Project Ireland 2040

National Investment Framework for Transport in Ireland

Background Paper 8: International Benchmarking

Prepared by the
Department of Transport
gov.ie/transport
Disclaimer
This Background Paper has been prepared as part of the supporting analysis for the National Investment Framework for Transport in Ireland. It reflects the latest data and information available to the author at the time of writing. The views presented in this paper do not represent the official views of the Department of Transport or the Minister for Transport.
## Contents

List of Figures ................................................................................................................................. 2  
List of Tables .................................................................................................................................. 2  
1. Introduction ................................................................................................................................. 3  
2. Infrastructure Quality .................................................................................................................... 5  
3. Benchmarking Transport Investment ............................................................................................ 8  
4. Strategic Transport Planning ......................................................................................................... 18  
5. Conclusions ................................................................................................................................. 25  
6. References .................................................................................................................................... 26
List of Figures

Figure 2.1: Perceived Transport Infrastructure Quality Compared, Ireland and the Netherlands ........................................... 5
Figure 3.1: Land Transport GFCF as a Percentage of GDP, 1953 to 2011 ............................................................................. 8
Figure 3.2: Land Transport GFCF as Percentage of Economic Output, 1995 to 2019 ................................................................. 9
Figure 3.3: Ireland’s investment in land transport infrastructure, 2000 to 2016 (constant 2015 prices) ............................................. 10
Figure 3.4: Ireland’s investment in land transport infrastructure as percentage of total GFCF less Intangibles, 2000 to 2016 ......... 11
Figure 3.5: Benchmarking land transport investment as a percentage of GDP, 2000 to 2015 ....................................................... 12
Figure 3.6: Benchmarking land transport investment as a percentage of GDP by country, 2015 ........................................................ 13
Figure 3.7: Benchmarking investment in roads as a percentage of GDP, 2000 to 2015 ................................................................. 14
Figure 3.8: Benchmarking investment in roads as a percentage of GDP by country, 2015 ................................................................. 15
Figure 3.9: Benchmarking investment in rail as a percentage of GDP, 2000 to 2015 ................................................................. 16
Figure 3.10: Benchmarking investment in rail as a percentage of GDP by country, 2015 ............................................................... 16
Figure 4.1: Comparison of the quality of Ireland’s and Norway’s transport infrastructure .......................................................... 19
Figure 4.2: Comparison of the quality of Ireland’s and New Zealand’s transport infrastructure .................................................. 21

List of Tables

Table 2.1: European Transport Infrastructure Rankings ............................................................................................................. 7
Table 4.1: Norway’s average annual investment in land transport by mode (€m, 2017 prices) ........................................................ 19
Table 4.2: Transport Planning Summary, Norway ...................................................................................................................... 20
Table 4.3: Transport Planning Summary, New Zealand ............................................................................................................. 23
1. Introduction

As part of National Investment Framework for Investment in Ireland (NIFTI), four areas relating to the management of the current transport network are being analysed. These are:

1. Protection and Renewal;
2. Maintenance Investment Priorities;
3. International Benchmarking; and,
4. Climate Adaptation.

This paper addresses the third of these themes, international benchmarking, and compares Ireland’s current global infrastructure ranking, level of investment in the land transport sector, and strategic policy against international comparators.

As core parts of Project Ireland 2040 (Government of Ireland, 2018a and 2018b), the National Planning Framework (NPF) and National Development Plan 2018–2027 (NDP) set out an ambitious, forward-looking vision for Ireland and establish a framework that should be followed by policy-makers to make informed decisions with regard to future land use and spatial planning. In particular, the NPF identifies ten National Strategic Outcomes (NSOs) that form the basis for prioritised investment in projects and schemes to cater for the extra one million people that are projected to be living in Ireland by 2040. However, given the intrinsic dependence of the NSOs on a well-functioning transport sector, a robust transport planning framework needs to be established that will support the goals of the NPF and NDP.

In order to support the development of a transport planning framework that is evidence-based, this paper aims to benchmark Ireland’s recent transport investment levels against a selection of comparator countries and to assess a number of international strategic transport frameworks in order to identify best-practices. This paper builds on previous background analysis conducted by the Department of Transport, both with regard to NIFTI and the research undertaken in the development of the Strategic Investment Framework for Land Transport (SIFLT) (Department of Transport, Tourism and Sport, 2015). For SIFLT, historical transport investment trends for the

Summary

- Recent underinvestment in Ireland's land transport network has caused a significant decline in our global infrastructure ranking, with Ireland now the lowest ranked country in Western Europe.
- As the economy has improved, the level of investment in land transport as a percentage of GDP has not experienced a concurrent recovery, with recent levels of investment remaining at a level last experienced in the mid-1970s.
- Without intervention, Ireland faces a risk of further decline in our perceived competitiveness and global infrastructure ranking, as Central and Eastern European countries are contributing significantly higher levels of investment as a percentage of GDP in land transport and are set to derive increased benefits from EU Cohesion Funds and the development of TEN-T corridors across the region.
- The profiles of land transport investment in Norway and New Zealand, who are identified as close international comparators, demonstrate a moderate but consistent upward trend that stands in contrast to the boom and bust cycle of Ireland’s past investment.
period 1951–2012 were analysed and international benchmarking of Irish transport investment over 1995-2010 was conducted with respect to an aggregated developed country average.

The paper is set out as follows: Section 2 presents a brief overview of how Ireland’s transport infrastructure is perceived and ranked internationally, as described in the World Economic Forum’s Global Competitiveness Report 2017-2018. This ranking is used to inform our selection of suitable comparator countries to benchmark our transport investment against in following sections.

In Section 3, we present a brief summary of previous Department of Transport work on historic transport investment levels before taking a closer look at Ireland’s recent transport investment with respect to a number of comparator countries for which transport investment data is readily available.

In Section 4, we then turn our attention to reviewing a selection of recent international strategic transport frameworks. The frameworks considered in this section were selected based on our goals of identifying best practice strategies and methods of implementation, in addition to strategic frameworks from countries with a comparable level of transport infrastructure to our own.
2. Infrastructure Quality

In this section, we present some summary results pertaining to how our existing transport infrastructure is perceived and ranked internationally. This qualitative overview is used in later sections to inform our selection of comparator countries that are suitable for closer benchmarking exercises. These results are sourced from global transport infrastructure rankings, as described under the "Pillar 2: Infrastructure" classification of the World Economic Forum’s Global Competitiveness Report 2017-2018 (GCR) (World Economic Forum, 2017).

It is worth noting that while the GCR transport infrastructure ranking system is a "high-level" ranking system and considers quite a narrow set of measures related to the perceived quality of a country’s road, rail, port and airport infrastructure (where quality is assessed as the extensiveness, efficiency and condition of the respective infrastructure), nevertheless it remains a highly visible competitiveness rating system that is referred to internationally. We note that in the following we have not presented a sixth transport infrastructure ranking of airline seat kilometres (millions/week) that is considered in the report, but this ranking is incorporated in each country’s overall transport infrastructure ranking score.

2.1 Global Infrastructure Ranking

Although Ireland holds a relatively high position of 31st in the global infrastructure rankings when electricity and communications infrastructure is included, when considered solely in terms of transport infrastructure, Ireland slips out of the top quarter of countries considered to have the best infrastructure, falling to 42nd of 137 countries. Moreover, Figure 2.1 illustrates the significant competitiveness gap between how Ireland’s transport infrastructure is perceived internationally against the highest rated European country in terms of overall transport infrastructure, the Netherlands.

Figure 2.1: Perceived Transport Infrastructure Quality Compared, Ireland and the Netherlands

Source: World Economic Forum

Focusing on our land transport network, the perceived quality of Ireland’s road network in terms of its extensiveness, efficiency and condition has fallen 13 places from its 2011 rank of 28th to 41st position in recent years, while our rail ranking has slipped 12 places from 31st to 43rd. This rapid decline in our land transport ranking
is likely due in part to recent underinvestment in the protection and renewal of existing infrastructure that has affected its perceived efficiency and condition. This downward trend is in contrast to some more positive trends in terms of our maritime and aviation transport infrastructure over the same period. In particular, there has been a slight increase in the perceived quality of our port infrastructure, rising from 30th to 28th, while the quality of our air transport infrastructure has remained at its 2011 level.

When compared to the 35 other European countries considered in the GCR (see Table 2.1), Ireland holds a mid-table position—below all the other Western European countries (WEC) but above the bloc of Central and Eastern European Countries (CEEC-18). Our closest European comparators in terms of infrastructure quality are Luxembourg and Norway (ranked 36th and 33rd globally, respectively), while Ireland ranks only marginally above Estonia (44th) in the overall rankings. In fact, Ireland actually ranks below Estonia in terms of its land transport and maritime infrastructure, and our higher rank in the overall ranking is secured only through being better placed in the two aviation sector rankings. There is thus considerable scope for benchmarking our transport infrastructure against a selection of our higher-ranked European neighbours, in addition to a growing need for further investment to prevent our ranking slipping further as transport infrastructure in the CEEC-18 continues to improve.

Globally, the breakdown of the transport rankings by mode allows us to recognise that New Zealand is our closest comparator in terms of the perceived quality of our land transport infrastructure. Despite ranking 11 places above Ireland in the overall transport rankings, the quality of New Zealand’s road and rail infrastructure, 40th and 46th, respectively, is considered to be on par with our own (41st and 43rd), which, in addition to other similarities between Ireland and New Zealand we highlight later, makes it a suitable choice of comparator country for further consideration. We note that New Zealand’s higher rank (31st) in the overall transport placings is buoyed by the strong quality of its port and air transport infrastructure (17th and 22nd, respectively).

While a downward trend following a number of years of underinvestment and lack of infrastructure maintenance is to be expected, what is particularly evident from the global competitiveness rankings is the rapid impact Ireland’s recent underinvestment in land transport has had on the perceived quality of our transport network and downgrading of our overall competitiveness. In particular, the margin between Ireland and the highest rated European country (the Netherlands) has widened significantly, and as the now lowest ranked Western European country, re-establishing an increased level of investment in our transport infrastructure is crucial to prevent further decline in Ireland’s competitiveness and ability to attract investment. This has become of increased importance in the face of future transport infrastructure improvements in the CEEC-18 countries, which are set to derive greater benefit from the EU Cohesion Fund and the development and upgrading of a number of TEN-T cross-border routes in the region.

---

1 The CEEC-18 countries comprise: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Serbia, Slovak Republic, Slovenia, Ukraine.
Table 2.1: European Transport Infrastructure Rankings

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Overall Transport*</th>
<th>Roads</th>
<th>Rail</th>
<th>Maritime</th>
<th>Aviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Netherlands</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>France</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>27</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>Germany</td>
<td>10</td>
<td>15</td>
<td>9</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Spain</td>
<td>11</td>
<td>16</td>
<td>11</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>Switzerland</td>
<td>12</td>
<td>3</td>
<td>1</td>
<td>56</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>United Kingdom</td>
<td>15</td>
<td>27</td>
<td>19</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>7</td>
<td>Finland</td>
<td>16</td>
<td>21</td>
<td>8</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Portugal</td>
<td>18</td>
<td>8</td>
<td>31</td>
<td>25</td>
<td>29</td>
</tr>
<tr>
<td>9</td>
<td>Denmark</td>
<td>20</td>
<td>13</td>
<td>22</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>Sweden</td>
<td>22</td>
<td>18</td>
<td>21</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>Turkey</td>
<td>23</td>
<td>30</td>
<td>57</td>
<td>54</td>
<td>31</td>
</tr>
<tr>
<td>12</td>
<td>Belgium</td>
<td>26</td>
<td>46</td>
<td>18</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>13</td>
<td>Italy</td>
<td>27</td>
<td>45</td>
<td>34</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>14</td>
<td>Austria</td>
<td>28</td>
<td>9</td>
<td>13</td>
<td>76</td>
<td>38</td>
</tr>
<tr>
<td>15</td>
<td>Iceland</td>
<td>29</td>
<td>47</td>
<td>n/a</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>16</td>
<td>Norway</td>
<td>33</td>
<td>58</td>
<td>36</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>17</td>
<td>Luxembourg</td>
<td>36</td>
<td>20</td>
<td>15</td>
<td>50</td>
<td>23</td>
</tr>
<tr>
<td>18</td>
<td>Ireland</td>
<td>42</td>
<td>41</td>
<td>43</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>19</td>
<td>Estonia</td>
<td>44</td>
<td>38</td>
<td>33</td>
<td>11</td>
<td>41</td>
</tr>
<tr>
<td>20</td>
<td>Cyprus</td>
<td>45</td>
<td>26</td>
<td>n/a</td>
<td>46</td>
<td>27</td>
</tr>
<tr>
<td>21</td>
<td>Greece</td>
<td>49</td>
<td>44</td>
<td>66</td>
<td>52</td>
<td>53</td>
</tr>
<tr>
<td>22</td>
<td>Lithuania</td>
<td>50</td>
<td>37</td>
<td>27</td>
<td>39</td>
<td>68</td>
</tr>
<tr>
<td>23</td>
<td>Malta</td>
<td>54</td>
<td>98</td>
<td>n/a</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>24</td>
<td>Czech Republic</td>
<td>56</td>
<td>74</td>
<td>26</td>
<td>94</td>
<td>35</td>
</tr>
<tr>
<td>25</td>
<td>Poland</td>
<td>59</td>
<td>65</td>
<td>45</td>
<td>64</td>
<td>66</td>
</tr>
<tr>
<td>26</td>
<td>Croatia</td>
<td>60</td>
<td>19</td>
<td>70</td>
<td>45</td>
<td>74</td>
</tr>
<tr>
<td>27</td>
<td>Latvia</td>
<td>61</td>
<td>107</td>
<td>29</td>
<td>29</td>
<td>37</td>
</tr>
<tr>
<td>28</td>
<td>Slovenia</td>
<td>66</td>
<td>51</td>
<td>62</td>
<td>31</td>
<td>71</td>
</tr>
<tr>
<td>29</td>
<td>Hungary</td>
<td>73</td>
<td>62</td>
<td>44</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>30</td>
<td>Slovak Republic</td>
<td>79</td>
<td>73</td>
<td>25</td>
<td>111</td>
<td>108</td>
</tr>
<tr>
<td>31</td>
<td>Bulgaria</td>
<td>81</td>
<td>93</td>
<td>58</td>
<td>68</td>
<td>73</td>
</tr>
<tr>
<td>32</td>
<td>Ukraine</td>
<td>87</td>
<td>130</td>
<td>37</td>
<td>93</td>
<td>92</td>
</tr>
<tr>
<td>33</td>
<td>Albania</td>
<td>92</td>
<td>57</td>
<td>101</td>
<td>67</td>
<td>83</td>
</tr>
<tr>
<td>34</td>
<td>Romania</td>
<td>102</td>
<td>120</td>
<td>73</td>
<td>92</td>
<td>89</td>
</tr>
<tr>
<td>35</td>
<td>Serbia</td>
<td>107</td>
<td>100</td>
<td>79</td>
<td>113</td>
<td>76</td>
</tr>
<tr>
<td>36</td>
<td>Bosnia and Herzegovina</td>
<td>125</td>
<td>109</td>
<td>89</td>
<td>129</td>
<td>129</td>
</tr>
</tbody>
</table>

Source: WEF, Global Competitiveness Report 2017-2018

*Overall ranking is affected by a further transport ranking that not presented here, Airline Passenger km (millions/wk)*
3. Benchmarking Transport Investment

In order to provide some perspective to our benchmarking of Ireland's investment in transport infrastructure, we first present a brief overview of our past transport investment, which is presented in terms of Gross Fixed Capital Formation (GFCF) data as a percentage of Gross Domestic Product (GDP). We note that a comprehensive long-term overview of historic transport investment levels for the period 1951-2011 was conducted as part of the background research for SIFLT, and that this analysis also informed NIFTI Background Paper 2. While that background paper discussed complications arising from the use of GDP and recommended focusing on modified Gross National Income (GNI*) as a more appropriate measure of underlying economic activity, to ensure the comparability of Ireland’s transport investment with international data sources we use GDP in the following analysis.

3.1 Historical Investment

Based on analysis conducted for SIFLT, Figure 3.1 is shows Ireland’s annual land transport capital formation as a percentage of GDP from 1953 to 2011. As a share of GDP, the long-run average investment in land transport was 1.13%, while for the period from 1999 to 2011, covering both the height of the motorway building programme and the financial crisis, it increased to 1.44%.

This analysis was refreshed to cover the period up to 2019 in NIFTI Background Paper 2. In addition to presenting Ireland’s transport investment as a percentage of GDP, investment with respect to GNI and GNI* was also considered, as reproduced in Figure 3.2.
There are a number of points that are worth noting from this figure. The dramatic fall in transport investment previously identified in SIFLT is seen to have continued even as the economy has recovered. In 2018, just 0.38% of GDP was invested in transport capital formation. When effects related to multinational activity influencing GDP are excluded and transport investment is measured in terms of GNI*, transport investment has averaged 0.68% over the past five years. Overall, recent investment in transport infrastructure is at a low level last seen in the mid-1970s.

Figure 3.2: Land Transport GFCF as Percentage of Economic Output, 1995 to 2019

3.2 Benchmarking Recent Investment

In the following, it is worth noting that while most of the results are presented in terms of GDP for international comparability, a GNI*-based measure is likely to better reflect Irish economic output and present a more positive comparison\(^\text{2}\). It is also worth highlighting that, as noted by the Joint OECD/ECMT Transport Research Centre, determining what the appropriate level of investment in transport infrastructure for a country is can be problematic (Short and Kopp, 2015). An average investment level of 1% of GDP was considered to be the norm in countries with well-established transport infrastructure such as France and Germany in the late 1990s, but following the economic crisis, investment as a percentage of GDP in transport infrastructure in OECD countries has declined, falling to an average of 0.75% in 2014 (OECD/ITF, 2017).

Another challenge arising in international benchmarking of transport investment is the accuracy and reliability of data sources. The most complete data source suitable for international comparison is held by the International Transport Forum of the OECD, yet it too suffers from incomplete data and differences in how countries report their figures. In fact, the ITF database has not received rail data from Ireland since 2008, and the database thus

\(^{2}\) The variance between investment with respect to GDP and GNI* is approximately 0.2 percentage points.
lacks crucial data for the main years of interest to us here. In an effort to address this missing data gap, we have therefore had to provide our own estimations for recent levels of transport investment using data sourced from the CSO, and these estimates are summarised in Figure 3.3 and Figure 3.4.

An important point to note is that in Figure 3.4 we have attempted to correct for the significant distortionary effects of intangible assets (such as the importation of patents and intellectual property) that have arisen in recent years by presenting the share of land transport investment as a percentage of the total GFCF less intangible assets.\(^3\) As with previous figures, the dramatic fall in investment since 2008/2009 and a modest stabilisation and recovery since 2013 is evident.

Thus, we reiterate that the following benchmarking of Ireland’s investment in land transport as a percentage of GDP is based on our own estimates and international comparator data sourced from the ITF database. Again, we highlight that making direct comparisons is hindered by certain caveats due to how transport investment has been defined in different countries, missing data and the provisional nature of our own calculations. We also note that in order to address such data gaps for other countries, we have made a crude estimate of the level of investment by substituting an average of two adjacent years for the year in question, and given that the most recent figures in the ITF database date to 2015, the range we consider in this analysis is limited to 2000–2015.

\(^3\) As an example, intangible assets comprised 56.3% of total GFCF in 2016 compared to a 9.3% share of total GFCF in 2000.
In addition to benchmarking Ireland against Norway and New Zealand, highlighted in Section 2 as close comparators in terms of their transport infrastructure quality, in Figure 3.5 we also compare Ireland’s investment against an averaged measure of investment for the Western European Countries (WECs) who ranked above Ireland in terms of transport infrastructure quality (see Table 2.1), and an averaged measure of investment in a reduced selection of 14 of the CEEC-18 countries who ranked below Ireland in terms of transport infrastructure.

As was the case with previous figures, Figure 3.5 reveals the dramatic slump in Ireland’s transport investment as a percentage of GDP in the years of austerity following the global financial crisis. The distortionary effect of Ireland’s recorded GDP growth of 26% in 2015 is also evident, and we would expect that a GNI*-based measured would provide a more positive outlook, placing Ireland somewhat closer to the WEC average of 0.75%.

Interestingly, the level of investment in both Norway and New Zealand in the aftermath of the economic crisis was resilient, and apart from a fall of 0.2 percentage points in the level of New Zealand’s investment in 2012, both countries demonstrated a consistent upward trend in their level of investment in land transport. We must also note that the ITF-sourced New Zealand data crucially underestimates the actual level of combined land transport investment, as no New Zealand rail data was supplied to the ITF. Thus, realistically, we can expect a more significant margin between Ireland and New Zealand than what is presented here.

---

4 The 14 CEEC countries included here comprise: Albania, Croatia, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Serbia, the Slovak Republic and Slovenia.
The average level of investment in the WEC region was also stable throughout the entire 2000–2015 period, falling from a height of 0.9% of GDP in 2008 to 0.75% in 2015. On the other hand, the average level of investment in the CEEC bloc was far more volatile over the same period. For this group of countries, the average level of investment over 2000–2015 is calculated to have been 1.34% of GDP, with the level of investment falling 0.75 percentage points from a 2008 high of 1.85% to a low of 1.10% in 2012. However, as is also evident from the figure, CEEC countries appear to be in the process of returning to higher levels of transport investment at a more rapid pace than Ireland.

**Figure 3.5: Benchmarking land transport investment as a percentage of GDP, 2000 to 2015**

Qualitatively, the figure also highlights the fact that though Ireland could be geographically termed as a WEC, its position in the global infrastructure rankings and the profile of its investment in land transport more resembles that of a country in the CEEC bloc. This is despite the fact that Ireland is classed as an "Innovation-driven" country in the World Economic Forum's Global Competitiveness Reports, while the majority of countries in the CEEC-18 are classed as "Developing". Again we note that while identifying the appropriate level of investment in transport infrastructure is not without controversy, if one agrees that Ireland's transport infrastructure is more akin to countries in the CEEC bloc than the well-established infrastructures of the Netherlands, France and Germany, benchmarking would suggest that our current level of transport investment is roughly only half of what it “should” be.

Taking a closer look at 2015 data, for the European countries (and New Zealand) presented in Figure 3.6, the average level of land transport investment stands marginally above 1% of GDP, which is a return to the guideline figure proposed by Short and Kopp (2015) as the norm for countries with a high quality of infrastructure. In the WEC states that ranked above Ireland in terms of their infrastructure quality, the average level of investment in
2015 was 0.75%, which matches the value of 0.75% recorded for the wider OECD region in 2014. However, in the CEEC region, the average level of investment stood at 1.39% of GDP, which is more than triple that invested by Ireland (0.44%).

Figure 3.6: Benchmarking land transport investment as a percentage of GDP by country, 2015

In fact, as the figure shows, Ireland out-ranked only three countries in terms of transport investment as a percentage of GDP, namely, Portugal, Malta and Iceland. If we account for the distortionary effect of the anomalous GDP growth in 2015 and assume investment as a share of output for Ireland is at the WEC average, Ireland would still be in the lower third of European countries for transport investment. If such levels of transport investment are sustained, there is a risk that Ireland’s ranking in the global competitiveness tables will fall further behind other states in the WEC region, in addition to being overtaken by our closest competitors in the CEEC bloc.

A slightly different picture emerges when land transport investment is broken down by mode, at least in terms of investment in roads. As Figure 3.7 shows, as a percentage of GDP, our investment in roads was above the WEC average throughout the period from 2000 to 2008 and, despite a dramatic reduction in investment from 2009 to 2015, Ireland’s investment in roads has remained in-line with or above the WEC average. While much of the investment in the period first decade of the 2000s was in the completion of road projects initiated pre-2000, several existing routes were also upgraded to become part of the motorway network as part of the then "Transport 21" investment programme (NTA, 2011), including the extension of the M3, M4, M6, M7 and M9 corridors.\(^5\)

\(^5\) http://www.irishmotorwayinfo.com/inex/roads/overall_map_to_2015.html
However, the resilience and overall consistent upward trajectory of in roads investment in Norway and New Zealand again stands in stark contrast to the apparent boom and bust cycle volatility of Irish investment. Moreover, if we accept that benchmarking would place a target level of Irish investment in roads at about the same level of investment as New Zealand (0.72%), then even accounting for a more positive outlook obtained through the use of a GNI*-based measure, it is likely that there is still a margin of approximately 0.2 percentage points below what would be required to maintain our current ranking, with significantly more investment required to regain our 2011 rank of 28th.

Taking a closer look at the national breakdown of road investment in 2015, the average level of investment for the 33 countries included in Figure 3.8 was 0.63% of GDP. Once again, Ireland's investment is found to be in the lower third of European countries and is at the same level as countries with far more established road networks, e.g., France, Germany, Netherlands and the UK. If we account for the fact that Ireland's road infrastructure has more in common with countries in the CEEC bloc than WEC states with well-established infrastructure6 (Eurostat, 2017), Ireland's position on this ranking should ideally be shifted several spaces toward the right.

---

6 Approximately 5.4% of Irish roads are classified as motorways or national roads, with close comparators being Estonia at 6.8% and the Slovak Republic at 7.3%. In contrast, the corresponding figure in Portugal stands at 66.5%, while in Germany the figure stands at 22.3%.
On the rail-related side of land transport investment, one might expect Ireland's performance in terms of benchmarking past rail investment to be quite poor. However, while Ireland’s investment in rail does lie below the WEC average as shown in Figure 3.9, the margin between Irish investment and the WEC and CEEC averages over the 2000–2010 period was quite small, the largest gap being 0.12 percentage points in 2006. In fact, investment throughout this period covered not only a significant amount of investment in the Luas light rail network but also extensive rail safety and re-signalling works, the development of a new terminus in the Dublin Docklands, the construction of a new line and service to the M3 Parkway as part of the Western Commuter line, and Phase 1 of the Kildare Route Project, all of which formed part of the €16bn allocated to public transport in the €34bn “Transport 21” capital investment programme (NTA, 2011). However, following the cancellation of the Transport 21 in 2011 and reduced Exchequer capital investment in rail, there has been a significant decline in investment, and the margin between Ireland and our international comparators has widened, standing at 0.26 percentage points with respect to the WEC average and 0.33 percentage points with respect to the CEEC average in 2015.

In fact, since 2012 investment in rail has experienced rapid growth in CEEC countries, while Ireland’s investment in rail has been declining since 2008. This is particularly evident when we compare Ireland’s investment in rail to Hungary, which we have selected as our closest rail comparator (Ireland: 43rd; Hungary: 44th, see Table 2.1). While the profile of Ireland and Hungary’s investment in rail was broadly comparable from 2000 to 2010, there has been a significant divergence in more recent years, with a gap of 0.57 percentage points separating their respective investment levels. We also note that Norway’s profile of rail investment indicates a moderate but, for the most part, consistent upward trajectory.

The M3 Parkway facility formed the first phase of a proposed railway linking Navan to Dublin and was opened in 2010. The Kildare Route Project was identified as a key component in the Greater Dublin Integrated Rail Network and a prerequisite to the full utilisation of the proposed DART Underground project (also deferred).
Finally, when we consider the national breakdown, the average level of rail-related investment across the European countries included in Figure 3.10 was 0.35% in 2015. Again, Ireland is seen to be among the poorest
performers. In fact, Ireland outranks only Albania and Greece, and a GNI*-based measure would likely not correspond to a significant improvement. We reiterate the fact that many other factors, such as policy, geographic and socio-economic conditions, contribute to an estimation of what an appropriate level of investment in rail is. However, this benchmarking exercise demonstrates that Ireland faces a significant investment challenge if a decision is made to maintain or improve the quality of its rail infrastructure.

### 3.3 Project Ireland 2040

Looking to future investment in the land transport sector, we can make a rough estimation of the projected level of investment in land transport over the next decade by considering the cross-sectoral funding breakdown outlined in the NDP (see Tables 3.1 and 3.2 therein). In particular, the NDP outlines how an overall funding figure of €116 billion is to be distributed across the ten National Strategic Outcomes (NSOs) outlined in the NPF over the period 2018–2027, rather than assigning capital allocations to different Departments. However, we can estimate the total level of transport-related investment by considering the amounts allocated to achieving each NSO, and the breakdowns outlined in Table 3.2 of the NDP. Our estimates suggest that approximately €25.4bn or 22% of the total amount is committed to transport-related NSOs. For the NDP as a whole, the split of how investment will be financed is 78.5% from Exchequer investment and 21.5% from non-Exchequer commitments.

Thus, a rough estimate that does not account for possible preferences of commercial bodies to invest in targeted infrastructure projects would yield an estimated figure of 78.5% of the €25.4 billion, or approximately €20 billion, as the total amount of Exchequer investment in transport-related infrastructure projects over 2018–2027, averaging to €2bn per year. In 2016, we can see from Figure 3.3 that the estimated level of expenditure in land transport was just over €1.2bn. In line with the five-year Departmental capital allocation covering 2018–2022 set out in the NDP, the amount allocated to transport rises from €1.3bn in 2018 to €2.4bn in 2022. While this increase is welcome, as we have noted, recent investment in land transport as a percentage of GDP has been at a level last seen in the mid-1970s and there is a significant amount of investment required to adequately maintain our existing network, without mentioning investment in new projects. Indeed, the annual Departmental investment required to protect and renew our existing network is estimated to be €1.3bn (as discussed in NIFTI Background Paper 6), which leaves little scope for network expansion until the latter years of the NDP’s life-cycle.
4. Strategic Transport Planning

In this section, we take a closer look at strategic transport planning frameworks that have been published by our choice of comparator countries, Norway and New Zealand. In particular, we aim to identify their scope, timeframe, priorities, the level of investment and how expenditure is split across different transport modes. In addition to these points, we also attempt to extract lessons regarding how other countries deal with two key questions that arise in long-term strategic planning (OECD/ITF, 2017b), namely:

1. How to create a long-term planning framework that can respond to change?
2. How to deal with uncertainty in infrastructural demand over long horizons?

We have primarily selected the strategic planning frameworks published by Norway and New Zealand as representative countries whose overall quality of transport infrastructure is considered to be broadly in line with our own based on the infrastructure rankings presented in Section 2, but other aspects that make these countries stand out as suitable comparators are also highlighted in the commentary below.

4.1 Norway

Since the Norwegian government’s initial proposal to develop a long-term National Transport Plan (NTP), Norway has prepared a series of NTPs that span a period of 10–12 years and which are revised every four years. The latest NTP was issued in April 2017 and outlines their transport policy for the years 2018–2029 (Norway, 2017). Naturally, while the demographic and transport challenges facing Ireland and Norway are particular to their own regional challenges, there are a number of additional points that make Norway an appropriate comparator country to consider in further detail.

First, owing to its large land area, harsh geography and cold northern climate, after Iceland, Norway has the lowest population density in Europe with an average of just 13.2 people per square kilometre. However, despite starting from a more urbanised and larger population—5.26 million in January 2017, of which approximately 80% live in urban regions—Norway’s projected population growth of an extra 1.2 million people by 2040 closely mirrors the projected population growth of an extra 1 million people identified in Project Ireland 2040. Moreover, its capital, Oslo, has also been held as a benchmark for sustainable mobility and compact urban growth (Naess, Naess and Strand, 2011), and can thus be considered as a model that can be emulated in accordance with the first NSO of Project Ireland 2040, i.e., Compact Growth. While Dublin is of comparable size with Oslo today, Norway’s next three main urban centres, Bergen, Stavenger and Trondheim, represent cities of comparable size to the estimated future populations of Cork and Galway. Furthermore, in terms of physical infrastructure, while the quality of Norway’s road network is considered to be poorer than Ireland’s with motorways comprising 0.4% of its network in comparison to Ireland’s 0.9% (Eurostat, 2017), its overall length (approximately 95,000 km) is similar to our own road network (approximately 99,000 km).

Three main objectives are specified in the NTP. In addition to increased mobility, the framework highlights improved safety and the decarbonisation of transport as firm priorities. These connect the NTP with wider Government policies such as their 2030 ‘Vision Zero’ transport safety initiative and other climate change commitments. Norway’s NTP also outlines a number of recent reforms that aim to improve the operation and efficiency of their transport sector. These measures include mechanisms to reduce transport costs and the time spent in the planning process, and the creation of a new Railway Directorate with responsibility for long-term...
planning, the purchase of passenger rail and infrastructure services, and co-ordination between rail operators and the public transport sector. Parts of the former National Rail Administration have also been transformed into a State-owned enterprise (Bane NOR SF), which is responsible for managing, operating, maintaining and renewing railway infrastructure. Moreover, in addition to a national first in the development of a National Port Strategy and plans to open up air navigation to competition, Norway has established a new infrastructure fund valued at 100bn NOK (€11.2bn) to promote predictable and long-term financing of projects.

Figure 4.1: Comparison of the quality of Ireland’s and Norway's transport infrastructure

In terms of overall financial commitments, the Norwegian government has committed to an estimated investment of €105bn over the 12-year period considered in the NTP. An additional €15bn is projected to arise from road tolls that will be reinvested, raising the total investment allocation to €120bn. Average annual expenditure across the period is thus expected to be €8.7 billion, which represents an increase of 37% compared to transport expenditure in 2017. The average annual allocations to each transport mode are outlined in Table 4.1.

Table 4.1: Norway’s average annual investment in land transport by mode (€m, 2017 prices)

<table>
<thead>
<tr>
<th></th>
<th>Budget 2017</th>
<th>2017 Modal %</th>
<th>NTP 2018-2029</th>
<th>NTP Modal %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>3,941</td>
<td>62.0</td>
<td>5,015</td>
<td>57.5</td>
</tr>
<tr>
<td>Rail</td>
<td>2,051</td>
<td>32.2</td>
<td>2,984</td>
<td>34.2</td>
</tr>
<tr>
<td>Coastal</td>
<td>167</td>
<td>2.6</td>
<td>297</td>
<td>3.4</td>
</tr>
<tr>
<td>Urban Transport</td>
<td>203</td>
<td>3.2</td>
<td>387</td>
<td>4.4</td>
</tr>
<tr>
<td>New NTP measures</td>
<td>-</td>
<td>-</td>
<td>46</td>
<td>0.5</td>
</tr>
<tr>
<td>Government funding</td>
<td>6,362</td>
<td>100</td>
<td>8,730</td>
<td>100</td>
</tr>
<tr>
<td>Other funding (est.)</td>
<td>954</td>
<td>-</td>
<td>1,224</td>
<td>-</td>
</tr>
</tbody>
</table>

In the following, we have converted all figures to Euros using a NOK-EUR exchange rate of 0.11228, as on 31 January 2017.
In terms of the main infrastructure investment projects listed in the NTP, a total of €17.5bn has been allocated through the Norwegian Roads Administration, with an additional €6.9bn allocated to projects overseen by Nye Veier Ltd., a dedicated highway construction company. Furthermore, €20.6bn has been committed to rail projects, which includes €2bn specifically for investments to develop rail freight networks. In total, planned investment in main infrastructure projects covers 43 road and rail projects, each of which have an estimated project cost of more than €340m. Elsewhere, a total of €2.7bn has been allocated to support localised bus and rail measures in the four main urban centres—Oslo, Bergen, Trondheim and Stavenger—in addition to a further €2.7bn assigned to measures aimed at supporting cycling and walking in urban centres.

The NTP also sets out commitments with regard to smaller improvements and maintenance. In particular, Norway has committed €168m per annum to road improvements, €112m per annum for rail-related maintenance and upgrades, and €27m per annum for coastal improvement measures. Moreover, the funding for new NTP measures listed in the table above represents the government’s plans to “future-proof” the transport sector. This investment will support innovation, pilot schemes, research and development, and ‘Smarter Transport’ initiatives.

While a detailed funding breakdown is not presented in the NTP, it also sets out firm goals with respect to combatting climate change, resolving to ensure that by 2025 all new passenger vehicles and urban buses will be zero-emission vehicles and that 75% of long-distance coaches and 50% of new trucks will be zero-emission vehicles. Significantly, the NTP also outlines plans to target a 30% blend-in sustainable biofuel requirement in the aviation sector by 2030.

Finally, in terms of the regional distribution of Norway’s planned transport investment, while the majority of land transport projects identified in the NTP are located in the more populated southern part of the country, the importance of the northern Arctic region (Barents Euro-Arctic Transport Area) for better cross-border connectivity between Norway and Sweden, Finland and Russia is also recognised, with approximately 30 land projects and 18 coastal projects identified for investment as part of the NTP. A summary of the NTP is outlined in Table 4.2 below.

Table 4.2: Transport Planning Summary, Norway

<table>
<thead>
<tr>
<th>Summary of Norway’s National Transport Plan 2018-2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Investment</td>
</tr>
<tr>
<td>Time Frame</td>
</tr>
<tr>
<td>Objectives</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Split of Expenditure</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
4.2 New Zealand

New Zealand has published a number of transport planning studies and strategic frameworks in recent years. The two studies we attempt to summarise here are the “National Infrastructure Plan 2015” (NIP) (New Zealand, 2015), which sets out New Zealand’s planned wider infrastructure investments out to 2045, and the “Connecting New Zealand” transport policy document (CNZ) (New Zealand, 2011), which outlines planned transport investment for the 2011–2022 period. The 2015 NIP is the third framework developed by a cross-governmental National Infrastructure Unit that was established in 2009 and lays out a long-term vision for the transport, energy, water, telecommunications and social infrastructure sectors, and accounts for approximately $50bn of planned investments in these areas over the first ten years of the plan.

Figure 4.2: Comparison of the quality of Ireland’s and New Zealand’s transport infrastructure

As shown in Figure 4.2, New Zealand’s suitability as a comparator for Ireland is evidenced by the similarity in the perceived quality of road and rail infrastructure in both countries in the global infrastructure rankings, and the fact that New Zealand’s current level of investment in land transport as a percentage of GDP, despite strongly contrasting recent trends, is roughly proportionate to our own. Indeed, even in terms of actual physical land transport infrastructure, New Zealand’s road network of approximately 11,000 km of State highways (of which 700 km are “high-volume highways”) and 80,000 km of local roads is broadly similar to our own road network of 5,300 km of national roads (of which 790 km are motorways), 13,000 km of regional roads and 80,000 km of local roads, while its rail network of approximately 4,000 km in length is just over double the length of our own rail network.

Like Ireland, New Zealand faces numerous transport challenges arising from being a small, geographically peripheral, island nation, and in fact faces even more significant transport costs when exporting goods due to its distant location from its main export markets. Indeed, this motivates the use of several key indicators relating to freight traffic and forecasted growth in regional freight traffic throughout the two frameworks, and the importance of improving the efficiency of the transport network to reduce such transport costs and overcome this competitive disadvantage is strongly emphasised throughout. Another important similarity that warrants New
Zealand’s selection as a comparator country is that its population of 4.7 million people is in-line with our own and its cities face similar challenges in how to cater for forecasted population growth.

While we are mainly focused on the transport aspects of the NIP here, we note that the overarching goal of the NIP is to realise infrastructure that is resilient, coordinated and that contributes to a strong economy and high living standard. Here, resilience not only incorporates resilience to climate change and natural disasters such as the earthquake that hit Christchurch in 2011\(^9\), but also resilience in the face of aging assets, infrastructure pinch-points, regional growth and decline, and affordability constraints, and is thus expected to require high levels of cooperation with local government authorities. Indeed, these challenges also highlight the crucial importance of accurate demand forecasting and New Zealand is in the process of re-evaluating historic assumptions about future demand and future revenue from fuel taxes in the face of emerging trends and the decarbonisation of transport. We also note that, while not directly presented as part of the two frameworks considered here, New Zealand has conducted several "scenario-based" population modelling projects in an attempt to establish an informed evidence base of how future population growth and transport demand may be distributed.

The 2015 NIP is the first NIP to also set out a range of “Actions” for central and local government decision-makers to drive a new approach to policy-formation and optimise the decision-making process. Here, in addition to regulatory action and efficient asset management, addressing data needs is highlighted as crucial to the successful delivery of the NIP’s goals. In terms of the transport sector, the Action Plan sets out plans to assess the potential of demand management tools to optimise the use of road infrastructure. Actions related to improving coordination between central and local governments also aim to encourage greater collaboration between authorities to support integrated public transport and land use planning. It is important to note that as a high-level, long-term framework, a detailed breakdown of all planned investment is not provided within the NIP, however the nine significant transport-related projects outlined in the NIP are estimated to account for the predominant share of available funding and represent $13.6bn in total funding, compared to the $11.7bn in funding committed to 31 significant projects across the other main infrastructure sectors.

Turning to the CNZ policy framework and the financial commitments outlined therein, the three main objectives of planned investment set out are maximising economic growth and productivity, establishing value for money, and improving road safety. New Zealand planned to invest an average of approximately $1.6bn per annum over the ten-year life cycle on the construction, maintenance and renewal of its highways, and to provide subsidies of approximately $600m (or 50% of the total cost) per annum toward the construction, maintenance and renewal of local roads. Subsidies of $275m per annum, again accounting for roughly 50% of the total cost, are also allocated to local authorities for public transport investment. In total, approximately $36bn is thus committed to road and subsidised public transport projects through the National Land Transport Fund over the 10-year period, comprising $19.5bn on State highways, $8.5bn on local road subsidies, $4bn on public transport subsidies, and $3bn on road policing.

In terms of investment in rail, New Zealand’s government re-nationalised the rail system in 2008 and begun a process of substantial investment in the rail network. This strong level of financial commitment will continue at least out to 2022 with a total of approximately $4.6bn to be invested as part of the “KiwiRail Turnaround Plan”.

\(^9\) The cost of rebuilding transport infrastructure compromised or destroyed by the earthquake is estimated to have cost between $400m and $500m.
This ten-year plan aims to improve the quality of rail infrastructure and to support KiwiRail to become a commercially viable business. At the time of the plan's publication, the rail network was estimated to carry 15% of total national freight, and the high level of investment was aimed at improving the rail system's overall capacity and ability to meet future freight demand. It is important to distinguish that New Zealand's government provided $750m of the initial capital required for the Turnaround Plan, and the majority of this funding is reinvested revenue from the freight business. Elsewhere, a further $2.3bn in direct funding was provided for the development and upgrade of metro rail systems in Auckland and Wellington, which are the only two cities in New Zealand with an urban rail network. Thus, New Zealand budgeted for a total investment of approximately $7bn in rail over the period covered in the CNZ policy document.

Finally, while both the NIP and CNZ highlight the importance of port and air infrastructure for international connectivity, and outline regulatory reforms in both sectors, the primary focus of each is directed to investment in land transport. A summary of the CNZ is outlined in Table 4.3.

Table 4.3: Transport Planning Summary, New Zealand

<table>
<thead>
<tr>
<th>Summary of New Zealand's Connecting New Zealand 2011–2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Investment</td>
</tr>
<tr>
<td>Time Frame</td>
</tr>
<tr>
<td>Objectives</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Split of Expenditure</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

4.3 Lessons for Long-term Strategic Investment Planning

We conclude with a few comments with regard to the two key questions posed at the beginning of this section:

1. How to create a long-term planning framework that can respond to change?
2. How to deal with uncertainty in infrastructural demand over long horizons?

In particular, we recognise that Norway's practice of reviewing their strategic frameworks and presenting a White Paper to the government every four years ensures that the investment framework is flexible, with a regular review process that allows long-term capital projects to be adapted or prioritised accordingly. This practice has the added benefit of encouraging greater cross-sectoral political engagement in the strategic planning of infrastructure.

Clarifying responsibilities and ensuring there is effective coordination between both central and local government and transport authorities is also recognised to be crucial to the efficiency of transport planning processes and the
successful delivery of planned infrastructure. As part of this, rethinking and updating models and projections for emerging trends and improved data collection are integral components required for the accurate forecasting of infrastructure demand. A continued emphasis should thus be placed on ensuring that accurate data collection and modelling form a central part of planning and on-going operations.

Finally, the establishment of an action plan, as was undertaken in New Zealand’s NIP, which outlines the necessary changes in regulations and planning policies to ensure the successful delivery of overarching objectives, such as the NSOs in the case of Ireland, can be helpful. Such an action plan would help solidify overarching long-term goals into a sequence of short-term deliverables.
5. Conclusions

The global financial crisis transformed Ireland’s infrastructural investment landscape, with Ireland’s investment in land transport as a percentage of GDP falling from roughly 0.8 percentage points above the WEC average to a level last realised in the mid-1970s. The resulting underinvestment in the protection and renewal of our land transport infrastructure in recent years has been reflected by a decline in the perceived quality of our infrastructure, with the competitiveness margin between Ireland and higher ranked WEC neighbours continuing to widen. Moreover, without intervention, Ireland faces the risk of further decline in our competitiveness and ability to attract foreign investment as investment in the developing CEEC region has recovered at a more rapid pace than in Ireland, and the average level of land transport investment in the CEEC now stands 0.9 percentage points above our own. Ireland thus requires a significant amount of infrastructural investment to narrow the competitiveness gap with higher-ranked WEC countries, in addition to ensuring that our current ranking does not decline further.

Norway and New Zealand, the two countries we have selected for closer comparison, present a starkly different pattern of investment in land transport. While in previous years the margin in investment levels in land transport as a percentage of GDP was over 1 percentage point in Ireland’s favour, both New Zealand and Norway have experienced a remarkably resilient, moderate and consistent upward trend and have overtaken Ireland in recent years. Recent strategic frameworks published by Norway and New Zealand highlight that both countries are planning to continue to invest significantly in land transport and this consistent upward trend is thus likely to continue.
6. References


