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*Investing in the future by working together
for a sustainable and competitive region*

Prepared by



**Transport
Research
Institute**

Contact: Transport Research Institute

Edinburgh Napier University, Merchiston Campus, Edinburgh EH10 5DT

E-mail: tri@napier.ac.uk, Telephone: +44 (0) 131 455 2951

Internet: <http://www.tri.napier.ac.uk/>

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1. Introduction

“Dryport” was a project funded by the European Union under the Interreg IVB North Sea Region Programme. The Transport Research Institute (TRI) at Edinburgh Napier University was one of the two Scottish partners in the Dryport project, along with SEStran (transport partnership for the southeast of Scotland). The partners worked together from 2009 to 2012 to investigate the intermodal freight transport system in Scotland, with a particular focus on inland terminals or “dry ports”, encompassing related issues such as port development, hinterland access and operational integration between maritime and inland transport systems.

Throughout the life of the project, the Scottish partners held frequent meetings together and with various stakeholders in the Scottish freight industry. Regular discussions were held with industry to remain up to date with the latest developments and to feed project findings back to them. The Scottish partners also attended several international partner meetings and workshops. Both partners worked with other project partners to provide inputs to promotional material and to share findings from the Scottish project that could be of benefit to other partners, as well as providing support and advice to other partners at their workshops and during project discussions. Academic collaboration was pursued with research organisations such as Gothenburg University and Chalmers University, Sweden, Institute of Shipping & Logistics, Bremen Germany and the Institute for Trade and Transportation Studies in the USA. One of the major contributions from TRI was to visit numerous intermodal terminals across Europe and the USA to conduct interviews with staff there and write case studies that could then be shared with project partners as well as a wider audience that could benefit from the research funded by the project. TRI staff therefore attended numerous major academic conferences over the course of the project in order to disseminate project findings to a global audience.

This report is a summary of the outputs produced by TRI. The following research deliverables were produced by TRI:

1. Three publications from the dry port conference: one book and two journal issues
2. Other academic journal publications
3. Report on barge operations in the Forth
4. Report on international dryport case studies
5. Report on Scotland: overview of infrastructure and services
6. Report on retail logistics as the main driver of dry port success (joint with Foodport)
7. Report on Scotland: policy and planning
8. Analysis of the changing port geography of the UK
9. Executive summary

This executive summary will briefly recap the main conclusions from these outputs and then draw them together to conclude the project and suggest directions for future work. Each of the individual outputs listed above will be made available for distribution at the conclusion of the project.

2. Academic publications

As an academic research organisation, the interest of TRI in this project was to produce research output that would be of value to Scottish partner SEStran as well as the other project partners and other interested parties beyond the project, including future researchers in this subject area. As these are not consultancy reports produced on demand for clients, they tend to take an academic focus. Indeed, one of the key aims for TRI was to take the academic discussion forward, advancing understanding of intermodal transport development from both practical and theoretical perspectives.

A number of academic journal publications by TRI staff resulted from the research undertaken by TRI for the Dryport project. These are available separately and all acknowledge the financial support of the project. As well as these individual article publications, three joint publications were produced by TRI, resulting from an international conference held in Edinburgh in October 2010, organised by the Scottish partners. The conference was attended by over 130 delegates from 26 countries and included over 40 speakers from both academia and industry across the world to discuss all aspects of dryport development and operation. The best papers from this conference were collected in three publications. *Dryports: a global perspective* was published by Ashgate, and special issues of academic journals *Maritime Economics & Logistics* and *Research in Transportation Economics* were also published. All three of these publications were edited by Prof Kevin Cullinane (TRI), Dr Gordon Wilmsmeier (TRI) and Dr Rickard Bergqvist (University of Gothenburg).

3. Research on the potential for barge operations in the Forth

One of the early aims of the project was to consider the potential for barge operations in the Forth as part of a broader approach to integrated freight transport in the region. The research report produced by TRI showed that using current cost structures the service did not appear to be feasible. However the purpose of this report was to provide a benchmark that could be used to make decisions regarding where costs can be reduced which might then make the service financially attractive.

Complementarity between Scottish/UK and EU funding requires further research, particularly in terms of whether state aid rules are preventing desirable government investment in ports and shipping. A number of issues were identified with the current FFG/WFG system for financial support of water freight services in Scotland. Therefore one way for the current project to proceed could be to apply for Interreg funding to run a trial service, although this funding has its own conditions and a guarantee of certain levels of commitment would be required from the shipper.

It was concluded that the best way to take the project forward would be to secure an operator through a tender process. An operator could assess the economics in greater detail as part of a larger operation. It is possible that additional improvements can be made to the overall cost, perhaps through innovative ship design or crew usage for greater flexibility of operation, but these efficiency advances were not within the scope of the study. Furthermore, as noted in the report, if the service were operated by the port operator as an

internal move between quays, there could be greater scope to reduce handling charges and make the service more economically attractive.

It was recommended that the next step of the project should be to obtain a commitment from the potential shipper, and then to run a tender process inviting operators to submit bids in which they present detailed accounts of how they would run the service. These actions were taken forward by Scottish partner SEStran in the new Interreg-funded project LO-PINOD.

4. Inland terminal case studies

A number of site visits to inland terminals across Europe and the USA were undertaken by TRI staff to interview key personnel and write case studies. These case studies are provided in a large report that begins with a literature review to put the analysis in a conceptual context, and the case studies are followed by a discussion of the key issues from both practical and theoretical perspectives. Much of the recent popularity of the dryport concept has been due to academic research that has promoted a certain conceptualised view of inland intermodal terminals. Therefore it was felt pertinent to the subject to consider to what extent this concept actually obtains in the industry and what refinements may be necessary to clarify and develop the concept.

The approach taken was to place the case studies within the context of “port regionalisation” theory (Notteboom & Rodrigue, 2005), in which processes of integration and decentralisation lead to a complex network of hinterland links and cooperation strategies between port and inland actors. For this research, an additional focus was applied, distinguishing between Inside-Out strategies driven by inland actors and Outside-In approaches, driven by port actors. It was found that significant differences between the two kinds can be identified, meaning that the level of integration required to achieve increased efficiency on landside links is quite difficult to accomplish.

An inland intermodal terminal can provide port access to a region that suffers from poor accessibility to ports, fulfilling aims of both the inland region and the port. Consolidation of flows to provide economies of scale, decreased transport costs through access to main routes and increased frequency of services providing flexible options are all desirable for shippers in inland regions, while the port benefits from increased traffic along this corridor. Yet while the port has an interest in improving hinterland links, it can be achieved in different ways.

Notteboom & Rodrigue (2005) stated that regionalisation “is characterised by strong functional interdependency and even joint development of a specific load centre and (selected) multimodal logistics platforms in its hinterland” (p300), and they go on to remark that “the implementation of regional load centre networking strategies can vary from informal programs of coordination to advanced forms of strategic partnerships through strategic alliances, (cross-)participation, joint ventures or even mergers and acquisitions” (p307). This account does not clarify who drives the development of the strong interdependencies that lead to port regionalisation. As the case studies reveal, the direction of development and the drivers, whether public, private or in combination, have a significant impact on the level of created interdependencies, which particularly materialise in the level of logistics integration.

Traditional ports and port systems are under pressure to find new solutions to cope with competition, capacity constraints and the requirements of logistics and supply chain management. These various strategies are often grouped under the umbrella term of regionalisation. “Location splitting” as part of the port’s lifecycle was explored in the case studies, and a number of important issues were raised with regard to the spatio-temporal transformation represented by this strategy. Comparison of various concepts on how inland terminals and the connecting corridors are planned, controlled, owned and operated have shown that location splitting is frequently driven Inside-Out.

Port devolution and deregulation of transport services in general has opened wider possibilities for the private sector, public sector and varying forms of cooperation between the two. Land use and transport planning require integrated approaches across local, regional and national boundaries to be able proactively to influence and direct port development in this type of spatially discontinuous system. As with the discussion on development, the operational discussion highlights the difficulty of making intermodal transport feasible in Europe. Most terminals had their development subsidised by public money, and many operators still receive public money. Indeed, terminals rely on rail traffic for their existence, and as many rail operators in Europe continue to receive subsidies from their national governments, this subsidy indirectly supports the small terminals that continue to exist. It is unclear how many small intermodal terminals may fail if the rail operators using them were to lose their subsidies. Some interviewees noted the existence of previous inland terminals developed with public money that had since failed. Therefore a recognition in industry of the risk of public development can be identified. What is needed now is for public bodies such as local and regional planning authorities, as well as national bodies who tend to provide the funding, to recognise the seriousness of this issue and strive to improve the integration of their transport planning with industry needs, whether that be market demand or operational requirements.

The success or failure and source of location splitting can commonly be attributed to the existence of institutional barriers that prevent the efficient and effective operation of an integrated port-inland system. The case studies showed that these barriers can relate to policies of regulation (either over-regulation of transport services or under-regulation of inland terminal planning regimes), or operational aspects such as consolidation of market demand across political boundaries or finding space to marshal trains or transload cargo within two competing private rail networks.

The report demonstrated that focusing attention on the driver and direction of intermodal corridor development enables a more nuanced understanding of the process of port regionalisation. However it is recognised that additional case studies will be required to gain an understanding of regionalisation strategies in further contexts.

Relating the findings back to the tradition of spatial theory of port development leads to a question: what is port development? Firstly, physical, as evidenced by most of the earlier models: infrastructure, superstructure and spatial development. This stream of models leads towards location splitting as spatial discontinuity. The aim of this strategy is to support the core business of port throughput. Secondly, port development may be considered from operational and strategic perspectives. These are the aspects sought by the regionalisation

model, which focuses on relations between the port and the hinterland, through a variety of interdependent relationships. These can only work if accompanied by a move beyond the same aim of supporting the port's core business. While the regionalisation model does discuss this break from the traditional understanding of the port's role, it does not elaborate sufficiently on how it is done, in particular which actors direct the process and from which direction.

A trend may be observed, beginning with the port's core business of container throughput, and developing towards hinterland actions and investments (either physical or operational/strategic) with an aim of supporting this core business. However as can be seen from the case studies in this report, these developments struggle to succeed if they are viewed merely in this supporting role. Greater integration with the supply chain requirements of the cargo inside the containers is required, even if this integration relates only to visibility of the cargo in the supply chain, so that more efficient movements may be scheduled within the port's operational hinterland links. This will be the next challenge for ports.

In order to succeed in an increasingly competitive environment, ports can only achieve the required efficiencies in their hinterland links if they no longer make a clear distinction between core and supporting activities. Therefore the emerging stage in port development theory must understand relations between port authorities, port terminal operators, inland terminal operators (including the transport link between the two) and logistics providers who can provide visibility of the supply chain requirements of the cargo in the boxes. Cargo movement and box movement must be aligned more closely, and the direction of vertical control and the drivers of these developments can help reveal these relationships and linkages.

The first conclusions drawn from the field work were of a conceptual nature. Firstly, differentiation of inland terminal concepts has been achieved, demonstrating the correct use of the "dry port" terminology, in comparison to inland terminal or intermodal terminal. Similarly, understanding of the extended gate and freight village concepts has been bolstered by this research. The importance of separating transport and logistics functions, an approach drawn from the literature, has been strengthened by these findings.

A major goal of this research was to pursue the discussion on port regionalisation; to this end the drivers and direction model has been added and then examined through the case studies. The operational role in Outside-In relations has been shown to have greater likelihood of success than strategic developments, whereas Inside-Out development has been revealed to be the dominant kind, however a potential conflict exists between the strategies of ports and inland actors, such that development remains risky, and a number of institutional issues can prevent developments achieving their operational potential, even if a market is in existence. Thus the role of policy and planning in driving such developments must be questioned. Theoretical discussions have revealed location splitting to be only one aspect of the potential for the structural transformation of ports, and a focus on logistics integration, visibility of cargo flows and information management comes to the foreground in the future of port development theory.

The second conclusions from this research were from a practical point of view, relating to insights into the development, operation and port integration of inland intermodal terminals. One finding is that integration with ports is very difficult and consequently rare. Suggestions of integration with ports and leaving the container at an inland terminal “as if at the port” can only be possible if a number of difficult obstacles have been overcome, therefore integrated transport chains with lower transaction costs and increased efficiency is not yet the norm and may not be for some time.

What lessons can be learned for the Scottish case? Firstly, a deeper understanding of inland terminal development strategies and concepts will allow greater clarification of these strategies in Scotland (e.g. dry ports and freight villages). The importance of institutional factors is noted, needing to align market demand with public planning regimes. Therefore the key questions for Scotland relate to how policy and planning can align with market and operations.

5. Scotland’s intermodal freight geography: freight flows, infrastructure & related issues

TRI and SEStran worked with many stakeholders in the freight industry throughout the course of the project to obtain an overview of key issues and then analyse these findings in the context of other research to consider how to develop the project and add value to Scotland’s intermodal freight sector. This research report by TRI presented an overview of freight flows and infrastructure issues associated with trade access for Scottish shippers.

It was found that a significant proportion of Scotland’s external trade comes through English ports and then travels overland to/from Scotland. Scotland’s limited accessibility in terms of international markets is therefore reflected in the limited share of total Scottish unitised freight traffic coming through Scottish ports. The primary intermodal access points (water and rail) were identified and it was found that capacity is not a problem in the short term or even potentially the medium term. This is mainly due to the recession, which challenges any accurate forecast, as well as the degree to which future increases in demand can be met by increasing the efficiency of operations rather than building of new infrastructure. Both of these issues are beyond the scope of this report.

What issues are affecting Scottish trade? These include lower frequency of services, increased cost of repositioning, wrong equipment available and an imbalance of equipment (primarily containers vs trailers). At the core of much of this is the difficulty gaining economies of scale to develop intermodal corridors, either inland or coastal. Additionally, rail operational issues were identified, such as asset utilisation, market structure, backhauling and consolidation (these are discussed in detail in the report on retail intermodal logistics). Horizontal fragmentation across the (already small compared to other countries) industry makes coordination difficult and supply chain requirements split flows further and prevent consolidation on key routes, thus requiring ongoing operational subsidies. As well as these barriers to rail and coastal shipping, problems on Scotland’s only ferry route include a changing schedule and service interruptions, resulting in three operators in three years. Multi-user consolidation centres were identified as a potential role for public policy to support massification of flows at key nodes (e.g. for the ferry or for rail),

as well as the need to solve the container imbalance, perhaps through examining the potential for some kind of container sharing or transloading system.

Scotland's peripherality has been established, but why does traffic go overland rather than use the ports? Is it the cost? Findings show that it is cheaper by water or rail than road. The driver is logistics strategies based on centralisation of inventory in the midlands. Scotland is peripheral to these main flows and policy documents indicate that government agencies seek to challenge this status. Key issues are related to the need to decentralise UK trade geography, which is related more to restructuring the supply chains of large shippers to use those nodes rather than requiring new ones, but it also raises the role of Scottish policy and planning. Some of the same issues have been identified in the case studies in other countries: lack of economies of scale, problems aligning market demand with transport infrastructure development and difficulties achieving high levels of cooperation between the port and the inland terminal. This is exacerbated by the often antagonistic relationship between the two modes in the UK (which also feeds back into the regionalisation theory in which competition between modes is insufficiently addressed). Therefore there was a need to examine the planning and policy system to see how these can be aligned in Scotland. A separate report will analyse intermodal transport in Scotland through a study on retail logistics as the primary market for these services, while another report will address the role of policy and planning.

6. Retail intermodal logistics in the UK

It was found from the case studies and the analysis of Scotland's freight flows that the market and operational issues must be understood in order to plan for intermodal freight usage. Therefore TRI conducted a piece of research on retail logistics as the key driver of intermodal transport growth in the UK over the last decade, in particular the key Anglo-Scottish route. This research was also supported financially from the Interreg-funded Foodport project.

The examination of the rail industry revealed that the intermodal market is growing but served by a limited supply of traction providers and 3PLs. The key route is Anglo-Scottish though port flows are relevant, for example Tesco seeking to replace carrier haulage with their own primary network. Intermodal terminals for these flows in England and Scotland were identified along with current service provision.

From an operational perspective, it was found that asset utilisation is key for traction providers as expensive assets are forced to remain idle while daytime paths are used by passenger trains. This also relates to the fragmentation of the UK freight industry in terms of providing enough flows for each train. Other operational issues such as wagon and container management play crucial roles.

Horizontal collaboration is important to achieve full trains, and while this is happening now, the issue of preferring private sidings rather than shared user terminals splits economies of scale and can be a barrier to greater use of intermodal transport. Planners should consider whether multi-user platforms should be preferred in the planning system rather than more rail-connected sheds.

Vertical collaboration is more common. This involves working closely with traction providers and 3PLs to develop a seamless operation from the DC to the terminal, the handling, the trunk haul and the last mile. The partnership between Tesco, DRS and Stobarts has been shown to be successful in overcoming operational issues.

Analysis of the spatial development of the retail sector identified the centralisation of DCs, growing retailer control of the primary chain which provides new opportunities for intermodal use as does greater use of planning and forecasting through ICT. The need for full containers of product to go into NDCs before sending picked loads to RDCs and stores is something that will remain a barrier to solving the container imbalance. Scotland needs more northbound deepsea containers, but currently they receive many northbound moves in trailers or 45ft boxes.

There are some potential drivers for decentralisation, such as port centric logistics and continental hubs. The analysis in the report has suggested however that they have only limited potential. One aspect of distribution geography is the importance of consolidation centres. They are very important for consolidating LCL into FCL which can feed intermodal services if they are located at intermodal hubs. They can also be used for retailers de-stuffing containers and consolidating loads for regional stores. This could be a planning target for the public sector.

In the interviews it was unclear to what degree a company's interest in using rail is due to a shift in the sector or a purposeful management policy or whether it is just down to an individual in a company. Therefore it is difficult to drive this through policy when it often comes down to individuals, meetings and discussions between 3PL or rail personnel and the potential client, built on individual relationships.

Future drivers of rail growth include fuel price rises, carbon targets and increasing road congestion, particularly in areas where the road is poor. It will still be 3PLs, retailers and shipping lines who drive this. Fuel price is certainly an issue, as some operators update their costs on their contract weekly due to changing fuel costs. Congestion is less of an issue at the moment but will not go away, and corporate social responsibility has grown in importance, according at least to company reports and promotional literature (Jones et al., 2005). While the green agenda may have fallen slightly in prominence due to the recession, it remains a key driver, according to interviewees.

7. Scotland's intermodal freight geography: analysis of policy and planning

Scotland's freight flows and infrastructure were analysed in one report and retail logistics as the key driver of intermodal transport was analysed in another. A third report on Scotland focused on the role of policy and planning. The question to be answered was what is the public sector trying to do to support the intermodal transport and what agency does it have to do so?

The institutional analysis of transport governance in Scotland as it relates to policy and planning revealed uneven processes of hollowing out and filling in. Scalar and spatial fixes do not align and the economic geography literature was useful in understanding these issues. Utilising a theoretical framework for institutional analysis developed elsewhere by

the authors, key issues were highlighted relating to the institutional setup in Scotland. Misalignment of policy and strategy across scales was identified, for example European funding coming into the regional level, whereas the regional level of transport governance does not have a clear mandate and mode-specific lobbying groups and competing private sector freight operators make coordination difficult. Regional body SEStran does not have direct control over transport planning or funding but it has managed to develop an informal role by bringing actors together across scales which could not be done by local authorities and little evidence was found of it being done at national level. A useful comparison is the adoption of a corridor approach in the USA, whereas in Scotland each piece of infrastructure development, whether the rail network or the nodes (ports and inland terminals) are treated individually, and the numerous companies competing for a small territory dilutes economies of scale and thus makes planning and investment difficult.

The FFG grants are not used strategically and are not suited to the operational realities of the industry (e.g. lead times and multi-user issues). There is a strategic plan for the infrastructure network (as this is managed by Network Rail) but not for terminals (as these are privately operated). One option could be to merge the FFG funding into the strategic Network Rail programme, thus considering terminals as infrastructure, supporting their development through a system modelled on the United States TIGER grant (see other research by TRI), combined in a package with relevant network upgrades into a corridor approach. The other instrument available to the Scottish government is the planning system, but the analysis revealed how the proposed container port development at Rosyth was removed from the NPF, thus creating obstacles to its development and enforcing the status quo. Feeder ships will get bigger; if Scottish ports cannot accommodate them then Scottish feeder cargo will go to other regional UK ports. Therefore the two instruments available to the Scottish government, planning and funding, are not being used strategically and should be addressed. These problems are related to the conflict between legitimacy and agency identified in the institutional analysis based on the theoretical literature.

While competition resulting from rail market liberalisation has brought some improvements in the freight market, fragmentation has meant a loss of knowledge and service integration. Haywood (2007) noted that rail freight privatisation has generally been considered a success unlike passenger rail privatisation, yet he also said that the UK rail market is too small to split. American interviewees commented that vertical separation is unworkable. So, in order to make it economic, 3PLs such as Eddie Stobart, JG Russell and WH Malcolm need to cooperate to fill trains, establishing a unified freight service such as existed before privatisation.

From the case studies presented in another report it was learned that different terminals and freight villages follow different models and exhibit different levels of integration and collaboration. But they experience the same problems everywhere. Collaboration is particularly difficult in Italy which is more fragmented than the rest of Europe. The Italian model is freight villages with intermodal terminal within the site, but they still don't achieve significant modal shift due to problems of collaboration, illegal road driving, etc. which again comes back to the economic realities of the freight industry. It is a marginal business with no spare money for risky innovation. However the economics of the

industry can be improved through processes of “virtual” integration, i.e. considering a corridor as an integrated unit of infrastructure, superstructure and operations into which funding can be injected.

8. An analysis of the changing port geography of the UK

Finally, TRI brought the research reports together in an analysis of the changing port geography of the UK. The natural evolution of transport nodes might have been distorted by governance issues resulting from peripherality within the UK, and this report revealed the temporal aspect in path dependence. In overcoming peripheral status, the first mover advantage is of considerable importance because when fighting for a small market, coming in against an incumbent is an unattractive business proposition in a sector with large upfront investment, large sunk costs and a long payback period. However, proactive strategies such as those pursued by Liverpool and Teesport seem to be challenging this path dependence. But how will future government investment affect current development?

The changing port geography in the UK based on the explosion of the container port market in the last decade has made northern ports more likely to achieve enough feeder traffic to be worth expanding. An emerging research question is thus what effect these developments will have on potential developments in Scotland, as it already suffers from double peripherality (both geographically and institutionally) and is currently engaged in a follower rather than leader strategy, by trying to copy the success from port centric logistics in other ports.

How will new feeder strategies and decentralisation movements bringing greater volumes to regional ports affect inland distribution? Greater flows to regional ports through larger feeder vessels as a knock-on effect of larger ships on mainline routes (e.g. 18,000 TEU vessels only making one or two hub calls in the northern range, which may not be in the UK) could reshape inland distribution and lead to greater decentralisation. The high incidence of carrier haulage in the UK (about 70%) has an effect on inland distribution, but large retailers such as Tesco are challenging this monopoly. This could affect port choice and centralisation strategies.

The effect of these potential strategies could be to challenge rail from south-eastern ports to the north of the UK. Port centric logistics must also be considered, although its potential may be limited by operational issues (Mangan et al., 2008; Pettit & Beresford, 2009; Monios & Wilmsmeier, 2012) which again feeds into the imbalance of container types affecting Scottish exports. This issue will be analysed by the authors in a future work, as further research is required into imbalances of container flows and the complementarity of different unitised cargo types in order to understand the intersection between port development and logistics strategies.

This report identified a potential deconcentration of container traffic within the UK port system, related to a shift in gateway region for UK trade, increasingly being transhipped through continental ports rather than the traditional southeastern UK ports. This deconcentration has potential benefit for regional UK ports, many of which are pursuing significant port expansions to take advantage of these trends. These ports seek to reposition themselves within an emerging feeder market that could reduce their peripherality that has

been embedded by the current concentrated UK port and infrastructure system. The findings thus raise questions about port policy and both public and private sector responses to a changing UK port geography.

9. Discussion and conclusions

The findings from TRI's research on this project suggest numerous avenues for future research. Follow-up analysis could examine the contrasting roles of Coatbridge (load centre terminal or dry port for maritime flows) vs Mossend (freight village with intermodal terminal). It would seem that the freight village model could work in Scotland, for intra-UK flows at least. Lack of integration between the freight village and its "co-located" two intermodal terminals could be an issue, as well as lack of alignment with supply chains of potential users. Similarly, further research should pursue the issue of port development in the north of the UK. Why did port centric logistics succeed in Teesport but not Grangemouth, and what about the new proposed developments at other UK ports? The subject of port centric logistics in the UK, its potential and likelihood will be a fruitful avenue for research in the context of port regionalisation strategies in the UK.

In this context of the expansion of regional UK ports is the future study of shipping line strategies, the impact of 18,000 TEU ships and the resultant feeder strategies in the northern range. Will the port geography of the UK be deconcentrated, leading to a number of knock-on effects for freight distribution in the UK, in particular north England and Scotland? The research in this project has identified this issue and highlighted some key drivers of the current situation, but the picture will no doubt change as time progresses and future study should examine this unfolding and exciting direction.

A major issue for Scottish trade that was identified during this research is the problem of repositioning costs for providing empty containers for Scottish exports. This problem was considered through numerous interviews and discussions but remains unresolved. In any potential scenario someone still has to pay the repositioning cost, unless unitised imports through Scottish ports increase. This problem requires an innovative solution that could be addressed in future work.

The analysis of institutional aspects of intermodal transport development in Scotland raised issues of strategy and coordination across scales that could be addressed in the future, in particular aligning funding and planning strategies more closely with market and operational realities.

From a project perspective, the Dryport project has led the Scottish partners into new Interreg projects. TRI has joined the GreCOR project which involves partners from other projects such as Stratmos; the aim is to build on the Dryport project through a work package on extended logistics hubs. Scottish partner SEStran has taken forward ideas from the Dryport project in Interreg-funded projects Foodport, LO-PINOD and Weastflows. The Scottish partners will continue to work together and also with contacts established through the Dryport project to progress the aims that have been developed through the three and a half year life of this project.

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