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Recommended Citation

Gimenez, J., Sweeney, E., Harvey, J.: Rail Freight in the Republic of Ireland. ,i>Irish Transport Research Network (IRTN) Annual Conference, University College Cork, August/Septemer, 2011.

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RAIL FREIGHT IN THE REPUBLIC OF IRELAND

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Abstract

In a world where freight transport is increasing, efficiency is essential. Transport by rail is characterised by its low fuel consumption per tonne. This mode of transport became extremely important during the last century but unfortunately it has been losing its importance in the logistics sector with the passing of time. However, we are currently witnessing an important transformation in the railway sector throughout Europe. This has been promoted by the European Union, with a significant allocation of resources to this issue. With the objective of increasing the volume of goods transported by rail, European nations are conducting a transformation process of their infrastructure and rolling stock. In Ireland, the outlook for rail freight is not very positive since its market share has been dangerously decreasing. This paper presents an analysis of the current situation in the Republic of Ireland. The research is based on a range of secondary sources, as well as on a series of semi-structured interviews carried out by the authors with current rail freight customers. A focus group comprising rail freight experts was also used to identify possible future scenarios.

1. INTRODUCTION

Freight transport is in continuous growth as a consequence of the concentration of manufacturing plants far from the final products distribution areas due to the globalization. This results in higher energy consumption and the need for optimization to satisfy the world's sustainability objectives.

Global politics are focused on establishing plans to overcome this problem and railways are supposed to play a leading role, both for goods haulage and passengers transport. This was the aim of the EU White Paper*, Transport Policy for 2010: Time to Decide*. Significant resources have been allocated to this issue and European nations are conducting a transformation process in their railway systems. However, goals for rail freight are not being achieved as a result of a number of barriers that have been appearing. The Republic of Ireland is not an exception and rail freight in Ireland is suffering a dramatic decrease in its market share.

To analyze this situation, different forums and studies have been accomplished by important consultancy firms and organizations like Inter*Trade*Ireland (the body responsible for the promotion of trade between the Republic and Northern Ireland), Booz & Co. and the Irish Exporters Association among others. This paper is aimed at identifying the barriers to rail freight development in the Republic of Ireland exploring the point of view of Iarnród Eireann (the national rail company) and the logistics sector, as well as current users of rail freight.

This paper is organized into five sections. After the introduction, the second section presents a literature review about the issues associated with transporting freight by rail. The third section sets out the methodology followed in this research. Findings and results are shown in the following section. The paper finishes with the conclusions section which summarizes the highlights of the research.

2. LITERATURE REVIEW: Convenience, Barriers and Recommendations in the Rail Freight scenario.

The adoption and support of strategies to increase the transport of goods by rail has become a major issue in recent years for EU policy makers. Rail haulage has been decreasing in Europe whereas it has been flourishing in the US with a market share close to 40% (compared to a decline in Europe to 8.4 % of total freight) [1]. This huge gap can be explained taking into account critical differences between North-American and European railways [2], summarized as follows:

- Haul distances tend to be longer in the USA and railways are more competitive for such distances;
- In North-America two or more rail operators compete in the same route versus road hauliers;
- In Europe there are gauge restrictions since the infrastructure is designed in general for passenger services;
- In North-America rail operators give priority to freight traffic whereas the opposite occurs in Europe since passengers receive priority;
- In Europe the railway industry is highly regulated whereas there is a more competitive environment in the USA;
- In Europe rail infrastructure is controlled by an administrator whereas this is under operator control in North-America; and,
- Railway infrastructure financing is largely public in Europe while it is largely private in USA.

The environmental sustainability of rail freight transport is well-known and widely recognized: “travelling by rail is on average 3-10 times less CO_2 intensive compared to road or air transport” and “rail is on average 2-5 times more energy efficient than road, shipping and aviation” [3]. Furthermore, if the locomotive is powered by electric energy instead of fuel, CO_2 emissions are strongly reduced: “CO_2 emissions in a train towed by diesel traction locomotive are between 2.4 and 2.8 higher than the same train towed by an electric locomotive” [4]. This is very important because dependency on fossil energy sources can be reduced, which means that in the ultimate scenario where all energy generated came from renewable sources – i.e. the objective of zero emissions - would be accomplished.

The main barriers for rail to compete versus other modes of transport are the external costs: “the prices of transport in general – and road in particular- are artificially low. Transport prices do not cover air pollution and climate change, noise annoyance, the human toll of accidents, emergency and medical services, and higher insurance costs” [5]. A comparison for external costs is shown in figure 1:

Millions Euro/year	External Costs by mode of transport			
	Road	Rail	Aviation	Waterborne
	223114	4487	6250	2632

Fig1. External Costs by mode of transport (Source: [6]).

This scenario represents a major competitive advantage in favour of the road: “External costs should be taken into account to allow a fair comparison between modes” [5]. Recent research

conducted by Booz & Co. [7] reveals that rail freight actors need to adapt capacities and costs quickly to the significantly lower demand experienced due to the economic crisis:

> "Railway operating companies as well as infrastructure companies need to invest consistently – even during the current crisis – in expanding the rail network and driving forward optimisation of capacity management and order management".

3. METHODOLOGY

The objective of the paper is to investigate the current situation regarding rail freight in Ireland and, in particular, the barriers which are slowing down its development. The specific objectives of the research are as follows:

1. to understand current Irish Government strategy regarding rail freight;

2. to understand perception of Iarnród Eireann with regard to rail freight; and,

3. to identify the external and internal factors affecting the development of rail freight in Ireland.

The analysis is based on secondary research and semi-structured interviews both with logistics companies and railway experts. The initial part of the study concentrated on gathering data about rail freight traffic and investment in railway infrastructure. That information is then used to elaborate a comparison versus other modes of transport. The second part of the study is based on gathering data and conducting interviews with Iarnród Éireann professionals to build up the perception of rail freight within the company. The final part involved a series of meetings and focus groups with experts and interviews with professionals working in the rail freight field.

4. ANALYSIS OF THE RAIL FREIGHT STATE OF ART IN THE REPUBLIC OF IRELAND

4.1. CURRENT SITUATION IN IRELAND

Rail freight traffic in the Republic of Ireland is characterized to be very low in comparison with other EU countries and almost insignificant compared with road haulage. The volume – measured in millions of tonne-km – reduced dramatically in the period up to 2009 [8]. This trend surprisingly changed during last year with the volume increasing slightly [9]. To put this in context, road haulage volumes actually decreased during this period [10]. Figure 2 shows this evolution:

Millions Tonne-km	2004	2005	2006	2007	2008	2009	2010
Rail	399	303	205	129	103	79	92
Road	17144	17910	17454	19020	17402	11687	10939

Fig 2. Millions Tonne-km (Source: [9,10]).

In any case, although this change suggests grounds for optimism, there is a long-term target fixed by the EU [1] and the reality is that freight in Ireland has seen a continuous shift from rail to road over a long period of time with rail freight now almost negligent in the context of total freight movement in Ireland. Currently rail freight customers are confined to the following small group:

Boliden: Transportation of lead from Tara Mines located in Navan to Dublin Port.

DFDS: Having taken over Norfolk line and carrying three trains per week from Ballina to Waterford Port.

IWT: Four trains per week from Ballina to Dublin Port.

Coillte: Two transportation routes are used. Firstly, a route from Ballina to Waterford depot, with a level of service of two trains per week. Secondly, trains going two days per week from Wesport to Waterford depot. In both cases haulage must be transported by road from

Waterford depot to the Smart Ply manufacturing plant. Coillte pays for road transport at both ends since Iarnród Éireann provides rail transport only.

The low market share of rail freight can be explained analyzing Government policy in this area, transport needs for freight across the island of Ireland and Iarnród Éireann's performance. Regarding Government's investment, plans are focused on road transport as it is shown in figure 3:

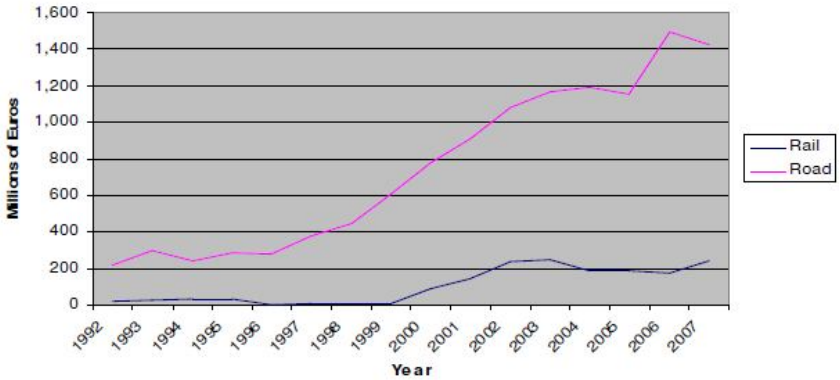

Fig 3. Government's investment. (Source: [8]).

Regarding the investment in rail, this has been aimed at increasing passenger numbers rather than freight. The Irish Government's approach emphasises moving people using public transport with freight movement taking place primarily on the roads [8]. This illustrates the lack of focus on rail freight planning.

Regarding the transport needs of the country, most freight needs to be delivered over relatively short distances from seaports. This matter was pointed out both by Stephen Aherne, Manager of Iarnród Éireann Freight, and Harry McGeehan, Senior Economist of Córas Iompair Éireann (Iarnród Eireann's holding company), and it is also highlighted in the road freight survey of the Central Statistic Office (CSO) [8]. However, in other countries – for example, New Zealand - there are many examples of freight going by rail over short distances [11]. Market share for rail freight in New Zealand is approximately 15% [12].

Regarding Iarnród Éireann's approach, there are two important negative aspects. The first one is the dependency of resources on the passenger side. Iarnród Éireann Freight shares locomotives and drivers with the passenger division of the company. Iarnród Éireann's policy dictates that the passenger business has priority when it comes to the availability of drivers and locomotives. The other negative aspect is that downloading and uploading processes have to be done by the customer since Iarnród Éireann Freight only "sells" the load transport. Both add uncertainty to the customer which makes the decision of relying on rail more difficult when designing and implementing supply chains.

4.2. THE IARNRÓD ÉIREANN POINT OF VIEW

An effective way to evaluate the internal and external factors affecting a company involves defining its strengths, weaknesses, opportunities and threats (or SWOT). A SWOT analysis realized by Iarnród Éireann is shown as follows [13]:

Strengths:

- Strategically rail-connected depots.
- Rail connected ports in Dublin and Waterford.
- The ability to move large volumes speedily, regularly and reliably.
- The ability to reap economies of scale.

- Rail is an environmentally friendly and safe mode of transport. The external cost of rail freight is €19 per 1,000 Tkm. as against €88 for road freight.
- The proven ability to move dangerous substances safely.
- The railway helps to reduce indirect social costs to the community arising from accidents, traffic congestion, pollution, land utilisation and imports of vehicles and fuel.
- Rail is most economic user of energy. While road freight uses 50 grammes oil equivalent (GOE) per tonne kilometre, rail freight uses only 22.

Weaknesses:

- Distances in Ireland tend to be short and subsequently uneconomic.
- The restricted nature of the network sometimes give rise to extended journey distances and consequently journey times, e.g. Galway to Sligo – road distance 134 km as against rail distance 257 km.
- In providing a door-to-door service, road shunt distances of 150 km and upwards can be involved, e.g. Cork to West Cork.
- Rail has to bear the cost of transhipment depots.
- Very few firms are rail connected. Without grant aid, the cost of providing rail connections to customers' premises places rail in an uncompetitive position with road.
- The absence of large-scale heavy industry, such as coal and iron ore mining, for which rail is ideally suited.
- The concentration of industry on the east coast, together with the development of port facilities around the country, results in short haul domestic movements and generally provides little opportunity for rail transport of import/export traffic.
- Being an island, there is no through rail traffic except to Northern Ireland.
- There are also some physical limitations restricting railway operations, e.g. axle load limitations, bridge clearances and the high proportion of single line trace.

Opportunities:

- There is an increased level of awareness of the environmental benefits of rail freight.
- Cork, Drogheda and Dublin Ports have expressed an interest in improving the rail links in their respective ports.

Threats:

- Open access to rail infrastructure is available to other rail freight operators.
- There is a marked increase in the number of UK bases logistics companies entering the Irish market.
- Increasingly competitive Road Freight industry.
- Significant investment in road infrastructure.
- Economic recession.

4.3. THE CUSTOMER PERSPECTIVE POINT OF VIEW

When measuring service quality, the customer's point of view is a key factor. Companies dealing everyday with rail freight service have an in-depth knowledge of the current situation and the shortcomings which are influencing the decrease of rail freight market share.

Semi-structured interviews and surveys were conducted with almost all current rail freight customers. DFDS, IWT and Coillte responded positively to our request for collaboration in this regard. Customers were firstly questioned regarding their satisfaction with the service. Thereafter the interview focussed on assessing the importance of different elements to the improvement of service. Figure 4 (below) summarizes their answers.

EVALUATION OF THE RAIL FREIGHT SERVICE	DFDS	IWT	Coillte
Satisfaction with the current service	Medium	Medium	Medium
Importance of the following issues to improve the service	**DFDS**	**IWT**	**Coillte**
Freight Transportation Time	Low	Low	Medium
Price fluctuations among different transportation modes	High	High	High
Punctuality	High	High	High
Alternative travel routes available at varying departure times	Medium	Medium	High
Availability of functional fast rail lines	Very High	Very High	Medium
Wagon customization based upon customer preferences	Very High	Very High	Medium

Fig 4. Evaluation of Rail Freight Service. (Source: Self elaboration).

There is a total agreement between the companies in relation to satisfaction with the service. Customers consider that there is a need to improve the service and evaluate it to be of an average standard (i.e.medium satisfaction). Availability of functional fast rail lines and wagon customization based upon customer preferences were chosen as the key issues to be improved. Some rail lines have low speed limits which is problematic when urgent transport is required, making road more competitive. The lack of flexibility with rail freight is also highlighted.

Punctuality and price fluctuations among different transportation modes received the same importance rating. The first is essential when relying on freight transport and it is negatively affected by the priority given to passengers over freight transport. The second is highly important and was the primary reason for Diageo's shift from rail to road [14]. A key issue when assessing the quality and satisfaction of a service is to review and analyze if changes have been accomplished to attract future customers. Current customers were asked about how different issues regarding rail freight service (punctuality, etc.) changed in the past five years.

Changes in the past 5 years	DFDS	IWT	Coillte
Freight Transportation Time	Unchanged	Improved	Unchanged
Price fluctuations among different transportation modes	Unchanged	Unchanged	Unchanged
Punctuality	Improved	Improved	Unchanged
Alternative travel routes available at varying departure times	Unchanged	Unchanged	Unchanged
Availability of functional fast rail lines	Unchanged	Unchanged	Unchanged
Wagon customization based upon customer preferences	Unchanged	Unchanged	Unchanged

Fig 5. Changes in Rail Freight Service in past 5 years. (Source: Self elaboration).

As it is shown in figure 5, not many changes have been introduced in the rail freight service during this period. The most improved issue was punctuality which is of great value for transport services to guarantee the reliability of the supply chain. IWT specifically highlighted a service improvement in terms of freight transportation time (Ballina-Dublin Port connection).

Customers consider there is a real need for the improvement of the following rail connections: Ballina to Dublin, Dublin to Waterford, Waterford to Cork, Cork to Limerick, Limerick to the West Boarder, Dublin to Cork, and Waterford to Dublin.

Other comments during the interviews were the following:

- Routes are only one-way tracks and bypass length are not enough.
- Night rail freight traffic would reduce travel times since there are no passenger services. The main barrier is the lack of agreement with Iarnród Éireann staff for night work.
- Railway infrastructure is old and not well adapted for freight transport. The load capacity of bridges is not enough and the same with tunnel clearances. Infrastructure needs to be revamped.
- Uploading and downloading processes should be integrated into Iarnród Éireann's service offering.
- Transit times are a problem. Speedier tracks could reduce these transit times.

5. CONCLUSIONS

Rail freight is not an outmoded means of transporting goods but an efficient mode of transport and a key choice to guarantee sustainability in the transport sector. This paper has presented an overview of the current situation in Ireland regarding rail freight from different points of view: the operator and customers. Different shortcomings have been pointed out. The following important conclusions can be outlined from research:

- There is a lack of strategic support from the Irish Government to develop rail freight with the majority if transport investment focussed on road transport.
- Some rail corridors need to be revamped and adapted to rail freight. Increases in speed limits are essential to compete with road.
- New strategies for wagon customization should be adopted to add more flexibility.
- More frequented rail corridors should be electrified to further reduce CO_2 emissions.
- Bypass lengths should be increased where appropriate.
- The possible entry of competitors into the rail freight market needs to be considered.

Further research will be focused on analyzing the point of view of former customers of rail freight and on elaborating a comparison with how other countries in Europe are overcoming barriers to the development of their rail freight transport systems.

6. ACKNOWLEDGEMENTS

Authors would like to thank the help and collaboration of the following people and organizations: Ivan Sheridan (Lecturer at Dublin Institute of Technology), Harry McGeehan (Senior Economist of Córas Iompair Éireann), Stephen Aherne (Manager of Iarnród Éireann Freight), Howard Knott (Trade Facilitator of the Irish Exporter Association), logistics professionals from DFDS, Coillte and IWT. Juan Carlos Carrasco would also like to thank specially to Argo Global Foundation and La Caixa Foundation.

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Rail Freight in the Republic of Ireland

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AGENDA

1. Motivation for this research
2. Convenience, Barriers and Recommendations in the Rail Freight Scenario
3. Research Objectives and Methodology
4. Analysis of the Rail Freight in the Republic of Ireland
5. Conclusions and Directions for Further Research

1. Motivation for this research

Context

- Freight transport is in continuous growth as a consequence of the concentration of manufacturing plants far from the final product distribution areas due to globalization.
- This results in higher energy consumption and the need for optimization to satisfy the world's sustainability objectives.
- Global politics are focused on establishing plans to overcome this problem with railways playing a leading role.
- Significant resources have been allocated to this issue; however goals for rail freight are not being achieved in most countries.
- The Republic of Ireland is not an exception and rail freight is suffering a dramatic decrease in its market share.

2. Convenience, Barriers and Recommendations in the Rail Freight Scenario

Rail Freight Transport: USA vs. Europe

- Haul distances tend to be longer in the USA and railways are more competitive for such distances.
- In North America two or more rail operators compete in the same route versus road hauliers.
- In Europe there are gauge restrictions since the infrastructure is designed in general for passenger services.
- In North America rail operators give priority to freight traffic whereas the opposite often occurs in Europe.
- In Europe the railway industry is highly regulated whereas there is a more competitive environment in the USA.
- In Europe rail infrastructure is controlled by an administrator whereas this is under operator control in North America.
- Railway Infrastructure financing is largely public in Europe and largely private in USA.

(Source: Enguix Peiró, J.C.)

2. Convenience, Barriers and Recommendations in the Rail Freight Scenario

Convenience of Rail Transport

Main objective is to reduce dependency on fossil energy, and rail is a good solution:

"Rail is on average 2-5 times more energy efficient than road, shipping and aviation".

(Source: UIC)

And this efficiency increases in electric powered railways:

"CO_2 emissions in a train towed by diesel traction locomotive are between 2.4 and 2.8 higher than the same train towed by an electric locomotive"

(Source: García Álvarez, Alberto)

2. Convenience, Barriers and Recommendations in the Rail Freight Scenario

Barriers of Rail Transport

The main barriers are external costs:

"the prices of transport in general – and road in particular- are artificially low. Transport prices do not cover air pollution and climate change, noise annoyance, the human toll of accidents, emergency and medical services, and higher insurance costs"

(Source: UIC)

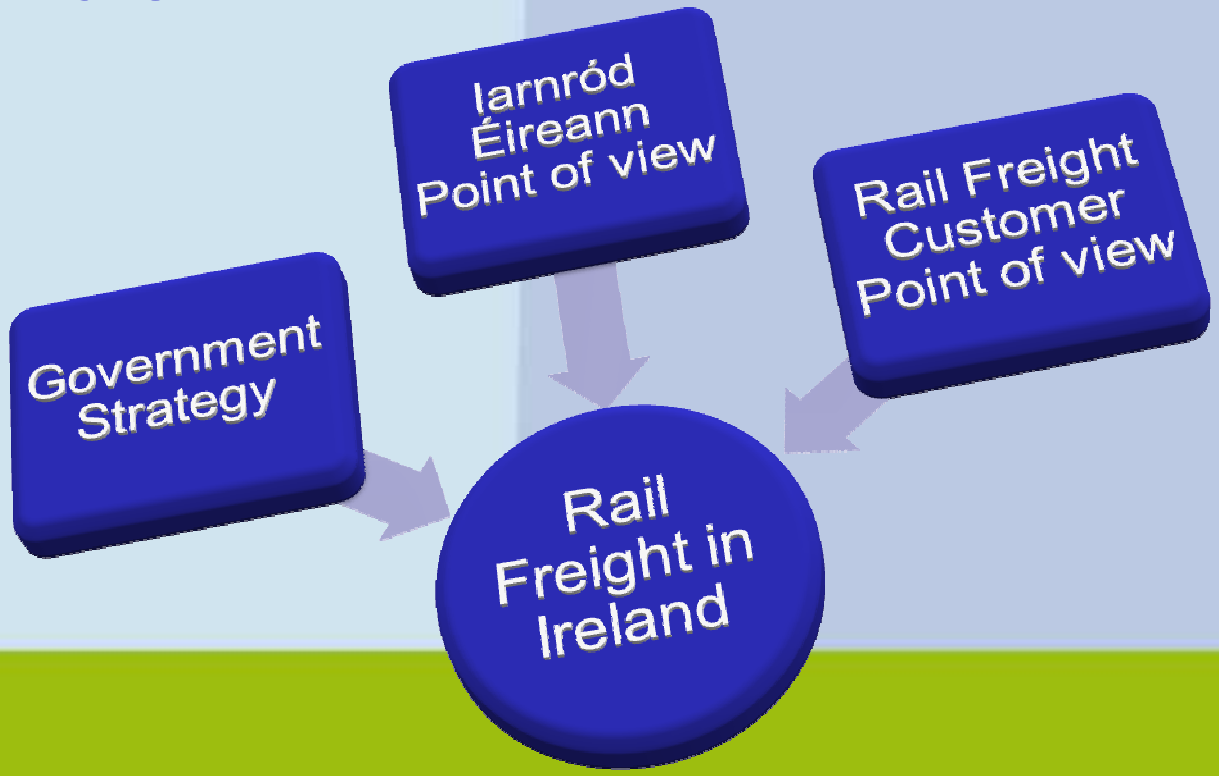
Millions Euro/year	External Costs by mode of transport			
	Road	Rail	Aviation	Waterborne
	223114	4487	6250	2632

(Source: INFRAS/IWW)

3. Research Objectives and Methodology

The key: to understand different perspectives

The objective of this research is to investigate the current situation of rail freight in Ireland taking into account different point of views.



4. Analysis of the Rail Freight in the Republic of Ireland

Current situation in Ireland

- **Rail freight traffic in the Republic of Ireland is characterized to be very low in comparison with other countries and almost insignificant compared to road haulage.**

Millions Tonne-km	2004	2005	2006	2007	2008	2009	2010
Rail	399	303	205	129	103	79	92
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Current transport

- **Boliden →** Lead from Tara Mines (Navan) to Dublin Port
- **DFDS →** Three trains per week from Ballina to Waterford
- **IWT →** Four trains per week from Ballina to Dublin Port
- **Coillte →** Two trains per week from Ballina to Waterford depot
  Two days per week from Westport to Waterford depot

4. Analysis of the Rail Freight in the Republic of Ireland

Current situation in Ireland

- **Why this low market share?**

Irish Government	• The investment in rail has been aimed at increasing passenger numbers rather than freight. • Road transport has received larger investments.
Transport Needs in the Country	• Most freight needs to be delivered over relatively short distances from seaports.
Iarnród Éireann	• IE's policy dictates that the passenger business has priority when it comes to the availability of drivers and locomotives. • Downloading and uploading processes have to be done by the customer.

4. Analysis of the Rail Freight in the Republic of Ireland

The Iarnród Éireann Point of view: SWOT analysis

Strengths	• The ability to move large volumes spedily, regularly and reliably. • Rail connected ports in Dublin and Waterford.
Weaknesses	• The absence of large-scale heavy industry, such as coal and iron ore mining, for which rail is ideally suited. • There are physical limitations restricting railway operations (axle load limitations, etc.).
Opportunities	• Increased level of awareness of the environmental benefits of rail freight. • Cork, Drogheda and Dublin Ports have expressed an interest in improving the rail links in their respective ports.
Threats	• Increasingly competitive road freight industry. • Significant investment in road infrastructure.

4. Analysis of the Rail Freight in the Republic of Ireland

The Customer Perspective Point of view

Evaluation of the Rail Freight Service:

- Customers consider that there is a need to improve the service and evaluate it to be of an average standard (i.e. medium satisfaction).
- Availability of functional fast rail lines and wagon customization based upon preferences were chosen as the key issues to be improved.
- Some rail lines have low speed limits which is problematic when urgent transport is required, making road more competitive.
- The lack of flexibility with rail freight is also highlighted.

4. Analysis of the Rail Freight in the Republic of Ireland

The Customer Perspective Point of view

EVALUATION OF THE RAIL FREIGHT SERVICE	DFDS	IWT	Coillte
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Availability of functional fast rail lines	Very High	Very High	Medium
Wagon customization based upon customer preferences	Very High	Very High	Medium

DFDS LOGISTICS

IWT International Warehousing and Transport

coillte

4. Analysis of the Rail Freight in the Republic of Ireland

The Customer Perspective Point of view

Changes in the past 5 years?

Changes in the past 5 years	DFDS	IWT	Coillte
Freight Transportation Time	Unchanged	Improved	Unchanged
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Alternative travel routes available at varying departure times	Unchanged	Unchanged	Unchanged
Availability of functional fast rail lines	Unchanged	Unchanged	Unchanged
Wagon customization based upon customer preferences	Unchanged	Unchanged	Unchanged

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5. Conclusions and Directions for Further Research

Conclusions

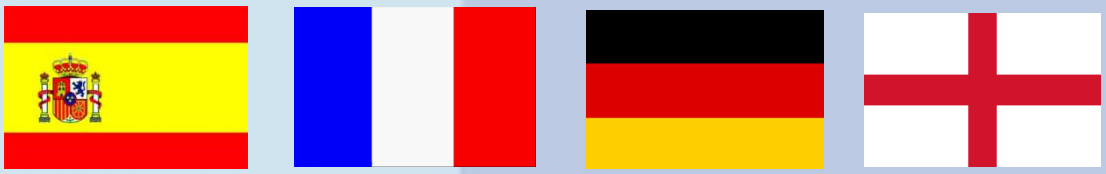
- There is a lack of strategic support from the Irish Government to develop rail freight with the majority of transport investment focussed on road transport.
- Some rail corridors need to be revamped and adapted to rail freight; Increases in speed limits are essential to compete with road.
- New strategies for wagon customization should be adopted to add more flexibility.
- More frequented rail corridors should be electrified to further reduce CO_2 emissions.
- Bypass lengths should be increased where appropriate.
- The possible entry of competitors into the rail freight market needs to be considered.

5. Conclusions and Directions for Further Research

Directions

Further Research will be focused on:

- **Analyzing the point of view of former customers of rail freight in Ireland.**
- **Elaborating a comparison with how other countries are overcoming barriers.**



Thank You!

And also special thanks to:

GOBIERNO DE ESPAÑA · MINISTERIO DE EDUCACIÓN · FICYT · BECAS ARGO GLOBAL · "la Caixa" Foundation

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Rail Freight in the Republic of Ireland

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