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**Abstract**

The aim of this chapter is to provide a practical counterpoint to the theoretical approaches found elsewhere in the book. A user’s perspective is crucial when planning infrastructure development, therefore this chapter presents insights from one of Scotland’s most innovative logistics service providers on the planning, location and utilisation of intermodal terminals in the hinterland.

Key words: Scotland, freight, intermodal, terminal, logistics
1. Introduction

Scotland’s accessibility in terms of international markets is reflected in the limited share of total Scottish unitised freight traffic coming through Scottish ports today. For market access Scotland relies heavily on maritime services via remote southern seaports, with the result that the majority of Scotland’s trade travels overland through England.

Other than the Channel Tunnel, all unitised freight comes to the UK by water but this traffic accesses Scotland in different ways. Scottish ports are not attractive to deep-sea traffic due to the physical requirements of large vessels. Therefore container traffic to Scottish ports comes by feeder or short sea vessels from English or Continental European ports, carrying transhipped deep-sea containers or short sea containers originating in Europe. Scotland also has a RoRo ferry connection from Rosyth to Zeebrugge (Belgium) and from Stranraer and Cairnryan to Northern Ireland, the latter for domestic traffic. Figure 1 illustrates the diversion of Scottish freight flows.

Yet the evidence suggests that Scotland does not suffer poor direct maritime access with the Continent due solely to geographic or economic reasons. Lagging infrastructure development as well as a lack of sufficient government initiatives to promote direct links have also been cited as key reasons (Baird, 1997; Baird et al., 2010a).
Figure 0.1. Schematic illustrating routing of Scotland’s external trade. Source: Monios and Wilmsmeier (2011)

A need to coordinate future development of port capacity, terminal operations and hinterland connections has been identified (Baird et al., 2010b). The aim of this chapter is to relate these findings to the experience on the shop floor, in order to test their relevance and match theory with practice. This chapter is based on an in-depth interview with Kenneth Russell (Roser, 2011), forming the basis for a detailed case study of transport operations and hinterland strategies in Scotland. Mr Russell is a Director of John G Russell (Transport) Ltd, a family-owned business with a history dating back to 1969. He is the second generation of the family in the business and the fourth generation in logistics, reaching back to early 1900. As Marketing Director, Mr Russell continues to spend time on the shop floor, in the warehouse and on rail sidings, monitoring train loading operations: “as a result if there is a delay I can tell a customer at first hand the cause and that is very important. So I am close to the coal face; when I bid for work, I know that the company can deliver what I sell” (Roser, 2011).
Russell operates three intermodal terminals (Glasgow, Inverness and Edinburgh) in Scotland and two intermodal terminals in England (Telford and Barking). Further, Russell offers rail distribution services to two destinations in Scotland (Elgin and Aberdeen) and five destinations in England and Wales (Liverpool, Cardiff, Daventry, Felixstowe and Southampton). Thus the company’s rail service network provides direct services to English seaports from Scotland and accommodates the diverted trade flows to and from Scotland.

Russell does not consider that current visions and challenges for transport planning or investment are any different from those of previous generations.

*It is true today that we have much faster communications and a global economy, which raises people’s expectations in terms of the services and charges they can expect from a...*
transport company. The downside for my generation is the plethora of social, fiscal or safety regulation not to mention planning demands that we have to deal with. This can detract from the time you can devote to customers. When my father was running the business he could identify a development and, provided the financial resources were available, get on and implement his plans. Also he spent a lot more time with his customers face to face than we are able to do today. The challenges and pressures then were just as demanding but different (Roser, 2011).

2. A perspective on rail transport potential

In Great Britain, 85% of intermodal freight train services are port-based, while 12% are domestic, and the Channel Tunnel makes up the rest. Of the 12% domestic, the majority of these are services between England and Scotland (Woodburn, 2008a).

In terms of Scottish rail freight, Scottish deep-sea containers are moved directly to and from the ports of Felixstowe, Southampton, Tilbury and Seaforth/Liverpool by rail by Freightliner, and DB Schenker run a service between Teesport and Mossend. Total 2009 traffic with English ports was estimated at around 73,000 TEU/year (Baird et al., 2010b). Direct container train services from UK ports to the midlands have grown over the last decade while direct services from UK ports to Scotland (i.e. Coatbridge) have fallen (Woodburn, 2007). This finding represents the integration of Scottish trade flows into UK-wide distribution networks centred on key sites in the midlands and to a lesser extent north England. Woodburn (2007) noted the increasing importance of the North-West and Yorkshire along with the Midlands for rail terminal location, and the lack of competition from coastal shipping for these inland locations. However, he questioned whether this might be altered by an increase in larger feeder vessels bringing increased traffic to other ports as opposed to the current main British ports, which would result in smaller land transport distances and a threat to the viability of rail for these flows. This potential trend could lead to the viability of port-based distribution (Mangan et al., 2008) as notions of centrality and intermediacy are altered in the UK context. Short distances in the UK have always put rail at a disadvantage with road haulage, however changes in relative distances of primary and secondary hauls due to restructuring logistics chains around port nodes could revise the calculation (Monios and Wilmsmeier, 2011).

In terms of intra-UK rail flows, there is a problem with a lack of data on unitised rail freight flows. Industry figures are broken down only as far as “domestic intermodal” for the whole UK, given in tonne-kms, which is not useful for the analysis undertaken here. However a rough estimate of 115,000 TEU for 2009 was produced by speaking to Scottish logistics companies (Baird et al., 2010b). The large DIRFT Daventry terminal (run by WH Malcolm) is the main consolidation point for Scotland, with Hams Hall also playing a role.
These trains are for large supermarkets in conjunction with logistics operators such as WH Malcolm, Eddie Stobart and John G Russell, and are run primarily by Direct Rail Services and DB Schenker. Interestingly, while Coatbridge focuses primarily on port flows, much supermarket traffic from the midlands in England comes into the rail terminal at the port of Grangemouth.

According to Russell, rail is an under-utilised asset in the United Kingdom, despite the fact that “the logic of freight by rail is inescapable” (Roser, 2011). The substance in that logic is evidenced by the opening of three new rail terminals from Russell between 2009 and 2011. Two of these are located in England and one in Scotland (see figure 1). Russell argues that rail will succeed and has a potential to reach volumes that were carried in the 60s and early 70s due to five principal reasons:

1. Environmental factors, emissions and external costs from road congestion.
2. The UK has a good rail infrastructure, despite the lack of capital expenditure on the network in the 70s, 80s and 90s. There is also a significant secondary network which is underutilised.
3. With people still wedded to cars despite current fuel costs, their disdain for trucks continues unabated. Trucks frustrate their car journey and society does not want them in their back yards. However, the same society seems to forget that freight is a derived demand based on consumer needs.
4. The economics of scale moving critical mass by rail over road.
5. The reliability and predictability that rail services can provide both on high volume routes (e.g. Anglo Scottish) and serving regional destinations (e.g. Inverness, parts of Wales, Devon and Cornwall) where LCL (less than container load) services rather than full loads will meet the demands of Small and Medium Size Enterprises (SME) customers populating these areas. However innovative technological solutions like the TruckTrain might be required to make services in these regions sustainable.

(Roser, 2011)

The current main users of rail are the energy sector and aggregates industry (12 billion net tonne-kilometres in 2009/2010), while the deep sea lines (mostly moved by Freightliner) together with logistics operators like John G Russell and WH Malcolm deliver 5.9 billion net tonne-kilometres (DfT, 2011). Russell suggests that untapped potential exists in the retail market and for refrigerated goods: “In the green context, retailers are only scratching at the surface. The reasons for this need to be further explored. Reliability, consistency and cost are the main drivers for retailers” (Roser, 2011).
In the opinion of Mr Russell, growth has been coming in stages, but the network is currently not prepared for a fundamental modal shift, which is what is required. The network suffers from capacity limitations and gauge restrictions achieving pallet-wide viability i.e. for refrigerated units and high cube containers. To unlock the full potential of rail, it needs to be used as a tool to minimise inventory, which would require timetabled services that are both predictable and reliable. Investment in equipment such as wagons and new cranes is required to support aggregators. Further, Russell notes that “freight has the same characteristics as passengers. It needs consistency, predictability and suitable accessibility” (Roser, 2011).

Other innovations to unlock the potential of rail include the “Trucktrain” concept (Bozicnik, 2011). This concept builds on short trains with a carrying capacity of up to 16 TEU including configurations for reefer and high cube boxes and speeds up to 140 kph. The possibility to accelerate and break like a passenger train makes it possible to use passenger train paths, thus making it easier to schedule on the network.

3. Strategies for the location of rail terminals

The location of rail terminals requires a clear definition of the hinterland. In his strategic perspective Russell defines “hinterland” as follows:

A hinterland is geographic region or area serviced by any form of terminal be it a port, a hub on an inland waterway, or a terminal for rail or road. The original definition was first used in English in 1888 by George Chisholm in his handbook of “commercial geography”. He defined it as the land behind a city or port. In Germany it historically describes the part of a country where only a few people live and the infrastructure is under developed. Actually these definitions could serve us well in the early part of the 21st century (Roser, 2011).

Additionally Russell notes that the average distance of haulage journeys has an impact on where an intermodal terminal should be located. This strategy is reflected in the terminals at Hillington and Coatbridge where “75% of movements are to or from destinations within 20-30 miles of the terminals, i.e. the major cities of Glasgow and Edinburgh. The remaining 25% of journeys average a radius of 80-100 miles. The regional hub Inverness in a more rural region of Scotland has 20% of movements within 5 miles, 40% within 40 miles and 40% within 100 miles” (Roser, 2011).

Such strategic reasons were already followed for earlier developments in the company as in 1970 when John G. Russell acquired the Gartcosh (Coatbridge) site near Glasgow in 1970. That site was a) adjacent to a railway line; and b) the 37 acre site had potential for development as a container terminal, consistent with the increase in container services to the Clydeport terminal in Greenock.
Interestingly Freightliner, the existing operator at Coatbridge, at that time opposed the development because competition was not in their plans. With the privatisation of large sections of the rail industry in 1994, different business approaches emerged and today John G. Russell Ltd. and Freightliner are key strategic partners. This development represents an example of the growing trend from competition towards strategies of “co-opetition” (Song, 2002) in logistics practice. 3PLs are finding that in order to achieve economies of scale, cooperation on certain routes is desirable. However industry has often been reluctant to pursue such a strategy (Van der Horst and de Langen, 2008). There is also a severe inertia in the industry when it comes to location. Runhaar and van der Heijden (2005) found that over a proposed ten-year period, even a 50% increase in transport costs would not make producers any more likely to relocate their production or distribution facilities. This inertia can in some ways be considered a bigger obstacle than infrastructural problems, and requires a restructuring of the transport chain in order to change transport requirements.
The Freightliner terminal at Coatbridge has daily rail services with Felixstowe, Tilbury, Southampton and Liverpool. There are also links from Coatbridge to the Midlands, London and Inverness. This site was a strategic development in the 1960s to provide an inland point of customs clearance for Scottish imports, therefore Coatbridge could be considered as the first Scottish “dry port”.

The terminal in Hillington near Glasgow was developed under the key aspect of mainline rail access, linking to Glasgow and the West Coast mainline. This 55 acre site adjacent to the M8 and M74 provides easy access to the main north-south and east-west corridors. A further strategic asset is the location of the terminal in relation to the key retail centres at Braehead, Silverburn and Glasgow’s Buchanan Galleries and St Enoch’s Centre.
According to Russell, Hillington forms an ideal base for construction companies building the sports facilities and athletes’ village for the Commonwealth Games 2014 in Glasgow. His vision is in stark contrast to Strathclyde Partnership for Transport who, based on a commissioned study, concluded that there was no demand for a freight consolidation centre in Hillington. The location also bears the potential to use electric vehicles for deliveries between distribution centres and retail parks. Russell stated that “so called dry port or Inland
Clearance Depot (ICD) facilities and freight consolidation centres [should be seen] as one. The three critical issues for all are: location and close proximity to city centres [e.g. Glasgow and Edinburgh], rail access, and, most importantly, access to key motorway arteries north-south and east-west” (Roser, 2011).

Russell believes that customs issues are still relevant for discussions on the purpose of inland terminals, as imports originating from outside the EU still have to be customs cleared either at the seaport or the inland equivalent with customs status.

4. A perspective on planning and investment

The development of transport infrastructure is key to maintaining the competitiveness of Scotland in international trade. Russell argues that “Scotland has made a good start with the National Planning Framework which identifies 30 key projects that are perceived as critical to competitiveness in 2030. Improvements in road connectivity to the port of Grangemouth are very welcome, the second Kincardine Bridge is very welcome and the new Forth crossing will consolidate our critical north-south corridor from Aberdeen to Edinburgh and the south. New port priorities have also been identified on the Forth which is welcome particularly since so much of our trade is with Continental Europe, therefore we must improve our sea connections. Diageo is further developing its site in Leven in Fife which will certainly add traffic volumes to the east coast road network. There are many good things going on and additional land bridge opportunities through Loch Ryan and perhaps Troon to Ireland will help us to integrate traffic flows to service a population of over 6.7 million” (Roser, 2011).

However on a more critical note Russell states that “frustrations remain with regard to government regulation, at both UK and EU levels. Sometimes new regulations appear or old rules are changed without apparent reason, and short term government thinking limits the potential for growth.” Russell is critical of “the traditional five year cycle rather than long term strategic thinking in the context of investment in infrastructure, like France which takes transport strategy out of the political arena” (Roser, 2011).

While a national strategy for planning infrastructure investment is laudable, questions have been raised regarding the ability of the Scottish government to fund all of these projects, and the ability to attract the private sector to drive such developments both financially and strategically will be extremely difficult (Wilmsmeier et al., 2011; Monios and Wilmsmeier, 2011). A number of studies have been performed over the years for the Scottish government, providing data on freight flows and potential port and inland terminal locations or development strategies (e.g. MDS Transmodal, 2002; WSP, 2006; Scott Wilson, 2009). Yet,
despite locations being promoted in government policy and planning, it has been difficult to
develop a strategy whereby both government agencies and private stakeholders can achieve
maximum benefit for minimum risk. In evaluating such complex situations, an appreciation
of the political and institutional relations is required.

Key priorities to be addressed by the industry are more effective coordination between the
UK Treasury, the Department for Transport (DfT) in London and the European Commission
in Brussels to maximise renewal and upgrading of rail infrastructure. “Without effective
coordination we have no hope of fully utilising the existing network to its potential. I have
already mentioned the secondary network which is grossly under used. I must stress this is
against a background where governments always place passengers first over freight” (Roser,
2011).

Russell feels that the principle of a European rail network without borders is undeniable:
“National rail jurisdictions just do not make sense. We as the UK need to closely examine our
potential future domestic network and how it links to the European network” (Roser, 2011).
In Russell’s understanding transnational cooperation and networking in groups such as the
European Freight and Logistics Leaders Forum are decisive in Brussels as these allow for
sharing best practice with shippers and transport suppliers in other EU countries. The fact that
he is one of only two UK members shows the significant need for UK operators to engage in
and develop pan-European strategies.

5. Key priorities for rail development

Due to reasons of historical development, the loading gauge1 on the UK rail network is
more constrained than in other EU countries (Woodburn, 2008b). Despite a range of upgrades
over recent years, gauge continues to be a significant challenge. Despite the fact that
“increasing from W8 to W102 in many cases is just a matter of paperwork, the DfT does not
even look at changes when minimal cost is involved” (Roser, 2011). These constraints
represent a specific challenge for intermodal transport of deep sea containers, as many routes
linking ports to inland terminals have not progressed beyond the W8 loading gauge (max

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1 “The physical dimensions of a railway vehicle and its load are governed by a series of height and width profiles, known as loading gauges. These are applied to a given route to ensure that a railway vehicle will not collide with a lineside or overline structure such as platforms, overbridges or tunnels. Loading gauge profiles vary by route, reflecting the constraints on vehicle size caused by lineside and overhead structures” (Network Rail website (a)).

2 W8: Allows standard 2.6 m (8 ft 6 in) high shipping containers to be carried on standard wagons.
W9: Allows 2.9 m (9 ft 6 in) high Hi-Cube shipping containers to be carried on “Megafret” wagons which have lower deck height with reduced capacity. At 2.6 m (8 ft 6 in) wide it allows for 2.5 m (8 ft 2 in) wide Euro shipping containers which are designed to carry Euro-pallets efficiently (Network Rail website (b)).
height 8’6” on standard rail wagons) that was implemented to all major ports as a consequence of the maritime container revolution. Moreover, high cube (9’6” height) containers are expected to increase to 65-70% of the market by 2023 (Network Rail, 2007). In order to facilitate transport of these units the enhanced loading gauge (W10) or low ride specialist wagons (e.g. Barber Low Ride 14.25) are required. Purchase and maintenance of specialist wagons is typically more expensive and they reduce the available train payload, thus making them economically undesirable for freight operators (Woodburn, 2008b; Network Rail, 2007).

In Scotland Inverness, Aberdeen and Fort William are all gauge-constrained and there is a need to consider alternative solutions to costly infrastructure investment. “A wagon solution would be far more cost effective,” says Russell (Roser, 2011). However government assistance is likely to be required for this solution to be implemented. According to Russell “in the case of the gauge problem the responsible government departments are not aware of the benefits than can be achieved for the economy in excess of perceived savings through cuts” (Roser, 2011).

Woodburn (2006) suggested the use of government grant to aid the start up of “flows that are not immediately commercially viable but which are likely to become so within a reasonable period. This would overcome the existing ‘chicken and egg’ situation. With a funded trial, viability could be established and further traffic that could use the new service could be identified.” While this idea is promising in principle, it is likely that the government would struggle to placate competing private companies if grant were given to one company to run a speculative service and build up its business with the commercial risk transferred to the public sector. In addition, Monios (2010) found that only a small proportion of the annual Scottish modal shift funding budget has been spent each year (e.g. £3.7m spent out of £15.4m in 2008/9). Reasons found for this lack of spending include the lack of strategic identification of projects, the lack of centralised knowledge and responsibility, and the misalignment between funding requirements and eligibility that results in difficulties attracting bids for the money. Now that the annual budget has been reduced to £2m (after the initial decision to scrap the grant was reconsidered due to industry pressure), many operators have suggested that they intend to bid for this money.

One of the questions that arises is whether transport companies really look consciously at the overall economy and its ups and downs when planning investment priorities over medium term time windows. If a company like John G. Russell is building a new terminal, buying new cranes or setting up a new route, how can they sure that the business will be there?
Russell says that it is unrealistic to expect shippers to sign long term contracts due to their inability to predict the future actions of the economy or their customers.

What we can do however is anticipate trends in key sectors, look at demographics and the resultant critical mass and the impact of government legislation, particularly in the context of rail as road congestion at its present levels and growing is not sustainable. On the specifics of retailers, people will continue to eat and consume multiple products, so we conclude that if one customer today supplies these products and they are not there tomorrow then someone else will fill the breach. That is how the economy works. Having said that, the transport industry needs to respond rapidly to changes in the economy and the supply chain demands of key shippers; we never take that for granted (Roser, 2011).

Every company has four stakeholders: customers, shareholders, employees and suppliers. Therefore the key must be to deliver commitment through consistency. If the offering is based on green credentials then it should be sustainable: “Companies that do not adopt this creed will struggle with delivery of service and credibility – this certainly applies to many elements of rail” (Roser, 2011).

“Innovation is key to survival”, according to Russell, “and if companies are innovative and looking to the future they are more likely to survive any issues that arise.” Moreover, companies must “build rail into an end-to-end solution. Generally customers want a seamless offering.” But the question is whether rail is genuinely attractive to the retail sector? “It can be with appropriate planning, including working with the customer and Network Rail to unlock the paths that provide the service required, but it does not fit all” (Roser, 2011). Research has also shown that a service needs to be well-developed before shippers will use it (Van Schijndel and Dinwoodie, 2000). This problem has been encountered in Scotland with the only international ferry service for Scottish shippers, between Rosyth and Zeebrugge, Belgium. Changing schedules and even a complete break in service when the original operator withdrew from the market in 2008 have contributed to Scottish hauliers driving down to England to access ferry services to the Continent.

Before the advent of computer systems, RFID and bar codes, information management was all done manually, however Russell noted that a mistake on the computer system can lead to delayed customer payment. This is a significant issue in an industry where “the gross margin in a good year ranges from 3% to 5%” (Roser, 2011). Cash flow is therefore imperative to survival. Russell says that “one major challenge we must face as a company and a country is the imperative not to lose sight of the commercial imperative to innovate and generate cash. As an industry we must make money and generate profit margins that are sufficient and sustainable in order that we are still around to invest in the future” (Roser, 2011).
Thinking from the customer perspective is very important for a logistics provider, according to Russell.

*Cost neutral – then it is interesting. Cost effective – then it is needed. But you must not compromise service; if it is more expensive – forget it. Furthermore, simply switching to rail is insufficient to achieve carbon savings; the train capacity use remains crucially important. To attain environmentally friendly results the minimum capacity use on the train has to be achieved. Sending half empty trains can be positively negative in fulfilling environmental benefits (Roser, 2011).*

In Russell’s perspective rail needs to be a credible product in its own right; not just because it is presumed to be environmentally friendly: “Shippers need detailed information on emissions and external costs so that when decisions are made to use rail they are made for the right reasons” (Roser, 2011).

In terms of new sites for Scotland, Russell suggests that there is a case for a site located on the west coast at Fort William. Otherwise he is not convinced based on current evidence that any new sites are needed. However development is required on the current network. Scotland’s key intermodal terminal at Coatbridge needs improvement: new cranes and a new layout would allow a significant increase in throughput. Additionally, siding capacity and length needs improvement at Coatbridge, Mossend and Grangemouth. “If this could be improved it would speed up train turnaround times, improving track occupation time. This would result in more capacity capability” (Roser, 2011).

A number of key operational areas also need to be improved, according to Russell: higher travel speeds, more acceleration and deceleration to aid in pathing and improved end to end times; a well-disciplined timetable, predictability; train traceability, always aware of performance; higher productivity in fuel workforce and train assets.

6. **The shop floor perspective on future developments in Scotland**

The integration of ports and hinterlands from a Scottish perspective is influenced by two primary infrastructural issues: the lower gauge on the East Coast Main Line (which is used to divert trains when the WCML (West Coast Main Line) is unavailable) and the problems with high-cube (9ft6) containers north of the central belt. With high cubes expected to account for the majority of 40ft containers in the near future, this problem needs to be addressed. As the cost is too prohibitive to raise the required bridges to allow high cubes through, the only feasible option is to use low wagons. However there is a lack of these wagons in the UK, and they attract higher maintenance costs. Moreover, under current regulations government funding cannot be used to solve this problem. Additionally, even when funding is available
for a new rail service, the length of lead time can be detrimental to the service development process.

Access has been reduced as the UK rail industry has seen a major decline in wagonload services over the last few decades. Better information for potential shippers is also required regarding train services, timetables and wagon capacity. Due to a lack of marketing and information availability, rail is often not visible to prospective customers. According to Russell it is necessary “to utilise capacity far better. We see far too many less than filled trains running around. We need a trading platform that shares the resource available” (Roser, 2011).

Public sector initiatives can help to resolve this issue through feasibility studies and knowledge of other experiences to bring a new service or facility to fruition by reducing the risk that either the shipper or the operator has to take in the first instance. In the meantime, rail services will rely on large shippers and then smaller users can add their containers to these regular shuttles.

Furthermore, Russell clearly highlights the importance of aligning service offerings with customer needs, as well as maintaining reliability and consistency.

It needs to be at the right price for both supplier and customer or it will not be sustainable. It needs to satisfy all. These requirements come back to innovation, which was mentioned earlier. Innovative ways to enhance capacity on the network need to be pursued, in particular gauge enhancements on specific routes and wagon solutions where required. Where possible, faster, cleaner, more fuel-efficient trains need to be implemented (Roser, 2011).

The current situation has significant implications for the practicalities of conducting trade to and from Scotland as a peripheral location. Major adverse impacts have been observed from the current arrangements as the hinterland transport of Scottish cargo and underlying logistics structures have not been given the necessary relevance in policy and by the private sector, where a visionary mid- and long-term perspective remains uncommon. Therefore the shop floor perspective provided in this chapter has confirmed previous findings in academic research presented earlier. Industry, government and academia can work together to develop innovative solutions to the problems of infrastructure upgrading and collaboration on the provision of capacity on intermodal services. A research agenda can be developed from this perspective that incorporates not just a supply side approach (focused on infrastructure and services) but the demand side as well, bringing together large and small shippers to underpin economically viable services on key transport corridors.
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