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**The Role and Limitations of European Union
Transport Policy in Light of Increasing Container
Vessel Capacity**

by

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Abstract

The growing scale of container shipping has been a feature of the maritime and transport sector for a number of years. A central aspect of this growing scale is the increasing size of container vessels. In recent years these vessels have grown to such an extent that they are now reaching over 400 metres in length and 60 metres in beam. As a result, terminals, ports, port clusters and wider transport network either have adapted or will need to adapt to remain free flowing enablers of domestic and international trade. The European Union is one included. In terms of transport infrastructure and policy the European Union is a special case given the pooling of sovereignty across a number of political and economic competences. The European Single Transport Area has been an objective of the EU since its very founding. The objective of this thesis is to investigate and explore the role of the European Union in determining and implementing transport and transport infrastructure policy with a view to discovering its strengths, limitations and overall success thus far. The project will be conducted via a content analysis of European Union policy documents and treaties following the Drivers of Change methodology. The report comes to the ultimate conclusion that the European Union transport policy is hampered by incompatible objectives set at the highest level. This ambiguity or lack of clarification then feeds down into the implementation phase where individual projects suffer from a lack of clear objectives, delays, cost overruns and an overall lack of added European value. These limitations have subsequently fed down into the project implementation and the case of the Rotterdam to Duisburg corridor has been used to examine them.

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1. Introduction

1.1 Background

The European Union is a unique political and economic phenomenon. 28 countries have pooled sovereignty in a variety of policy areas with many being fundamental to the nation state's economy. The Internal Market is often hailed as the crowning achievement of the European project and is now a single market of circa 500 million people representing around 22% of world GDP (World Bank, 2019). Central to the size, maturity and importance of the European market to the world economy is the Union's transport network. Efforts have been made to create a Single Transport Area along the lines of the Single Market, yet concerns, challenges and limitations remain.

The EU is a net importer of goods and remains central to the world maritime trading system. As such, Europe's ports are some of the most advanced and largest in the world. The Hamburg – Le Havre range is often cited as the core of European trading relations and the range serves a broad hinterland area covering the major economies of North Western Europe many of Europe's largest urban centres. As such, the transport network of Europe is one of the most advanced in the world, especially western Europe. The European transport network now comprises some 221,000km of railways, 45,000km of inland waterways and 90,000km of motorways.

Port-hinterland connections

One of the most important elements of the transport chain is the infrastructure at the connections between ports and their hinterland. Hinterland connectivity is often seen to be a key determinant of the competitiveness and overall performance of both the port and the wider economic area. The vessel growth and the associated traffic increases experienced by European ports both to and from the hinterland is likely to have an impact on the transport network around the port, especially on these key hinterland connections. The transport and logistics industries are constantly working to improve efficiency, timeliness and reliability and the transport network plays a crucial facilitating role. The shifting dynamics of containerised trade and growing scale may require improvements to the existing network both in terms of physical infrastructure, but also softer measures aimed at enhancing organisation, connectivity and coordination.

Megaships

The growth in vessel size has been a constant feature of the container shipping market in recent years. This growth has now led to the introduction of vessels reaching 23,000 TEU capacity. The growth poses questions to actors throughout the transport chain, affecting shippers, carriers, terminals and the wider port cluster and transport infrastructure. Moreover, given transport networks are principally public goods, neither rival nor excludable, other stakeholders, including the local population, urban planners and local authorities, are affected. Throughout 2019 and 2020 an increasing number of these so called Ultra Large Container Vessels (ULCV) will be delivered to carriers and thus the questions and challenges for the various stakeholders involved in the logistics chain will become more pressing and pronounced. Building on example studies from the existing literature, the expected outcome of vessel size increases includes a requirement for terminal and berth

efficiency to improve, increased peak factors, demand on yard capacity and increased strain on terminal/port-hinterland connectivity. The increased traffic and peak factors would be expected to impact congestion, utilization and overall performance of the surrounding transport network.

Investment in transport infrastructure

Investment in transport infrastructure and projects aiming to enhance connectivity and coordination throughout the supply chain are often a long and complex processes and not always seen to be a successful use of public (and private) funds. The capital-intensive nature of infrastructure improvements makes project decisions a cumbersome exercise and there is a considerable time lag between the decision and the implementation with unexpected delays a frequent occurrence. The characteristics of infrastructure investment have the potential to exacerbate the effects of any sudden change in the market dynamics and vessel growth is no exception. Therefore, in depth studies aimed at exploring, discovering and enhancing understanding of complex phenomena have a high degree of utility for future decisions and future research.

1.2 Objective

The objective of this study is to understand and explore the policy making powers of European transport policy makers and the limitations faced. The study will then apply the findings to dealing with the hinterland problems caused by megaships. The study will be made up of two major parts. Firstly, a conceptual analysis will investigate the development, objective, role and limitations of European transport policy. The chapter will be made of two sections, an analysis of the existing academic literature on the subject of European transport policy and a content analysis investigating how the policy has developed and then been implemented. As a result of the conceptual chapters a number of hypotheses have been developed which will then be tested through the empirical part. The empirical chapter will investigate both the existing academic literature regarding the impacts of megaships and the data from the European institutions responsible for policy implementation. The overall objective of this second chapter is to test the hypotheses derived from the conceptual analysis on the case study area.

Case Study Scope

The case study will focus on the section of the European Rhine-Alpine corridor running from the Port of Rotterdam to the inland Port of Duisburg. Rotterdam, situated in North Western Europe on the Rhine – Scheldt delta, is Europe's largest port. In 2018 the port handled 469 million tonnes of good across dry bulk, liquid bulk, containers and break bulk. Around 30,000 sea going vessels and over 100,000 barges visited the port (Port of Rotterdam, 2019). The sheer volume of ships and cargo passing through the port give some idea of the scale and importance of Rotterdam as a trading hub for not just North Western Europe but the European Union Single Market more generally.

Duisburg in Germany has grown to become the world's largest inland port and a major hub for European logistics. It's location in the heart of the Ruhr area means it is ideally located as both a destination and transshipment point for cargos heading into and from the Port of Rotterdam but also Antwerp, Bremerhaven and Hamburg. The centrality of these two ports and the hinterland transport network between them,

characterised by high volumes across multiple transport modes, are fundamental to the European economy.

The Rotterdam-Duisburg transport corridor is part of the wider Rhine-Alpine Corridor which is one of nine core corridors within the European Union’s Trans European Transport Network scheme (TEN-T). The European Union’s Directorate General for Mobility and Transport (DGMOVE) has defined the corridor project as “a European Commission policy directed towards the implementation and development of a Europe-wide network of roads, railway lines, inland waterways, maritime shipping routes, ports, airports and rail-road terminals” (DGMOVE, 2019). The Rhine Alpine Corridor, as shown in figure 1 below, is one of the most developed and well-funded as it covers some of Europe’s largest population centres and key areas of industrial production. The Rhine-Alpine corridor has even been said to be “leading the way” for the other corridors in terms of towards a “new generation of infrastructure development, inter-alia strengthening multi-modality, optimising infrastructure use or promoting innovative approaches” (European Commission, 2014, 7) The freight corridor is the busiest in Europe and despite having been invested in heavily by the party member states, significant future investment is required.

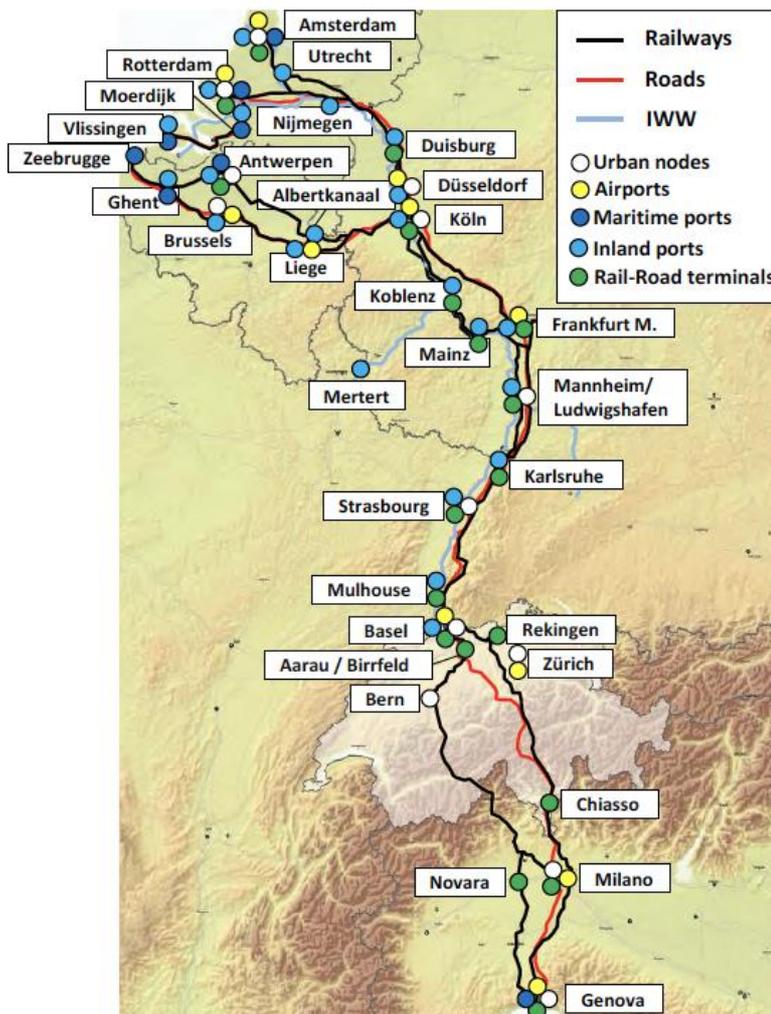


Figure 1. Map of the Rhine – Alpine TEN-T corridor (DGMOVE, 2014)

1.3 Problem Identification

As explored briefly above, the growth in containerhips looks set to continue and the majority of major carriers are boasting extensive orderbooks, many of which include ULCVs ranging between 16,000 and 23,000 TEU. For example, in July 2019 MSC took delivery of the latest vessel to receive the accolade of the world's largest containerhip (TradeWinds, 2019). Five more vessels of a similar size are due in the months leading into 2020 and beyond. The demands placed on both terminals and the wider transport network are numerous and complex. While these issues permeate throughout various sections of existing study and literature thus far very few authors have approached the types of questions posed by megaships from the perspective of policy makers, and in particular policy makers at the European level. In the quest to further develop the Single Transport Area Europe is playing an increasing role in trade facilitation, infrastructure investment, emission control and transport coordination projects.

1.4 Research Questions and Objectives

The purpose of this study is to bring together the varying impacts of vessel size growth, particularly ULCVs, on the existing transport network in Europe and the limitations faced by European policy makers in addressing them. This will lead to an exploration of the role and effectiveness or lack thereof of the EU transport policy. The study will seek to answer the following research question:

What factors limit the role of European transport policy when dealing with the problems megaships impose on hinterland transport networks?

In order to answer this question a number of sub-questions will be answered:

- *What is the general role of European policy makers in terms of transport problems?*
- *What policy measures have been taken to this point?*
- *What transport related problems are caused by megaships?*
- *To what extent have existing measures been successful?*
- *How and why have these measures been a success or failure?*
- *What are the determining factors for a successful role for European transport policy in dealing with the hinterland problems caused by megaships?*

1.5 Research Design and Methodology

The project follows a two-stage approach. The first stage is the conceptual analysis where an investigation of the current role, aims and limitations of European transport policy takes place. This is done through a content analysis. The second part of the project is based on the empirics of megaships, the impact on the European transport network and the ability of the European transport policy to deal with the impacts. The conceptual analysis will primarily seek to answer the first two sub research questions and the empirical part will seek to answer the remaining sub-research questions.

For this project a qualitative research design based on secondary data analysis has been chosen. This will be done through a content analysis and case study. A review of existing academic literature has also been incorporated as this is integral to the

identification of the existing and observed effects of megaships. The literature review has been split between the conceptual and empirical sections of the study. Each section then builds on the primary data gathered from European Union sources. The empirical part will centre on the Rotterdam to Duisburg section of the European Rhine – Alpine Corridor. The choice of case provides one of the greatest pools of European policy measures to analyse and one of the main hinterland connections for ULCVs.

The thesis will follow an interpretative methods approach. Interpretive methods have been described by Bhattacharjee (2012) as “an inductive approach that starts with data and tries to derive a theory about the phenomenon of interest from the observed data”. By way of an analytical framework, the project will utilise the Drivers of Change (DoC) method. The specifics of the framework will be explored in the methodology chapter. The central phenomenon under consideration in this thesis project will be the role and limitations of the European Union’s transport policy with an application to dealing with the effects of increased container vessel sizes. The phenomenon is well suited to this approach given the requirement for in an in depth understanding of the case itself and the factors shaping it. Policy questions, especially those at a European level involve a wide variety of stakeholders and can be viewed from a number of perspectives. The data intensive nature of content analysis thus allows a broad spectrum of sources to be included. The study will seek to analyse from the perspective of the European Union acting as a trade facilitator through infrastructure strategy, planning and development with the objective of enhancing overall competitiveness of the European internal market.

1.6 Study Relevance

The principle contribution of this paper is the application of a political economic framework to a problem which to this point has been heavily explored from a purely operational perspective. The paper adds academic value to the field by allowing a greater understanding of the political, institutional and regulatory framework in which these developments are taking place. This will allow for a more informed debate about mitigating measures which are feasible in the current political and economic situation in Europe.

The research will have continuing relevance given the increasing rate of introduction of larger vessels throughout 2019 and 2020 and beyond. As acknowledged in the existing literature, the delivery and deployment of larger vessels causes a cascading effect on to other, smaller trade lanes and routes. As such, there is scope for this study to be expanded as the effects of vessel size on transport networks will occur at multiple port hinterland connections. The relative size of the vessel to the level of development of transport infrastructure would likely matter more than the absolute capacity and growth. The study would therefore be of utility to urban and port planners, public policy planners, freight forwarders and other logistics service providers.

2. Methodology

As briefly introduced above, the methodology employed for this study is based on qualitative research. With the research project grounded in the likes of political economy, a secondary data analysis is the best fit given the intensive data collection that would be required to include primary data. Furthermore, any primary data collection would be hampered by access to data both in the public and private domain. As such, the data sources, as will be outlined later in this section, provide the most comprehensive data pool available in light of the constraints.

The choice of the Rotterdam-Duisburg corridor has been made in part to overcome data availability problems. However, as it is one of the most developed and well documented of the European transport projects the existing literature and secondary data available plays to the strengths of the chosen methodology.

The case study approach provides the most appropriate method for testing the hypotheses developed through the content analysis due to the requirement for an in depth understanding on multiple contributory features. Furthermore, the research question chosen requires an exploratory framework to gain insight and understanding of role and limitations of a broad, comprehensive policy.

The content analysis has been carried out via a coding system in order to give the exercise transferability. By establishing a method of investigating and analysing the documents, through unitisation and coding, the project becomes less of an over-extended review of literature. By developing codes and themes the documents could be compared and contrasted, and long-term themes can be identified. The coding system thus helped condense a huge amount of written text into manageable units, categories and patterns.

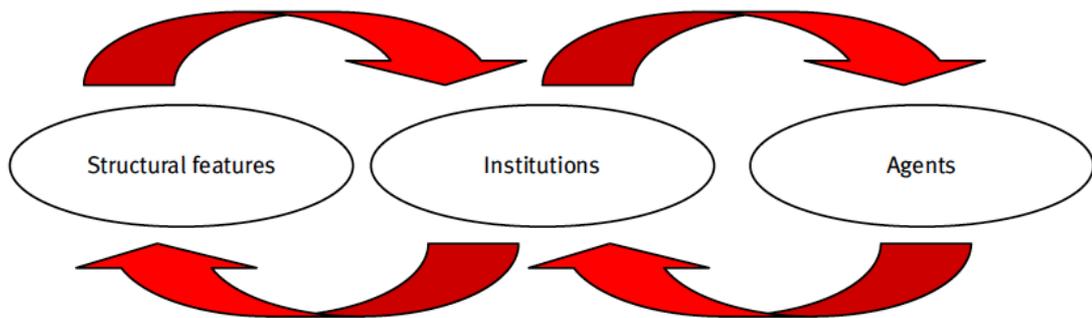
The relative lack of existing study, especially in terms of a political economical approach, into these problems leaves a void in terms of theory and the theory building possibilities under case research further add to the utility of this study. As outlined by Bhattacharjee (2012, 93) "case research can help derive richer, more contextualized, and more authentic interpretation of the phenomenon of interest than most other research methods by virtue of its ability to capture a rich array of contextual data". The high number of stakeholders affected by the identified problems generates a requirement for a thorough understanding of the context in which these effects but also mitigating actions are taking place. The requirement for some kind of democratic or popular legitimacy in the policy making process adds further importance.

2.1 Drivers of Change

In order to have a strong analytical framework tying the project together the Drivers of Change (DoC) method will be applied throughout the data collection and analysis. The DoC method was first developed by the Department for International Development in the United Kingdom to address the lack of linkages between a country's political framework and the day to day operations of development agencies when implementing overseas development projects (Overseas Development Institute, 2006). As outlined by the OECD in 2005 (OECD, 2005) "The approach focuses on the interplay of economic, social and political factors that

support or impede poverty reduction”. Despite the significant gulf between the environment in which the model was developed and its utilisation in maritime economics, a number of parallels can be found in the type of problem the method seeks to address.

The apparent disconnect between the plans and ideas in relation to the Single Transport Area and addressing localised transport problems closely resembles the linkage focus of the DoC approach. Second, the adaptable nature of the framework following from its “country led” design is well suited to the case research approach outlined above. The importance of exploring and situating the research project with the social and political context of the European Union and transport infrastructure networks requires a focus on institutional and structural factors at play but also actions and imperatives of individual actors in relation to the drivers of the change (ODI, 2006, 14). The framework has been slightly adapted for this study as agency plays a less important role given the EU remains the principle actor throughout. As such, this study focusses more on the disconnect between the establishment of objectives and the means of implementing them.



Certain limitations do apply to this type of methodology but the main concern in this case is the transferability and the ability use the study for comparison with other cases. Such limitations originate from the fact that a method such as DoC is not a highly rigid, standardised procedure. The priority given to context, relationships and institutions make an enquiry on this basis highly specialised. However, it is important to note that within the context of the European Union such a study would be relatively easy to reproduce given the fairly standardised reporting and monitoring of the TEN-T, CEF and Marco Polo projects allowing easy comparison. Moreover, the utility of this study and expanding it to neighbouring ports or countries will be made more straightforward by the presence of common political institutions or regional bodies such as the EU but could also include bodies such as the African Union or the African Development Bank for example. Furthermore, certain international organisations including the International Transport Forum, The World Bank and the United Nations Conference on Trade and Development provide a more expansive, international view which may aid comparison. Notteboom et al (2013, 651) state “there are for example only a limited number of true comparative studies on ports around the world using the same methodology although seaports are very suitable for such comparative exercises”. This extract highlights the fact that even amongst other, more common methodologies used in port research have not yet allowed for comprehensive comparative analysis.

The second limitation of the chosen methodology will be the balance between internal and external validity. Internal validity, defined by Bhattacharjee (2012, 35) as an examination of whether the observed change in a dependent variable is caused by a corresponding change in a hypothesized independent variable. Internal validity is often difficult to achieve in case study research given the inability to manipulate the independent variable and the measurement of both potential cause and effect occurring at the same incidence in time. Internal validity in the case of this study is in part derived from preceding studies which have sought to measure the impact of megaships on various elements of the maritime logistics chain through statistical analysis, these analyses have led to a recognition of varying effects of megaships which are disputed in scale rather than substance. As such, this study builds on, adds context and situates the existing recognised impacts of megaships within a wider political-economic framework and the challenges within it rather than a measurement of phenomenon in progress.

As is the case in many case research-based projects, external validity is easier to achieve. Again Bhattacharjee (2012, 36) provides a definition of external validity, linking it to generalisability and the ability to expand and apply the observed associations from either sample to population or to other people, organisation, contexts or times. This point was briefly introduced earlier in this section and thus external validity in terms of generalising this study within the European Union, strong potential exists and in relation to generalisability outside the European Union there is definite scope but the quality or availability of data may be a hindrance and thus requiring a higher proportion of primary data and field research rather than secondary data and desk research as conducted as part of this thesis project.

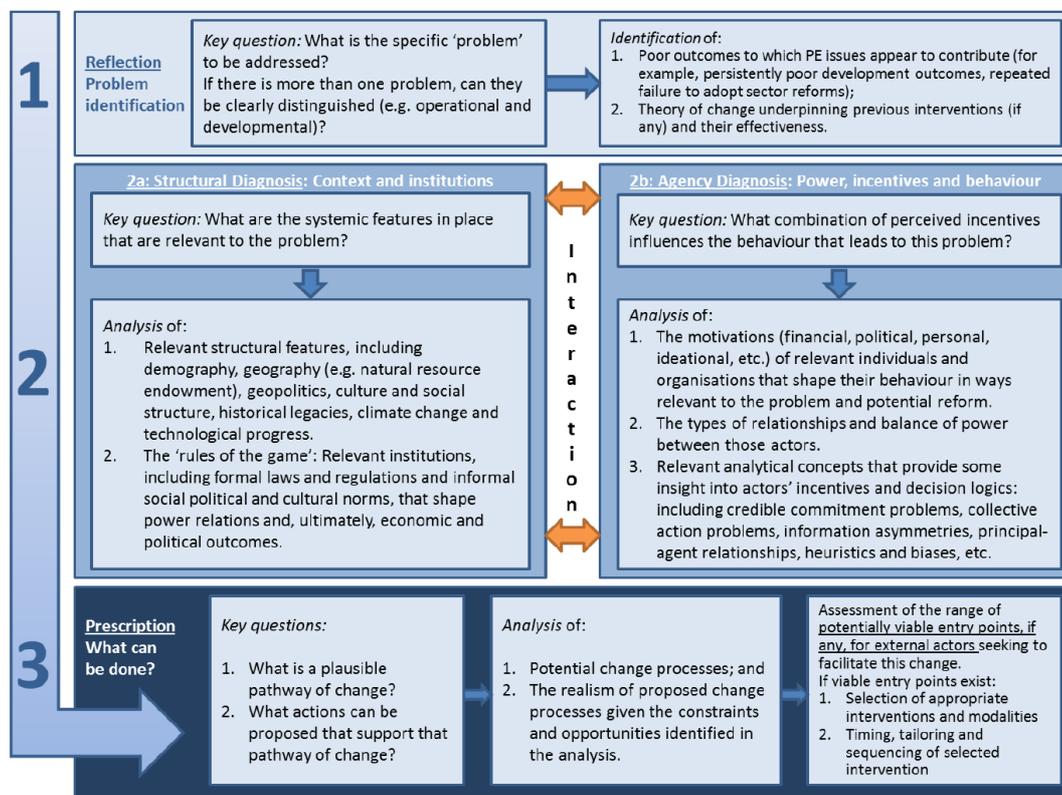


Figure 2: An outline of the Drivers of Change methodology (ODI, 2013, 5)

As outlined in figure 2 above, the framework consists of three key steps. The problem identification has primarily been carried out through the analysis of the existing literature. A number of areas will be explored in order to answer the research question including: the development and limitations of European transport policy and the growth in container vessel sizes, challenges facing ports, terminals and hinterland transport networks.

The structural features, as defined in this project, relate to the fundamentals of the policy. Therefore, the first part will explore the development of the policy and aim to understand and explore aims, objectives and limitations. By combining this with the empirical section the project will include the features which remain relatively fixed, those that change at a slow pace and those factors which are often quick to react or are prone to change quickly (ODI, 2013, 2). The agency diagnosis, defined in this project as those elements aimed at implementation and action of the policy rather than its design, will identify and outline the relevant actions and issues including the monitoring and reporting methods at the project level. The structural and institutional features along with the principal agents including in the study will be identified using a content analysis and the associated coding structures. The hypotheses derived from the conceptual part will then be tested and applied to the case study.

2.1 Data Strategy

Content analysis has been defined as the systematic analysis of text in a quantitative or qualitative manner (Bhattacharjee 2012, 115). In essence content analysis can be broken down into five core principles: selecting data sources, data collection, coding, analysis of content and interpretation of results. In order to overcome a common criticism of content analysis relating to the lack of systematic procedures it is important to properly designate the unit of analysis (*unitisation*) and determine the key concepts which apply to the designated units (*coding*). While these generic steps are important for any content analysis Weber (1990, cited in Galvao et al, 2016) states that there is no simple right way to conduct a content analysis, instead stressing that the methodology employed must be appropriate for the research problem at hand.

In order to determine both the structural and implementation framework in which the policy actions concerning European transport networks and infrastructural measures relating to transport facilitation one must first highlight the legal basis and framework from which the competency is derived. As with many areas of European policy, determining competency can often lead to a complicated and complex legal network with varying policy areas either split or codetermined between the European and national level and then again between national and local levels. As this study is primarily concerned actions at the European level the primary source of information for determining the extent of European competency will be the institutions of the European Union.

Building on this, the next chapter first identifies the legal texts underpinning the core policies, agencies and institutions which design and implement the measures which will be identified. The baseline for this aspect of the data collection will be those texts relating the European Single Transport Area. As the Single Transport Area is

the umbrella under which other more targeted policies and measures are taken this would be a logical starting point for the investigation.

The second stage of the analysis will be to investigate the specific role of the institutions, projects and agents identified in the implementation European transportation policy sector. The distinction between overarching policy objective setting, implementation and oversight will be highlighted as this forms a key part of the utility of this study as it is often neglected, quite logically, from other strands of literature such as optimisation and simulation studies.

The data will primarily be taken from official documentation from the European Union including the European Treaties and white papers for the broader policy objective setting and legal basis before moving into the reports, working papers and project documents associated with the design and implementation of specific measures. In regard to the oversight of both strategic objectives and project implementation bodies and literature from bodies including the European Court of Auditors will be examined.

In terms of the layout of the findings from each document consulted, the results will be presented in a series of tables each relating to the level of the body or document consulted. For example, the first table will highlight the key sources consulted and findings from the legal texts establishing the legal basis, the second will address the implementation, the final section will then apply the findings of the content analysis to the Rotterdam-Duisburg corridor.

The content analysis employed throughout this study is based on an inductive approach. Given the lack of a comprehensive analysis of European transport policy to this point as established in the literature review, the utility of the inductive approach is the best fit. The inductive approach includes the creation of an open coding scheme, creation of categories with a certain degree of abstraction (Elo et al, 2014). Given that many of the documents to be consulted were either legal texts or policy texts the most appropriate unit of analysis was deemed to be the paragraph. Following the unitisation, the codes outlined in table 1 were applied. Following the completion of the coding, each document was assigned to a particular theme or category conforming to a broader level of analysis.

To provide greater validation or trustworthiness to the data sample the documents have been selected from a number of sources, both in terms of the institution but also a mixture of legal, policy and review documents. Furthermore, the credibility has been heightened by including sources such as the European Court of Auditors. The inclusion of documents produced by 'independent' bodies removes a source of bias which may be present in other reviews and assessments produced by the legislating or executive body such as the European Commission.

The sources for the content analysis were gathered using the Official Journal of the European Union. At the outset the Treaties of the European Union were analysed, Given the treaties act as the guiding framework for the entire project these are the logical place to begin. Following the analysis of the Treaties the transport white papers were collected. The white papers are an important linkage between the objective and role setting function of the Treaties and summits towards the implementation phase. The final selection of sources was derived from the white

papers as they speak of reviews to be carried out or make comments in light of previous reviews.

For the second part of the content analysis the data collection was more difficult due to the lack of a concrete structure as found in the documents setting out the structural aspects of European transport policy. A similar process was followed to retain continuity, but greater attention was given to the institution, implementation, the role of independent oversight and monitoring.

3. Conceptual Analysis

This section will set out the conceptual background to European transport policy. The first part of the chapter will analyse the existing academic literature available on European transport policy and the second will provide an analysis of legal and policy documents via a content analysis. The development of the European transport policy has been a long and complex process involving multiple institutions. The nature of transport policy has meant that the policy has taken shape through a number of stages. It is these stages that the content analysis will address. The first stage will address the design and overarching objectives of the policy and the second will look at the policy's implementation. The content analysis will highlight key elements and limitations and at the end of this chapter a number of hypotheses will be developed from the findings.

3.1 The Role of European Policy

Throughout its development European Transport Policy and the associated measures have touched on a wide variety of sectors, policy objectives, regions and institutions. As such, pinpointing the exact role of the EU's transport policy is not an easy task. The existing literature has explored a number of these elements of the European transport policy and it is possible to outline a number of key themes informing and guiding its formulation and implementation.

Firstly, transport and transport infrastructure are often recognised as being a core tool for the enhancement of economic development. In this sense it is important to emphasise the links between the development of European competency in transport policy and the growth and completion of the single market. Priemus and Zonneveld (2003) describe corridors as bundles of infrastructure linking two or more urban areas and the authors state that connectivity along and to these corridors is a key driver of economic development and removing fragmentation. The idea of transport policy being an enabler of economic development goes to the very heart of the European project, especially in recent years following a succession of enlargement projects. Peters (2003) takes this idea one step further and indicates that the three themes contributing to the policy objectives are integration, enlargement and sustainability. The integrational and cohesion-based theories underpinning European transport policy have gained prominence following the enlargement rounds given the at times massive gulf between infrastructure and transport organisation between eastern and western Europe. The decline and ultimate collapse of the Soviet Union opened up a number of economies to EU influence and ultimate membership and their integration into the European transport network has been an essential tool in their economic development. The integration of these economies, one of the central pillars of European transport policy, causes a number

of internal conflicts and contradictions for policy makers and these are summed up well by Vickerman (1995) as centralisation vs peripheralization, connectivity vs location, mobility vs sustainable development and planning vs competition. In essence, the focus on a fairly equal distribution of projects and funding in a bid to link every corner of the European single market into the core network can fail to recognise the disparities in traffic flows, populations, industrial outputs and thus derived transport demand. This problem then leads to the question of addressing cohesion or bottlenecks but then questions arise as to the support of Member States for projects not directly impacting their country.

In the early years whilst competency for the various aspects of transport policy was still being determined a number of measures were taken in regard to liberalisation and regulation of the transport market. The assessment of European transport policy before 1992 often highlight a lack of or even a failure of implementation. However, the measures that were taken were key part of the ideational foundations of the Single Market – a lack of borders between service operators. Sichelschmidt (1999) highlights this trend and suggests 1992 as the date when European transport policy morphed from being coordination focussed to infrastructure and cohesion focussed. A number of fundamental questions regarding the way the EU operates were settled in 1992 and in addition, as will be explored in the next section, actions and exchanges between the various European institutions helped build momentum for the implementation of the transport policy.

The stated objectives of the European transport policy have always centred on the high-level ideas of connectivity, facilitating economic growth and the mobility of people, however, the means for achieving these goals has changed. As explored above, this began with the harmonisation of regulations and standards, which were perhaps easier to achieve and thus seen as a kind of low hanging fruit. Ponti et al (2013) suggest this may in part be down to Member State willingness to protect so called “national champion” transport providers or services. Peters (2003) suggests that the nature of the regulatory, standardisation and competition-based initiatives were not location based, thus removing a potential source of political tension or apprehension which may lead to public or political opposition from and within member states.

From 1992 and the introduction of the Trans European Network system the focus shifted to provision of infrastructure and a more concrete role in facilitation. While the overall aims of the policy have remained fairly stable (economic development, integration, cohesion and sustainability) the means to achieve these aims has morphed and, in many ways, grown. Furthermore, the challenges identified have been a source of constant change with previously relatively unimportant aspects coming to the fore in recent years, most notable of which is the problem of congestion and bottlenecks. This has grown to be an essential role for European transport policy given the rapid growth in cross border traffic flows of both people and goods. Congestion around key transport hubs is an ever-increasing phenomenon and brings the question back to the discussion earlier about internal contradictions within European transport policy, the disparities between required investment in the core versus the periphery.

In order to explore the objectives, scope and impact of European transport policy a content analysis of a number of European documents has been carried out. To give a deeper and more holistic analysis of European policy it is important to build on the existing literature and explore the objective and scope through primary research.

The following section will present the results of the content analysis. The content analysis results will be presented in two sections in table form. Both tables will maintain the same format including the title, author, summary, codes and themes associated with the document.

The first part of the content analysis will focus on the structural elements of European transport policy including the development at the highest levels of EU policy making including the Treaties. The second section will look at the more micro level including project-based documentation and reviews conducted both by the European Commission and the European Court of Auditors.

Following the results section, each section will be analysed and assessed through a narrative of the findings following a chronological order. In the final section, the findings and results will be applied to the case study of the Rotterdam-Duisburg corridor.

Author and Document Title	Content	Codes	Theme
Treaty Establishing the European Community, European Union	The Treaty of Rome, the first step in establishing the European Community, later European Union contains a specific title (Title IV of Part Two – Foundations of the Community) on the establishment of a Common Transport Policy.	Sovereignty, competency, commonality and coordination, transport cost reductions, scope	Legal basis and structure
Judgement of the Court 22 May 1985 in Case 13/83, Court of Justice of the European Union	In 1983 the European Parliament, supported by the European Commission brought a case against the Council of the European Communities on the basis of a failure to fulfil its obligations in respect of the common transport policy. The case related to the failure to provide a coherent policy framework or programme for the establishment and also regarding the failure to adopt provisions put forward by the Commission. As a result, the CJEU urged the Council to start the process towards a common transport policy in a meaningful way.	Competency, scope, implementation, commonality and coordination	Legal basis and structure
Treaty on European Union (Maastricht), European Union	The Treaty establishing the European Union agreed in 1992 is an important moment for the future of the CTP. The Treaty further	Sovereignty, competency, legal basis, scope, transport networks	Legal basis and structure

	advanced and in some ways settled the political, institutional and budgetary foundations of the CTP and introduced the Trans-European Networks for transport, telecommunications and energy.		
The future development of the common transport policy: A global approach to the construction of a Community framework for sustainable mobility, European Commission	The 1992 White Paper developed in response to the requests and urgings of the CJEU in the aforementioned case is an important document within the structural development of the CTP. The document initially highlights the trends occurring within the European transport industry, aims to finalise the legal basis, sets future objectives and narrows the scope of action towards policy measures rather than frameworks. Furthermore, the implementation of the Trans European Transport Network is first contemplated. Finally, the document highlights the considerable challenges which impacted the progress of the CTP.	Competency, implementation, competition, efficiency, sustainability, transport networks, social	Legal basis and structure, implementation
European transport policy for 2010: time to decide, European Commission	Continuing the trend seen in the previous 1992 White Paper, the 2001 White Paper provides a further narrowing towards a targeted policy. Overall around 60 measures were put forward in the White Paper across a range of	Commonality and coordination, implementation, competition, efficiency, sustainability, transport networks, congestion, enlargement	Objective setting, implementation

	<p>topic areas including intermodally, the Trans-European Networks, sustainability and modal split. The White Paper also begins to point out the success of some projects which were started around the time of the 1985 CJEU judgement. As such, in the document the Commission states that the implementation of certain projects is starting to bear fruit. On the whole, the document represents further development of an overarching strategy towards specific objectives identified in earlier documents.</p>		
<p>Keep Europe moving - Sustainable mobility for our continent Mid-term review of the European Commission's 2001 Transport White Paper, European Commission</p>	<p>The 2006 report on the progress made since the 2001 White Paper provides the first real mid-term review of the agreed CTP framework since questions of competency, scope and implementation were settled in the 1980s and 1990s. The document provides an overview of projects which have been completed or underway along with an update on the challenges facing the completion of the CTP. Principally the document highlights the changing nature of the transport industry towards a more</p>	<p>Sustainability, enlargement, social, coordination</p>	<p>Sustainability, accountability</p>

	environmentally aware, technologically advanced sector which has wider societal impacts than previously acknowledged. As such, the paper highlights the requirement for more joined up thinking and implementation with Member States, especially in light of the recent 2004 enlargement.		
Greening Transport: A new Commission package to drive the market towards sustainability, European Commission	The 2008 package represents one of the most explicit recognitions and incorporations of greener, more environmentally friendly and sustainable practices into the European transport policy framework. While the majority of the measures set out relate to road freight and reducing externalities on citizens the package is part of a wider trend in the development of the policy framework towards a transport policy aimed at environmental responsibility.	Sustainability, externalities, social	Sustainability
A sustainable future for transport: Towards an integrated, technology-led and user friendly system, European Commission	The document fulfils a similar role to the 2006 review and provides a 'near' end of term account of the major drivers, trends and challenges that will remain and inform the future direction of the European Transport Policy. Building on the Greening	Sustainability, pollution control, accountability, social, transport networks, coordination, capacity, congestion	Sustainability, objective setting

	<p>Transport package, sustainability, pollution control and environmental responsibility across all modes is a central part of the 2009 review. In particular, air quality and the impact of pollution on the population is explicitly mentioned as a part of the strategy rather than an aspect of implementation. Furthermore, a number of key drivers and trends highlighted relate to the growing capacity of transport, growing demand for transport services and population growth, indicating a realisation of the growing scale of transport in general. Finally, the document goes beyond transport policy to take a more holistic approach to how the future of the policy should be. Links are made to the implementation and utilisation of ICT and tech solutions to improve coordination and extend the TEN-T corridors.</p>		
<p>Roadmap to a single European transport area – Towards a competitive and resource efficient transport system, European Commission</p>	<p>In a similar vein to both the 1992 and 2001 White Papers the 2011 document sets the overall policy objectives for the following decade. The core themes from before remain including the single transport area, enhancing</p>	<p>Objective setting, sustainability, congestion, capacity increases, transport networks, pollution, multimodality</p>	<p>Objective setting, scope, implementation</p>

	<p>connectivity through the corridor approach, especially between eastern part so the Union and western parts. However, the additions and changing trends seen through the intermediate reviews and packages are evident in the white paper. Sustainability and resource efficiency are at the heart of the policy document. Moreover, key objectives are put in place in regard to emission targets and modal split targets. Building on the drivers identified in the 2009 review paper, congestion again is recognised as one of the main challenges facing the transport network.</p>		
<p>A European Strategy for Low-Emission Mobility, European Commission</p>	<p>The 2016 strategy provides an outline of the fields in which the European Union should act in order to achieve the environmental objectives set out in the 2011 White Paper. While the document remains at a fairly abstract level, without detailing exact policy measures and implementing projects the document does give a comprehensive overview of the targeted areas. These areas include reducing reliance on fossil fuels and especially crude oil</p>	<p>Sustainability, pollution control, multimodality, social</p>	<p>Sustainability</p>

	<p>products in the transport sector, enhanced R&D and innovation, multimodality and digitalisation. Overall the 2016 strategy provides more context and detail on the measures outline in previous years rather than outlining a new step or dimension in the ETP.</p>		
<p>The implementation of the 2011 White Paper on Transport "Roadmap to a Single European Transport Area – towards a competitive and resource-efficient transport system" five years after its publication: achievements and challenges, European Commission</p>	<p>The 2016 review document plays an important function in determining the overall success of the ETP and some of the measures implemented. The document provides an overview of both the successes and failures of the policies and strategies set out in the 2011 White Paper. Furthermore, the document outlines the changes in context, trends and drivers which have occurred in the time since the White Paper was published. Overall the review document has a fairly negative view of the progress made towards the goals set out in 2011 citing the lack of follow up and implementation rather than a lack of proposals. Furthermore, the unexpected pace of technological change and digitalisation has hampered progress. Finally, there is a</p>	<p>Accountability, congestion, social, transport networks, multimodality, implementation</p>	<p>Implementation, accountability</p>

	recognition of the growth of negative externalities originating from the transport sector with congestion being one of the primary causes.		
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Table 1: Content analysis results of the structural design literature

3.2 Implementation Analysis

Author and Document Title	Content	Codes	Theme
Opinion on the Commission Communication on the Future Development of the Common Transport policy (CTP), The Economic and Social Committee	The primary function of the document is the opportunity for the members of the committee to provide feedback to the Commission on the 1992 white paper. A number of areas are touched on ranging from the overarching policy goals to the situation of the CTP within the EU project framework. Notable interjections include the remedying of the two contrasting functions of transport policy: an essential public service and balance or competition between transport modes. Further comments related to the basis for Commission proposals and a critique of the analysis carried out beforehand and the questionable track record	Implementation, policy objectives, diagnosis (project rationale), assessment, critique	Accountability, review

	<p>of implementation. Finally, the paper provided a brief overview of the First All European Transport Conference – this conference highlighted the desire to improve links with central and eastern Europe with cohesion and integration high on the agenda.</p>		
<p>COUNCIL REGULATION (EC) No 2236/95 of 18 September 1995 laying down general rules for the granting of Community financial aid in the field of trans-European networks, The Council of the European Union</p>	<p>The regulation marks an important moment for the development of European transport policy as a legal framework for the funding (or part funding) of infrastructure and operational projects has been established. Moving beyond the ideational and objective setting nature of the previous documents and summits, the framework allows for the true implementation of the keystone of European transport policy – the Trans-European Networks. As explored in the literature review, the 1990s was a time at which transport policy was morphing from a coordination and regulatory based exercise into an infrastructure corridor-based programme. The establishment of funding mechanisms thus represents a positive forward step, of the kind</p>	<p>Funding mechanisms, implementation, transport networks, project based</p>	<p>Funding</p>

	that had been fairly non-existent in previous years and decades.		
<p>DECISION No 1692/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 1996 on Community guidelines for the development of the trans-European transport network, European Parliament and Council of the European Union</p>	<p>The decision document of 1996 provides one of the most comprehensive descriptions, plans and identification of projects yet produced as part of the common transport policy. The document provides detailed explanations of the types of projects, micro-economic aims, location data and technical specifications for the projects. As such, in combination with the previous regulation specifying the financing mechanisms shows real progress in producing a working framework through which investment can be made. Whilst concerns remain regarding the utility and success of projects, as will be explored later, the implementation and project level planning was witnessing a step change through the 1990s compared to previous years. The difference from 10 years previously throughout the 1983 case of the CJEU are massive. In addition, the detailed plans and specifications were also broken</p>	<p>Project implementation, transport networks, road, rail, maritime, multimodal, transport networks</p>	<p>Project based implementation</p>

	down by mode and multimodal solutions.		
DECISION No 884/2004/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 amending Decision, No 1692/96/EC on Community guidelines for the development of the trans-European transport network, European Parliament, Council of the European Union	The 2004 decision adds little to the CTP in terms of substantive changes, rather providing a kind of review and update function on top the previous 1996 decision. The majority of the topics discussed remain the same with some minor alterations and reworkings of some technical aspects. In general, the high degree of similarity potentially reflects a lack of progress or a lack of innovation to follow the changing trends within the transport market. To provide an assessment of this further, more project-based documents must be discussed. The notable exception is the expansion of the section regarding environmental performance, conformity and impact assessments.	Project implementation, review	Project based implementation
TEN-T: A policy review - TOWARDS A BETTER INTEGRATED TRANSEUROPEAN TRANSPORT NETWORK AT THE SERVICE OF THE	The 2009 policy review marks an important step in the project implementation literature. It is the first comprehensive review of the policy since the project and funding guidelines were introduced. As explored in the	Review, assessment, accountability, delays	Policy review

<p>COMMON TRANSPORT POLICY, European Commission</p>	<p>previous section, the 2002 whitepaper setting the agenda specified 2010 as a key date by which serious progress should be made. Whilst the document outlines that around €400bn had been spent to that point, considerable delays are evident across numerous projects and modes. Furthermore, the document goes further and states that the majority of the projects have “little added European value” and have remained in essence national investments. Notable for this study are the comments relating to the Motorways of the Sea – described as having complex and difficult financial procedures and a lack of clear objectives. Overall the so called “fundamental review” does not have overly positive sentiments.</p>		
<p>COMMISSION WORKING DOCUMENT CONSULTATION ON THE FUTURE TRANS-EUROPEAN TRANSPORT NETWORK POLICY, European Commission</p>	<p>The consultation document of 2010 grew from the wider review exercise explored in above. The overall aim is to better align the implementation with the objective setting done through the white papers and high-level working documents outlined in section 1. The importance of these reviews is</p>	<p>Assessment, review, accountability, objective setting</p>	<p>Review, accountability</p>

	<p>to show that while the grand ideational concepts of enhanced mobility, cohesion and growth remain central, numerous problems putting plans in action and ensuring the projects actually address what they are supposed to appear to be considerable challenges. A recurring theme within the review documents is the question of how to make the progress more visible to ordinary Europeans. The considerable length and delays encountered often make this difficult. In general, there appears to be a considerable gap between the macro level aims and objectives and the micro level implementation and results originating from the projects.</p>		
<p>SPECIAL REPORT No 6/2005 on the trans-European network for transport (TEN-T) together with the Commission's replies, European Court of Auditors</p>	<p>The 2005 special report is the first in a series of reviews carried out by the Court of Auditors in regard to the common transport policy but also individual modes. The independent body fulfils an important role reporting on the success, failure and value for money of the projects. As would be logically derived from the previous findings, the overall review at the time of writing in</p>	<p>Review, accountability, added value, delays, monitoring, implementation</p>	<p>Accountability, assessment, review</p>

	<p>2005 was on the whole negative. The ECA highlights the number of projects behind schedule, the cross-border difficulties limiting the utility of the whole policy, the problems with evaluation procedures and insufficient monitoring of the implementation. One item that also comes to mind from the review is the lack of any designated funding for problem solving in the transport network. Funds are dedicated to the high-level macro aims of integration and cohesion, but little is set aside to deal with practical, local problems.</p>		
<p>Special Report No. 4: USING STRUCTURAL AND COHESION FUNDS TO CO-FINANCE TRANSPORT INFRASTRUCTURES IN SEAPORTS: AN EFFECTIVE INVESTMENT? European Court of Auditors</p>	<p>The 2012 review was focussed on investment projects taking place at European seaports and thus has specific utility for this study. AS in the wider assessment of European Transport Policy, the overview was negative, although some project successes were evident. Overall there appeared to be a severe disconnect between the funding of long-term infrastructure without long term planning or detailed understanding of port development needs. The report highlights the significant delays across more</p>	<p>Review, accountability, project implementation, delays, limited effectiveness, long term planning, unsuitable objectives</p>	<p>Review, assessment</p>

	<p>than half of the projects audited and the effectiveness of other completed projects has been questioned. As has been raised in the existing academic literature, questions can be raised regarding the criteria, evaluation and ultimate selection of projects by the European Commission given the track record of limited success thus far.</p>		
<p>Maritime transport in the EU: in troubled waters — much ineffective and unsustainable investment, European Court of Auditors</p>	<p>The 2016 review of maritime transport investment provides an enhanced, sector specific review similar to that of 2012. A number of problems with both the policy design and implementation are highlighted. Many of the core themes are recurring from previous project reviews although relating to different projects. The Court of Auditors principally stress four main problems: the lack of robustness and coherence in long term port development and capacity planning, ineffective and unsustainable funding/ financing of projects, poor value for money (including unused projects) and large cost overruns and delays. Furthermore, on the more structural side are the difficult</p>	<p>Review, accountability, delays, planning, competence, implementation</p>	<p>Review, accountability, assessment.</p>

	relations, including poor communication between the Commission and the European Investment Bank and the interplay between investment and state aid rules causing issues for the level playing field approach		
Rail freight transport in the EU: still not on the right track, European Court of Auditors	The 2016 special report on the state of rail transport, with a similar function of the maritime review of 2016, again provides a negative review of progress. The Court of Auditors findings indicate little progress has been made against stated aims including modal split and interoperability between national rail networks. Overall shippers still prefer road, in many locations the road investment from European funds outweighs rail investment. Overall the progress since 2000 has been deemed unsatisfactory. Rail investment and service improvements are seen by many to be key for reaching both sustainability goals and removing congestion on the roads and thus achievement of policy goals in the rail sector are a key determinant of overall policy success or failure. The problems in the rail sector have largely been	Rail, modal split, sustainability, emissions, review, accountability, interoperability, regulations	Review, assessment

	<p>attributed to the regulatory and strategic framework and the difficulty of implementing a truly borderless European rail network.</p>		
<p>Inland Waterway Transport in Europe: No significant improvements in modal share and navigability conditions since 2001, European Court of Auditors</p>	<p>The 2015 review of progress in the inland waterway sector again follows a similar trend to the other modes, although slight differences in the causes of the failure are evident. Overall, the findings of the report highlight the lack of effective strategic implementation, a disconnect between projects and objectives, neglect of environmental considerations and poor analysis and evaluation of proposals. Important to note is the questioning of the micro level more so than the macro policy level. In other modes the actual strategy and objectives are questioned, however within the IWW sector the implementation and project level issues take a more prominent role. The recommendations of the Court relate to improved coordination with member states and enhanced planning, evaluation and monitoring in order to overcome the project-based limitations</p>	<p>Modal split, review, accountability, environmental, sustainability, policy objectives</p>	<p>Review, accountability, assessment</p>

<p>Landscape Review: Towards a successful transport sector in the EU: challenges to be addressed, European Court of Auditors</p>	<p>The landscape review provides a high-level review of the overall policy and its implementation in order to make suggestions on how to move forward. Contrasting with the previous documents explored, the landscape review provides an overview of the entire policy and its effectiveness rather than at the project level. The recommendations include matching objectives and resources, implementing enforcement tools to ensure better coordination and action from member states, focussing on high European added value projects, enhanced planning and monitoring, reaffirmation of environmental and modal targets. The utility of this kind of review lies in the ability to stock take in reward to the interplay between the agency (implementation) level and the structural (institutional) level. As will be explored in the results section, this macro review provides a number of points helping to answer the research questions.</p>	<p>Institutions, objective setting, competency, member states, transport networks, resources, review, assessment</p>	<p>Accountability, policy review</p>
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Table 2: Content analysis results from implementation literature

Codes	Themes
Sovereignty	Legal basis and structure
Competency	Implementation
Commonality	Objective setting
Coordination	Sustainability
Cost reductions	Accountability
Scope	Scope
Implementation	Review
Legal basis	Funding
Transport networks	Project based implementation
Competition	Policy review
Efficiency	
Social	
Sustainability	
Congestion	
Enlargement	
Externalities	
Pollution control	
Accountability	
Objective setting	
Capacity increases	
Multimodality	
Policy objectives	
Diagnosis	
Project rationale	
Critique	
Evaluation criteria	
Funding mechanisms	
Project based	
Road	
Rail	
Maritime	
Review	
Assessment	
Delays	
Added value	
Monitoring	
Effectiveness	
Modal split	
Interoperability	
Regulation	
Institutions	
Resources	

Table 3: an overview of codes identified throughout the content analysis.

3.4 Findings

The first part of the content analysis focusses on the documents and other sources relating to the legal basis, institutional functions and EU competencies in European transport policy. The first half of the content analysis corresponds closely to stage 1 of the research framework. The analysis of the policy development is aimed at identifying and exploring the relatively fixed, or slow to change elements which give the foundation for later stages.

This section will provide an analysis of the results and highlight the key findings in terms of objectives, role and limitations of the policy. This section will follow the development of the policy chronologically beginning with the 1956 Treaty of Rome until the latest white paper setting policy direction. In order to trace the key developments of the institutional framework/ structure of European transport policy, a *purposeful sample* of the most prominent documents and cases relating to the policy development have been chosen. The importance was derived from the type of document, parties to the agreement or document and a review of the literature surrounding the actual policy development rather than substantive measures and projects which will be covered in the next section.

The following section will outline and analyse the principal findings of the content analysis in a chronological order, mirroring the tabulated results. The structural development of the CTP is in some ways a linear progression towards to the objectives set in the most recent White Paper and thus this appears to be the most suitable form for the analysis. The decades succeeding the Treaty of Rome saw moves occurring at succeeding summits aimed at enhancing both integration and effectiveness of implementation and so it is important to investigate these steps.

Early Stages

Transport has always been seen as paramount to the European project, indicated by its inclusion in the Treaty of Rome, the founding treaty of the then European Community. Article 3(e) of the Treaty expressly states the intention to for “the adoption of a common policy in the sphere of transport” (European Union, 1956). Further details are given in Title IV of Part Two, also labelled as “Foundations of the Community”. The language involved establishing these very early ideas regarding the development of a common European transport policy clearly situate it at the heart of the European project. However, the envisaged transport policy as set out in these early articles relates heavily to coordination and commonality between European countries rather than any meaningful role in the provision of transport services or infrastructure. In the 1950s transport was still regarded as a ‘national industry’ and thus member states were very keen to promote and, in some sense, protect their national carriers and transport providers.

The following codes and themes were prominent: sovereignty, competency, commonality, coordination, transport costs and scope. Thus, the document can clearly be seen to be in part establishing the structural conditions under which the common transport policy would be developed. For example, Article 75 establishes the voting procedures and competency and roles of both the Council and the Commission in proposing and adopting measures or objectives to be implemented. As mentioned above, the way by which transport was regarded as a core national

industry makes these fundamental elements to establish early on the move towards implementation.

The major themes identified as part of the Treaty of Rome relate to the legal basis and structure of the CTP. As is the case in many areas of European policy making the legal basis and structure is often a source of great debate and disagreement, taking many years, summits and treaty changes to settle on a framework finally allowing for implementation and action within the policy area. Transport is no exception to this. However, the crucial element to take away from the inclusion in the Treaty of Rome is the centrality of transport to the European project. As is hailed by many as the crowning achievement of the European integration project, the single market is incredibly reliant on the European transport network and in many ways the single market and transport policy and network of the European union are inseparable. Transport is a key determinant of economic success and the aim of integrating European economies, even more so with subsequent enlargements throughout the early and mid 2000s. The path towards proposal and adoption of actual measures relating to transport would take decades to reach but the Treaty of Rome is the definitive starting point for the ideational development of a CTP. The centrality of transport to the European project in many ways informs the aims and objectives of the policy which will later be shown to be a source of some limitations faced.

The Judgement of the Court of Justice of the European Union (CJEU) of 1985 is in some ways a watershed moment in the development of the CTP. It marks a tipping point in the move towards formation and implementation of actual measures rather than ideational objective setting. The case was brought by the European Parliament against the Council for failure to act and a failure to meet its obligations under the European treaties in the field of European Transport Policy. The Parliament's principal source of contention was the failure to provide a coherent policy framework or programme of establishment or approve the adoption of any of the series of measures proposed by the European Commission.

The case, when looked at through the broader scope of competency and scope setting for the CTP, highlights the differing roles played by the various institutions. The Commission, in effect the executive branch of the European Community, had been active in devising and proposing measures for agreement by the Council. However, as set out under Article 75 of the Treaty of Rome, action in the field of transport policy would require unanimity of the Council. The way by which the measures became bogged down within the remit of the Council perhaps highlights the sensitivity with which transport policy was treated by Member States. The European Commission, by way of its establishment is supposed to have the ideas of the EC at the heart of its actions whereas the Council, made up of the heads of state of the Member States, by virtue of its composition has the individual Member State interests at heart in many respects despite a willingness to engage at the European level.

In the 30 years since the first musings of a European transport policy there had been remarkably little action besides some measures aimed at cost reduction and improving accessibility between European countries. However, in many ways this is not surprising given the political and economic challenges Europe was facing at the time. European integration was still finding its feet. The main codes identified within

the judgement relate to competency, scope, implementation, commonality and coordination. The important takeaway from the content analysis in this section is the way by which the code *implementation* appears for the first time. This marked the first stage at which the actual implementation and the need for a programme of action was set agreed and acted upon. The wider theme remains the same as the Treaty of Rome, legal basis and structure of the European transport policy given implementation is only mentioned rather than substantively acted upon.

The early stages of the policy's development were plagued by indecision, lack of agreement and an overall absence of forward momentum. It was not until the mid 1980s that real impetus was injected into the process. The early European transport policy suffered from the same problems as other areas throughout this period, namely the divisions and debate about European integration and which powers should be transferred to Brussels. The role during this time was primarily based on coordination and developing the legal basis for a more comprehensive policy in the future. The principal limitation

The Beginning of the Trans-European Networks

Many of the references to transport within the Maastricht Treaty are a reiteration of the previous commitments under preceding treaties including Article 75, the establishment of overall objectives and voting procedures. However, one of the most crucial new inclusions in the Treaty is the Trans-European Networks (TEN-T). Article 129b under Title XII states that:

“To help achieve the objectives referred to in Articles 7a and 130a and to enable citizens of the Union, economic operators and regional and local communities to derive full benefit from the setting up of an area without internal frontiers, the Community shall contribute to the establishment and development of trans' European networks in the areas of transport, telecommunications and energy infrastructures.” (European Union, 1991, 51)

The TEN-T programme in later years would become the primary driver of European Transport policy along a number of planned corridors. The importance of this inclusion at Treaty level represents the agreement among member states on the vehicle through which a meaningful transport policy, including infrastructure and service projects would be implemented. In this way the Maastricht Treaty represents a fundamental shift or further step in the integration of transport policy as it goes beyond just the removal of barriers to providing a cross border service or allowing costs to be cut. A recognition of the need or desire on the part of the EC and now EU to play a more decisive role in the facilitation of transport at a level previously reserved for Member State governments and local authorities.

In order to reach the objectives, set out in Article 129b three measures were outlined at Maastricht: A series of guidelines aimed at identifying suitable projects, greater technical standardisation and financial support of member state projects which have a common interest identified in under the aforementioned guidelines. Projects may also be funded from *cohesion fund* to be established by the end of 1993 (European Union, 1991, 51).

The main codes identified within the Maastricht Treaty document are sovereignty, competency, legal basis, scope, transport networks. As such, the Maastricht Treaty follows in a similar vein to the previous Treaties as far as setting the overall objective and the competencies of each institution, providing the framework for the European Transport Policy in the widest possible sense following agreement from Member state governments. The most important takeaway from the Maastricht Treaty is the inclusion of the TEN-T programme as this would become a core element of the following strategic documents and frameworks developed in the subsequent decade. Over 30 years after its inception the CTP finally had a vehicle for its implementation and development.

Moreover, it is important to situate the developments seen in the Maastricht era within the wider scope of European integration. Maastricht was the moment at which the European Communities (EC) became the European Union. The Treaty marked the start of a process towards the monetary union established in the following years and was a key step in the often-cited process of “ever closer union”. Other important steps were made in a number of policy areas including justice and home affairs and the common foreign and security policy.

The Trans-European Networks can be described a vehicle for the implementation of the European transport policy. Through the networks the required projects could be identified, and a coherent *European* network could be designed. Many have raised concerns and complaints about the TEN-T programme, and it has often been labelled as an idealistic shopping list. However, the TEN-T programme is instrumental in defining the enhanced role that Europe would come to take through the 90s and mid 2000s in terms of infrastructure development rather than the earlier role of coordinator.

From Treaty to White Paper

In 1992 the European Commission released the first of a series of transport white papers. The white papers can be described as a type of translation of the objectives determined in the Treaties and ideas for the network from the TEN-T programme to the implementation phase.

The 1992 White Paper was largely developed in response to the CJEU judgement of 1985. The document begins with the identification of themes associated with the transport industry in the EU and these identification chapters provide important insights into the themes informing and shaping the CTP at different points in its development. Thus, they provide a strong source of comparison at different points in time.

Perhaps the most crucial sentence within the document is found in paragraph 8 in which the document states:

“Therefore, 1992 marks an important turning point in the evolution of the CTP from a policy which has aimed essentially at the completion of the internal market through the elimination of artificial regulatory barriers to the provision of services, towards a more comprehensive policy designed to ensure the proper functioning of the Community’s transport systems on the basis of an internal market in which any remaining restrictions or distortions should be

eliminated as rapidly as possible, while taking into account the new challenges likely to confront transport policy in the post- 1992 period” (European Commission, 1992, 5).

This passage is of great importance as it provides a recognition of the changing face of the CTP from the originally discussed and agreed way forward of enhancing coordination and the removal of barriers to the comprehensive project based initiatives we see today under the TEN-T, Marco Polo and wider Connecting Europe Facility. The White Paper marks a step down in the level of analysis, planning and objective setting from the previous stages discussed insofar that actual existing transport issues are discussed relating to distinct geographical regions and areas within the Union with a view to highlight and address the existing challenges. Thus, the White Paper marks a shift to a more operational mode of thinking with potential projects discussed.

The prominent codes within the White Paper reflect this change in the level of analysis with implementation, efficiency, transport networks, competition and sustainability all coming to the fore. The repeated theme throughout the document and similar to the previous parts discussed is the role that competency setting plays. Finally, it is important to highlight the growing role and recognition of the social aspect of transport policy. For the first time the impact of both the existing transport network and the proposed route of development on the population and social aspect of the Union was discussed. This social dimension will become an ever more important part along with sustainability, with the two inextricably linked in the field of transport policy. Finally, the white paper looks to distinguish and elaborate on the challenges to be addressed in specific modal sections of the European transport industry. For the first time distinct conversations are occurring regarding maritime, inland waterway, road and rail and the needs and roles of each to fulfil are investigated.

The second transport white paper, produced in 2001, gives away the theme of the content in the title *European Transport Policy for 2010: Time to Decide*. The white paper builds on both the themes and the format of the previous white paper in helping facilitate the moves from the high level structural and legal basis setting initiatives within the Treaties and Treaty negotiations to the implementation and objective setting level of individual projects. The 2001 white paper provides a consolidated list of around 60 key measures that would further enhance the CTP and help reach the goals set out both at a Treaty level but also at the more micro level.

For the first time in the CTP the white paper plays a review function for projects previously initiated since the 1985 CJEU judgement. The success of the implemented projects and the way by which they contribute to the overall strategic goals of the CTP is often one of the first elements to be questioned and thus the steps taken towards including methods of accountability and review would surely be welcome. Accountability and review at the project level will be further discussed in the next section.

Continuing the trend established in the 1992 white paper, the codes identified within the 2001 white paper further highlight the movement to the operational level from the legal basis and structure setting in earlier years. The codes identified include

commonality, coordination, implementation, competition, efficiency, sustainability, transport networks, congestion and enlargement. When looking critically at the content analysis to this point one can see the gradual lengthening of the list of codes applied to the documents, this is a logical step as the strategy is refined and applied to individual regions, areas and transport modes. Another important aspect of the coding to assess here is the first feature of enlargement, around the mid 2000s the EU would expand rapidly to Central Europe and many states formerly of the Soviet Union. For the first time the EU would be taking in members whose transport policy and infrastructure varied considerably from the well developed economies of Western Europe. Therefore, the stated function of the TEN-T networks and the emphasis placed on *connectivity* came to the fore. Linking these new, developing economies into the heart of the European single market was to become a crucial trend in the coming years. With European enlargement comes a renewed focus on transport playing the role of facilitator of economic integration and development. Connecting the core to this new European periphery would be paramount to the successful growth of the EU. These rounds of enlargement perhaps directed attention away from problem solving towards macro-economic and political aims.

The white papers are clearly intended to give practical effect to and narrow the scope of the European transport policy. However, the issues exist with the coherence of the policy and the objectives it is attempting achieve. As will be seen in the section below, many of the implemented projects are seen to have little added value which raises fundamental questions as to the aims and objectives of the policy itself.

The Review Function

The 2006 report's principal function is to review and report the achievements, failures and overall progress in reaching the objectives set out 5 years earlier. This 5-year review is an important part of any analysis carried out on European transport policy and it improves the ability to report on the success of implementation rather than just the stated aims and objectives. However, the objectiveness of the reporting may be hampered by the document being produced by the same institution carrying out and implementing these projects. The 2006 review differs from other reviews and assessments that will be the focus of the section of content analysis in so far as it provides a review of the policy and agenda setting rather than purely implementation and project-based concerns.

In addition to a review of the objectives and wider policy the 2006 review provides an overview of the status of some projects implemented over the previous 5-year period since the white paper and also long running projects which had been started beforehand. However, more importantly when addressing the structural and institutional framework is the investigation and analysis of the key trends and drivers within the CTP framework. In the case of the 2006 review, a fairly substantial shift towards a more environmentally friendly and environmentally aware transport regime is evident. This is combined with a wider acknowledgement of wider societal and demographic changes occurring in Europe at the time. In essence the document shows a realisation of the requirement for a holistic transport policy tapping into wider economic developments such as sustainability initiatives but also embracing the ever-increasing rate of technological change and advancement. The

final theme which takes on an increasingly prominent role is European enlargement. The White Paper on which the review is based was produced prior to the first round of enlargement in 2004 and thus the 2006 review provides the first publication in the aftermath of an enlargement process. The document stresses the need and desire amongst both the European institutions and Member states for increased joined up thinking, coherence and levelling between the European regions.

The codes associated with the 2006 review include sustainability, enlargement, social and coordination within a wider theme of sustainability and accountability. This change in theme from the previous decades which was based primarily on legal basis and structure highlights the growing role of wider influences on transport policy beyond the traditional focus on efficiency and cost. This emphasis will continue to grow and move the heart of the CTP, especially with the next stage of the development, the Greening Package of 2008.

Oversight and monitoring are a key part of any political system and the policies it enacts. As such, following the increased spending and momentum in terms of delivering the European transport policy, a comprehensive review mechanism was required. While the European Court of Auditors plays an important role and this will be explored later, the European Commission also carries out these functions. As such, questions can be raised as to the independence and utility of having the institution which creates and determines the direction of the policy carrying out its review and evaluation.

Individual Challenges – Sustainability and Congestion

In 2008 the European Commission set out the Greening Package for transport. The package was a series of measures aimed at producing a “strategy to ensure that the prices of transport better reflect their real cost to society, so that environmental damage and congestion can gradually be reduced in a way that boosts the efficiency of transport and ultimately the economy as a whole” (European Commission, 2008, 1). The package represents the first measures aimed explicitly at reducing emissions and the negative environmental externalities caused by the transport system as opposed to enhancing recognition of such issues. The main codes identified throughout the package include sustainability, externalities and social and the theme remains the same as the previous item, sustainability.

The second item in the series of review studies was produced in 2009. The document fulfils the role of a ‘end of term’ review as the 2001 white paper set the agenda until 2010. In a similar format to the 2006 review the 2009 study investigates, reiterates and in some cases updates the trends, drivers and challenges associated with the CTP. Building on and going into more depth than the 2008 package, the review places sustainability and the removal of externalities at the heart of the envisaged trends in the coming years, a theme reflected in the following White Paper realised in 2011.

The second new trend introduced in the 2009 review is the recognition and analysis of the growing scale of transport. This is both in terms of demand for transport services but also in relation to the capacity of the transport modes. As explored in the earlier literature review throughout the time period in which the CTP was evolving, the scale of container vessels and thus the demands placed on the

transport network was growing rapidly. As such, the 2009 lays the foundations for the future analysis in terms of capacity limits and the need to combat congestion in the European transport system, a prominent challenge identified in the existing literature. The introduction as capacity and congestion is an important point as in later measures and documents bottlenecks and congestion are at the heart of the challenges faced. In the long-term development of the CTP these issues have only surfaced in the last decade yet now dictate much of the need for infrastructure and project spending. As will be explored in more depth later, the *well-developed* corridors of Western Europe and especially north western Europe feature heavily in the programmes in order to combat these problems drawing resources away from the connectivity and standardisation priorities seen earlier. Around 2009 the world's largest container vessel was around the 14,000 TEU mark. In the following years rapid growth both in ship size but also fleet size would occur, exacerbating some of the issues identified in the literature review.

In more recent years when challenges such as environmental responsibility and congestion came to the fore some of the inherent contradictions of the policy began to surface. In the early years the aim of the policy could clearly be seen to be integration, cohesion and bringing Europe closer together through better pan-European links. However, the resources required to deal with the later challenges would draw attention away from these initial aims and thus cause friction. This is not aided by the fact that many areas facing congestion are located in the more economically developed areas of Europe rather than the newer Member States. As such, political motives and divisions would likely surface.

Where we are now?

In the same way as the previous 2001 and 1992 versions the 2011 white paper aims to implement the broad policy objectives and highlights some of the key areas in which progress is to be made in the following years. Furthermore, the white paper provides an analysis and assessment of both current and future trends expected to impact and inform the policy measures chosen.

The trends and changes in theme indicated by the intermittent review papers and policy packages as outlined above have clearly informed the thinking when it comes to the white paper. Sustainability, the greening of transport and overall environmental protection, awareness and the removal of negative externalities feature prominently. A particularly important element is that the 2011 white paper actually quantifies the targets for both modal split and emissions. In previous instances these have been determined as overall objectives, but such targets have not been set. These targets have been developed within the wider geopolitical environment of climate change and the moves towards the Paris Agreement of 2015.

Building on the identified trend in the previous section, congestion, traffic and the removal of bottlenecks is a core element of the 2011 strategy. This marks an important point in this study as a whole because one of the largest challenges caused by the introduction of ever larger vessels is the impact on traffic flows, especially in key hinterland transport areas and at the hinterland connections to ports and port clusters. In the second section of this content analysis the substantive measures outlined in the white paper and challenges outlined will be addressed in

more detail. A second trend seen in the 2011 white paper is the focus on multimodality as a strategy to deal with both the issues of congestion and sustainable transport. Multimodality will feature prominently in the second section when looking at individual projects. In terms of policy framework and structure, the white paper fulfils the same job as previous editions in setting out the broad objectives of the CTP.

The coding structure identified through the 2011 white paper follows the overall pattern seen thus far, moving from establishing structure and the basis for the policy to the implementation and project activities. In many ways the 2011 White Paper is closer to this operational level than previous white papers perhaps reflecting that the competency question and the functional designation of the European institutions and the member states has now been settled. Prominent codes identified include objective setting, multimodality, congestion, capacity increases, transport networks, pollution and sustainability. The core themes associated with the programme are scope and implementation.

In 2016 the European Commission launched the so-called low emission mobility strategy. The strategy gives off a similar message and function as the 2008 greening of transport package insofar as targeting specific areas and modes for policy measures aimed at enhancing the environmental friendliness, or at least reducing some of the harm caused. The strategy provides an operational level framework and programme for reaching the targets set out in the previous white paper.

The follow up policy packages, as in 2016, show a determined effort to avoid the slow rate of proposals and lack of action which occurred in the early years of the CTP. This has coincided with the growing recognition both amongst policy makers and the wider population of the role of transport in growing the economy but also the impact on the environment and the ways by which the two can be reconciled. In some ways the movement towards follow up studies and reviews add to the signalling role the European commission has come to perform. There has definitely been a move towards greater information exchanges and actively encouraging public participation in agenda setting within transport policy. Environmental standards and emission friendly policy objectives has by this point become one of the most developed strategic objectives of the CTP, alongside the TEN-T projects.

The final document reviewed as part of this section is the 2016 mid-term review of the 2011 white paper. The review again fulfils the role of increasing accountability of the CTP, allowing those involved in its implementation to gauge the success in value for member states and ultimately tax payers money but also in terms of achieving the strategic objectives set out at the beginning of the decades and finally, whether these objectives still fit well with the current political and economic environment.

In the case of the 2016 review, the overall outlook is fairly negative. The paper cites the lack of follow up and implementation of important projects but also in the lack of proposals to be approved. Questions over implementation of projects has been a key theme throughout the development analysed in this paper and perhaps explains some of the limitations of the European transport network in dealing with the impacts of megaships. A more micro analysis is required to analyse this question

further but the apparent disconnect between the overarching policy goals and objectives determined and the implementation or success of the projects is clearly a limiting factor in completing an efficient, fully functioning single transport area.

Congestion again is stressed as being one the biggest challenges facing the network. As mentioned previously, congestion has been recognised as a problem only recently but has now become one the main issues, this perhaps suggests that congestion is worsening at an increasing rate. The codes identified in the 2016 review include accountability, congestion, social, transport networks, multimodality and implementation. The core themes are implementation and accountability.

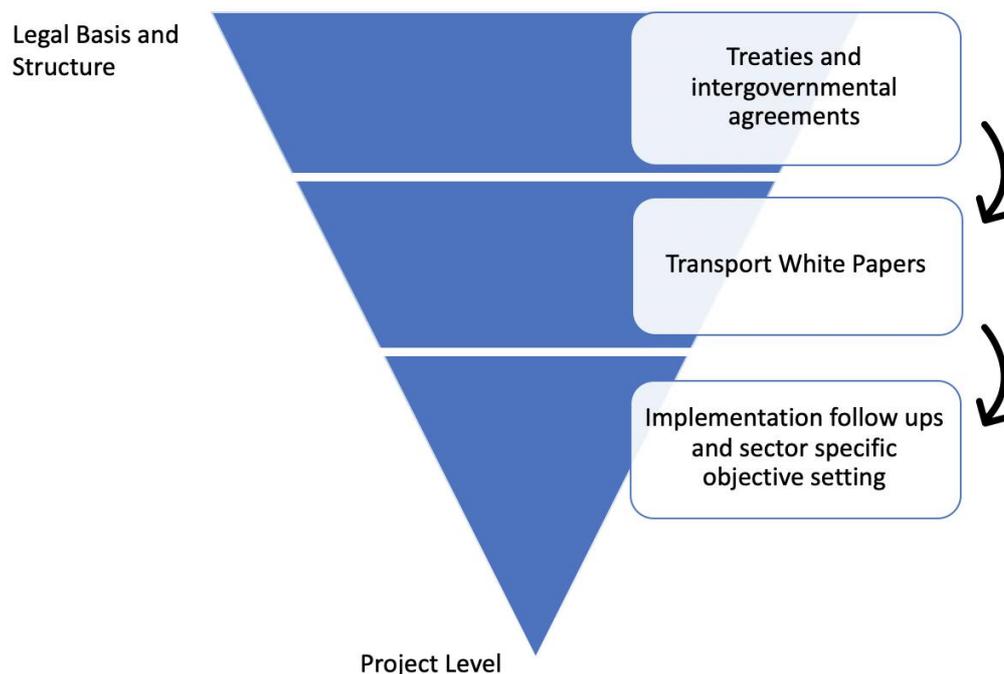


Figure 3: The narrowing of European Transport Policy from the initial legal basis to the project level.

The second section of this chapter will focus on the agency diagnosis. This section will focus on the agents responsible for the implementation of the projects and the project framework themselves as a vehicle for investment in transport infrastructure and coordination attempts.

Implementation

The second half of the content analysis corresponds to phase 2 of the research framework, namely the analysis of the. Motivations, the role played by institutions and the reactions to the policy problems at hand. Furthermore, certain relationships such as that between the evaluation carried out by the Commission and the ECA is explored.

By the early 1990s many of the debates and questions regarding the competencies of the various institutions but also in regard to the division of labour between member state and European level were sorted or sorted to the extent that allowed meaningful project-based progress to be made. While certain projects had been proposed and implemented prior to the completion of the single market, a step change occurred with the morphing of European transport policy into an infrastructure investment vehicle, somewhat more active than throughout the standardisation and regulatory phase in the 1960s, 70s and 80s.

The tabulated results have been compiled following a content analysis of documents relating principally to project-based policy measures, review documents and reports from the European Court of Auditors. Following this, the final section of the content analysis will report on the results of the Rotterdam-Duisburg case study, building on the findings of sections 1 and 2. The section will proceed as in the previous section and address the examined documents in a chronological order. Given the way the policy developed over time and the nature of the sources consulted this would be the most logical approach. The documents begin with the micro level objective setting and establishment of funding mechanisms and move through to assessment, review and evaluation of both the projects and the wider policy.

Lack of Substance

Firstly, in 1993 the European Commission sought the views of the Economic and Social Committee. Following the signing of the Maastricht Treaty in 1992 the pace of developments within the CTP appeared to quicken. As explored in the previous section, the first transport white paper was presented in 1992. The opinion of the Committee thus comments and seeks to critique the outlined objectives set out in the white paper. The opinion document raises a number of important points which provide the basis for themes running all the way through the implementation phase, right up until the latest round of reviews between 2016 and 2018. The contrasting and perhaps conflicting goals of European transport policy are highlighted; an essential public service and a balance in the competition between transport modes.

In essence, the dual faced nature of transport policy underlays some of the many critiques and perhaps even undermines the foundations of the policy causing the issues that will be evident in later sources. By trying to strike a balance between serving the public interest, that of mobility, and providing a stable free market for transport providers, European policy makers have set themselves a difficult task. These difficulties are again highlighted in the opinion of the committee who stress the need for improved evaluation, planning and selection criteria for the projects. The Committee stresses and draws attention to the questionable track record that already exists in regard to the implementation of transport related projects. The challenges posed by the duality in the policy objectives will surface time and time again across numerous objectives, at multiple policy levels. It is important to note that these concerns were beginning to surface as early as 1993. The early 1990s is the point at which European action in the field of transport really took hold following the design and agreement of the Trans-European Networks – the key vehicle for advancing transport infrastructure and connectivity. As will be seen throughout the content analysis, both temporally and emanating from a variety of sources, these questions and the problems they later cause remain a constant factor. The disconnect between objectives, institutional setting and project implementation was seemingly present from the very beginning. The codes identified within the 1993

opinion are: implementation, policy objectives, diagnosis, project rationale, evaluation criteria, assessment and critique.

The Finances

In 1995 a Regulation of the European Parliament and the Council of the European Union paying down general rules for the granting of financial aid for the Trans-European Networks was signed and came into force. The guidelines, in combination with the later 1996 guidelines on the development of the Trans European Transport Network, provide a legal and regulatory framework for the proposal, agreement and implementation of projects on the ground. The agreement of such guidelines marks a concrete step on the journey away from ideational and macro level policy objective setting towards the means of reaching these goals. The agreement of the guidelines at the point in time fits well with the themes explored in the existing academic literature about the morphing of European transport policy from a regulatory, standard setting, open market based and competition enforcement body to one whose role would be to allow, promote and facilitate the growing interconnectivity of Europe and enhance the infrastructure corridor approach. The development of funding a project-guidelines is the type of step forward that was lacking during the early years of development of the CTP.

The guidelines on the development of the Trans-European Networks provide the first comprehensive description and the micro-economic aims, location, data and technical specifications that European transport projects must adhere to. While the guidelines mark a positive step in terms of policy momentum the actual success of the guidelines is questionable. As mentioned briefly above, a common and recurring theme within the review and assessment literature is the lack of effective planning and evaluation criteria in terms of project selection. The empirical effects of such will be shown later but the centrality of these guidelines and the importance they possess for guiding very costly projects central to the planned economic development of the region or country.

The codes identified within the guidelines, especially those on the development of the Trans-European Network for transport are telling in regard to the morphing of the discourse away from that seen in section 1. The codes relate to project implementation, transport networks, road, rail, and maritime. For the first time, the technical requirements and plans for model specific projects were starting to be discussed. The EU institutions were thus moving away from setting objectives such as “cohesion”, “development” and “interconnectivity” towards setting concrete, attainable targets in terms of return on investment, added value and environmental performance.

In 2004 the guidelines were updated. The renewed guidelines are telling in terms of change and innovation or lack thereof. With only minor differences between the 1996 and 2004 versions one could suggest that there has been a distinct lack of forward movement or momentum. A key element of the documents explored in section 1, and especially the white papers was the constant updating of trends at both the micro and macro-economic level. The way by which the implementation guidelines do not keep up with these changes in trends is perhaps telling of the disconnect between the broad, ideational policy objective setting and the way things were going on the ground. However, the notable exception is the section relating to

environmental and sustainability performance. These elements had clearly grown in importance and were now central to project performance evaluation.

The development of funding guidelines gave practical effect to the shift of the CTP towards the development of transport infrastructure. The cost and time taken to implement transport infrastructure projects and sensitivity around EU spending meant that these guidelines were crucial for the future of the policy. The guidelines provided a solid basis for the funding of projects however, when these projects were in the implementation phase they were dogged by delays and cost overruns. These issues with the economics of the policy have led to questions regarding the criteria and initial evaluation before they were signed off.

Evaluation

In the years following 2000 the emphasis within the sources and publications very much turned to review and assessment of the projects which had been implemented under the previous white paper. Thus, they provide a great deal of feedback and information regarding both the success, failure and role of the CTP. The 2009 review is the first comprehensive review of the CTP and the introduction of the updated funding and practical project guidelines. 2010 was always a key date for the project to be judged on given the plans and timeframe set out in the white paper. In total around €400 billion had been spent in the intervening period showing definite progress on the implementation front, in stark contrast to the failure and slow pace of change in the 1980s and early 1990s. However, spending for spending's sake comes to mind when assessing the evaluation section of the source. There are multiple references to project delays and crucially 'little added European value'. When assessing these documents against the institutional framework outlined in section 1 the diagnosis of 'little added European value' after only a few years of proper funding and implementation is a big blow to the whole idea of a single transport market and integrated transport systems central to this study, the role of the maritime sector, are the comments relating to the relatively new Motorways of the Sea project. The MoS project aims at enhancing maritime links between two or more European member states including both the gateways and ports, but also the hinterland markets. The MoS project was described as having complex and difficult funding mechanisms and a lack of clear objectives.

The subsequent Commission consultation document seeks to address some of the issues which have been identified through the mid 2000s review publications. Principally, the overall aim of the consultation is to explore and adapt the CTP in order to better align project implementation with macro objectives established through since the Treaty of Rome and linking to the wider European and single market project. The documents, when taken in relation with the others explored above show the incredible difficulty that European policy makers and member states were encountering when achieving the ideational concepts of cohesion, interoperability and network growth and connectivity. The numerous problems encountered which included delays, underutilisation and ineffective investments point to either fundamental flaws or a misunderstanding of the needs of the network. Furthermore, the idea of added European value figures prominently alongside the question of awareness amongst ordinary European citizens.

The Role and Actions of the European Court of Auditors

From 2005 onwards a number of special reports and reviews of the Union's transport policy were published by the European Court of Auditors. These reviews and reports have a key role as part of this study due to the important accountability and review function that they perform. As an independent 'guardian' of the EU's finances the reviews they carry out may be more objective than those presented by the Commission regarding the implementation of the CTP. Overall, both the overall transport policy and individual transport modes have been addressed. The 2005 report is the first in a series setting out the limitations and, in many ways, failed implementation of the CTP. In the document the ECA bases its conclusions on the numerous delays across many projects, the ineffectiveness of completed projects and the overall lack of added European value derived from them. Furthermore, the actual workings of the CTP are questioned with both evaluation criteria for the decisions regarding new projects and the monitoring functions carried out by the Commission coming under intense scrutiny. An important feature to note is the lack of progress in facilitating smooth and effective cross border links. One of the pillars of the CTP was creating a European transport space in which crossing borders should be as seamless as possible. Overall implementation of this ease of access between European countries is one of the most disappointing aspects, especially from the point of view of maritime transport given the large contested hinterlands that the major ports are competing for.

Linking to previous observations made as part of this study, the failure or perhaps lack of intent on behalf of transport policy makers to be problem solvers rather than idealists on the shape of the future European transport area is becoming more and more evident. Funds are directed to projects aimed at achieving the higher-level interconnectivity of Europe which neglects some of the smaller scale issues developing as a result of increased transport network usage. The growing role of congestion and bottlenecks in the literature provides evidence of this.

The 2012 special review focussed on the maritime sector and investment projects at seaports. Overall the judgement of the ECA was negative despite some successful projects. One of the key flaws in the development of maritime transport links has been the disconnect between planning and implementation of infrastructure projects and long-term development planning of seaports. A misunderstanding of the long-term needs of ports or port clusters has been highlighted. When looking at some of the individual projects undertaken and the lasting impact this disconnect is evident. Some projects have been completed only to later be under-utilised or not utilised at all and others did not solve the problems they were implemented to solve. Again, delays and cost overruns inform much of the report and the idea of little added European value remains prominent alongside evaluation criteria and monitoring.

Through both sections 1 and 2 of this content analyses it has become evident that the same problems and flaws have repeatedly surfaced. Thus, it is becoming evident that the CTP has failed to adapt to changing circumstances and relates faced on the European transport network. Again, this leads back to the disconnect between policy levels with the agenda setting bodies working towards aims and objectives that may not be realistic or achievable given the situation within each member state and on the transport network itself. With the continuing issues and failure to address fundamental changes when required the European Union has in

essence undermined its own role. It has not been able to achieve its own aims and objectives, nor has it been able to address specific problems because they have not been the focus of the policy. This void that has grown between existing problems and the aims of the policy will be explored further in the final content analysis section.

Over the course of 2016-2018 the ECA produced in depth studies for maritime transport, rail transport and inland waterway transport. Across all the transport modes similar issues have been encountered, principally relating to a failure to reach stated objectives through the projects chosen for implementation. Common across all modes is the failure to achieve meaningful change in the modal split. Facilitating intermodal and multi modal transport and changing the modal split across the European transport network has been at the core of CTP efforts given the contribution it can make towards environmental and sustainability goals. The limitations set out by the ECA across the documents are both project-based and policy based. Cost overruns, delays and ineffective investment feature prominently and relating to the institutional level, poor monitoring, communication and mismatched objectives are central to the judgement.

The latest review takes more holistic approach and, in essence, provides a kind of summary opinion on the last decades of European transport policy and policy implementation. The landscape review provides a reiteration of the recommendations made throughout the review and assessment documents stretching back to the early 2000s. The document highlights the same challenges, limitations and recommendations which had been highlighted over and over again.

The implementation diagnosis has shown that the majority of the projects and series of projects have not be deemed a success. Various bodies, including the commission itself and the independent financial watchdog of the European Union, the European Court of Auditors have highlighted numerous flaws affecting the policy. These includes a lack of or poor evaluation and monitoring but also more practical problems relating to delays and cost overruns. When taken in combination with the structural diagnosis there appears to be a disconnect between what the policy makers are looking to achieve, the plans for implementing it but also how it is being implemented. As such the definition and identity of the policy seems to fall away once one goes to a deeper level than the idea of trans European corridors as part of the TEN-T programme. To highlight how this is likely to affect the way by which the policy can deal with issues such as those posed by megaships an analysis of key empirical network problems will be carried out before ultimate conclusions are presented.

The preceding section and this section link closely together. The focus had very much shifted, and review had become an essential part of the process, helping to give the project greater political legitimacy. However, once the reviews were independent on the implementing institution many issues were identified across all modes, locations and project types. When looking holistically, as this conceptual chapter has sought to do, it is important to question whether these flaws discovered through the implementation phase were down to the initial policy not fulfilling the needs of the EU or lacking a true understanding of the role of European transport policy.

3.5 Hypotheses

The conceptual part of this thesis has conducted an analysis of both the existing academic literature and a number of European Union policy documents in order to understand the role, objectives and limitations of the European transport policy. By tracing the policy through its development but also separating the process of establishing the policy from its implementation and review, a number of conclusions can be made, and hypotheses developed for testing in the empirical section.

In terms of the role of the European Union in the field of transport and transport infrastructure it is evident that network problem solving is not the key element. While responding to growing problems has started to come into the discourse surrounding the CTP and the TEN-T programmes, the overarching role remains integration, cohesion and development of the Union. As such the CTP is a means of completing or furthering the Single Market rather than a solely transport related entity with transport related goals or problem solving in mind.

The structural diagnosis has shown evidence of a number of fundamental limitations and challenges that the current incarnation of the Common Transport Policy. Firstly, there appears to be an intrinsic confusion as to what the CTP sets out to achieve. On the one hand the discourse is centred on the linking the core (North Western Europe) to the periphery following enlargement and thus addressing the differences in economic and transport network development. Yet, at the same time the transport policy also aims, on a corridor level, to address more practical concerns such as capacity, bottlenecks and missing links. From the analysis above and, as will be explored through the implementation diagnosis, it is clear that these macro and micro objectives do not always complement each other. The differing challenges and requirement between these levels have led to an apparent inability of the CTP to define itself and thus for the European Union to define its role in the transport market.

The content analysis has shown evidence of a number disconnects and inconsistencies within the policy. Firstly, in the objectives set by policy makers. Transport is fundamental to the economic growth and vitality of any nation state and thus acts as an important tool for economic development. The European Union, especially following a number of enlargement rounds, has often cited cohesion, integration and economic development as key tenets of European transport policy. However, in later years problem solving such as bottlenecks and congestion have played an increasingly prominent role in project selection. The content analysis however has shown that the areas requiring significant investment to enhance capacity are not those areas which are deemed to require enhanced integration into the existing network. Thus, having these two objectives under the same policy banner leads to mixed aims and objectives as well as political division all the way to the project design level.

The second limitation identified was along more practical lines. An oft-cited issue with numerous projects implemented under the TEN-T and CEF was the lack of effective monitoring and evaluation both before and throughout. Many projects came in over budget and considerably delayed. However, most striking is the number of projects deemed to have little added European value. Therefore, linking back to the previous limitations, the way the projects are selected and implemented have fallen

well short of achieving or helping to achieve the stated objectives. The only success in this way is the considerable improvement in terms of projects completed, the rate of which has increased hugely from the early years of the CTP.

- *What is the general role of European policy makers in terms of transport problems?*

The analysis of the existing literature and the content analysis has helped answer the above research question. Two central aspects make up the general role of European transport policy: enhancing European cohesion and integration and dealing with transport network problems. The first objective has been part of the policy since the very first moves were made towards a European transport policy. By bringing down barriers for transport operators, enhancing cross border links and improving Europe's connectedness in general it understood that Europe would become a more cohesive package. Linked to this is the idea of economic development through transport interconnectedness, an idea which gained traction following a number of rounds of European enlargement. The second part of the role has surfaced more recently. Once the EU gained competency in the provision of transport infrastructure the problems of dealing with bottlenecks, congestion and other localised transport issues became a key concern. The general increases in the scale of trade meant that these problems grew at a quick pace. An investigation of these problems will be conducted in the next section.

- *What policy measures have been taken to this point?*

Once the legal basis of a European transport policy had been settled progress was slowly made towards implementation. In the early years the measures implemented included the opening up of transport markets for service providers and enhancing standardisation throughout the European transport market. In later years the EU gained competency for upgrading and improving transport network infrastructure. In recent decades this has been done through the Trans European Transport Network. Under the umbrella of the TEN-T programme a wide variety of measures have been implemented including the building of physical infrastructure, transport studies and the development of IT and soft measures aimed at enhancing cross border cooperation. The policy measures are often outlined in a white paper every 10 years which provides an overview of observed trends, objectives and projects for the coming years.

Interaction Between Analysis Levels

Fundamental to the DoC method is the interaction between the different levels of analysis. For this study the division has been between the structural level which established the fundamentals of the policy and the implementation of the policy and actors involved. The striking feature that this study has highlighted is the distinct lack of interaction. Firstly, lessons were not learned, and changes were not made to the structure of the policy in light of numerous shortcomings. Second, with the same institution involved both in the implementation but also the overall setting of policy aims there was little objective analysis and reflection, especially in the early years of the policy. This element was improved in later years once the European Court of Auditors gained greater competency in the review function.

A second important feature to acknowledge which arises from the study is the way in which the policy remains isolated from other important stakeholders, especially Member States and private entities. A critique often put forward in the independent reviews was the lack of alignment of priorities with long term development planning. In essence, the Trans-European Transport Networks were treated as an entirely separate policy initiative from the existing national transport networks.

Overall, given the European Commission is the leading institution in the design and implementation of the European transport policy a number of the observed features are unsurprising. The European Commission is often the main institution driving the European project forward and thus the focus on connectivity and cross border links is understandably a key element of the project. Questions can then be raised as to the interplay between the Commission and the other European institution and also Member States. This would be an interesting aspect to explore but beyond the scope of this current study.

Following the content analysis and an investigation of the role of European transport policy the following hypotheses have been devised:

Hypotheses

- 1) European transport policy has been unable to match the twin objectives of enhancing European integration and cohesion through a European transport network with short term infrastructure-based challenges**
- 2) The lack of clear oversight and evaluation in the project selection has reduced the overall utility of the policy**
- 3) The increasing rate of deployment of megaships is causing capacity issues on the European transport network, primarily around key transport hubs**

The following section will test the above hypotheses against the empirics of the case at hand, the deployment of megaships and the issues caused. In a similar way to the conceptual analysis the chapter will begin with an overview of the existing literature followed by an analysis of primary data. The data in this section has primarily be taken from a comprehensive study on the Rhine-Alpine Corridor.

4. Empirical Analysis

4.1 Existing Literature

At this point it is important to situate the findings within the context of the wider study relating to megaships. Throughout the period of institutional wrangling, objective setting and overall soul searching for the development of the CTP both demand and capacity on all transport modes was increasing. This was leading to increased bottlenecks at key nodes on the transport network around large ports and urban centres. The problems identified, when taken in this context, would surely lead to further questions and consequences down the line. In essence, at this juncture the

key problem for dealing with the problems caused by capacity growth and the associated peaking and surging on the transport network is the inability for the project planners and policy makers to address real world, in some cases urgent, problems through a policy aimed at broad ideational concepts such as cohesion and integration. Despite the attractiveness and importance of these ideas to the European project the ability to meet short term challenges encountered in the transport industry is essential to successful transport policy. The policy was not designed to be reactive to short term problems, instead focussing on long term societal change.

Growth in ship sizes

The nature of this study means that it straddles a number of themes in the existing academic literature. Principally, these themes include container vessel size growth, transport network design, transport infrastructure investment and EU political decision making. Furthermore, a wide variety of methodological approaches have been employed to address some of the questions posed by these topics ranging from quantitative modelling to case studies and qualitative based surveys. While the literature remains varied on the subject, the overall trend is difficult to dispute. One study has the average TEU carrying capacity of vessels almost doubling between 1980 and 2008 (Sys et al, 2008) and Tran and Hassis (2014) state that the carrying capacity of the container fleet has expanded by a factor six while the number of vessels has only increased twofold. In many ways, the drive towards larger vessels and the subsequent overcapacity the container shipping market has been experiencing for many years now can be attributed to the behaviour of shipping lines in the expansion of fleets and fleet capacities. Significant debate surrounds the definition of a megaship, with some authors categorising those vessels over 16,000 TEU as megaships and other narrowing the bracket to those above 18,000. However, the majority of uses of the term *megaship* came around in the early to mid 2000s with the introduction of the Emma Maersk, Maersk Line's first 10,000 TEU vessel (Imai et al, 2013). In order to assess the impacts of vessel capacity growth one must first identify the drivers. This is an area which has been extensively explored in the existing literature ranging from studies in the 1970s to the present day. The first section of the literature review will track this development before moving on to the observed implications.

A number of drivers of vessel size growth have been identified in the existing literature, both on the part of the carrier and external forces to the carrier. Sys et al (2008) identify the key drivers as the upscaling of demand, strive for cost cutting and the formation of strategic alliances. Furthermore, the study goes on to look at the influencing factors which include shippers and customers, port managing bodies, technological innovation, terminal operations and developments, the carrier itself and market conditions. Economies of scale have long been seen as a principal driving force behind the immense growth in vessel sizes in recent years and the phenomenon of vessel size growth trends has been a key research item for multiple decades (Cullinane and Khanna, 2000, Ham, 2004, Sys et al, 2008, Wijnolst, 1999). By increasing the carrying capacity of a container vessel the per slot cost of transportation can be substantially reduced via economies of scale. In a review of the growth of container vessel sizes since 1994, Gilman (1999) expands on the slot cost argument by suggesting four key benefits of size increases: stowage efficiency, containership pricing, cost structure and propulsive efficiencies. The cost

minimisation idea has been expanded by quantitative studies including Veldman (1993) and Lim (1998). Sys et al (2008) quantify the expected cost savings and put the figure at a 16% cost reduction moving from an 8000 TEU vessel to an 18,000 TEU vessel.

Beyond identifying trends and key drivers, the existing literature as focuses on the optimisation of vessel sizes (Qi and Song, 2012) and the network on which they operate. Again, as explored briefly by Sys et al (2008) there is disagreement amongst some parties as to what qualifies as the optimal vessel size operating a certain route or market. Some have put optimality down to minimised costs (Talley, 1990) whereas earlier studies investigated ability to enter both origin and destination ports (Heaver, 1968 Cited in Sys et al. 2008). This earlier focus on the vessel's ability to enter a port is likely to be taken again given the immense dimensions of the world's largest and latest vessels. Some of the world's leading ports, including Hamburg are already tide dependent when receiving them, causing network and operational contingencies including discharge only calls at preceding ports on the service. Essentially, one can derive from the various studies and lines of enquiry that both the cause and effect of megaships is something that must be looked at holistically in order to appreciate the impact on the wider transport network beyond a terminal operations or network operations scope.

Finally, it is important to establish the role of global alliances and their contribution to ship size growth. The capital intensity of the container shipping sector and the struggle for profits experienced by many prominent shipping lines means that many would be unable to provide comprehensive network coverage unilaterally, as explored by Sheppard and Seidman (2001, 353) who state that "cooperation has increased because few carriers can afford to operate on trade lanes that are experiencing imbalanced trade flows, and even fewer carriers can afford to unilaterally expand their networks". The immense demand required to fill up and thus utilise the cost efficiencies of megaships has been an important factor for the pooling of demand and slot sharing agreements evidenced by global alliances. This argument has been put forward by the World Shipping Council (2018) in response to the European review into the future of the Block Exemption Regulation, stating that "the consolidated cargo volumes allow carriers to deploy bigger, more efficient vessels, which the carriers could not deploy if they all were operating individually".

Lim (1998, 362), states that "the benefits are such that no one dares to be left behind. The new mega-ships are impressively efficient on the large routes, provided they are full". This idea that nobody wishes to be left behind suggests that, while advantages certainly exist, expansion in some cases could be down to copycat behaviour and potentially a prestige issue. Malchow (2017) argues that it is precisely the drive for efficiencies and economies of scale which have contributed to the decline in freight rates in recent years, thus exacerbating the issues for shipping lines. With the newest generation of vessels, often known as the Megamax, now carrying up to 23,000 TEU and some carriers (Port Technology, 2019) suggesting that a 25,000 TEU vessel may not be far away these questions will continue, as will the utility of studies in this field.

Impact on Ports and Terminals

The reasoning behind the introduction of megaships has been explored in the literature and a common approach is to assess the impact of these vessels on the operations at ports and terminals and the effect on shipping line network design. In the late 1980s to 1990s studies such as Hayuth (1988) and Slack and Starr (1994) assessed the movement towards major hubs, as part of a hub and spoke network, capable of handling the new generation of vessels and the required landside changes following from a new technological wave hitting the maritime industry (Hayuth, 1998, Cullinane and Khanna, 2000).

The impact of vessel size growth on container terminals especially has been thoroughly explored, optimised and improved through the use of quantitative and simulation techniques (Meng et al, 2017, Alicke, 2002, Veolqui et al, 2014). The major impacts relate to the various measures of terminal performance including berth productivity, crane productivity, yard utilisation and peak/ separation factors. The introduction of ever larger vessels whilst scheduling remains constant causes increasingly complex problems for terminal operators given the service demands of their customers (Bottema, 2019). Musso and Sciomachen (2019) provide one of the most recent contributions to this area of the literature and explore the impact of megaships on the ability of a terminal to manage import flows from arrival to inland distribution. A number of interesting factors come from the analysis but the commercial challenges for terminals, the changing determinants for port competitiveness towards the ability to handle megaships and the associated cost increases have particular resonance.

Other avenues explored include the feasibility and effectiveness of new berth designs (Imai et al, 2013). Such studies investigate the possibility of handling such vessels from both sides of the berth, so called indented berths, and such a system was put into operation in the Amsterdam Container Terminal. This type of study sits within the wider field of addressing the so-called berth allocation problem or BAP (Imai et al, 2003, Monaco and Sammarra, 2007, Golias et al, 2010). As the impact on specific terminal operating parameters is not the focus of this study little space will be dedicated to exploring this area however, it is an important element within the wider context given the strong focus of the existing megaship literature of optimisation and solving terminal operating problems rather than wider economic and social issues outside the port cluster.

Beyond the optimisation and terminal and berth design literature another key trend which has received attention is the limitations caused by port geography and size. The growing dimensions of large containerships, now reaching 400*61.5*33.2 (Tradewinds, 2019), raises questions of the required port basin size, port draught, quay length and channel width. These limiting factors fit within the idea of *diseconomies of scale* as explored by Malchow (2017) who again highlights the limiting factors, especially within terminals. Such limitations feed into the liner shipping network design problem literature as certain vessels will be unable to berth in certain ports due to these prohibiting factors. Major ports such as Hamburg are at a distinct disadvantage given the tidal requirements on the river Elbe. The cost to port management bodies, local and national governments can already be seen in the case of Hamburg as the Elbe will be deepened at an expected cost of €238 million.

Moving beyond the focus on the container terminal an extensive literature is available investigating port connectivity and also connectivity between the port and the hinterland. The growth of port clusters as business ecosystems and the associated growth of distriparks, value added logistics and value-added services have led to a variety of methodologies and objectives within the port connectivity literature. Studies including Halim et al (2016) investigate and propose a strategic model for port-hinterland freight distribution networks and seeks to optimise the location of distribution centres. Alternatively, Yang et al (2016) investigate the role that port and port-hinterland connectivity play on the attractiveness of a port for carriers. In their study Yang et al use a regression methodology to determine attractiveness based on surrounding facilities and geographical conditions in the Shanghai area. The attractiveness of a port feeds into the wider stakeholder management literature given the role of port clusters in fostering economic growth, employment and regional development (Jung, 2011). De Langen and Sharypova (2013) follow a similar logic but look at port-hinterland connectivity as a port performance indicator. The key message emanating from this area of the literature is the importance that port connectivity plays in the economic performance of the port and its terminals but also on the wider regional or national economy. However, this thesis will seek to go to the next level beyond both the terminal scope and the port cluster scope and look at the port-hinterland corridor scope. Whilst hinterland freight operations and connectivity with ports is a heavily studied part of maritime economics and logistics the impact of specific trends, such as the growth and increasing number of megaships, is relatively under explored. There is an apparent disconnect or gap in the literature between analysing distinct problems facing ports and terminals through optimisation and simulation and the more macro studies looking at port connectivity and the importance of port clusters. This paper seeks to bridge this gap by providing a framework in which identifiable problems faced by operators is situated and analysed in the wider political-economic space occupied by numerous agents and stakeholders beyond port and terminal managers and encompassing political decision makers and local populations.

Impact on Inland Transport

The impact of megaships on inland transport networks has been explored from a number of angles, in some cases with a geographical focus (Veloqui et al, 2014) and in others with a modal focus (Jaffee, 2016, Sharif et al, 2011, Chen and Yang, 2010, Rizzoli et al, 2002, Parola and Sciomachen, 2005, 2009). The desired modal shift contained in the European Commission's 2011 White Paper has received a great deal of attention both in academic literature but also in terms of policy action. Programmes including the European Union's Marco Polo programme and various elements of the TEN-T schemes are focussed on enhancing intermodal connectivity and coordination throughout the supply chain. It is important to examine the links between the growth in sea going vessel size and the inland transportation network throughout both the port foreland and hinterland. The increased call sizes, peak factors and surge factors will increase demands on the inland transport network requiring investment in static facilities including cross docking and distribution centres but also investment in traffic infrastructure to deal with congestion and transport and logistics assets capable of both meeting the capacity requirements and environmental targets.

A common theme within supply chain literature (Chopra and Meindl, 2016) is the narrow focus of each actor or link in the supply chain. Each actor often aims to optimise or maximise margins for their respective activity rather than for the good of the whole supply chain. In this regard there is both a requirement and opportunity for policy makers at all levels to encourage joined up thinking and integration amongst transport providers both horizontally across regions and vertically throughout the supply chain. Europe is a prime example of this requirement given the international supply chains criss-crossing the continent.

It is impossible to assess the impact of developments such as mega-vessels without taking a holistic approach and assessing the varying stages of the transport chain. In this sense the current literature remains somewhat fragmented. A great deal of focus is placed on the optimisation of terminal operations, the relationship between costs and benefits for various stakeholders and the requirement for innovative transport solutions to meet these challenges. However, these elements remain very compartmentalised. For example, in an analysis of the intermodal connection between drayage and container terminals Jaffee (2016) introduces the notion of sequential interdependence throughout the supply chain, highlighting the need for better coordination and communication to overcome the existing transport network problems. The impact of larger vessels and call sizes on landside operations comes at the same time as carriers and logistics services providers are increasingly looking to vertical integration to overcome coordination issues and provide door to door services. As Islam (2014) has explored in relation to intermodal and rail transport connections, logistics providers and therefore performance measurements are increasingly moving away from terminal to terminal services towards door to door.

Impact on Infrastructure Investment

The penultimate theme to be examined is the role of transport infrastructure in dealing with the impacts and challenges of vessel growth. The recent technological developments both relating to waterside and landside transport activities have further increased the capital intensity of the maritime and transport industry. The huge sums involved raise important questions as to who should be responsible for their financing with ongoing strain on public budgets a key factor to consider (World Bank, 2007). Changing management and ownership structures also play a role given the increased role of the private sector in providing what has been seen up to now as a public good. Geographical variations also apply with port developments in Africa taking a very different route to completion from the projects in Europe involving different stakeholders and financing methods.

Europe has one of the most well-developed transport networks in the world but many areas, especially in north western Europe suffer from growing congestion, especially around major transport hubs such as Rotterdam and Antwerp. This congestion is a factor across all modes including trucking, rail and inland waterway. As in most fields, transport policy in Europe is complex with a variety of actors responsible for differing policy areas, operations and planning. Furthermore, in recent decades the role of the private sector has grown enormously, particularly in the port and maritime sector. The desire to implement the Common Transport Policy (CTP) can be traced all the way back to the Treaty of Rome 1957 but neither the political will to create or transfer powers for transport policy making at that time (Zajac, 2015). Within the existing literature studies such as that by Zajac, (2015),

Ponti et al (2013) and Otsuka et al (2017) trace the development of the policy from the Treaty of Rome to the 2011 European Commission White Paper on establishing a Common Transport Policy. More specifically, Marshall (2014) provides insights on the background and developments within the Trans-European Transport Networks, a central pillar of the Common Transport Policy. The TEN-T project is funded primarily from the Connecting Europe Facility (CEF) sets strategies and objectives for European transport corridors through both multi-annual and annual programmes for the development of infrastructure and network processes (DGMOVE). The projects are under the oversight of the Directorate General for Mobility and Transport on behalf of the European Commission. Overall, this thesis will not seek to elaborate on how the current policy situation evolved as this is well covered in the existing literature but seek to identify challenges, go beyond and situate the current issues facing the transport network within the framework and look to provide an assessment of effectiveness.

Within the existing literature a number of drawbacks and failures of the both the Common Transport Policy and the implementation through TEN-T have been established. Ponti et al (2013) open their account of these issues highlighting the way the network grew on maps but failed to do so physically, further stating that the implementation of the projects has been wholly unsatisfactory. This failure of implementation has been mirrored in the port sector, highlighted by the struggles to both agree and implement the Port Package, both being rejected twice by the European Parliament following pressure from multiple sources (Ponti et al, 2013). The analysis of Peters 2003 indicates that the problems facing European transport policy have been an ongoing theme throughout the past decades and Peters principally highlights the conflicting plans and investments, stating that “EU transport investments lack consistence and sustainability due to the existence of partially complementary, partially competing EU development objectives which are in turn expressed through four key storylines: ‘cohesion’, ‘polycentricity’, ‘missing links’ and, most recently, ‘bottlenecks” (Peters, 2003). On a more operational level Proost et al (2013) have analysed the effectiveness of the TEN-T projects through a cost-benefit analysis of the 30 priority projects at that time. Their overall conclusion being that “Most of these projects fail the cost-benefit test and few of the economically justifiable projects would need European subsidies to ensure their viability”.

Following this review of the existing literature it is evident that a significant gap remains in terms of assessing challenges to the European transport sector arising from a single yet important strand of industry development, that of mega ships. To this point the literature investigating the challenges to the transport network have focussed on the wider questions of policy implementation and the sources of weakness emanating from the internal design and application rather than external forces. Such external forces have been analysed in light of terminal operations, but these analyses are often focussed on process and network optimisation rather than situating and looking to resolve the wider impacts on the political economy locally, nationally and regionally.

In conclusion, the existing literature in relation to the growth in vessel sizes and the associated impacts is extensive. However, the literature appears to stop short of expanding its analysis to the wider transport network. The growth of multi modal and inter modal transport means that the hinterland connections of ports are a growing determinant of port competitiveness and the competitiveness of the wider economy.

The European Union is a special case in this regard due to the integration of the member state economies into the single market and the pooling of policy making powers, including transport policy.

The final section of this study will explore the Rotterdam to Duisburg corridor, part of the wider Rhine - Alpine corridor to investigate the empirical evidence of capacity and congestion issues in the European hinterland.

4.2 Rotterdam – Duisburg Case Study

Through the conceptual part, including the content analysis, the role of European transport policy, its implementation and its limitations have been highlighted. This section will now look to apply the findings to the corridor between Rotterdam and Duisburg.

The Rotterdam to Duisburg corridor is characterised as a multimodal route with strong road, rail and inland waterway connections. The Rotterdam to Duisburg link is part of the wider Rhine-Alpine corridor, the busiest of all European transport corridors. The corridor is a central part of the so called ‘blue banana’ which encompasses around 70 million people and includes a number of major urban and economic centres of Europe such as London, Rotterdam, Amsterdam, Dusseldorf, Zurich and continuing down into Italy. Cross border freight flows along the corridor were estimated to be around 372 million tonnes in 2014 (DGMOVE, 2014), illustrating the importance of solid transport connections along the corridor.

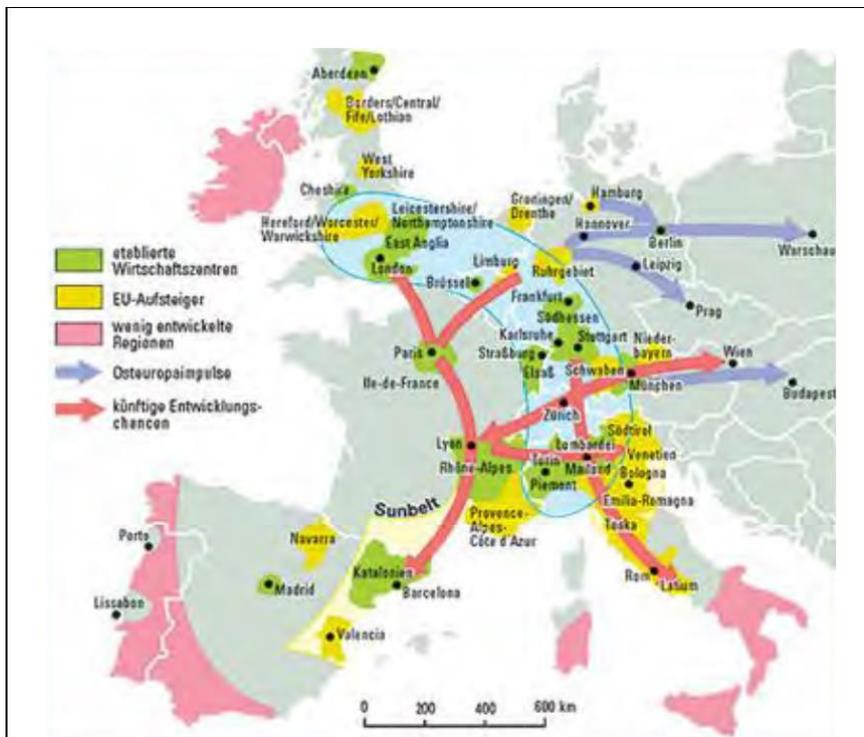


Figure 4: The ‘Blue Banana’ encompassing the industrial heart of Europe.

In 2014 a comprehensive study of the corridor and the transport needs of it was conducted. The 2014 corridor study provides an overview of the planned works, challenges and important market features. Throughout the document the aims and objectives of both the CTP and the individual corridor play a prominent role and support the findings of the earlier content analysis. Early in the document the simplified aim of European transport policy is outlined as, “the trans-European transport network shall strengthen the social, economic and territorial cohesion of the Union and contribute to the creation of a single European transport area” further corridor specific objectives include the following:

- Territorial and structural cohesion: The Core Network must ensure accessibility and connectivity of all regions of the European Union;
- Efficiency between different networks: the removal of bottlenecks, the increase in capacity of over-utilised sections and the bridging of missing links within Member States' territories and between them must be a priority for the European network;
- Transport sustainability: all transport modes must be developed in view of addressing concerns regarding sustainability and economic efficiency;
- Increase in the benefits for the users: the European transport network must answer to the mobility and transport needs of its users.

The development of the Rhine-Alpine corridor and the Rotterdam Duisburg section specifically provides a strong example of the types of projects and measures that are undertaken as part of European transport policy. Measures and projects have been implemented across all three modes of inland transportation. The plans and strategies for further development of the work programmes are carried out in two stages, a compliance analysis and a transport market study. From here, the Commission and Directorate General for Mobility and Transport put forward proposals. The programmes have been situated within a number of multi-annual frameworks (1995 - 1999, 2000 – 2006, 2007 – 2013 and 2014 – 2020). Throughout these frameworks programmes and projects have been implemented across the network geographically but also in terms of the transport modes and types of transport hubs.

In particular the frameworks have included efforts to increase the share of both rail and inland waterway. These efforts have led to the development of rail freight corridor including a new freight only rail connection between the Netherlands and Germany, the European Rail Traffic Management System and the PLATINA II information packages. These different types of schemes indicate that the policy covers physical infrastructure investment, methods aimed at improving coordination and organisation and finally, studies for the future direction of the policy. Overall a significant number of projects have taken place or are planned for the coming years. For example, in the 2014 - 2020 work plan some 145 projects were identified at a total cost of around 48 billion. The Rhine-Alpine projects have been split into three major groups (European Commission, 2014):

- Bridging missing links, removing bottlenecks, enhancing rail interoperability, and, in particular, improving cross-border sections
- Optimising the integration and interconnection of transport modes and enhancing the interoperability of transport services, while ensuring the accessibility of transport infrastructures” presents a lower number of projects

- Ensuring sustainable and efficient transport systems in the long run, as well as enabling all modes of transport to be decarbonised

The extent of work programmes marks a significant shift from the inaction of the early years of the CTP. The Connecting Europe Facility and the TEN-T project have certainly guided the implementation phase since the early 1990s however, many contest, however, that the corridors exist on paper but in reality there is little to delimit them from the wider transport network.

The disconnect and conflicting objectives are evident here. The overarching objective and sub-objective 1 are in keeping with the broader macro objectives of enhancing interconnectivity and cohesion between member states and their markets. Objective 2, however, has a completely different focus, missing links and bottlenecks, in essence resulting in a problem-solving mentality. The second part of the content analysis highlighted the problems faced in the implementation of projects and these largely related to ineffectiveness and inability to reach the stated objectives. Addressing the two areas or levels is important for the success of the EU transport network however, with a common approach to reaching the varying objectives, the measures fall short of both.

While in more recent years problem solving, such as in terms of bottlenecks and missing links, has featured more throughout the policy documentation the actual implementation has fallen well short. Two striking examples can be identified, firstly the growth of bottlenecks and capacity issues as a key problem on the network and second, the failure to achieve the desired modal split. Throughout the Rhine-Alpine study, via a number of studies including SWOT analyses, bottlenecks feature prominently as a limitation of the network. However, despite the recognition of the problem there is little analysis or evaluation as to what is causing the problems to develop at those particular network nodes. This links to the issues raised throughout the numerous studies by the European Court of Auditors relating to the evaluation criteria for the selection of projects, without determining the root causes of the problems often leads to ineffective action. Furthermore, the lack of communication and alignment between European supported projects and long-term port planning or capacity developments has been a key flaw.

As identified through the review of the existing literature on the increasing use of megaships, the key effects include higher peak and surge factors, growing call sizes, requirements for greater infrastructure investment within the port and the optimisation of intermodal connections and the modal split. However, a barrier seems to have developed and these issues are no longer recognised beyond the boundary of the port or terminal. Following the content analysis of the Rhine-Alpine corridor documentation, Rotterdam and its hinterland connections feature prominently with scale difficulties, traffic problems, road congestion, multimodal capacity issues and more general congestion. As can be seen in figure 5 the route between Rotterdam and Duisburg contain multiple bottlenecks, as does the route from Antwerp which shares the corridor for the majority of the distance.

To the extent of increasing the amount of investment in the European transport network and in terms of moving from the policy development stage to the implementation stage there has certainly been success. However, when the impact and added value of the projects and programmes is assessed the success appears

to fizzle out. At the heart of the policy the internal contradictions and confusion as to its purpose is borne out. The projects have not led to a coherent development of the European transport network in keeping with its aims or objectives but neither has the policy been able to adapt with specific challenges which have become apparent in recent years.

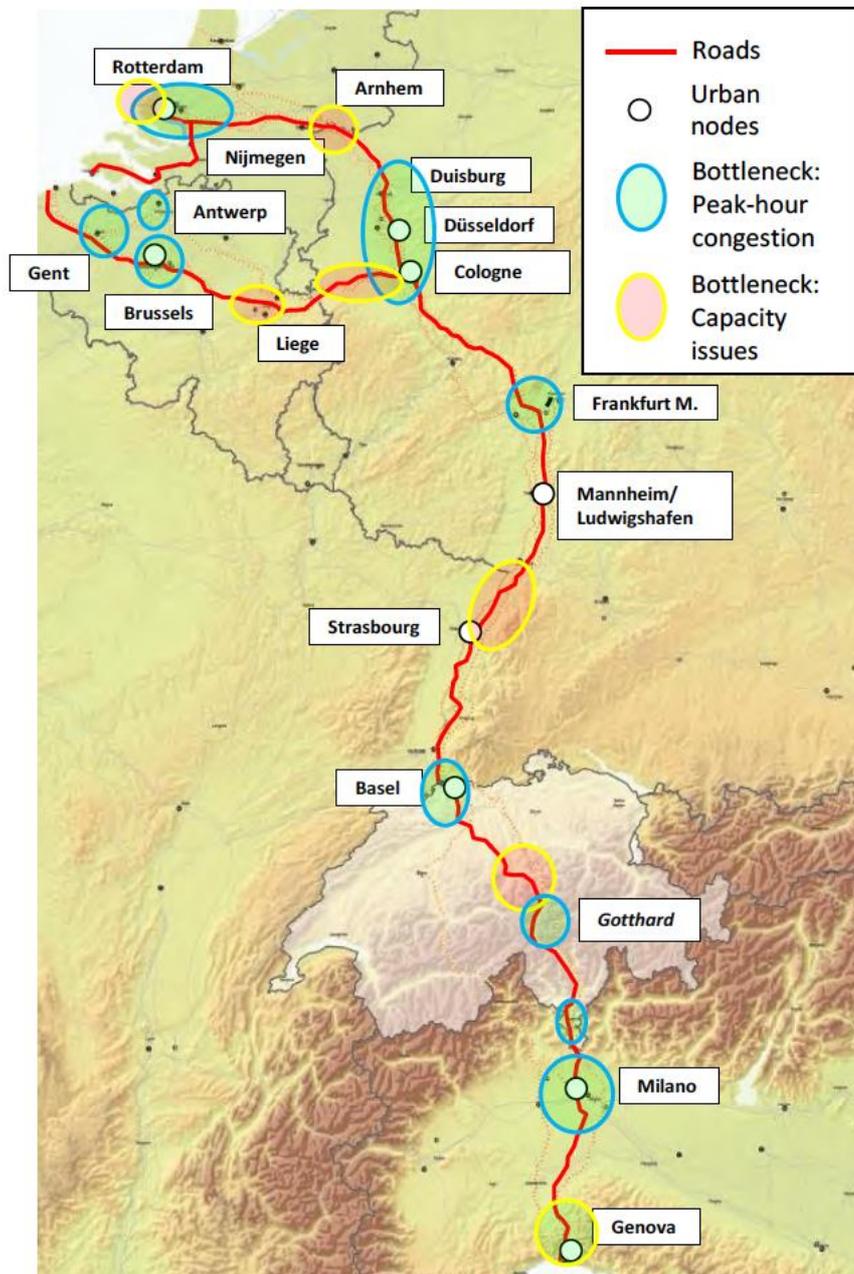


Figure 5: Key bottlenecks on the Rhine-Alpine corridor

4.3 Research Questions

- *What transport related problems are caused by megaships?*

The main transport problems that can be identified following the introduction of more and more megaships relates to congestion. This congestion occurs both at the terminal and outside, at the links between the terminal or port cluster and the wider transport network. Furthermore, as can be seen by the EU's own literature on bottlenecks, further congestion often occurs around large urban centres and logistics hubs. The congestion also impacts all modes of transport. It has been pointed out that the increased peak factors and surge factors lead to many issues with drayage providers attempting to collect containers at the terminal. Furthermore, road congestion is a well-known phenomenon in north western Europe. In terms of rail, the issues lie more with terminal and port connectivity and the difficulties in running the necessary amount and quality of services to make rail transport more viable. However, given much of the rail network is shared with passenger services, congestion remains an issue. The introduction of megaships could lead to the growth in the desirability of rail transport given the increased volumes however, this would entail a great deal of investment by many stakeholders. In terms of inland waterways, a similar story exists as that of rail. Increasing the modal split is a desired outcome but infrastructure requirements are a limiting factor. Finally, in terms of the vessels themselves, in order to ports to attract the vessels a great deal of investment is needed both within the port and at the transport connections. Infrastructure investment is notoriously expensive and takes many years to implement. The increased rate of megaship delivery means that decisions must be taken sooner rather than later in this regard.

- *To what extent have existing measures been successful?*

Overall, it is difficult to say that the measures have been a success. In terms of achieving the objective of enhanced cohesion and integration throughout Europe, the damning reports of the independent European Court of Auditors and the lack of *added European value* speaks volumes. Furthermore, on a more localised basis, the cost overruns, delays and often ineffectiveness of the completed projects raises numerous questions about the selection criteria for projects and the way they are implemented. Bottlenecks and congestion remain a problem, the TEN-T projects remains a glorified shopping list in the eyes of many, and the EU has been accused of failing to match up their plans with the long-term development plans of key transport hubs.

- *How and why have these measures been a success or failure?*

The main reasoning for the lack of success of the policy is the way by which it attempts to do everything at once. The conflicting objectives of enhancing macroeconomic integration and cohesion amongst Member States and dealing with localised transport problems such as congestion muddle the policy's design. Each objective is likely to require a different type of project and often in different locations. By trying to solve both issues under the umbrella of a single policy leads to ineffective action and a failure to achieve either objective. Furthermore, the oft cited problems with evaluation and monitoring lead to questions of the institutional actors themselves and the role they perform.

- *What are the determining factors for a successful role for European transport policy in dealing with the hinterland problems caused by megaships?*

From the analysis conducted in this study it is clear that in order for European transport policy to play a successful role it must rethink its priorities and objectives. By trying to cover all bases simultaneously it in fact covers none properly. Both European cohesion and economic development and dealing with localised transport problems are crucial to the functioning of the European Single Market but perhaps the policy area should be separate. In many ways, localised transport issues such as bottlenecks, especially when they are not cross border could be the sole responsibility of member states as they will not be trying to achieve added European value per se. By always focussing on the supra-national rather than the local, the European Union may well be poorly placed for such localised problems.

Second, the EU must pay closer attention to the previous project failures and learn from the evaluation and monitoring studies conducted to this point. Project selection must be improved given the numerous cases of ineffective projects, poor value for money and an overall lack of added European value. The significant volume of review documents provides a significant base on which to start this change.

4.4 Hypotheses:

1) European transport policy has been unable to match the twin objectives of enhancing European integration and cohesion through a European transport network with short term infrastructure-based challenges

Throughout the studies and review of the Rhine – Alpine corridor and specifically in relation to the area around Rotterdam the two sets of objectives are evident. The documentation lists both cohesion and the removal of bottlenecks explicitly as major policy objectives. As identified within the content analysis and policy implementation section, the projects needed to achieve each are markedly different. The extensive investment and numerous projects identified to help remove the bottlenecks is focussed on the areas that already have a well-developed transport network. However, improving these links at the expense of areas away from the corridor has the effect of drawing economic activity to these centres rather than aiding cohesion across each Member State or the Union itself. As identified in the existing literature, concentration on these hubs causes a kind of concentration in the core at the expense of the periphery.

Therefore, it is difficult to see how the two objectives can be achieved via the same policy or projects. Both are important for the ongoing economic vitality of Europe but with each objective requiring a different focus, the absence of significant overlap is an inhibiting factor.

Of the three hypotheses tested, the conflicting aims and objectives is supported by the greatest amount of evidence.

2) The lack of clear oversight and evaluation in the project selection has reduced the overall effectiveness of the policy

The content analysis, and especially the analysis of documents linked to the implementation of projects certainly highlights the ineffective and poor standard of monitoring and evaluation, both before and during the project. The number of projects determined to have little added value, combined with the concerns regarding the same institution carrying out both the implementation and review

functions in the early years would certainly suggest a failure to learn lessons from failed projects. Another element of the policy selection problems relates has been the failure to align TEN-T and CEF projects to the long-term planning of major infrastructure providers such as ports and terminals.

Through the case study the absence of significant root cause analysis was evident. While problems were highlighted and solutions sought by means of infrastructure investment, little attention was paid to the causes of the problems. Furthermore, there was little by means integration with the long-term development plans or forecasts of Member States or private entities such as the ports and terminals themselves. Overall, from the analysis it appeared as though little had been learned from the numerous recommendations and lack of success in the past.

3) The increasing rate of deployment of megaships is causing capacity issues on the European transport network, primarily around key transport hubs

Statistical evidence and further primary research would be needed to test the extent and the definitive link. The existing literature and the review of the Rhine-Alpine corridor provide a certain amount of evidence in favour of the hypothesis. The link between the increasing scale of trade and congestion is certainly there and has been explored in terms of issues at the terminal. From the analysis of the policy documentation it is evident that these are understood to extend to the immediate transport network. Capacity and bottlenecks feature prominently in relation to Rotterdam and multiple bottlenecks have been identified in the immediate hinterland.

The links between the hinterland and port clusters are often stressed as the critical nodes for the TEN-T network. More and more large vessels are likely to be deployed to North Western Europe and so the problems identified in the existing literature are likely to become worse.

5. Conclusion

The development of the Common Transport Policy has been a long and complex process. Beginning with the initial statements in 1956 of a desire to create a Single Transport Area in a similar vein as the Single Market and now actioned through a variety of mechanisms and projects. Many changes have occurred throughout the process. By performing a holistic analysis of the European transport policy taking into account the role of the European Union, the limitations and challenges this thesis has come to following conclusions.

The nature of the European does not help to solve this issue. With the agreement of 28 Member States often needed for any progress there must be compromise and common ground between them. A transport policy which focuses too much on one dimension has the effect of causing discontent among those Member States not receiving the same level of investment as its neighbours. Furthermore, policy making competency for transport continues to be spread between all levels of government, ranging from the local to the supra-national. These issues are commonplace across many areas of European Policy and is likely to continue.

The study has come to the ultimate conclusion that the European transport policy is ill-equipped to deal with transport network problems caused by megaships. However, these limitations are not solely restricted to this problem. The limitations primarily relate to the inability of the European Union to simultaneously work towards its twin objectives. The improvement of cohesion and integration amongst Member States and their transport networks is an important aspect for the future of the European project and dealing with congestion and bottlenecks is crucial for a smooth-running economy. However, dealing with these two issues requires contrasting approaches and there is very little overlap in solutions. On the one hand, the aims are supranational, transcending national borders and thus has a different focus from the more nationally grounded, localised solutions to congestion. There are certain places, such as at the Port of Rotterdam and other key hubs where the two share more features although the question is then further complicated by the influence of other actors, such as the terminals themselves. An expansion of this study to look at the interplay of policy makers and these private entities could be an avenue for further study.

The testing of the hypotheses through the case study has shown the flaws and limitations of the policy has fed down into the actual policy implementation. Despite the limitations of the policy becoming clear fairly early on following the introduction of the Trans-European Networks and the numerous independent reviews highlighting the issues, little was changed and improved.

On a more project-based level, the policy has been held back through poor monitoring and evaluation of the implementation phase. By this point many rounds of projects have been agreed and implemented although the problems surfacing in the periodic reviews remain starkly similar. Many authors and institutions have raised these concerns, both in the academic literature and official sources, yet little appears to have changed.

The research framework employed, the DoC method, provided a new approach to the subject. Previous literature has focussed on the more traditional approaches to shipping and trade problems and remained in the operational field. The framework guided the research approach in terms of first outlining the structural elements followed by agency and implementation and then leading to an evaluation and assessment (via the case study). As the study focussed more on the policy development it was at times difficult to complete all stages as there remained relatively little agency interaction. However, this would be an area to improve upon if the study were repeated.

Throughout the completion of this project a number of strengths and limitations have been identified. The key strength of the project is the adaptation of a political economic framework to a problem that has previously been analysed in light of organisational and simulation-based methods. Transport and transport policy impacts society as a whole and thus it is important to complement industry, port and port cluster-based research with a greater understanding of the political, social and wider frameworks and situations in which it develops and operates. Secondly, the availability of data allowed this type of research to be conducted. The number and variety of publicly available sources allows for comprehensive desk research to be undertaken. Furthermore, given the scale of the TEN-T and CEF policies across the

European Union a similar study could be conducted across other ports, port clusters or regions aiding its transferability.

The choice of methodology proved correct. By combining an analysis of the existing literature with the content analysis, a holistic understanding of the policy developments could be arrived at. The sheer amount of literary data meant that a systematic approach had to be employed in order to trace the development of themes and patterns throughout the policy development. The coding structure allowed for comparison and contrast both between documents and in a chronological way. Via an analysis of the codes identified it was simple to produce a kind of timeline tracing the phases of the policy development from legal basis to coordination and then further into infrastructure investment and finally problem solving. It also meant that the timing of different priorities such as congestion or sustainability could be assessed.

In terms of limitations, the first encountered was the need for statistical evidence to back up the increasing rate of megaships to the area concerned. Although it is recognised that the number is definitely increasing, to give a stronger empirical base to the project an analysis of megaship use would be a positive step forward. Second, in a similar vein, traffic analysis around the hinterland and on the Rotterdam-Duisburg corridor would be beneficial. There is some available data from the project studies carried out which has been beneficial in determining key bottlenecks, but it would be beneficial moving forward to make this part more prominent. As such, following the completion of the project a mixed methods approach would likely make the overall project much stronger as the trends analysed could be found and then analysed rather than relying on secondary data and existing literature when forming the problem statement.

Moving forward the study could provide a sound base for further investigation into the wider political economic or even socioeconomic impact of maritime based traffic growth on hinterland transport networks. The study could enhance the monitoring and evaluation stages of policy making as thus far it appears to be an area of enquiry which has featured little. The study would easily be expanded to other areas of the European Union given the data availability.

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