half of the costs (TEN-T 2004), but the exact total number of the costs have proven to be difficult to find.

It is hypothesised that this roadway network extension will benefit 70% of the population living along the newly built route through boosting economic growth, development and accelerating the economic prospects of the region (TEN-T 2004). This is caused by easier access for passengers and freight to the rest of the EU. Additionally, this connects major ports in the area, making shipping easier and efficient (TEN-T 2004).

Steps have been taken to reduce the environmental impact of the project, however, compared to the alternatives, the additional trucks and cars on the roads will cause continued and expanded environmental devastation (France24 2019).

### 2.2.3 Malpensa Airport

Malpensa airport, located in Lombardy, Italy, opened to the public way back in 1998, but remains one of the most significant projects the TEN-T contributed towards (INEA 2022-b). Construction continued to 2001 and was marked as a finished and completed TEN-T project. However, development is continuing, working towards increasing rail and road connectivity to the airport,

with the goal of making the airport a more viable alternative to a wider range of people (INEA 2022-b).

In 2022, over 21 million passengers flew in or out of Malpensa airport, however pre-covid numbers reached as high as 29 million passengers annually (Italian airport Guide 2023). The airport has non-stop flights to 174 different destinations in 74 different countries. A large part of them are domestic, however Malpensa is classified as mostly an international airport, reaching destinations all over the world (Italian airport Guide 2023).

Finding the exact number of total TEN-T funds invested in the Malpensa airport is once again proving to be difficult to find. However, it has had a continued interest in the project, during its construction and providing funding for additional expansion projects connected to the airport.

Around 20 000 people are employed at the airport and stands as a significant hub for companies and cargo shipping. It is estimated that a production value of 4,1 billion euros was generated as a direct or indirect consequence of the airport, in 2018 (Milan airports 2018).

Air-travel is without a doubt convenient for long-distance travel and the quickest form of transportation. Although, when it comes to the environmental impact, it is the worst and most devastating form of travel (France24 2019).

## 3 Theory

In the following chapter, I will present the theoretical framework from which the research question will be analysed from. This chapter is divided into three different sections which explores three different theories that I believe go well together to answer my research questions. Firstly in 3.1 I present the theory of *critical political economy* (CPE). CPE will lay the groundwork for this thesis ontological and epistemological worldview. Secondly, in 3.2 I will discuss *policy failure*. Policy failure will help us understand why we have an issue with the TEN-T policy and why it is worth criticising. Lastly, in 3.3 I will consider *path dependence* as a possible explanation as to why the TEN-T policy has failed in its objectives.

### 3.1 Critical Political Economy

Critical political economy is a theory within the social sciences that focuses on the system of the world order, the ruling hegemony and the social forces that give birth to them (Cox 1981:141). Additionally, it is concerned with the practical aspects of what a theory is and how they can be approached (Cox 1981:135). In other words, critical political economy is concerned with ontological and epistemological claims.

Establishing the nature of theories and how they can be used and approach is key for understanding the rest of the critical political economic world view. Firstly, it is importantly stated that theories are always created and used *for* someone and *for* some purpose (Cox 1981:128). What this means is that no theory is ever objectively, universally true, but that they should instead be viewed as a lens from which a researcher can choose to observe a phenomenon from. However, this doesn't mean that every theory can be discarded as just another subjective take, and that all perspectives are valued equally. The more well developed a theory is, the more likely it is to transcend and reflect over its own perspective (Cox 1981:128), giving it more weight to its arguments and conclusions. Additionally, it is highlighted that it is impossible to separate a theory from the time and space of its creation. So as time progresses, it is important to revise and adjust theories to fit the world as it is now. Secondly, theories are divided into two

separate camps: *Problem-solving* and *critical theories* (Cox 1981:p.128-129). Problem-solving theories are characterised by a direct response to a proposed problem within a particular perspective. It views the world, its framework and patterns of organisation, as constant and as the arena from which it can draw actions and conclusions from. The aim of problem-solving theories is to solve specific sources of trouble within this existing system, to streamline and effectivize the mechanisms in place (Cox 1981:128-129). Critical theories on the other hand are more reflective of the world around them and more suitably represent the critical political economic world view. Instead of limiting itself to the status quo, critical theories reflect upon how it came to be and what the process of change might look like (Cox 1981:129). Just like problem-solving theories, critical theory might start with a particular issue, but from that starting point expand and construct a larger picture and criticism of the political complex as a whole. Importantly, through this criticism, it allows for a normative stance on how it should change or evolve. However, it limits itself to alternative systems that are deemed feasible (Cox 1981:130). Lastly, this theoretical reflection is summarised in five points: (1) An action is never free, but takes place within a framework for action. (2) Not only action, but also theory is bound by the framework that gave it birth, which makes it important to reflect and continually adapt to changing times. (3) the framework for action changes over time and it is up to CPE to understand and highlight these changes. (4) CPE has its base in an historical analysis, where the combination of thought patterns, material conditions and institutions make up the context in which people exist and act. (5) To view this issue from the top-bottom perspective would be faulty. It is important to include bottom and outside perspectives to gain access to the whole picture (Cox 1981:135).

Moving onwards, the most important concepts within critical political economy are world order and hegemony. These two concepts essentially mean the same thing: leadership or dominance by one over the others (Gill & Law 1989:476). This is usually explained through the concepts of *pax britannica* and *pax americana*, which highlights the dominance Britain and America had on the world stage during their respective military peaks in the eighteen- and the nineteen hundreds. However, this is a very rationalistic take on hegemony and is mostly concerned with *direct power* (Gill & Law 1989:476). Direct power could be characterised as A making B do what A wants, which only covers a fraction of the *power* of a hegemonic system according to the CPE perspective. The concept of hegemony has been used by CPE scholars to analyse the relationship

between the social forces that exist within our societies, meaning that a truly hegemonic order is characterised by one dominating social force (Gill & Law 1989:476). Additionally, this analysis isn't solely focused on direct power, but recognises the importance of structural power, which covers the power over ideas and ideology. A hegemonic order is not one of force and coercion, but one of ignorant consent (Gill & Law 1989:476). The masses agree because they cannot phantom anything else, even if it stands against their own self interest. Obviously, a truly hegemonic order has never been achieved and CPE scholars are aware of this. However, there exists near hegemonic orders in our world today, and for the interest of this thesis, these are the world ideology of capitalism and its much connected hegemonic cousin of car usage within the transportation sector. This will be elaborated upon in the analysis.

The concept of hegemony is analysed in two stages. Firstly, through the lens of ideas, institutions and material capabilities, as a means of identifying the structure and the characteristics of the prevailing hegemony. Secondly, through looking at the origin, rise and demise of hegemonies in the past, present and future through the concepts of social forces, forms of state and world orders (Cox 1981:141). I will be focusing on identifying the hegemonies previously mentioned and discuss their impact on the European transport sector, while including a discussion of the second half near the end.

## 3.2 Policy Failure

Moving forward from the ontological and epistemological stance and basis of this thesis, comes the question of what this is an issue of. Essentially, what this thesis is about is *policy failure* and there has been an academic interest in exploring the concepts of policy failure, or the related issue of the *policy gap* for some time. Looking into why certain policies are implemented and why others aren't and why some fail to reach their outset goals.

In a top-down perspective, policies are firstly the result of expressed intentions formulated in a set of goals. These goals lay the foundation and determine the instruments which will be used to achieve these goals, which is followed by the actual implementation (Hudson et al 2019:1). Policy failure is used to describe a situation where the implementation process has deviated

from, or been unsuccessful in achieving the goals set by the policy formulation (Hudson et al 2019:1). However, it is important to note that total policy failure is seldom observed, rather it is much more common for policies to be described as partial failures. Total policy failure would imply that no progress was ever made towards achieving the outset goals. It is an extreme outcome, and in most cases there is at least modest noticeable progress (Hudson et al 2019:2). Hence, why it is more common to discuss and observe partial policy failures. The reasons behind why many policies result in partial failures are multitude, but to keep it simplistic, here are four main factors:

*Overly optimistic expectations:* It would not be surprising if one were to believe that the more precise and carefully made cost-calculations and assessments would be applied to the most grand and expensive of policies. However, it has been shown that one of the most frequent failures of policy formulation is the overly optimistic expectations of what can be achieved in a set amount of time and with a set amount of money (Hudson et al 2019:2). Five reasons have been identified to contribute to the often occurring overly optimistic expectations: Complexity (the underestimation of the challenges of implementation), evidence base (the lack of accurate information on costs, timescales, benefits and risks), misunderstanding of stakeholders (the failed wishful thinking of aligning differing views among relevant people of interest). Behaviour and incentives (interested parties boosting their own prospects) and challenge and accountability (decision-makers making short-term benefit) (Hudson et al 2019:2). These types of challenges are strengthened when the policy requires a long-term focus (Hudson et al 2019:3), as, for example, the TEN-T policy does.

*Implementation in dispersed governance:* Implementation is seldom an easy process, and policy formulated on the supranational or the national level is not always realised in the way the formulators might have had in mind when it is applied at the local level. Especially when the different levels have their own separate degree of political autonomy, as is the case within the EU (Hudson et al 2019:3). All policy implementation is plagued by the local context, and one method that worked in one instance might not work in another. This is highlighted by the bottom-up perspective to the implementation process,



as they discuss concepts such as the street-level bureaucrat and the nature of receptive and non-receptive contexts (Hudson et al 2019:3).

*Inadequate collaborative policymaking:* Policy formulation is often made in its own bubble with little connection to the real world, even as the effect of the policy spreads and affects external parties (Hudson et al 2019:3). The lack of interorganizational collaboration and the failure to establish a common ground for public problem-solving stands as an obstacle to all implementation processes (Hudson et al 2019:4). Policies, especially the more complicated ones, require constant and continuous collaboration between all relevant stakeholders, including at the supranational, national, subnational and the local level. Without it, unwanted consequences such as inefficiencies, questions of legitimacy and an unnecessarily long implementation stage become reality (Hudson et al 2019:4). As the saying goes, teamwork makes the dream work.

*Vagaries of the political cycle:* In a democratic system, politicians are not always incentivised to prioritise the long-term. Short-term success can prove to be very helpful for their own political career, as it might get them re-elected (Hudson et al 2019:4). Additionally, politicians are seldom held accountable for the outcomes of their policy initiatives. Meaning, that focusing on the short-term carries few drawbacks (Hudson et al 2019:4). There is research suggesting that the political will required to drive through long-term policy-making is significantly more difficult to amass, and in most cases, dissipate over time (Hudson et al 2019:4).

These factors and summaries of why policies fail will be applied to the analysis of the TEN-T policy and deduce if the TEN-T policy should be categorised as a total, or more probably, a partial failure. Additionally, what can be done about it will be briefly discussed in the discussion section.

### 3.3 Path Dependence

Now that we have established our world view, how we should use our theories and what it is we are interested in, I will continue with presenting the theory of *path dependence* as my main explanation as to why the TEN-T has failed in its objectives.

At its most simple state, path dependence is simply the statement that history matters. That our, or our predecessors, actions have importance in our daily lives and the decisions we make and will continue to have importance in the future (Castaldi & Dosi 2006:99). The past is ever present and shapes the world today and the future. At its core lies the concept of time irreversibility, simply meaning that once a course of action is taken, there is no turning back (Castaldi & Dosi 2006:99). You can get a lot of lumber from a tree, but you can't get a tree from a lot of lumber.

Concerning time irreversibility, it is important to note that there seldom is a grand plan spanning decades, where every course of action is planned ahead of time. Instead, decisions are usually taken sequentially over time, and they often reflect uncertainty and imperfect information (Castaldi & Dosi 2006:100). Meaning that you, the actor, have a set of conditions that influence the way you are able to act. This in time, leads to path dependence, in the sense that past decisions or past beliefs determine present and future decision processes. This leads to the puzzle that the theoretical framework of path dependence tries to answer: How is the status quo reinforced, how do we break away from it and what were the initial conditions that allowed it to be developed (Castaldi & Dosi 2006:99-100).

Path dependence comes in many different forms, although the most prominent type discussed in the literature is *increasing returns* from the field of economics (Castaldi & Dosi 2006:101). It's not surprising since path dependence was developed by economist *William Brian Arthur* in the book *Increasing Returns and Path Dependence in the Economy* published in 1994. Within economics, increasing returns implies that there is some sort of positive feedback from focusing on one specific line of production, technological advancement or specific product (Castaldi & Dosi 2006:101). In the example of producing tractors, there is an immense start-up cost when

buying or building the factory responsible for assembling the tractor. However, once the factory is built, the long term costs significantly decline. This in itself, leads to path dependent development, as the factory already stands, and continuing or expanding the factory is significantly cheaper than switching to a new form of production. Most probably, this leads to continued tractor production, even if another, more profitable, suitable, environmentally friendly option were to present itself. A simple short-term cost-benefit analysis.

A classic example of increasing returns comes from the QWERTY keyboard which I assume all of my readers have in front of them (Mahoney 2006:130). The keyboard was presented in 1868 and is today the most widespread type of keyboard in the world. It dominates the market, with small regional differences. Since its debut, more efficient keyboard types have arguably been developed, however they have all failed to gain a significant user base (Castaldi & Dosi 2006:103-104). Within the theory of path dependence, this is described as a *lock-in*. A lock-in is characterised by the complementary relationship between the production line of the supplier and the specificities in the skills of the consumer (Castaldi & Dosi 2006:104). In other words, the facilities to produce QWERTY keyboards exist and are widespread and consumers have been using the design for generations at this point. Meaning that they are skilled with the function and the use of the QWERTY keyboard. Because of this, even if a better alternative presents itself, there are low incentives to change. In fact, it might be an unpopular move to change. To make it clear, in this example we see not only increasing returns from the supply side, but also from the consumer side, which constitutes the lock-in situation.

Another clear example of path dependence and increasing returns from the perspective of political science can be found within the institutions that make up our political system. It is argued that institutions are one of the fundamental carriers of history, as they reproduce the values that birthed their existence and tend to persist even though the reason for their creation is no longer relevant, or changes drastically (Castaldi & Dosi 2006:106). Additionally, institutions are incredibly important actors when it comes to the formation of our political landscape, and also society as a whole. Meaning that they shape what opportunities and decisions that can be made (Castaldi & Dosi 2006:106). This is strengthened by the complementary nature of a network of institutions, that all work together and interconnect with each other (Castaldi & Dosi

2006:107). The path dependency of institutions becomes clear when there are attempts at trying to reverse or undo existing institutions. There are extremely few cases where the dissolution of an established institution is done successfully, and in those cases it comes at an incredible cost (Mahoney 2006:131). Because of this, I would most definitely characterise the institutional network that makes up the majority of countries, as a lock-in phenomenon.

The questions that arise is: can we observe a pattern of path dependence within the European transportation sector, or more specifically, is the TEN-T policy plagued by path dependence? Could path dependence explain why there has been significantly less investment in an arguably more suitable mode of transport, considering their own stated goals and ambitions?

There have been attempts at analysing and categorising the prevalence of path dependence in certain areas. Classifying it as either *mild*, *moderate* or *strong* history, depending on a set of criteria (Castaldi & Dosi 2006:112). However, this leads to some interesting methodological questions that highlights the difficulties that the theoretical framework of path dependence has for explaining the initial conditions that set a certain path into motion, and what the selection process between the different paths looked like (Castaldi & Dosi 2006:113). However, it still leads to an interesting discussion, even if undisputed certainty can't be reached. My ambition is to conduct such an analysis, but how will be explored in more detail in the methodology section.

## 4 Method

Following my introduction to the issue at hand and the theoretical scope of this thesis, I present the methodology. This covers the practical approach from which the research question will be attempted to be answered from. Firstly, in 4.1 the mixed method approach is explained and stated as the main method moving forward. Secondly, in 4.2 the quantitative part of the methodology is covered, which includes a sizable list of operationalisation of the TEN-T goals. Lastly, in 4.3 the critical analytical part of the methodology is discussed.

### 4.1 Mixed Method

The definition of a mixed method research design is that it's a method for collecting and analysing data while mixing methodological aspects from both the quantitative and the qualitative schools of thought (Ivankova et al 2006:3). The reasoning behind this lies in the fact that some argue that neither method is well equipped enough to explain the mind boggling puzzles that we as social scientists choose to tackle. Instead of excluding one or the other, the mixed method design capitalises on the complementary nature of the different methodologies, and combines them to get a better understanding of the situation at hand (Ivankova et al 2006:3).

A mixed method approach comes in many shapes and forms and I choose to use the sequential explanatory design for this thesis. Such a design comes in two differing phases: A quantitative approach followed by a qualitative approach (Ivankova et al 2006:4). Meaning that firstly, when it comes to implementing this approach, the quantitative data will be collected to build a base from which the puzzle can be explored and overviewed. Secondly, the qualitative approach can analyse and explain the collected data in an attempt to provide a more thorough answer (Ivankova et al 2006:4). However, my unique take on this approach is that it will be applied to every research question individually. Meaning that the issue of if the TEN-T policy should be classified as a policy failure will firstly be explored quantitatively and later on qualitatively. The same procedure will be followed for the question if path dependence could present a satisfactory answer as to why.

However, with this research design comes the question of priority. Which methodological side will be given the most time and focus throughout the research (Ivankova et al 2006:9). Usually this isn't decided in the initial phase of the thesis, but discovered throughout the data collection and analytical process. However, with the sequential explanatory design, the quantitative side is often given the most weight, as it comes before the qualitative side (Ivankova et al 2006:9). This remains true for this thesis, as without the statistics provided by the quantitative side, there would be no analysis to begin with.

Lastly, the question arises on how to integrate these approaches. This can be done in many ways, as one might choose to intertwine the quantitative and qualitative lenses from the very beginning, however, in the sequential explanatory approach they are first mixed in the intermediate phase of the research process. Meaning that the qualitative approach is used to explain the quantitative results (Ivankova et al 2006:11).

Additionally, moving forward, I will be referring to the qualitative analysis as a critical analysis. The reason for this lies in the fact that quantitative analysis is generally concerned with data collection from, for example, interviews, however, I will not be collecting any qualitative data. My aim is to conduct an analysis of the statistics provided by the quantitative data collection through a theoretical approach. These theories were presented in the previous chapter, and this type of analysis is typically referred to as a critical analysis in academic circles within the social sciences. Yet, I believe that qualitative and critical analysis serve the same purpose: To deepen one's understanding of the statistics provided and to further analyse the situation that the quantitative data has revealed, to give a more thorough answer.

## 4.2 Quantitative section

As mentioned in 4.1, the quantitative section of my analysis will be used to provide a general overview of the situation. This will be done through collecting data from relevant sectors, visualising them in a table or a graph and deducing if it could be impactful or relevant for my research question. The areas of data collection will be bound by the operationalisation of the stated TEN-T goals and will be presented in 4.2.1. It is important to note that I will not be doing

my own data collection, but relying on the data collection of trusted sources, such as the OECD and Eurostat. This comes with some drawbacks, yet considering the time and resource limitations of this thesis, It seemed like the obvious approach.

Considering the theory based approach to my statistical analysis, I will not be conducting any regression analysis or similar analytical methods that typically follow a statistical approach. However, I will be analysing and comparing the statistics collected through the theoretical lens to discover if any hegemonies, dominances or path dependent behaviour can be revealed, as discussed in my theory chapter. This will be done through, for example, comparing and contrasting the total monetary value spent on the different types of transportation modes, the share of priority projects concerned with each mode of transportation or seeing if we can notice a trend surrounding the spending and development of new motorways and the increase of private car ownership. Usually a relationship between two variables can't be determined without at least a regression analysis with statistical significant results. However, an exception is often made for claims backed up by theory and other related evidence (John 2017:261). This exception will be central to my analysis.

To visualise and analyse these collected data sets, I will be using *R*, or rather *Rstudios*. *R* is a programming language mostly used for data visualisation and statistical analysis and is the continued development of the older programming language *S* (Campus Sage 2019). *Rstudios* is an integrated development environment (IDE) which is a tool that allows users to more efficiently produce code, visualise data and save progress (Campus Sage 2019).

Within the field of social sciences, *R* is often the tool of choice when working with quantitative data. Excluding the arguments for its easy use and visualisation benefits, one important reason is that it's a free programming software. This is not only beneficial for saving expenses, but more importantly it provides easy access and reproducibility for everyone (Sage Campus 2019). This results in higher levels of transparency and reliability, which are valued qualities of any published academic research (John 2017:267).

### 4.2.1 Operationalisation

The stated goals of the TEN-T policy contain a lot of keywords that will have to be operationalised for an analysis to be possible to produce. In this section, we will go over these key words and translate them into observable and presentable data, with the ambition for us to compare them against each other and deduce which mode of transportation the European Union should focus their funding on. Just as before, these are categorised into four different categories. Additionally, we look at, for example, their financing pattern and completion rate of their projects to deduce if it should be classified as a policy failure or not.

This is not only important for myself, but crucial for the validity of the thesis. Validity as a concept is defined as the accurate and logical measurements in relationship to the research question at hand (Scribbr 2022). Simply put, does the data collected and analysed represent what the researcher is supposed to measure. Therefore a presentation of the operationalisation is incredibly important.

### 4.2.2 Operationalisation of Policy Failure

For the sake of this thesis, and specifically for the TEN-T policy, policy failure will be defined through three different variables: *Priority projects*, *Financing pattern* and *completion rate*. I believe that these three factors go together nicely with the theoretical framework presented in the previous chapter, and pair well with the stated objectives of the TEN-T policy.

Priority projects	How many “priority projects” are concerned with each of the modes of transport?
Financing pattern	How much money has the TEN-T policy invested in each mode of transport?
Completion rate	Have the priority projects, set out to have been completed by 2020 been constructed?



### 4.2.3 Operationalisation of the TEN-T goals

I have chosen to operationalise the stated TEN-T goals through a number of principles. Firstly, I have tried to pair each goal with variables that I believe will represent them fairly. Yet, I would not claim that there is a systematic approach to my method of picking variables. Additionally, I would not claim that these operationalisations are flawless, yet they are based on what I can only describe as my own common sense. For example, I have operationalised safety with the total amount of casualties caused by the different modes of transportation in a year, as I believe that the death toll can fairly represent the safety-level of that specific transportation mode. I understand that *common sense* could not, and should not be defined as a scientific approach, although It will have to do for this particular part of the thesis.

#### Transport efficiency

#### Operationalisation

Reducing traffic congestion	The number of people that can be transported on a typical vehicle
Speed	Max speeds reached on cross-national European travels
Safety	The total amount of casualties caused by the different modes of transport in a year
Seamless	A discussion on the obstacles of travel for the different modes of transport

#### Economic

Freight efficiency.	The total amount of goods that are able to be transported on a typical vehicle.
Resource efficiency.	What resources are required to get the mode of transport to move forward and how do they compare cost wise with each other.

Cost and maintenance of transport infrastructure.	How much does it typically cost to build the required infrastructure and how much does it typically cost to maintain?
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### **Environmental**

Environmental impact.	The amount of CO <sub>2</sub> and other dangerous emissions caused by the mode of transport.
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## 4.2.4 Operationalisation of Path Dependence

For the operationalisation of path dependence, I have tried to find variables that can fairly represent the core concepts described by the theory, more specifically variables that could hint at the existence of a lock-in phenomenon within the European transportation sector.

### **Supply-side path dependence**

Have certain modes of transport been prioritised in the past?	What have the historical investment patterns looked like for the different modes of transport?
Do the production facilities to produce the necessary means of the mode of transport exist?	The total monetary value of the different modes of transport sector
Is there the possibility of lobbying occurring from either powerful companies or unions?	The different modes of transport market share within EU countries.  Number of people employed in the different transport sectors.

### Consumer-side path dependence

Consumer proficiency	How big is the share of people who own a car in the Union?  Share of the total passenger kilometres in a year
How well liked are the different modes of transport?	Public support for the different modes of transport

## 4.3 Critical Analysis

To complement the quantitative data collection and to complete the mixed methods approach, a critical analysis will be applied to discuss and explain the data collected. critical analysis is concerned with questions such as how and why a certain situation came about, the structures surrounding these situations and tends to be used by the less positivistic researchers (Vromen 2017:237). Considering one of the subgoals of this thesis wants to explain why car centrism has dominated the European transport sector and the thesis constructivist-like approach to the world, it seems like a fitting approach.

Qualitative research designs have historically been used in a descriptive sense (Vromen 2017:237), and some descriptions will undoubtedly be found in my qualitative section, however much has changed since then. As noted in this thesis, the descriptive side will mainly be covered by the quantitative section. The qualitative, or more accurately, the critical analysis will focus on the clarification of the problems, the risks and the possibilities we face as humans and societies (Vromen 2017:241). Another significant difference between critical and quantitative research designs can be found within the sample size used to conduct the research. Quantitative research designs generally agree that the bigger the sample size, the more accurate the observations (Vromen 2017:244). However, when it comes to critical analysis, smaller samples are usually used to highlight the specificity and the importance of that specific case (Vromen 2017:244). The specificity of certain cases will be highlighted in the analysis to make it easier for the reader to

comprehend the possibilities of further development in certain transport sectors, among other reasons that will be revealed later on.

The critical research will, as mentioned, be based on the findings of the quantitative section. However, much of it will additionally be theory based. This means that it doesn't necessarily base its arguments on observable data (Vromen 2017:239), but on the hypothesis presented by the theory. This means that it won't necessarily be possible to *prove* that the theory used will provide the correct and complete answer. It means that it is a possible answer to the question at hand, and depending on how well argued and supported the answer is, the most probable it becomes.

Additionally to the quantitative data, the critical analysis will be concerned with what is usually called *secondary research* sources, meaning pre-existing texts and documents (Vromen 2017:249). The main reason for this is concerned with the convenience and availability of secondary sources and the lack of resources and time to produce the primary sources that might be helpful for my research questions. Primary sources are concerned with interviews, group discussions and ethnography (Vromen 2017:246), but won't be included in this thesis.

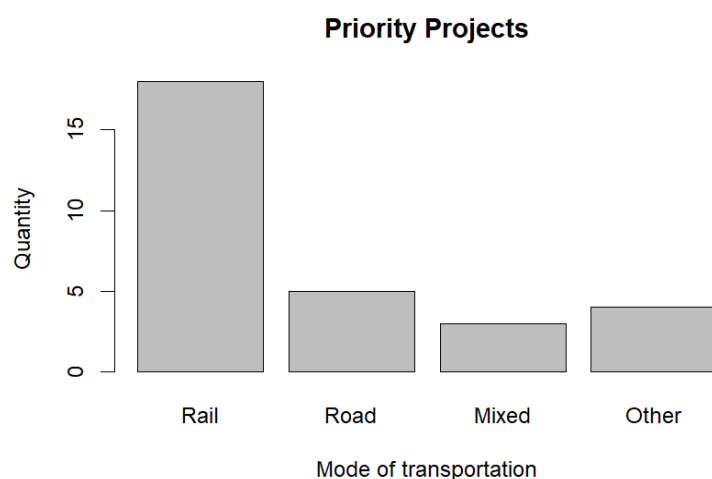
Lastly, it will become apparent throughout this thesis that my research contains a hint of a normative perspective. Normative research is concerned with how things should be, and not necessarily how they are (Armstrong 2017:158). Political scientists often discuss concepts such as justice, democracy, equality, freedom and other important and powerful ideas concerned with how societies and political structures should be formed. These types of questions are bound to be normative, as data cannot always give a satisfactory answer as to why we prefer one over the other. The normative part of my analysis will become most apparent in the critical section, as this is where one can more freely express their thoughts and opinions. Although, obviously backed by data and theory when possible.

## 5 Analysis

Passing the halfway mark, we move forward with the thesis analysis. This is where the introduction, the background, the theory and the methodology all come together to make an attempt at answering the research questions. To remind the reader, the research questions are formulated as: *To what extent should the TEN-T policy be considered as a policy failure and how can path dependence explain the development of the TEN-T policy.* The question of policy failure will be addressed first, moving into the evaluation of the TEN-T goals and discovering the most fitting mode of transportation, finishing with the question of path dependence.

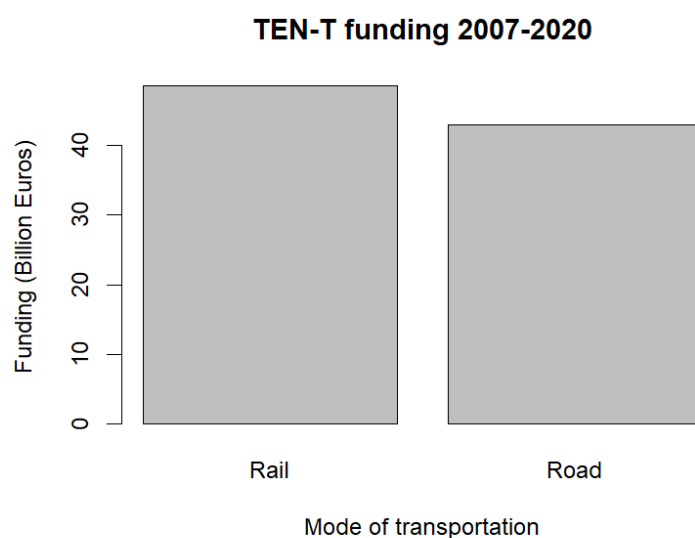
### 5.1 Policy Failure

In the theory chapter, we discussed some common reasons why some policies result in failure, however it is important to note that the definition of policy failure can be rather subjective. It is therefore crucial to operationalise failure, especially when conducting an evaluation. For this thesis, and the case of the TEN-T policy, I will base my definition of policy failure on the TEN-T's priority projects. I will assume that the larger number of priority projects that are dedicated to a specific mode of transportation should result in a higher share of TEN-T funding. In the bar-chart below, I've visualised the share of priority projects for the different modes of transportation.



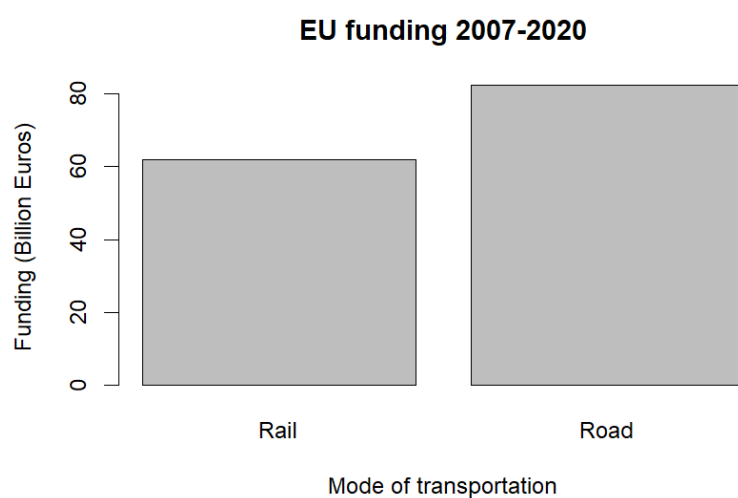
As the bar-chart shows, it is quite clear that one mode of transportation dominates the rest. 18 of the priority projects are solely concerned with the development of rail infrastructure. Next in line are road infrastructure, with five priority projects and thirdly mixed rail-road projects at three. Considering this, and excluding the mixed projects, I will assume that at least a share of around 18/27 or 67 percent of the TEN-T funding should be dedicated to rail projects and around 5/27 or 19 percent dedicated to road infrastructure.

Moving forward, we take a look at the funding pattern of the TEN-T policy. For certain years, the exact data has been difficult to find. The European Union has admitted that during the period of 2000-2006 no archived data exists to prove the exact funding provided by the TEN-T policy (Investigate Europe 2021-a). However, during the time period of 2007-2020 there are well documented reports for how the TEN-T policy chose to finance and spend their budget.



Rail and road infrastructure projects make up the large majority of the TEN-T budget and looking at the chart above, we notice that the share of funding that the TEN-T policy has provided is almost equal between rail and road infrastructure projects. Between the years of 2007 and 2020, the TEN-T policy provided rail infrastructure projects with 48,6 billion euros and road infrastructure projects with 43 billion euros (Investigate Europe 2021-a). Considering the share of priority projects dedicated to each of the modes of transport, road infrastructure is certainly

given a disproportionate amount of funding. As stated previously, five of the priority projects are concerned solely with road infrastructure, while a total of 18 are concerned solely with rail infrastructure. However, if we were to include the other sources of European transport infrastructure funding, this discrepancy becomes even greater.



For the same time period, the European Union has provided 82.5 billion euros in funds for road infrastructure projects, compared to the 62 billion euros for rail infrastructure projects (Railtech 2021). Considering that the Union's goal of becoming climate neutral, this is surprising.

Lastly, looking at the priority projects and the TEN-T policy as a whole, an important part to consider when evaluating the extent of a policy failure is completion rate. To what extent has the TEN-T policy completed the projects that they set out to construct. The priority projects were all planned to be launched before 2010 and to be completed by 2020, in contrast to the rest of the core network with its planned completion date of 2030 (INEA 2022-a). As of writing this thesis in 2023, not all priority projects have been completed, however most are either under construction, or at least seen some improvements. Certain projects are easier to evaluate than others. For example, the construction of the Öresund bridge, the Malpensa airport, Betuwe line or Galileo are mostly focused within a single country, excluding the satellite station Galileo, and have all been completed. However, when it comes to certain rail or road axes that span over several countries that consist of the construction of completely new infrastructure or the improvement of existing ones, it's not always clear whether the project has been completely

finished or not. However, considering we're three years past the completion date and that some of the projects have been cancelled, such as major parts of the Nordic triangle, the severely delayed construction of Rail Baltica, questionable states of certain axes and arguable funding patterns, I would consider the first step of the TEN-T policy and the construction of the priority projects to be a partial failure with significant and major improvements made to the transport network. There are seven years left until the completion of the core network is due and only time can tell if everything will be constructed in time. Although, if there isn't a real shift towards increased rail infrastructure funding, the prospects look bleak.

This could be theoretically linked to the ideas of overly optimistic expectation and vagaries of the political cycle discussed in the theory chapter concerned with policy failure. Firstly, It has been estimated that the core network would require 550 billion euros to be constructed (BMDV 2021). However, Looking at the previous bar-charts, it becomes clear that the funding provided by the TEN-T policy, or the European Union as a whole, does not come close to covering this immense cost. Although, the idea was never that the EU should fund these projects on its own, but that it would work with, and encourage, the member states of the Union to contribute towards the project (BMDV 2021). Yet, for a number of reasons, the TEN-T policy has failed in achieving the financial support it planned for. As the theory explains, long-term policy planning and implementation is consistently overly optimistic when it comes to due dates and the required resources. Unexpected events and complexities drive up costs and delay project timelines. The corona pandemic has been a major setback for all TEN-T related projects. The lockdowns many countries experienced worked as brakes for many public works projects and the decline in economic growth lowered the number of potential investors (European Central Bank 2023-a). Additionally, the Russian invasion of Ukraine has increased living-costs all throughout the European continent, both on the individual and state level. Many European countries rely on importing Russian natural resources, but since the start of the war, they have rightly sanctioned many Russian goods. This has resulted in higher energy costs and drastic increases in inflation, resulting in, among other things, higher infrastructure construction costs (European Central Bank 2023-b). These are two major reasons for possible delays within the transportation sector, but there are many others. Most of them will be less dramatic and be a result of poor planning and human error.



Secondly, since the TEN-T policy relies on the compliance and coordination of the Unions member states, the vagaries of the political cycle can have unwanted consequences. The priority project: The Nordic triangle, which partly consists of high speed rail connecting Stockholm to Gothenburg and Stockholm to Malmö, was recently cancelled after the latest national election in Sweden resulted in a change of government (Dagenssamhälle 2022). The previous government had dedicated time and resources towards the construction of the priority project, having already started on the new rail track that would accommodate the new high speed trains. However, the new government elected in 2022 decided to relocate those resources towards other projects. The TEN-T policy can't force member states to go through with its projects, only encourage them through political and financial means. If the concerned member states can't see the value of the project, then it fails. Additionally, if it is a contested issue, there is always the risk of cancellation after national elections. This is not necessarily a failure on the part of the TEN-T policy, however, It could be argued that it is a fundamental issue with the formulation of the trans-European transport network.

## 5.2 The most fitting mode of transportation

Next I am going to make my case for the superiority of rail, within the context of achieving the stated goals of the Trans-European transport network. I will be doing this by going through the goals and objectives set out by the policy, and evaluating, with the operationalisation of the goals presented in the method chapter as my basis, the most fitting mode of transport for cross-national travel.

### 5.2.1 Transport Efficiency

#### **Total passenger count**

Rail	Cross-national Eurostar e320 - 900 seats (The Guardian 2014)
Road	Private cars generally have 5 seats

Air-travel	The two busiest aircraft operators and their most used aircraft: Ryanair - Boeing 737-800 - 162 seats (Qantas 2023) Easyjet - Airbus A320-200 - 180 seats (Airbus 2023).
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When it comes to the total passenger count in a typical vehicle for the different modes of transportation there are varying capacities. A typical private car has room for five people, yet usually averages at about 1,54 passengers per car on commutes (Rapid Transient 2021). The most common aircrafts for cross-national European travel have a passenger capacity that ranges from 162 and 180 seats. Meanwhile the Cross-national Eurostar e320, which travels from London, Paris, Brussels and Amsterdam, on rail infrastructure partly funded by the TEN-T policy, has a capacity of 900 passengers. Additionally, It is important to note that not only do cars have lower capacity compared to rail and air-travel, they also take up more space per passenger. For cars to compete, they need an eight lane highway to equal the passenger capacity of a single train (Fast Company 2016).

### Speed

Rail	The e320 reaches speeds up to 320 km/h (The Guardian 2014).
Road	Highway speeds are generally between 110-130 km/h in Europe
Air-travel	The 737-800 and the A320-200 reach a cruise speed around 840 km/h (Capital 2023).

When it comes to travel speeds, air-travel is the fastest. For long distance transportation it stands undefeated. Following air-travel, rail comes in at top speeds of 320 km/h and cars range between 110-130 km/h depending on the country. Although, since most European countries are so close together, relatively speaking, there are multiple instances where taking the train is more efficient, or just as fast, as air-travel. This rings especially true if one accounts for the travel time to and from the airport and the security checks before boarding. Scandinavian airlines recommends people to arrive at the airport two hours before their plane departs (SAS 2023). Adding an

additional 45 minutes of travel to and from the airport, this adds a total of 2:45 hours of travel time. Travel time to and from train stations are generally much shorter, since unlike airports, they are generally located in city centres. Looking at the route of the Eurostar e320, these are the travel times:

- London to Paris by train: 2:24 hours
- London to Paris by plane: 1:20 hours of flight time and 4:05 of total time
  
- London to Brussels by train: 2:04 hours
- London to Brussels by plane: 1:05 hours of flight time and 2:50 of total time
  
- London to Amsterdam by train: 3:57 hours
- London to Amsterdam by plane: 1:15 hours of flight time and 4:00 of total time

For short to medium distances, high speed trains are a viable alternative to air-travel, even with the significantly lower top speeds. The extra time needed to check in and pass through security checkpoints negate the time saved from the actual travel time. Looking at the formation of countries on the European continent, a lot of international travel could and should be substituted by rail, removing the need for relatively shorter flights.

### Safety

Rail	In 2018, 853 people died from train accidents within the EU (Eurostat 2020-b).
Road	In 2018, 23 339 people died from road accidents within the EU (Eurostat 2020-a).
Air-travel	In 2018, 189 people died from aviation related accidents within the EU (Eurostat 2020-c).

The dangers of transportation are really dominated by one transportation mode. As the table shows, 23 339 people died from car-related road accidents within the Union in 2018. Compared to the alternatives, this is an incredibly high death toll. Rail-related deaths totalled 853 in the

same year and aviation-related deaths totalled at 189 people. Meaning that 95.7 percent of the total deaths caused by the three modes of transportation within the European Union were road-related. The leading cause of car accidents are driving under the influence of alcohol or drugs (GJEL 2023). However, driving while distracted by music, your phone, the other people in your car or being sleep deprived are other impactful factors. Unlawful driving, such as speeding or natural causes, such as the weather conditions and animal crossings are a few dishonourable mentions (GJEL 2023). The fact is that driving a car is dangerous, both for the driver, the passengers, the other cars around you and the people forced to share the public space with cars. It is a 1000kg metal box that has the capabilities of causing immense damage to people and structures in the event of an accident. The leading cause of rail-related deaths are collisions between trains and cars, which usually happen at rail crossings. Some other reasons are human error and poor infrastructure (Burge Law 2021). The leading cause of aviation-related deaths are pilot or crew member errors and weather conditions (WKW 2023).

### Seamless

Car	Car ownership, driving licence, driving the actual vehicle.
Plane	Security controls, luggage check ins, travel to and from airport, passport requirements.
Train	Show up at train station and possible train switches along the journey.

One of the major goals of the TEN-T policy is to develop a continental wide seamless transportation network. The word seamless is defined as: *Smooth and continuous, with no apparent gaps or spaces between one part and the next*. If one translates this to the context of the TEN-T policy and the European transportation network, it could be seen as giving the people of the Union the possibility to traverse every corner of the continent in a smooth and reliable manner. This is certainly worked towards from a car centric perspective, as the total length of motorways within the Union has almost doubled since 1990, going from 42 000 km to 74 500 km (Statista 2023). However, during the same time period the total length of the rail network has decreased by 20 000 km, going from 220 000 km to 200 000 km (Statista 2022). The reason for

the significant difference in total length can be explained by the fact that not all roads are motorways, but the rail network covers all tracks that trains can be transported on.

If we look at the seamlessness of transportation from the passengers point of view, one could debate the level of seamlessness they experience with the different modes of transport. To drive from one country to the next, no bookings have to be made, but one has to learn how to drive and get a driving licence. Additionally, one has to buy or rent a car, drive the vehicle and find and pay for parking. Driving a car can be fun, but tiring. Meaning that the driver has to take several breaks along the journey. To fly from one country to another, you book your flights, usually on a website and take the available public transportation to the airport. You arrive at the airport two hours before your plane's departure and pass through security checkpoints, including passport checks, baggage control and checking in on the plane. Once you've arrived at the outskirts of your destination you wait for your luggage to arrive and take the available public transportation into town. To take the train from one country to a neighbouring one, you book your tickets usually online or at the station and make your way to the city centre, where the train station is located. You board the train and arrive at the city centre of your destination. For certain journey's there might be train shifts along the way. Unlike the car and plane alternatives, during the trainride the passenger has the possibility of moving around and enjoying the bistro. Modern trains provide free wifi and a smooth ride, meaning that the passenger can work, read or sleep during the travel time. For night trains, passengers can book entire beds to sleep in during the journey, meaning that you go to sleep in one country, and wake up in another.

## 5.2.2 Economy

### **Cargo efficiency**

Rail	1300 tons (Media Rail 2022).
Road	25 tons (ACEA 2015).
Air-travel	113 tons (Cargolux 2023).

The economic value of a cross-national transportation network comes from its ability to transport people and goods over long distances. We've already established the passenger carrying capacity of the different modes of transportation, so here lies the focus on cargo. One truck generally has the carrying capacity of 25 tons of cargo. The cargo capacity of a plane differs from model to model, but the most common freight plane: the Boeing 747-700 has a total payload of about 113 tons. The average length of a freight train within the European Union lies at 740 metres. This equals a cargo capacity of 1300 tons, or the same capacity of 52 trucks. Although, it is worth noting that the newest developed train infrastructure, such as *Rail Baltica* allows for freight trains up to 1040 metres.

### Resource efficiency

Rail	Electricity
Road	Petrol & Diesel
Air-travel	Jet fuel

The major difference between the different fuel types between the three modes of transportation is that petrol, diesel and jet fuel are all fossil fuel based and therefore finite. The large majority of trains, and all modern trains run on electricity and have been since the middle of the 20th century. Electricity can be produced through the usage of fossil fuels, for example through coal and oil power plants. However, also through nuclear power plants and renewable energy sources such as hydroelectric, wind and solar power plants. The production of electricity is remarkably cheaper than the usage of fossil fuels and therefore more resource efficient (Eco experts 2022). Meaning that trains run on more resource efficient energy sources compared to the road and air alternatives.

### Cost and maintenance of transport infrastructure

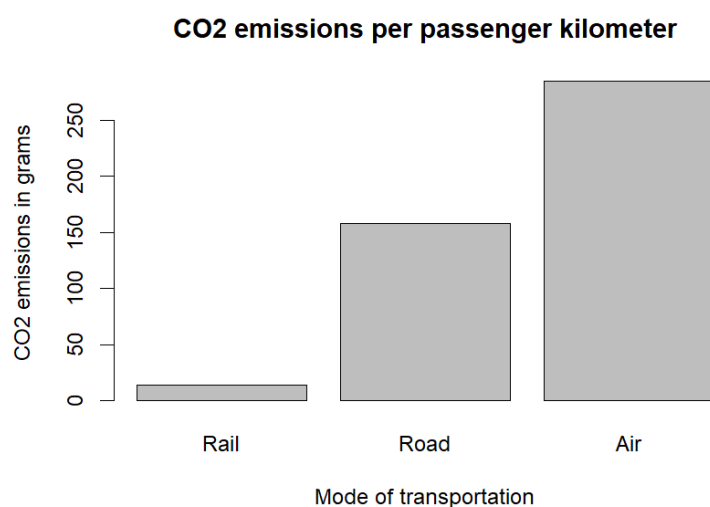
Rail	About 25 million euros per km of high speed rail (European Court of Auditors 2018).
Road	6-13 million euros per km of motorways (World Highways 2012).

Air-travel	Not comparable
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Looking into the construction costs of transportation infrastructure, high speed rail tops the list. According to the European court of Auditors in their nineteenth report, published in 2018, high speed rail averaged out to 25 million euros per kilometre. Looking into road infrastructure, one study found that European motorways cost between 6-13 million euros per kilometre. These costs are inflated by difficult terrain and the need for tunnels, meaning that the costs can differ from country to country. However, it is important to note that, as shown previously, rail infrastructure has the potential to transport more goods, more people and at higher speeds. The cost of air-travel has been excluded in this discussion, since it doesn't require a comparable type of infrastructure. However, the cost to construct international airports that can support a network of daily international passenger flights can be immense.

### 5.2.3 Environmental

As mentioned previously, the European Union has the ambition to become climate neutral by 2050. The TEN-T policy, sharing the same goal as the Union, has stated that they want to reduce the emission from the transport sector by 60% by 2030 and by 90% by 2050.



As seen in the bar-chart above, air-travel releases a significant amount of carbon dioxide per passenger kilometre. According to the European Environment agency, air-travel emits 285 grams

of carbon dioxide, followed by road transportation at 158 grams per passenger kilometre. Rail transport has shown to be the more environmentally friendly alternative, landing at 13 grams of carbon dioxide emitted per passenger kilometre (France24 2019). Additionally, It is important to note that there are other climate impactful emissions, other than carbon dioxide. Air-travel releases nitrous oxide and forms vapour trails that cause warming effects due to its high altitude. Nevertheless, road transportation is responsible for 70% of all greenhouse emissions within the European union. Air-travel, together with maritime transport make up most of the other 30% (France24 2019). Switching to rail transportation would result in a remarkable reduction in climate altering emissions, as road transportation releases about 12 times more carbon dioxide and air-travel releases about 22 times more carbon dioxide compared to rail.

### 5.3 Path dependence

Hopefully through this presentation I have shown and highlighted the benefits of investing and using rail infrastructure as a means of transportation for both people and goods. Hopefully, I have shown that the TEN-T policy has the ambition and the desire to invest and develop the rail network throughout the European Union, even if their actions and funding patterns don't always match their ambitions. Hopefully this has led you to question this behaviour and to wonder why?

To solve this conundrum, I will now be applying the theory of path dependence to the case of the TEN-T policy. To determine if path dependence could be playing a part in hindering the development of the rail network within the European Union, I will be analysing the supply-side and the consumer-side of the transport sector, in an attempt to identify a lock-in phenomenon, as described in the theory chapter.

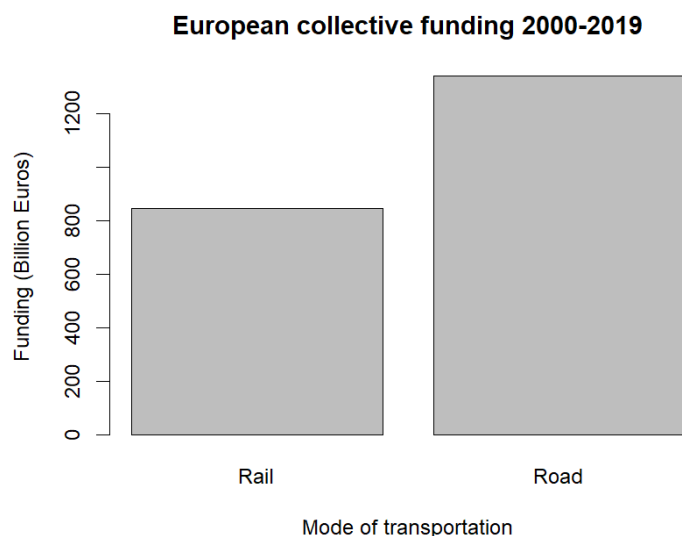
#### 5.3.1 Supply-side Path Dependence

##### **Historical investment pattern**

Since the turn of the century, road infrastructure has dominated the budgetary plans of the majority of the countries on the European continent. During the time-span of 2000 to 2019, 1341 billion euros were collectively invested in road infrastructure by the European states, compared



to the 843 billion euros invested in rail infrastructure (Investigate Europe 2021-b). The vast difference of 500 billion euros shows the prioritised mode of transportation. This is noticeable in for example, the decrease in total rail tracks and the great increase in total motorway length discussed earlier.



However, this trend goes further back than the 21 century. Looking at the European freight rail industry, one can observe a steady decline since the 1950s. In the 1950s, around 60 percent of all cargo was transported with freight trains. This decreased to 30 percent in the 1980s and to a staggering 15 percent today (McKinsey & Company 2022). This is of course paired with an incredible increase in road infrastructure investments and truck shipping. For example, from the 1960s to the turn of the century, motorway length increased by 920 percent in Belgium, 428 percent in Germany, 5346 percent in France, 606 percent in Italy and 660 percent in the Netherlands (Vahrenkamp 2011). A similar increase can be seen in all European countries. Additionally, trucking as a mode of transporting cargo increased significantly as a result of these new motorways (Vahrenkamp 2011).

### **Total monetary value of the transport sectors**

Given this remarkable difference in investments and prioritisation between the two modes of transport, it is not surprising that the total monetary worth between the two sectors differ greatly. The automotive industry makes up 7 percent of the European Union's total GDP, adding up to

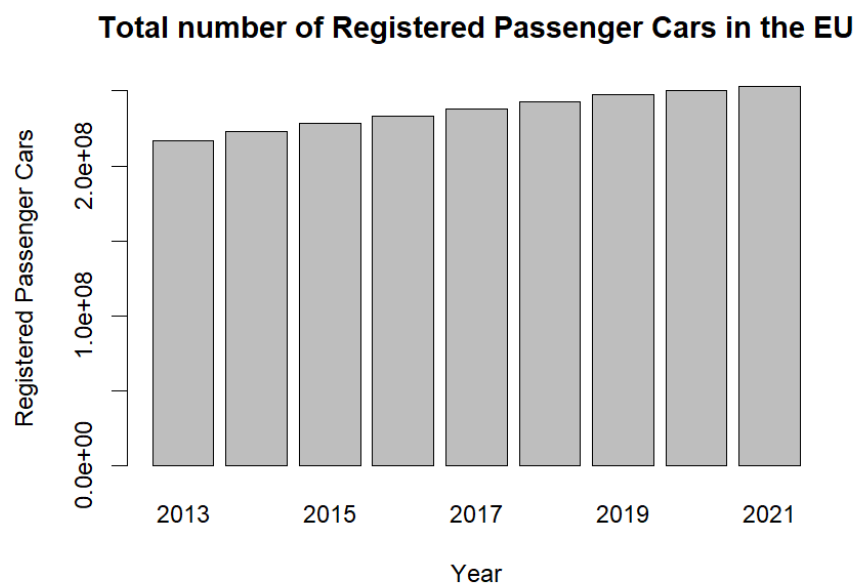
about 1162 billion euros (ERAI 2022). Additionally, the automotive industry generates 440 billion euros in government tax revenue and results in a 74 billion trade surplus (ERAI 2022). Counting by revenue, Volkswagen, the German automotive company, is the largest company in all of Europe, generating 254 billion US dollars in revenue (Statista 2023-b). In contrast, the rail industry is valued at a total of 143 billion euros, around 8 times less compared to the automotive industry (European Commission 2015). The largest rail company in terms of revenue is also German: Deutsche Bahn AG, generating 36 billion dollars (ComparaBus 2023).

### **Employment base**

Looking broader than the monetary value of each sector, the question of employment arises. The quantity of people employed in each sector can have a massive impact on the politics surrounding the industries and how politicians decide to refer to, and act upon them. Within the Union's rail industry, The European Commission estimated that around 2.3 million people are directly or indirectly employed within the sector (European Commission 2015). Within the automotive industry located within the Union, there are estimated to be 14.6 million people employed, either directly or indirectly (ERAI 2022). Meaning, that there are more than six times as many Europeans employed in the automotive industry compared to the rail industry.

### 5.3.2 Consumer-side Path Dependence

#### Car ownership



In 2021, there were 253 million registered passenger cars in the Union, compared to the total of 217 million in 2013 (Eurostat 2023). As the bar-chart shows, there has been a steady increase each year, adding up to a 17 percent increase from 2013 to 2021. The European Union has a total population of 447 million people, making the car-owners of the Union a total of 57 percent. Considering that a significant part of the population is below the age of 18 and not allowed to drive, the share of car-owners is even higher. However, this does not take into account people owning multiple cars.

#### Transport usage

When it comes to inland transportation, the car dominates all other alternatives. A staggering 82.9 percent of all inland passenger kilometres are travelled by car, compared to the 7.9 percent of passenger kilometres taken by train and the rest by coaches and buses (Eurostat 2020). Lithuania, Portugal and Slovenia are the top three countries by car usage, and Austria, Netherlands and France are the top three countries by train usage. However, even in the top train-using countries, trains are only responsible for 12.9, 11.2 and 10.3 percent of all passenger kilometres (Eurostat 2020). Although, it is important to note that these numbers include the total

passenger kilometres and not only cross-national journeys. Nonetheless, I would not be surprised if the share of train travel between countries is even less, considering the state of the cross-border rail network.

### **Satisfaction and Public support**

The satisfaction and public support for the rail sector varies greatly from country to country within the Union. According to a 2018 eurobarometer report, which includes factors such as available information, reliability, the purchasing of tickets and cleanliness, Austria has the most satisfied rail passengers, compared to Bulgaria who has the least satisfied rail passengers (European Commission 2018). The countries that ranked above the European average were: Austria, Ireland, Portugal, Luxemburg, Slovakia, United Kingdom, Spain, Finland, Netherlands, Czechia, Denmark, Sweden, Latvia, Belgium, Poland and Slovenia. While the countries that ranked below the European average were: France, Germany, Estonia, Greece, Lithuania, Bosnia, Italy, Hungary, Romania and Bulgaria (European Commission 2018). However, these are based on subjective opinions and do not necessarily reflect the actual state of the rail network in these countries. Nonetheless, when questioned if they supported the expansion of the rail network and increasing the competitiveness of the rail sector, 71 percent supported the idea (European Commission 2012). Yet, non-frequent train-users were asked why they choose to drive instead, they mentioned comfort, speed and reliability as the main reasons for choosing the car as their main mode of transportation (European Commission 2020).

### **5.3.3 The Lock-in Phenomenon**

As described in the theory chapter, the lock-in phenomenon is a core concept within the theory of path dependence. I am going to argue that this phenomenon is the main reason for the stagnant development of the railway network. To remind the reader, a lock-in is defined as the complementary relationship between the production line of the supplier and the specificities in the skills of the consumer. The production line, or the supply-side of the transport sector is currently heavily dominated by the automotive industry. As presented above in 5.3.1, the automotive industry is one of the largest industries within the European manufacturing sector. Having a total value of over a trillion euros, more than eight times larger than the rail industry

and an employment base of over 14 million, in addition to being the most subsidised mode of transportation during the last 70 years, through public infrastructure projects. On the consumer-side of things, we hear a similar tale: There are 0.6 cars per person, including people under 18. Almost 83 percent of all passenger kilometres are taken by car and public support for rail exists, however, according to polls, drivers choose their cars for comfort, speed and reliability. I would argue that this situation is a classic example of a lock-in phenomenon: The means of production are well established, and a large part of the population are not only satisfied with the product, but are dependent on it in their daily lives. This makes the incentives for change weak, and the support for the status quo strong.

This in turn affects the possible outcomes for the development of the TEN-T policy for a couple of reasons. Firstly, the context of the TEN-T policy is that it was formulated and established by the European Union and that we, as discussed in 3.1, live in a global society based on a capitalist hegemony. A capitalistic hegemony implies that the ideas of capitalism, such as economic gains, capital accumulation, profit maximisation, are at the core of everything, especially politics. Meaning, that when political decisions are made, the economic perspective forms the available options. Given the option to invest in infrastructure that promotes the automotive industry, worth over 1.1 trillion euros, or the rail industry, worth 140 billion euros, they are going to be more inclined to invest in the industry generating the most profit. Additionally, in a capitalist hegemony, economic value and economic gain translates to security and freedom in the international system of nationstates. Meaning that the European Union is not going to actively sabotage their automotive industry, even if it goes against their ideals, since it generates immense profits. It stands as an important actor within European industry and the mere existence of a profitable and established automotive industry is hindering and slowing down the progress of the rail industry, as they are both alternatives within the transportation sector that provide a similar service. The rail industry cannot flourish without large investments, just as the automotive industry couldn't flourish without large investments. Yet, since the automotive industry investments have already in large part been made, politicians are inclined to keep pumping in money to keep the industry alive and well. In short, since the European countries have already invested an immense amount of money into the construction of car friendly infrastructure, they have to keep investing in car friendly infrastructure or completely rethink how we approach

transportation. These immense investments and the long usage of cars have created a society completely dependent on the car, culturally, economically and socially, making it difficult to change. Additionally, since the automotive industry is profitable, breaking the status quo is highly unlikely, as profits are the main goal within a capitalistic society. Resulting in the lacklustre development of the railway network we've experienced in the last 70 years and a path dependency on road infrastructure.

Staying on the subject of hegemonies, I would argue that in addition to the capitalist hegemony, we currently live in a car-dependent hegemony. I base this fact on the statistics shown previously, highlighting that there are a remarkable quantity of privately owned cars within the European Union and the fact that 83 percent of all passenger kilometres are taken by car. The car dominates the transport sector, making it hard to imagine a society without cars. For example, the construction of a new housing district, a hospital or government office would never be approved if road access wasn't included, yet, It most definitely could be approved even if it lacked proper bike infrastructure or access to public transportation. This shows in the fact that The TEN-T policy aims to construct transportation infrastructure to connect even the most rural places, yet the total length of the rail network has decreased, making it difficult to get around by rail, in contrast to the immense increase in length of the road network. In our car-dependent hegemony, everything has to be accessible by car, and there has to be parking accommodation everywhere. This type of thinking makes it impossible to drastically reduce public expenditure on road infrastructure, which in turn makes it impossible to drastically increase public expenditure of other types of transport infrastructure, such as rail. This is once again connected to path dependence, as we wouldn't be in this situation if we hadn't historically invested in road infrastructure. This is a direct consequence of previous investment patterns.

If we ignore the structural issues that directly impact the development of the TEN-T policy and the transportation sector as a whole, and take a closer look at the actors and the stakeholders concerned with European transportation, we once again arrive at bleak conclusions. Both the stakeholders concerned with the supply and the consumption of transportation products and services are overwhelmingly in favour of car-dependent infrastructure. These are mainly the car manufacturers, which we have shown to be incredibly rich, the employees of the automotive

industry and their unions, which we have shown to be of huge quantity, and the rest of the population who have invested large parts of their yearly income to purchase a car. These stakeholders have it in their best interest to lobby their governments and the European Union to keep funnelling investments into road infrastructure to secure their industries, their jobs and their way of life. A drastic investment in rail infrastructure would inevitably reduce the amount of people who buy cars, and reduce the demand for car-centric services and production, since it would improve the rail services on the continent, and make owning a car optional and not a requirement. This would probably result in a reduction of the necessary employment count within the automotive industry and a reduction in demand of car-centric services, threatening the employment base of the automotive industry and their companies and likely resulting in a reduction of the required employee count within the sector. If a politician would go against their best interests, and heavily reduce the investments into road infrastructure, it is logical for the employees and the unions to vote for another candidate, and for the business to fund their opposition and for the population who already bought a car to vote for someone promoting their lifestyle. Resulting in a lower chance of being democratically elected. In general, change is difficult, and the status quo stands strong. In the last 70 years, Europe has built a car-dependent society and formed stakeholders that benefit from the status quo. Trying to change things will inevitably lead to backlash, and in this case that backlash hinders the electability of anti-car politicians, since the automotive industry has the resources that their competitors do not, and the possibility of lobbying to a greater extent compared to the other transportation industries.

Lastly, If we ignore the structural issues and the powerful stakeholders hindering the development of the TEN-T policy and take a closer look at the funding system behind TEN-T infrastructure projects, we once again come to discouraging conclusions. Since neither the TEN-T policy, nor the European Union, have the monetary capabilities to fund these projects on their own, they are reliant on the cooperation and co-funding of their member states. Member states that have historically invested heavily into road infrastructure and are influenced by the same forces that have been discussed previously in the sections above.

Together, these three overarching factors promote the status quo and enforce the lock-in phenomenon. The car has been the centrepiece in infrastructural development during the last 70

years, since the 1950s, and has slowly come to dominate the transportation sector. I would not suggest that this has been some grand scheme by the automotive industry, but that it has been a sort of natural progression over time, which has resulted in a strong and steadfast path dependence on road infrastructure. The actions of the past are ever present in our decision-making today, and reversing the direction of development is tough, especially when it has become something that the majority of people depend on in their daily lives. But of course change is possible, which will be discussed in the following chapter.



## 6 Discussion

In this final chapter before the conclusion, we will be discussing the possibilities of breaking away from the path dependence the European continent has developed on car-centric infrastructure and how to break away from the status quo to promote alternative modes of transportation. Additionally, the limitations of my research and my recommendations for future research will be discussed afterwards.

### 6.1 De-locking from Path Dependence

As established in the previous chapter, the European transportation sector is plagued by a path dependence on road infrastructure that in turn has led to a theoretical lock-in phenomenon supporting the status quo and continued car-centric development. This makes it difficult to propose and enact change, however, as we will discuss moving forward, not impossible. The theory states that there are a number of ways of moving away from the status quo, or *de-locking* from the car-centric path dependence:

**Invasion:** In the form of literal invasions, one country could invade another and impose their values, structures and norms. De-locking the previous societal pattern in the process (Castaldi & Dosi 2006). It could be argued the car-dependent society we live in today was the result of the devastation brought by the second world war. Many cities around Europe were bombed flat, giving city planners a “clean” slate to work with. Cars, being relatively new for commercial use and getting cheaper by the year, inspired city planners to reform their European cities around the car. However, this type of de-locking is neither ethical, resource efficient, sustainable or desirable. In a more abstract sense, one could argue that cultural “invasions” are a strong de-locking force, through presenting alternative ways of doing things. Seeing the success, or failure of neighbouring country A in any area could influence the actors within country B, leading to a change (Castaldi & Dosi 2006). This rings especially true within the European Union, considering the member states' close relationships and cooperative nature.

**Heterogeneity among agents:** One of the strongest forces of path dependence is the lack of diversity of agents. If all actors within a field preach the same alternative, then the dialogue is going to be dominated by those agents and their alternative. However, if there exists a widespread range of actors with different thoughts and solutions, the forces of path dependence are going to weaken. An open debate and an equality of resources level out the playing field and allow for the competition of ideas (Castaldi & Dosi 2006).

**Radical technological innovations and new knowledge bases:** The production of new technologies and the production of new information can have a powerful impact on the path dependence of a certain sector (Castaldi & Dosi 2006). A significantly cheaper way of producing a certain product can make it worthwhile to change the line of production. The emergence of new information, such as the dangers of the use of ozone depleting substances, could drastically change the products we consume and how we produce them.

These three sources for de-locking movements can currently all be found on the European continent. Firstly, The success of the Netherlands (Distilled 2023), the new development within Paris (BBC 2021) and the on-going successful construction of the Spanish high-speed-rail-network (Euro news 2023) could be potential sources of cultural invasions that inspire other countries to move away from car-centric infrastructure. After the second world war, both the Netherlands and the city of Paris heavily invested and prioritised road infrastructure, being inspired by the United States of America. New motorways were constructed, parking lots at every corner and road accessibility became a top priority. However, this soon led to undesirable outcomes, such as traffic congestion, air pollution and increased traffic accidents. The Netherlands learned from their mistakes and are today world famous for their city planning, prioritising public transportation, bikes and pedestrians. Paris, the city of romance and wide motorways, have long been dominated by car-centric infrastructure. Yet, since 2014 and the successful election of mayor Anne Hidalgo, this has begun to change. She has started a city-wide project of removing parking lots, reducing carlanes and promoting alternative ways of transportation. She is famous for her anti-car rhetoric and the greening of Paris. Lastly, Spain comes in at second place, after China, when it comes to the total length of their

high-speed-rail-network. The train ride from Madrid to Malaga takes 2:30 hours, compared to the 4:00 hour train ride between the similar distance of Stockholm to Hässleholm. These transformations have the potential of inspiring other European countries to invest in alternative modes of transportation, especially since they are all within the European Union.

Heterogeneity among agents is theoretically a serious problem when it comes to drastically increasing public expenditure on alternative ways of transportation. The automotive industry consists of powerful and rich companies that employ a vast amount of people, who form powerful and influential unions. These stakeholders, as discussed earlier, could possess significant lobbying power over the Union, resulting in unfair competition. Yet, there are ways of limiting the lobbying capabilities of these types of stakeholders and levelling the playing field for all ideas and solutions. Firstly, it is important to have a firm and extensive regulatory framework concerned with lobbyists. This includes (1) a public registry where lobbyists can be registered, that includes their objectives, targets and their beneficiaries (OECD 2013). (2) clear rules for the expected behaviour of lobbyists (OECD 2013) and (3) procedures for securing compliance of lobbyists through monitoring and enforcement (OECD 2013). Additionally, it is important to limit the resources lobbyists are allowed to provide to government officials and politicians. There should be a ban on direct donations and an open registry for all politicians where they can disclose their sources of funding (OECD 2013). Lastly, there should be a free flow of information. Meaning that all actors concerned with a specific topic share the available information, reducing the possibility of ignorant policy-making (OECD 2013). These measures should reduce the importance of financial resources in politics, and allow the best policy to flourish.

Radical technological innovations and the discovery of new information bases certainly play a role in breaking path dependent behaviour and can be discovered within the transport sector as well. The continued debate concerning climate change has changed the political landscape in which policies are enacted or terminated. As presented earlier, the Union has the ambition to become climate neutral by 2050, meaning that the Union has to reduce their climate impact in every sector, which includes the transportation sector. This has emphasised the importance of walkable, bikeable cities with good public transportation, and the importance of a robust and

efficient rail network. Cars and planes pollute at unsustainable levels, meaning that other alternatives have to be promoted. Additionally, polls from eurobarometer show that 59 percent of car-drivers within the Union are open to the idea of using public transportation as long as it doesn't cost more or take longer than taking the car. 34 percent of people who use the car as their main source of transportation do so because there are no other alternatives and 41 percent of people do so because it is the fastest alternative (European Commission 2020). However, some believe that international train rides are inconvenient from an administrative point of view, and 75 percent of people support the development of a single European ticketing system, making it easier to travel cross-border within the Union (European Commission 2012) This shows that the, perhaps radical, increase in spending on rail infrastructure and innovation would result in fewer car and plane rides. At the end of the day, the fastest, cheapest and most convenient way to get around is going to be a strong contender for the most popular form of transportation.

## 6.2 limitations and future research

The limitations section is an essential part of any thesis, and all research is bound by the context in which it is written and by the limitations that come with that context. Yet, by acknowledging these limitations the researcher can demonstrate an awareness that can provide helpful insights concerning the results of the research and recommendations for future research. This in turn increases the credibility of the research and shows the good will of the researcher. All research is flawed in one way or the other, and by discussing those flaws they can be overcome.

Firstly, it is important to note that this master thesis is written by a single student with limited resources, time and experience. It is the first time I approach and conduct a thesis of this size and it is bound to be flawed. Additionally, the time aspect of finishing this paper is limited to the spring semester of 2023, and the monetary resources allocated to this thesis is a total sum of zero. The research is done by a team of one, which could lead to a subpar end-result. Mainly, the dangers of working on a project alone, is that the prevalence of bias has the potential to run strong. It is no secret that I am an advocate of expanding the available European rail network, which could be used to discredit my findings. Yet, I have tried not to cherry pick data and made

an attempt to give credit where credit is due. I hope I don't come across as biased and to have produced something of value.

Moving forward, this thesis is incredibly theoretical, and doesn't necessarily produce any definite proof of anything. It is an attempt at a response towards the criticism the European Union and the TEN-T policy has received concerning the contrast between its goals and ambitions to the projects it decides to fund. Although, I can with confidence say that the TEN-T policy should be considered as a partial failure, but I cannot confidently say that path dependence is the reason why. It is a speculation that I hope I've made a compelling case in support of.

For my data collection, there are some noticeable drawbacks. Firstly, I have not been able to produce any of my own data, rather I have been dependent on the statistics available online. Some of the data I have used in my analysis could be considered to be too old to be relevant, some of it dating back ten years. Yet, it is the best data available that I have been able to find. Additionally, I have approached this research from a partly quantitative perspective and partly a critical perspective, which I believe gives the most insight given the situation. However, I believe that it would have been beneficial to have conducted interviews with noticeable key actors within the European transportation sector. This could have brought valuable insights into how they view the criticism they've received, what they believed to be hindering the development of the European rail network and what they believe to be the possible solutions. Some examples of these actors could be the head officials of the nine corridors included in the TEN-T core network. Additionally, In my thesis I discuss the possibility of lobbying from the automotive industry playing a powerful and significant role in hindering the development of the rail network. It would have been interesting to conduct a deep dive into this topic to deduce the level of influence it has on the transportation sector as a whole.

Lastly, I made some bold assumptions concerning the influence that global capitalism has on the actors concerned with the European transportation sector, or really everyone in the entire world. How it could influence actors to not go for the most fitting, or the most beneficial option, but instead to go for the most profitable option, no matter the social or environmental consequences. I did not present any proof of this, but based it on the theoretical works covered by the theory of

Critical political economy and the theory of path dependence. Yet, this comes down to ideology, and I do not believe that all research has to be neutral when it comes to such matters. Although, it is important to mention. I believe that research could benefit from including a normative aspect, especially in the social sciences. It is difficult to discuss societal issues without any sort of recommendation, and my recommendation through this thesis is to increase the investments and to increase the priority of rail infrastructure as a means of transporting both goods and people, for the health of our planet, the well-being of our populations and for the prospects of our economies.

## 7 Conclusion

To conclude, I set out to evaluate the European Union's transportation infrastructure investments pattern, or more specifically, to evaluate the Trans-European transport network policy (TEN-T). The TEN-T policy has been the main actor within transportation infrastructure projects within the European Union since 1996, and has the ambition to construct, with the help of the member states of the European Union, a transport network that will close gaps, remove bottlenecks and technical barriers, as well as to strengthen social, economic and territorial cohesion in the EU, through socially and environmentally friendly methods.

My aim was to judge the TEN-T policy through their own criterion. Using their own stated goals and ambitions, their own timelines and their own budget to deduce if they completed what they set out to construct.

I approached this project through the theories of Critical Political Economy (CPE), Policy failure and Path dependence, and conducted my research with a mixed-method methodology. The theory of CPE allowed me to take a critical lens at the influence of global capitalism on the European transportation industry and the relevant stakeholders within the sector. Additionally, it highlighted the car-centric hegemony that exists within the transportation sector. Through the theory of policy failure, I deduced that the TEN-T policy should be categorised as a partial failure, since the policy has not been able to construct the infrastructure projects it set out to complete. Additionally, it discovered that there has been a misalignment between the stated goals of the TEN-T policy and their investment patterns. The theory of path dependence was able to assist and provide an explanation for why this failure had occurred and why this misalignment exists, showing us that the European transportation sector is plagued by path dependent development on car-centric infrastructure. The main reason being a 70-year-history of immense investments on car-centric infrastructure that has promoted a car-centric economy, lifestyle and resulted in a-so-called lock-in phenomenon.

This analysis was done partly through the use of statistics and partly through a critical analytical lens based on the theories mentioned previously. The statistics provided a baseline of analysis that allowed me to test my hypothesis and to test my assumptions surrounding the European transportation sector. Additionally, the visualisation of these statistics through the use of R-studios help me present them in a reader-friendly manner. The critical analytical lens allowed me to deepen my understanding of the situation behind these statistics, the reasons behind this type of development, and the reason behind the questionable TEN-T investment patterns.

Lastly, I finished with a discussion covering my results and the possibility of breaking away from the status quo and the historical investment patterns the TEN-T, and the European Union as a whole, has followed. This was done through the lens of path dependence and its concept of de-locking. In the end, the situation looks slightly promising, showing developments that break this historical pattern, although the road is long, both figuratively and literally, meaning that the Union and the member states will have to shift a lot of investments into alternatives to road infrastructure if they are serious about meeting their stated goals.



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