

Potential for a Regional Freight Terminal in Aberdeen City and Shire

Analysis of terminal requirements and best practice

StratMoS WP C

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Summary: The report aims to provide support to Aberdeenshire and Aberdeen City Council's concerning new Regional Freight Terminal development. It contains opinions of potential RFT stakeholders concerning benefits from RFT, RFT's requirements, necessary services, facilities, and business model; as well as the experience of other successful RFTs (or Transport Centres) with similar size, location and types of activity. Analysis, results and recommendations on how to plan, structure and organize RFT with regard to regional needs. Report was developed by utilising findings from WP C and DP3a within the StratMoS project.	
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Preface

The StratMoS project is a part of the North Sea Interreg IVB programme. The StratMoS project is in progress from January 2008 to September 2011 and has partners from Norway, Belgium, Denmark, Germany, United Kingdom and The Netherlands. Furthermore StratMoS partners remain in cooperation with partners from North-west Russia. This present Work Package C report has been developed and written by FDT- Association of Danish Transport and Logistics Centres with support from the StratMoS DP3a project coordinator, partners from WPC and DP3a, and previous findings.

The report consists of 9 chapters and 2 appendices.

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1 Introduction to Report

Effective transport systems development, usage of sustainable modes of transportation, regional integration, and support to peripheral territories are important issues of European transport policy today. Reflecting those issues, the StratMoS project is focusing on the development of efficient connections between coastal areas of different countries in the North and Barents Sea Regions, intermodal logistics centres creation and hinterland development in those regions. One such region is Aberdeenshire in North-East Scotland, where the development of a new Regional Freight Terminal (RFT) is planned.

1.1 Background research on the Regional Freight Terminal

Regional Freight Terminal development in the Aberdeen City and Shire area is one of the Demonstration Projects (DP3a) in the StratMoS structure, which requires use of the findings of different Work Packages for a practical case study. This report has been developed and written by using findings from WP C (MoS Development in Hubs and Hinterland) for the DP3a project within StratMoS.

An idea to develop a RFT near Aberdeen is not new, and several preparatory studies were conducted for it:

- North East Scotland SustAccess Freight Study (March 2007)
- Aberdeen City Freight Flows – Survey Report (February 2011)
- Technical Note on Rail Sites Issues (February 2011)
- North East Scotland – Lorry Parking Study (March 2011)

Previous findings show that the bottlenecks related to terminal capacity and opportunities arising from potential freight flow will require additional storage and transshipment infrastructure. The development of smaller freight hubs seems less attractive in terms of efficiency compared to the establishment of a larger terminal. A larger terminal has potential for cost efficiencies from:

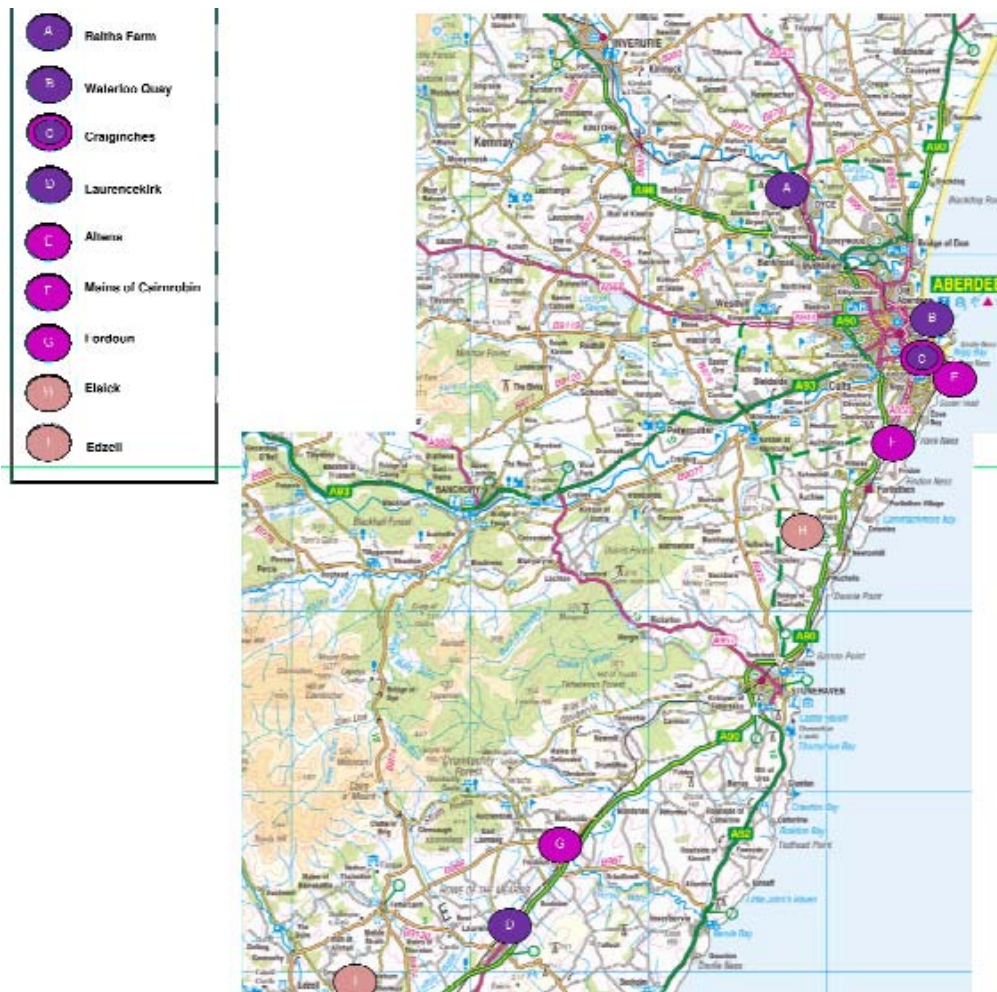
- sharing operational expenses;
- achieving higher equipment utilisation; and
- installation of more efficient loading/unloading equipment and layouts.

In addition, a larger freight hub would increase the efficiency of using a regional rail network, providing the opportunity for efficient train load consolidation and development of additional freight handling facilities at such a location. This is more easily achievable at a single location instead of a number of dispersed locations. Additional factors are aggregation of road and rail volumes, opportunity for break bulk operations, load

sharing, to support the operation of a city centre Low Emissions Zone and the use of vehicles appropriate to the load size.

Possible locations of the potential regional intermodal terminal are:

Figure 1: Possible locations of the potential regional freight terminal



Source: Aberdeenshire Council (2011)

1.2 Research question

The report aims at answering the following question:

How a potential Regional Freight Terminal in North-East Scotland should be planned, structured and managed in order to suit the needs of the potential stakeholders and users, the infrastructure and the special commodities of the Aberdeen region?

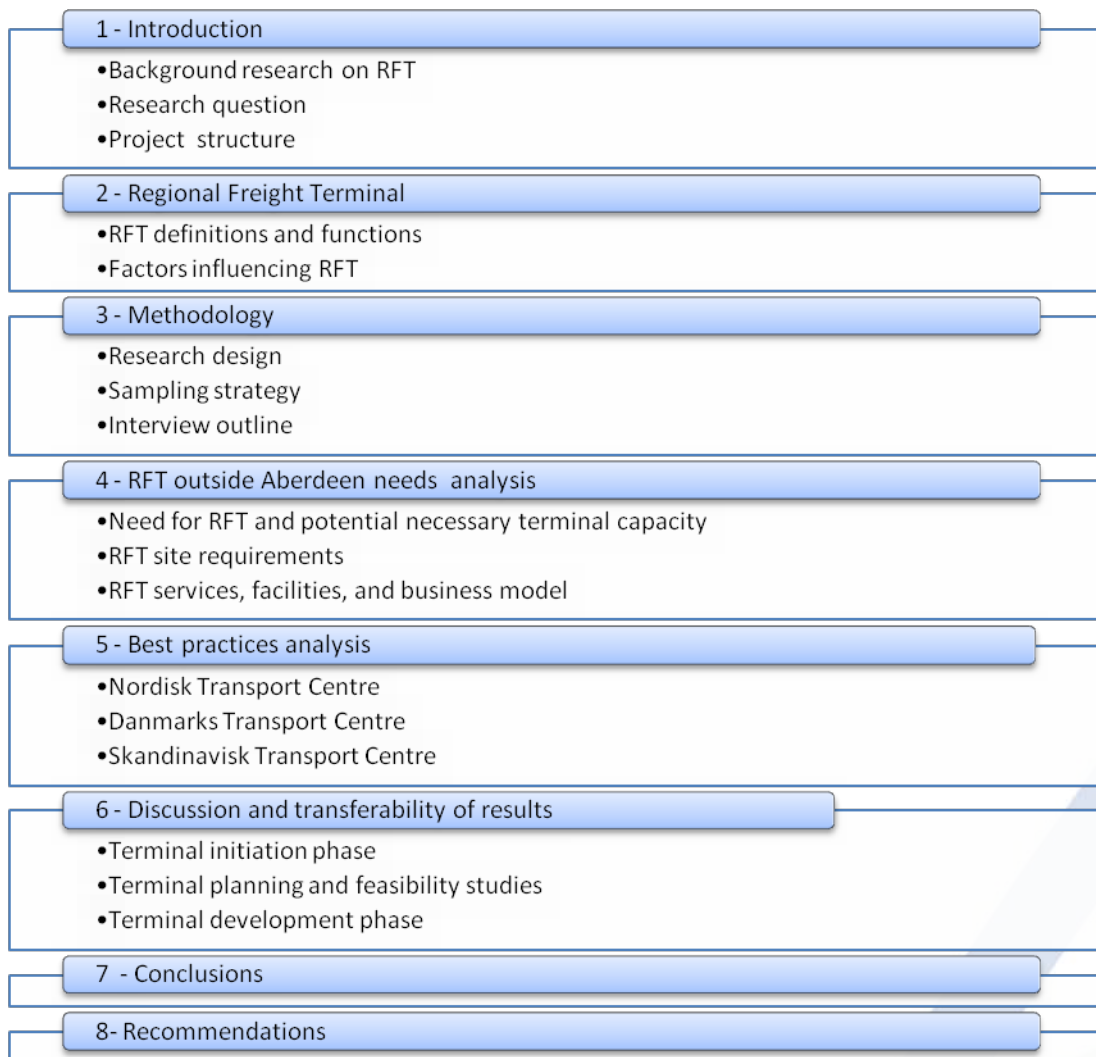
In order to answer this question, the following information will be collected:

- opinions of potential RFT stakeholders concerning regional need for an RFT, an RFT's requirements, necessary services, facilities, and business model; and
- experiences of other successful RFTs (or Transport Centres) with similar size, location and types of activity/handled goods.

1.3 Project structure

The report is organised as follows. First, the introduction presents the overall purpose, background and structure of the report. Second, the Regional Freight Terminal concept and research methodology will be presented. Then two empirical chapters will analyse findings obtained during two sets of interviews with RFT's potential stakeholders and RFT best practices' managers. In the best practices analysis chapter, discussion and transferability of results will further elaborate on the findings. Finally, the general conclusions will be given, followed by recommendations for an RFT outside Aberdeen.

Figure 2: Project structure



2 Regional Freight Terminals

This chapter will contain a conceptual framework of the report, defining RFTs, their functions and forces influencing an RFTs' development.

2.1 Regional Freight Terminals definition and functions

Regional Freight Terminal definition

Centres, terminals, and platforms have a certain problem of definition. When initiated in the 1970s intermodal transportation was mainly concentrated at ports and over maritime shipping, which only considered inland freight activities from a maritime perspective. Thus, the term “dry port” is often defined as a “terminal where various cargo handling and added value activities are performed, connected to a seaport with either rail or barge services” (Roso et al, 2009, Wiegmans et al, 1999, Rodrigue, 2010). As for inland ports, they can vary significantly from simple storage nodes to complex centres with logistics zones and a governance structure, such as a port authority.

A variety of definitions is not surprising, given the various services, locational characteristics and stakeholders of various terminals. The most common and widely accepted parameters for the definition of inland intermodal terminals according to Rodrigue, Debie, Fremont and Gouvernal (2010) include:

- *Containerization*: the important function of intermodal terminal is the handling of containers. Additional activities often include consolidation, transshipment or light manufacturing.
- *Dedicated link*: An inland terminal should have a high capacity link to sea, preferably by rail. If some terminals only have a road connection, it should still allow high and frequent freight flow.
- *Massification*: An inland terminal should allow economies of scale by handling high volume at low cost.

The European Associations of Freight Villages “EUROPLATFORMS” (2004) calls intermodal terminal a *Transport/Logistics Centre/Platform* and claims that in order to be effective and competitive a logistics centre should:

- Be open, or accessible, to all companies involved in the above-mentioned activities
- Contain all necessary facilities and be served by a variety of transport methods (roads, rail, sea, inland waterways, air)
- Provide high quality services with intermodal solutions
- Be run by an independent body in the form of PPP (Private-Public Partnership)

These parameters demonstrate the policy perspective on the terminals and again incorporate factor, demand, strategy and supporting industries dimensions of cluster shaping factors which were selected as a theoretical framework for current research.

Recently both the commercial sector, including maritime terminal operators, shipping companies, global logistics service providers etc, and public organisations have included the development of inland terminals into their planning frameworks. This has resulted in the integration of efforts between public policy and commercial strategies. This especially relates to the connection of inland terminals to their hinterland which has received the most attention. (Verhoeven 2009)

EUROPLATFORMS (2011) suggests the following definitions, which are taken as a point of reference for this research:

- **Multimodal transport** refers to «transport using more than one mode»
- **Intermodal transport** refers to «the segment of Multimodal transport that applies to unitized freight» (i.e. in containers)
- **Co-modality** is a «use of different modes on their own and combination in order to obtain an optimal and sustainable utilization of resources»
- **Terminal** is «a place equipped for the trans-shipment and storage of ITU (Intermodal Transport Unit) and non-ITU freight»
- **Transport/Logistics Centre/Platform** are «understood as nodes where series of logistics activities take place, connected to different modes of transport, and open to commercial traffic».

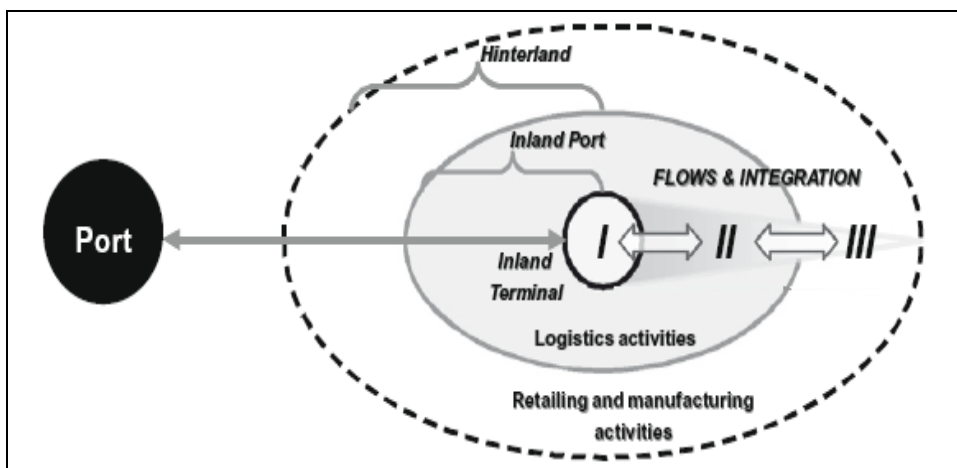
Following those definitions, **Regional Freight Terminals** for the purpose of the current project will be understood as *nodes for storage and trans-shipment of different types of freight (primarily containerized) on*

an open commercial basis. Regional freight terminals will need to have- co-modality, meaning that they can be either unimodal or multimodal, but provide the most sustainable and effective solutions. Overall, intermodal terminals are preferred; however, given the uncertainty of Aberdeenshire concerning a final modal split, at least one unimodal terminal will have to be considered..

Regional Freight Terminal functions

Rodrigue, Debie, Fremont and Gouvernal (2010) developed a framework for functional relations between inland terminals and their hinterland, which is presented in Figure 3. In their framework the inland port encompasses the inland terminal and logistics activities integrating all the flows of the three tiers around it. This shows that the inland terminal is placed in the very heart of the system, and is joining all other elements together.

Figure 3: Functional relations between inland terminals and their hinterland



Source: Rodrigue, Debie, Fremont and Gouvernal (2010)

The three tiers of the framework depict three groups of functions of the inland ports: transport related, supply chain related and hinterland related functions. This categorization is vital for understanding the purpose of the inland terminal and its relationship to other elements of the transport value chain.

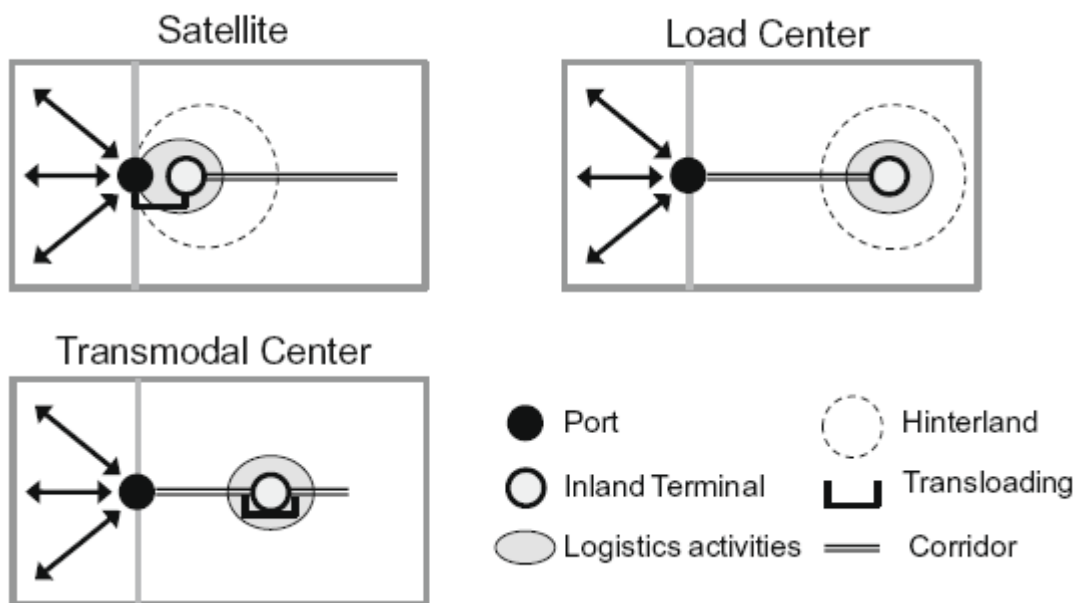
From a **transport perspective** inland ports carry the functions presented in Figure 4:

- *Satellite terminal* is located close to port and mainly accommodates additional traffic from the port, e.g. in a container depot. It is often perceived as one entity with the port and the inland extension

which helps avoid port congestion. Such a terminal can be serviced by truck shuttles or short line rail and barge.

- *Load* an intermodal rail or barge terminal providing a link from the port to a regional production and consumption market. This transport function is relevant for large containerized loads which are composed or decomposed along main transport routes. In this case, the inland terminal shows its spatial function of centrality mentioned above.
- *Transmodal centre* is an inland port which connects freight flows either through the same mode or through intermodal solutions. Such a terminal performs its spatial function of intermediacy.

Figure 4: Types of inland ports following their transport function



Source: Rodrigue, Debie, Fremont and Gouvernal (2010)

Supply chain functions of the inland ports include:

- *Consolidation/deconsolidation* includes inventory management practices and adaptation to the required shipment sizes by aggregation and separation of batches.
- *Transloading* involves such operations as adaptation of specific freight loads, different from standard ITU or TEU, to the available handling capacities of the terminal.
- *Postponement* allows such options as just-in-time procurement or last minute distribution by use of the warehousing capacities of the terminal. This inland port serves as a supply chain buffer.
- *Light transformation* includes such operations as packaging, labelling or customization to national, cultural or linguistic market characteristics. As inland terminals are located close to the final

customer, they allow fine tuning of the products, thus taking some of the functions of the traditional supply chain.

The third tier addressing **hinterland** concerns its market area. Here two types of cargo flows are involved: imbalanced flow of the consumer market, including inbound goods flow and outbound empty containers flow, and more balanced manufacturing sector flow mainly for intermediate activities where outbound flow is also generated, because inputs become outputs. (Rodrigue, Debie, Fremont and Gouveral, 2010)

Being the main focus of the research, a regional freight terminal (also called “logistics platform” and “transport centre”) agglomerates transport and logistics related activities in a single location. Regional freight terminals unite companies with competing and complimentary services in order to provide a full service for customers and the benefit of co-location. This allows them to qualify as **transport clusters** due to their:

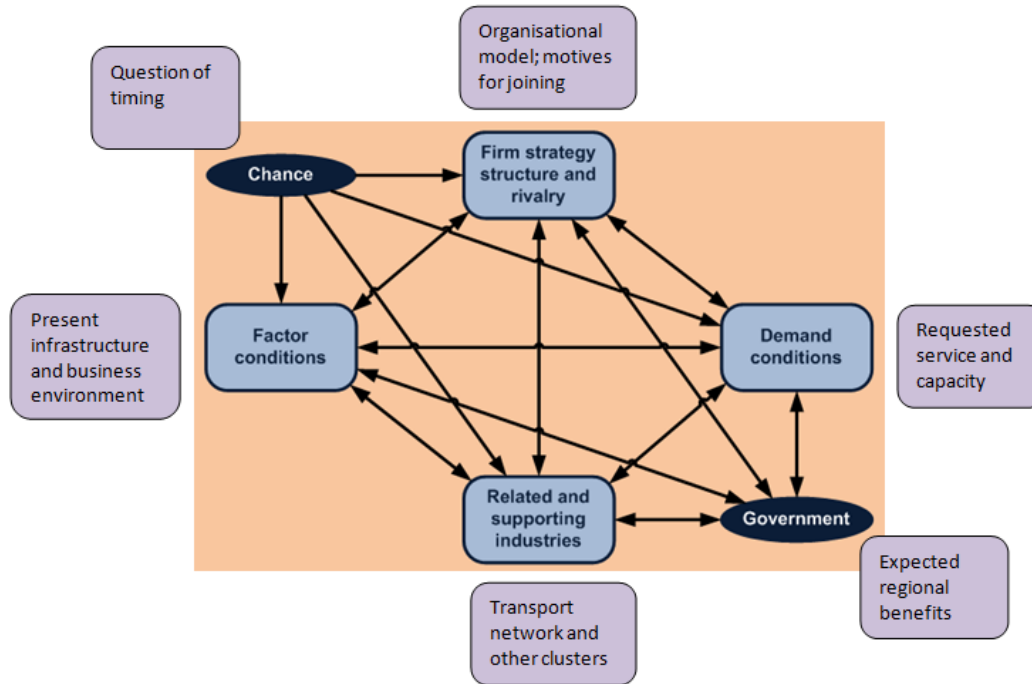
- *Geographical proximity*: by definition intermodal terminals / transport centres aggregate logistics functions in one geographically limited place.
- *Belonging to the same industry and interconnectedness*: services provided by intermodal terminals serve the same users, are complementary and/or substitute, and often belong to the same value chain.
- *Presence of associated institutions*: not only private firms but also public bodies are characteristic of transport centres. In fact, a commonly preferred model of their management is PPP – Public Private Partnership, which proves associated institutions active involvement.

Thus, by definition intermodal terminals are clusters. The widely accepted model for cluster shaping factors is Porter’s diamond, whose relevance for a RFT will be described in the following section.

2.2 Cluster shaping factors for Regional Freight Terminals

Application of the cluster shaping factors model to the transport cluster is visually presented in Figure 5.

Figure 5: Cluster shaping factors model applied to transport cluster



More detailed presentation of RFT shaping factors is presented in the Table 1.

Table 1: Intermodal terminal shaping factors

Cluster dimensions	Terminal dimensions	Terminal features	Details
Factor conditions	Present infrastructure and business environment	Physical requirements	<ul style="list-style-type: none"> Provision of adequate land plots for small, medium and large logistics companies. Easily accessible road and rail connection to the site and individual plots. Unobstructed development potential of the site. Unlimited accessibility. Possibility for land plots to be made accessible in a short-term (1-3 years) and mid-term (3-5 years) perspective.
		Business environment	<ul style="list-style-type: none"> Qualified work force Knowledge exchange between TCs and within TC Contractual relations
		Infrastructure	<ul style="list-style-type: none"> Traffic infrastructure, such as

			<ul style="list-style-type: none"> ○ parking areas for trucks, ○ cars and handling equipment. • Handling and transshipment facilities <ul style="list-style-type: none"> ○ container depot, ○ Roll-on/Roll-off. • Handling and transport equipment • Storage and warehousing facilities <ul style="list-style-type: none"> ○ open and covered storage areas, ○ general warehousing buildings, ○ special warehousing buildings for temperature-controlled and hazardous goods,
Demand conditions	Requested service and capacity	Capacity	<ul style="list-style-type: none"> • Mini: <10'000 ITU/year • Small: <30'000 ITU/year • Medium: 30'000 to 120'000 ITU/year • Large: 120'000 to 300'000 ITU/year • Mega: >300'000 ITU/year
		Services	<ul style="list-style-type: none"> • Storage and handling of ordinary, dried, chilled / frozen, and classified goods • Intermodal transport and freight forwarding • Trans-shipment rail-road • Traditional long distance heavy goods vehicles (HGV) traffic handling • LGV delivery and parcels • Food stuff handling • Break bulk handling • Waste recycle handling • Supermarket traffic consolidation • Handling of intermodal loading units (container, semi-trailer, swap bodies) • Handling of oversized cargo (project cargo) • Picking & packing, labelling services • Customs • Veterinary Authorities • Facilities for internal and external data communications • Communication and control systems (CCS) for truck guidance, gate process, combined transshipment module process • Diesel tank installations • Garage, Trailer Rental • Lorry parking • Wash facilities, Repair facilities • Shared facilities, canteen etc.
Firm strategy, structure and rivalry	Organisational model; motives for joining	Business Model	<ul style="list-style-type: none"> • Private ownership • Public ownership • PPP
		Pricing model	<ul style="list-style-type: none"> • Public tariffs

			<ul style="list-style-type: none"> • Quantity discounts applied • Not public tariffs • Bonus rules applied
		Motives for joining	<ul style="list-style-type: none"> • Initial incentive for creation of centre • Strategy for attracting new companies
		Operational structure	<ul style="list-style-type: none"> • Spatial organisation • Intermodal chain • IT & seamless solutions
		Other competitiveness factors	<ul style="list-style-type: none"> • Innovation • Environmental considerations
Related and supporting industries	Transport network and other clusters	Other clusters and industry in the region	<ul style="list-style-type: none"> • Main present industries • Their impact on terminal and vice versa
		Transport network in the region	<ul style="list-style-type: none"> • Condition of overall transport network • Their impact on terminal and vice versa
Government	Government support	Expected regional benefits from the terminal	<ul style="list-style-type: none"> • Reducing total transport expenses • Modal shift to more environmental friendly solutions • Connecting cargo handling from the port with other types of cargo at one common transport centre • Possibly avoiding traffic bottlenecks, which give less congestion on the roads • Reducing local environmental problems in the cities; • Relocating freight facilities outside of cities • Integrating port areas with the cities • Regional growth; New jobs in the area • Rational and efficient land use • Support of business
		Direct and indirect governmental involvement	<ul style="list-style-type: none"> • Legislative support • Physical resources • Lobby
Opportunity	Question of timing	External factors of terminal development	<ul style="list-style-type: none"> • Historical potential • Unpredictable factors involvement • Other
		Time perspective	<ul style="list-style-type: none"> • Development speed at different periods

3 Methodology

This chapter presents research design, sampling strategy and the interview outline used for the research.

3.1 Research design

The research was implemented in two stages: firstly, the needs of the potential RFT were defined; secondly, best practices with similar profiles were identified and analysed. Table 2 provides more details on research design.

Table 2: Stages of research

	Stage	Method	Data source	Interviewee	Method description
1	RFT needs identification	Interviews	Primary	Potential stakeholders	Identifying needs, potential services and structure of the RFT outside Aberdeen
2	Best practice analysis	Interviews	Primary	Managers of best practice terminals	Obtaining first-hand information about terminal shaping and development factors and its analysis

The interviews were conducted with the managers of selected stakeholders and best practices personally or by phone. In total, 11 interviews were conducted with stakeholders in the UK and 3 interviews were conducted with representatives of Transport Centres in Denmark.

3.2 Sampling strategy

Stakeholders' identification

Potential stakeholders were selected in such a way that both public and private sectors were presented. Contacted stakeholders have already been in one way or another involved in a discussion about a RFT before. The final list of respondents who took part in the interviews includes:

- Local and Regional Authorities
- Port
- Scottish Best Practice Freight Advisors
- Freight-forwarder / shipper
- 5 hauliers

- Terminal operator

Interviews with potential stakeholders were conducted using the terminal sites of Craiginches for the short term and Mains of Cairnrobin for the medium and long term.

Best practices' identification

Best practices were identified according to the following parameters:

- Small or medium size
- Regional level within country
- 0-30 km proximity to sea and good rail/road link to port
- Effectiveness, incl. current performance, expectations of future development, and reliability of service

Best practice identification was conducted on two levels: first, the suitable country was identified; second, suitable terminals were identified within this country following size / location and effectiveness criteria mentioned above.

Country selection

Country selection was conducted in the following way:

1. Europe: the geographical scope of the terminals was delimited to Europe due to a similar business environment and transport centre tradition.
2. Maritime proximity: the Ports of Aberdeen and Peterhead will be important bodies providing maritime connection to the terminal which then can qualify as a logistics centre served by a variety of transport modes, as requested by the EUROPLATFORMS definition. Thus this is a requirement for best practice.
3. Intermodal expertise: again following the definition of a transport/logistics centre, a terminal should be able to handle containers and provide intermodal solutions in order to be competitive. Thus the countries with long experience in container handling and EUROPLATFORMS membership will be selected.
4. Scale: small and medium (regional within the country) terminals will be of most interest which excludes from the research scope countries with prevailing large and mega terminals.

An overview of European terminals is presented in Figure 6. The 20 largest terminals are numbered. In decreasing size, terminals are marked in light blue and yellow respectively.

Figure 6: Overview of European Logistics Centres



Source: DGG (2010)

The lists of countries – members of StratMoS and Europlatforms, - which therefore have experience in maritime container shipping and logistics centre concept, are presented in the Table 3.

Table 3: Lists of StratMoS and Europlatforms member countries

StratMoS members	Europlatforms members
Denmark	Denmark
Norway	France
UK	Greece
Netherlands	Hungary
Belgium	Italy
Germany	Luxembourg
	Portugal
	Spain
	Ukraine

Judging by the size of terminals, maritime proximity and experience in logistics centre concept, Denmark is a perfect country to look for best practices addressing the needs of the Aberdeen case.

Specific terminals selection

An overview of terminals in Denmark (called in this country «Transport Centres») is presented in Figure 7.

Figure 7: Danish Transport Centres



Source: FDT – Association of Danish Transport and Logistics Centres (2011)

Selection of specific terminals was made according to the following parameters:

1. Link to port with high quality and capacity, preferably rail: exists in Hirtshals Transportcenter, Høje Taastrup Transport Centre, Nordisk Transport Centre (NTC), Skandinavisk Transport Centre (STC), Danmarks Transport Centre DTC (road only), and Taulov Transportcenter

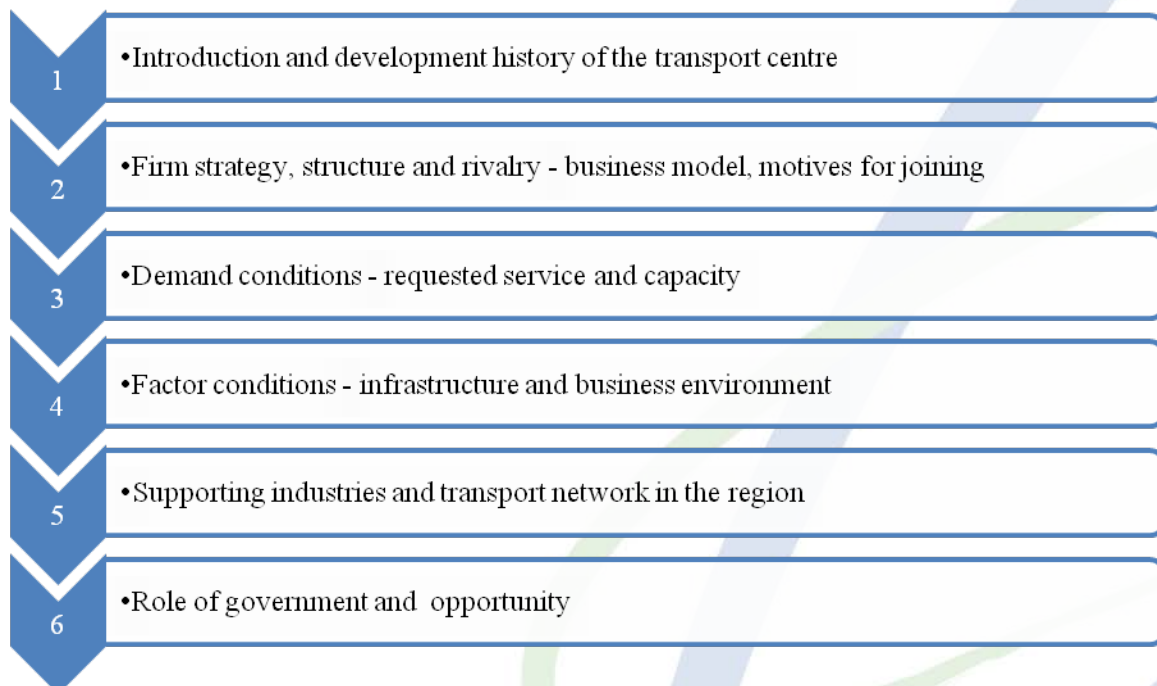
2. Size: the largest Danish terminals are DTC, STC and NTC
3. Expectations of future development: according to Association of Danish Transport and Logistics Centres (2011) all terminals survived the recent economic crisis well. Currently the most dynamic Transport Centre is the one in Køge (STC).
4. Reliability of service: All three biggest terminals (DTC, NTC, STC) provide reliable and frequent services. Also, they are highly innovative and pay significant attention to special planning, good management and environmental considerations (Association of Danish Transport and Logistics Centres 2011).

Thus, the selected best practices for the purpose of current research will be NTC (Nordysk Transportcentre) in Aalborg, DTC (Danmarks Transportcentre) in Vejle, and STC (Skandinavisk Transportcentre) in Køge.

3.3 Interview outline

The interview outline for both RFT potential stakeholders and best practices was developed based on the cluster shaping factors mentioned in the conceptual framework applied to intermodal transport terminals (see Table 1). The structure of the interview is as follows:-

Figure 8: Interview outline



The full interview guidelines are presented in Annex 1 and 2.

4 Needs analysis of Regional Freight Terminal outside Aberdeen

This chapter is devoted to the analysis of the interviews with potential stakeholders. It is important to remember that interviews and their analysis were conducted using the terminal sites of Craiginches for the short term and Mains of Cairnrobin for the medium and long term.

4.1 Respondents' overview

Responses were obtained from Aberdeen City Council, Aberdeenshire Council, Port of Aberdeen, Scotland Freight Best Practice Advisors, one freight-forwarder/shipper and five road hauliers with capacities from 3 to over 50 vehicles and a terminal operator. In total 11 interviews were conducted. Industries represented include transport planning, local governance (government??), port activities, shipping, road and general haulage, support of containers, pipes, and offshore oil.

Local government in Aberdeen

Aberdeen City Council works along the *Local Transport Strategy 2008-2012*, which includes five high level aims:

- 1 - Support and contribute to a thriving economy for Aberdeen City and its region
- 2 - Ensure a safe and secure transport system
- 3 - Minimise the environmental impact of transport on Aberdeen community and the wider world
- 4 - Ensure that the transport system is integrated and accessible to all
- 5 - Ensure that the transport policies integrate with and support sustainable development, health and social inclusion policies

Alongside the Strategy 2008-2012 the local government supports partner organisations with the development and implementation of the Regional Freight Strategy and Action Plan, and facilitation of a modal shift of freight from road to rail and sea. It is also recognized within the Strategy that there is a need to improve road infrastructure to enable fast and efficient freight movements, where more sustainable modes are not appropriate, to support the economic aims of the area.

Regional Transport Authority

NESTRANS is charged with creating the *Regional Transport Plan* which in turn incorporates a *Freight Action Plan*. There are also transport elements in the authority's Structure Plan. The Regional Authority has direct involvement and sponsorship of specific sustainable transport initiatives.

Port of Aberdeen and the freight forwarder/shipper

The port is keen to promote sustainable transport as a better environmental alternative specifically through rail terminal and its berths. Similarly, freight forwarder/shipper has always promoted sea freight and short-sea shipping.

Transport hauliers

The hauliers have the following attitudes concerning promoting sustainable transport (via rail and sea). One of them has worked in road transport for a number of years, but believes in sustainable transport where it is possible, for example at non-critical times. However, just in time deliveries are more important. Another haulier operates by collecting pipes from Raithes Farm which are delivered by rail, which shows the haulier's support to sustainable transport. Yet another company works closely with the marine sector, but sees no need for rail freight. Offshore products do not lend themselves well to container transport due to odd sizes and shapes, when containers used volumes are sporadic and journeys onshore usually short distance. The fourth road haulier has the intention of employing rail.

Their desired role in the RFT

Concerning the desired role in relation to RFT, the local government wishes to be a stakeholder and partner in the development of the terminal. They believe that investment could be made subject to there being a viable business case. Dependant on the level of risk this could be an investment with a delayed return over a longer timescale than would normally be acceptable to the private sector in order to start the scheme. If no investment, then facilitation of the development would be possible. Possibly some form of financial instrument could be made available. Investment in land or essential fixed ground works infrastructure would be possible. It is unlikely to invest in mobile infrastructure or directly involve in management. Other essential fixed infrastructure and warehousing (including for let) is not ruled out.

Regional authorities can offer facilitation of the RFT establishment and development. If a rail shuttle is involved then there will be a role for the port in the fixed physical infrastructure at the RFT. A shipper, which participated in the interview, confirmed an interest in managing the RFT and its operations. It could offer RFT its investment, management, possibly manning, and equipment.

As for hauliers, three of them see no involvement for themselves in the project (money is tight, fleet replacement, diesel costs and employees wages prevent any outward investment). One haulier would like to be a user of the RTF by collecting and delivering goods.

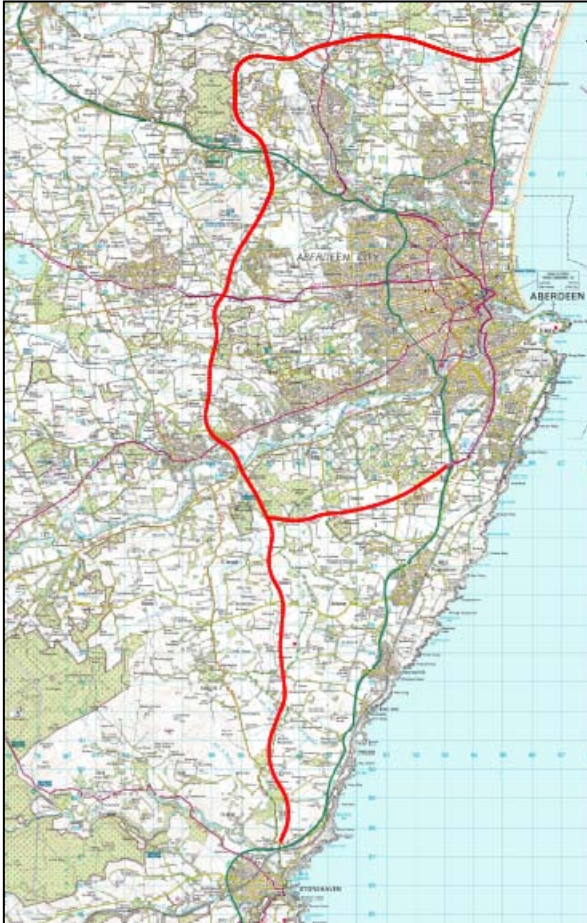
Respectively, the following question aimed to identify how much **space at the RFT** hauliers would need. And again the answer was “none” with the following comments:

- None, unless there is a large bulk of something from a customer which needed storage e.g. pipes;
- Wrong side of Aberdeen for one of the hauliers’ operation;
- Another haulier already has a depot in Aberdeen.

This clearly shows lack of interest from hauliers’ side in the RFT, at least at the current stage. They also do not see how small transport companies can benefit from the opportunity, which will be addressed in the following section.

4.2 Need for a RFT and potential necessary terminal capacity

Figure 9: Aberdeen Western Peripheral Route



Aberdeen’s road network is constrained by congestion, and several pinchpoints exist including Haudagain Roundabout, Market Street and Bridge of Dee. Aberdeen is served by a city centre port, central rail station with further branches for freight and an extensive radial bus service. Significant improvements are proposed for city’s road infrastructure in forthcoming years including Aberdeen Western Peripheral Route, the upgrading of Haudagain Roundabout, a new River Don crossing, Berryden Corridor improvements, access from the north and south, and Union Street pedestrianisation. Rail gauge improvements have been completed to enable container traffic.

The transport network between the markets south of the region and key locations to the north of Aberdeen are all served by trunk roads running radial from Aberdeen. Thus access to Inverurie, Fraserburgh and Peterhead is

via a sometimes congested area. However, when the modern transport system is delivered (a package of integrated transport measures, including Western Peripheral Route, Trunk Roads, Aberdeen Crossrail, Strategic Rail, Access to the Airport, Shipping/Harbours, etc.) then these cons become pros as all locations will be easily reached from the new trunk road without passing through the city centre.

One of the hauliers' concerns about Aberdeen Western Peripheral Route, which is definitely needed for the RFT, is that provided that funding is apparently there, why has it not gone ahead yet? Other problems in regional transport envisaged by hauliers include long distances, high fuel costs, driver turnover and the fact that good labour of the region goes offshore.

Local authorities recognise that there is scope to add to the existing freight transfer facilities located within Aberdeen at Aberdeen Harbour, Raiths Farm and Craiginches. One method of meeting these needs would be the provision of a regional freight terminal. There is potential for connections from existing rail, road and sea links to a regional site either directly or through transfer points. Regional authority also sees a need to assist in the aggregation of freight to promote modal shift. However, there is an opinion that industry does not know enough about the RFT to make a decision.

View on the situation in the sites delimited in assumptions

The freight advisor opinion suggests that **Craiginches** currently has one service a day, landing approximately 25 containers (50TEU) at the site. It does not have much capacity for materials handling on site and it was suggested that 2 or perhaps 3 daily services spread out around the clock could be handled on the existing facility. To fully realise its potential Craiginches needs additional acreage to manage the containers waiting to be delivered and being returned to the terminal. There is a necessity that container handling for at least two full trainloads (50 containers) be built close to the terminal in the immediate future. The site would require extra administration, security, material handling, HGV driver welfare facilities to cope with additional volume. If the user type and demand dictates it, warehousing and cross docking facilities should also be considered on or very close to that site, providing there is real estate available.

As for the Mains of **Cairnrobin**, it may allow up to 65,000TEU/year capacity in the next 10-15 years. To be cost effective and in the first instance, this site will need the capacity to receive and handle at least 3 trainloads each day (75 containers/150 TEU). And will require: hardstanding and materials handling equipment, office, security, HGV parking, trailer parking, container storage and welfare facilities.

The freight-forwarder / shipper's representative believes that Craiginches and Cairnrobin would never be truly intermodal, as there is no port link. He considered that **Waterloo Quay** would be the way to start. This has more value for intermodal transport, as it is the only site near the harbour. As for the terminal capacity, the shipper believes that a mini/small terminal (<10 000 or <30 000 TEU) is feasible.

Hauliers have the following views about the need for a **RFT**:

- Overall, RFT is a good concept, but in the North East there is probably less volume than in the past, and there is a lack of diversity: the oil and gas sector dominates North East Scotland. Considering its size, a small/medium terminal is the most appropriate: 30,000 units a year equates to approximately 600/week; 100/day. At the top end of the medium terminal capacity, 120,000 units a year equates to approximately 2,300/week; 460/day – which is very high for the North East context.
- If there were big volumes and companies could benefit from real cost savings then the terminal would be beneficial to hauliers,
- RFT would benefit large companies such as Craibs, Russells or Malcolm Group who move large quantities of goods long distances very regularly.

Thus, some hauliers fear that an RFT will create more power for the already powerful players and the terminal development will make road hauliers think twice about doing long distance transportation.

Interested industries

For potentially interested industries, there is a view that a major factor would be the relative cost of land at this site and at the site where current operations are carried out. Thus if pipe storage (a relatively high space requirement for low value) is being carried out elsewhere with a higher land value, e.g. at Altens or Dyce, then these operations may well relocate, but if the land currently used is lower value then they may not unless the transport efficiency saving is dramatic. Regarding the above example – if overweight loads can be brought in by rail, this may give transport efficiency savings. In addition, the fishing industry could take advantage, but probably not if the RFT is located south of the city. There is the view that local industries will benefit.

Respondents saw the following **benefits from an RFT**:

- Population of Aberdeen could benefit from the new economic opportunities, improved air quality, and lower congestion;
- Improved journey times for all modes and lower freight road miles would make transport systems more efficient;
- Joining Aberdeen to Central Scotland and further South would be possible;
- The region could catch business currently going to Central Belt;
- Secure trailer parking removes HGVs out of city centre to a certain degree and substitution by “white van” (smaller delivery vehicles);
- There would be an opportunity to share plant for un/stuffing containers;
- Remote un/loading of containers (not on quayside) would become possible;
- Potential for shippers would include increased shipping, more agencies and stevedoring.

Other issues on terminal development raised by some respondents:

- Market may change dependant on the Aberdeen Western Peripheral Route (AWPR) development;
- One operator should not be allowed to monopolise the site - that way smaller operators may have an opportunity to make use of it. If a monopoly or single user site exists no-one else will use it;
- It would be very interesting if the RFT could connect a feeder service, for example the previous Concorde container line service to Antwerp/Rotterdam.

4.3 RFT site requirements

Overall, whichever location is selected, easily accessible road and rail connections are a must, according to all respondents. The possibility for land plots to be made accessible and construction to commence is necessary within a mid-term (3-5 years) timeframe. Adequate land plots for small, medium and large logistics companies are not required at the start but would be desirable later when the existing plots are successfully developed.

It is uncertain whether 24/7 unlimited access is necessary: as this is a big operation – Saturdays and Sundays are quiet, thus limited access could be more appropriate. However, security and gate manning would have to be 24 hours each day.

One of the respondents commented on how **Craiginchess site** fulfils the above -mentioned requirements:

- *Easily accessible road and rail connection to the site and individual plots:* The site benefits from good road linkages with the A956 Wellington Road adjacent to the west of the site, providing access to the strategic road network, including the proposed AWPR interchange at A90 south. There may be limitations to the extent which expansion or increased usage of the site is limited by the site access constraints with only a small filter on A956 for vehicles accessing Girdleness Road from the south. Rail connections would appear to be excellent being situated on the Aberdeen to Edinburgh railway and Aberdeen to Inverness to the North West.
- *Unobstructed development potential of the site, with no special construction requirements:* Any development would have to take account of neighbouring uses. There are limited opportunities to the north of the railway being surrounded by a large residential area, including potential for a substantial buffer to residential properties to the north. Discussions at a regional freight group meeting included the potential for reallocating land to the south of the railway at East Tullos Industrial Estate for freight uses.
- *Possibility for land plots to be made accessible and construction to commence in a short-term (1-3 years) and mid-term (3-5 years) timeframe..* Given that land to the south of the railway has multiple occupiers and the majority of units are in active use, it would be difficult to utilise this land in the short and medium term. As indicated above, land to the north of the railway has very limited opportunities for expansion although it might be useful to know the extent to which the site is being utilised to its optimum capacity.

Rail connection could be a requirement for RFT, however at this point there is no single opinion on that. Authorities and a shipper believe that this is necessary, hauliers do not agree, commenting that they are too small to use it regularly and the majority of their freight movement is of short distance around Aberdeenshire. For the port, a rail connection would be a requirement if a shuttle were in operation on an overnight basis.

With regard to **skilled work force** in the area, one aim would be that companies with skills in this industry would relocate to this facility. It is considered unlikely that an existing skilled workforce would otherwise transfer. So, in some foreseeable circumstances training would be required if this did not occur.

Alternative opinion suggests that a skilled work force for an RFT is available in the region – although it should be noted that unemployment is unusually low in this region, and the work force is not cheap.

4.4 RFT services, facilities, and business model

The local government's initial reaction is that all of the **services and facilities** suggested during interview would add to the project in one or more ways. But each would be dependent on demand from the users of the site. It is likely that not all facilities would be required from the start of operations. It was also noted that some services, e.g. peripheral to the operation of HGV, could be tendered and thereby make a financial contribution towards the scheme.

Other opinions about required services and facilities, provided by the regional authority, port, freight adviser, shipper and one of the hauliers will now be presented and grouped according to two classifications:

- Belonging to the certain group of services/facilities:
 - Storage facilities
 - Goods handling
 - Value adding services
 - Truck stop facilities
- Level of necessity of the service/facility:
 - «+» - service/facility required;
 - «?» - no opinion / no single opinion among respondents;
 - «-» - not required.

Table 4: Storage facilities

Facility / service		Comments / Opinions
Container Terminal	+	Container handling equipment required; if there is a rail head, should try this; both for Craiginches and Cairnrobin – most useful facility
Warehouses for ordinary products	?	No view; needed because things never go to plan; very important; for Craiginches – not unless demand dictates; for Cairnrobin – build in the first instance and users will come
Warehouses for dried products	?	No view; for Craiginches – too specialised; for Cairnrobin – reserve land use until demand dictates, then build
Warehouses for chilled / frozen products	?	Fishing industry may create this need if existing facilities are closed but there is much doubt as to who would pay for this; most companies of this type have their own facilities; for Craiginches - too specialised; for Cairnrobin – reserve land use until demand dictates, then build; discussion of import of fish (by sea) from Russia/Norway – links with Europe (Maritime Corridor), new service provided by Streamline - frozen products could therefore be useful.
Warehouses for classified goods	-	Dangerous Goods could be difficult; for Craiginches - too specialised; for Cairnrobin - reserve land use until demand dictates, then build

Apparently, a container terminal is a must in the RFT, where there is a need for storage and handling (see below) of the containerised goods. This works in conjunction with sustainable intermodal transportation promotion, as mentioned by many respondents as part of their strategy. It also reflects the need in the region for the container facilities.

At this point warehouses for classified goods are definitely not a requirement, while demand for warehousing facilities for ordinary, frozen and dried products should be further investigated.

Table 5: Goods handling

Facility / service		Comments / Opinions
Intermodal transport & freight forwarding	+	Definitely / hopefully yes
Trans-shipment rail-road	+	Yes, in line with container terminal and handling
Handling of intermodal loading units	+	Containers - yes; semi-trailers - probably not by rail at this stage due to gauge constraints; swap bodies - yes; as required by market; in line with container question
Long distance HGV traffic handling	?	This is required; needs storage; for Craiginches – done externally; for Cairnrobin – yes, hand in hand with requirements
LGV delivery and parcels	?	Required; yes for low emissions zone; handling facilities have their own premises; Craiginches – no space parcel networks already established; Cairnrobin – build it, if demand dictates it
Food stuff handling	?	Possibly fish but otherwise unknown; own premises; Craiginches – too specialised/small market; Cairnrobin – build it, if demand dictates it
Break bulk handling	?	Assumed yes; Craiginches – too specialised/small market; Cairnrobin – build it, if demand dictates it
Waste recycle handling	?	It is the aspiration to consolidate these activities; however environmental health, planning and land use will have to be investigated at the proposed sites and compatibility with other on-site operations assessed. Could see this happening, as it is not time sensitive. But some volumes are not dense enough. Craiginches – no room at Craiginches/ no demand for service; Cairnrobin – depends on demand
Supermarket traffic consolidation	?	Yes, but not necessarily consolidation. Done in Central Scotland, no need to duplicate
Handling of oversized cargo	?	For the market to decide, could be required; this cannot go on rail as it is out of gauge, so only suitable for road and sea, but could be stored. Also noted that Aberdeen harbour is not large enough for much storage; Craiginches – check oil industry road/sea links; Cairnrobin – possible lack of demand, offshore services falling in volume

Again, services related to intermodal transport are of greatest importance. They include intermodal transport and freight forwarding, rail-road trans-shipment, and handling of intermodal loading units. All the other handling services are subject to further analysis, as many respondents mention an unknown level of demand for them. This means that the services' potential users should be contacted and level of demand for the short and medium term should be estimated.

Table 6: Value adding services

Facility / service		Comments / Opinions
Administration / office space	+	Necessary to facilitate growing site and demand
Facilities for data communications	+	Communications would be an essential aspect of any new business venture; required WiFi at least; Craiginches – needed, if additional offices built; Cairnrobin - yes, to supplement offices
Communication and control systems	?	CCS for truck guidance, gate process, combined transshipment module process: unknown by most respondents
Diesel tank installations	?	If required, could be subcontracted as a revenue source; Craiginches – HGVs fuel elsewhere; Cairnrobin – lack of demand, as vehicles fuelled at forecourt
Picking & packing, labelling services	?	As required, a freight forwarding function; a lot of these in England, but not enough volume; Craiginches – too specialised/small market; Cairnrobin – build if demand dictates it
Customs	-	Not necessary; most freight forwarders produce their own paperwork
Veterinary Authorities	-	For fish / meat if required; necessary if there is livestock, but considered that this would not be at a RFT, probably not
Garage	-	This would work if vehicles were coming in and out all the time; not enough if reliant on loading and unloading vehicles, but if someone was doing their own work, vehicles with problems could go to there
Trailer Rental	-	May be required, but does not detract from main activity; takes up a lot of space; Craiginches – most trailers rented; Cairnrobin – rented from Central Scotland

The only two value adding services which respondents believe would be necessary from the very beginning are administration/office spaces and facilities for data communications. Customs, veterinary authorities, garage and trailer rental are not required due to the potential lack of demand for such services.

Communication and control systems for truck guidance, gate process, combined transshipment module process were unknown to some respondents, which made it difficult to evaluate the necessity of these systems.

Normally a diesel tank installation would be one of the first things to install at an RFT / Transport Centre. This shows some of the respondents' lack of knowledge about the RFT concept. Also if truck parking is evaluated very high (see below), there would definitely be a need for diesel tank installations.

Table 7: Truck stop facilities

Facility / service		Comments / Opinions
Lorry parking	+	Definitely required; Craiginches – need to encourage legal parking
Wash facilities	+	Yes. Recently conducted parking survey suggests this is an essential requirement of lorry parking
Fenced areas for parking trucks	+	Without a doubt, yes; security is important
Gated and secured area for parking trucks and trailers	+	Without a doubt, yes; security is important
Shower and toilet facilities	+	Yes. Recently conducted parking survey suggests this is an essential requirement of lorry parking. Employee welfare
Repair facilities	?	May be required, but does not detract from main activity; doubtful
Food facilities	?	Parking survey suggests this is an essential requirement of lorry parking. Craiginches – not essential; Cairnrobin – very important
Sleeping facilities	?	Yes; not required; Cairnrobin - only if logistics operator requires it

It was considered that the truck stop facilities are very much needed in Aberdeen. This supports the findings of recently conducted research. At the moment, companies just come to Aberdeen, unload freight and leave, but they might stay at a truck stop if there was one.

Concerning the **RFT business model**, public authorities believe that PPP is possible as a management vehicle or investment model. The Local Authority would likely not be involved in owning buildings or other capital infrastructure unless it also owned the land in order to maintain sufficient control of their investment. In the current financial climate capital investment on such a scheme is probably of a lower priority. Information from the Council's consultants and advisers will be sought on best practice for Local Authority involvement elsewhere in the UK and in Europe

There is an opinion that there will be reluctance for management by the rail authority due to the potential for undue concentration on rail products. Additionally, there will be reluctance for management by the local authority other than in a PPP form.

Another opinion suggests using public sector money to fully realise the project, unless a really big player like Stobart, ASCO or Malcolms could cover the full cost. But then problems arise with sole ownership and occupancy.

The shipping company believes that land and buildings should be owned by PPP, while intermodal operator should own machinery and manage RFT.

The specific site (Cairnrobin) considerations stress that to anticipate and plan for future growth, it will require careful management of the real estate and land adjacent to the rail sidings to ensure that the future growth can be accommodated quickly and efficiently. Where specialist services such as break bulk and food handling are required, that requirement will be done by the customers inside their own leased warehousing close to the intermodal facilities. They can then manage that element of operations at their own volition in managed premises on the site.

As for the ownership, Mains of Cairnrobin should be owned by a PPP allowing the local authority to maintain control over the 'open access' of the site, thus ensuring that unfair tariffs are not imposed on smaller operators and that all users have fair access to the resource. Commercial investment into this site is absolutely required as the public sector neither has the budget or management skills to operate the site alone.

The same opinion suggests that the site should probably be operated by a partnership of commercial logistics providers (e.g. Malcolm Group/Craibs) who will provide cost effective operations and maintain a competitive pricing tariff for services rendered. Sole occupancy of a site such as this by one powerful company would not lead to healthy and fair competition between 3rd party operators and small companies wishing to trade from the site.

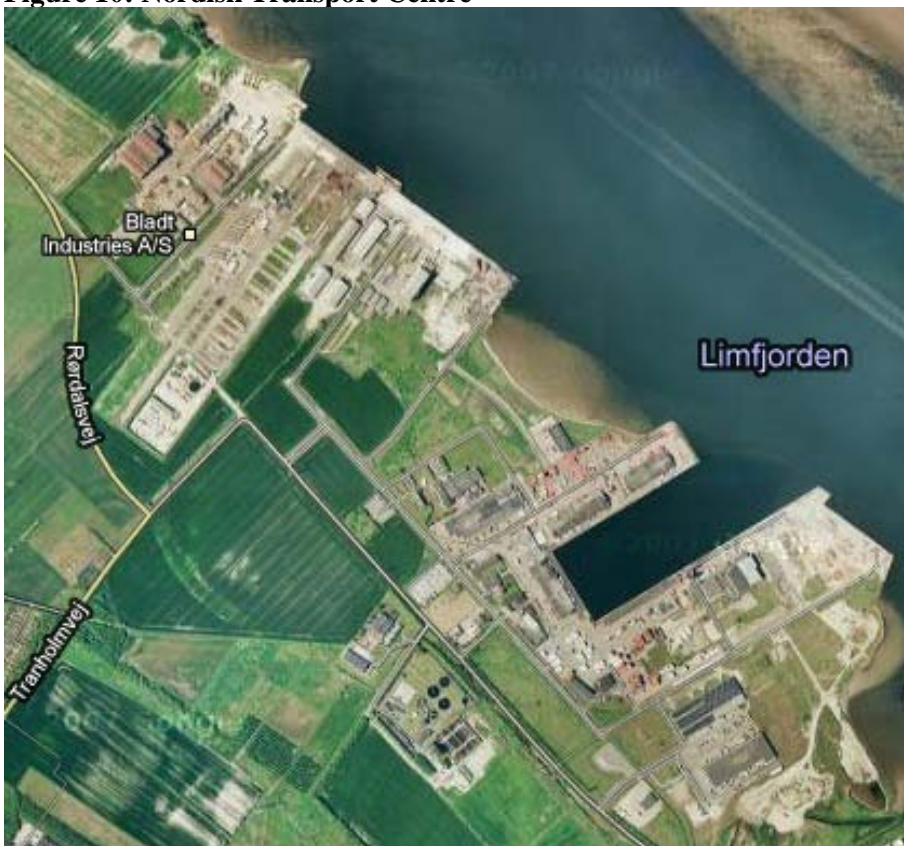
It was suggested that the pricing model would depend on the investment model used but would be mainly driven by the return required by the private investors on the share of private investment.

5 Regional Freight Terminal Best Practices

5.1 Nordisk Transport Centre (NTC), Aalborg

NTC - Nordisk Transport Centre positions itself as Northern Denmark's main hub providing all types of transport services and facilities for all types of goods at the carefully spatially planned harbour area. It sees its strength in its willingness and ability to collaborate with regard to holistic logistics solutions.

Figure 10: Nordisk Transport Centre



More detailed overview of the East Harbour of Aalborg Port where NTC is located is presented on Figure 11.

cranes with capacities up to 36 tonnes when using a hook and 24 tonnes with a grab bucket, as well as a mobile crane with a hook capacity of 45 tonnes. Those cranes handle mainly containers and general cargo. NTC has been one of the first Transport Centres in Denmark to develop a parking spot for handling the so called “heavy commercial vehicles” which are wagon trains up to the length of 25.25 meter.

Figure 12: Example of operations at NTC



Source: www.aalborghavn.dk

NTC storage and handling capacity is operational 24/7 and includes among others a 55,000 square meters area for handling and storage of containers and 29,000 cubic meters of refrigeration and freezer capacity. NTC also has the ability to provide Ro-Ro facilities. Finally NTC is the main hub for servicing the Greenlandic traffic, which to a large extent is containerized.

Currently a large logistics centre providing various trade, value chain and logistics (not only related to physical movement of goods) services is under construction. It was not initially in the NTC plan, but now, 20 years after establishment there is a clear need for that.

Factor conditions include not only infrastructure, but also qualified workforce and business environment. Hereafter their condition will be presented.

In the 1980s more than 60% of 876 interviewees, contacted for the purpose of a terminal needs evaluation, had only 7 years of school education. There was also no one who had a wider holistic understanding of the situation and who could provide advice (i.e. consulting company). Transport sector was a “black box”, thus

motivated stakeholders relying mainly on themselves were essential. Currently the situation is different with qualified **labour force** available in the market.

The University expertise was of great importance for NTC. It was used for space planning and technical solutions development. In addition, NTC agreed to test several new IT solutions, cleaning system, etc. Overall it was very open not only to its founders' ideas, but also to what the market wanted and what the science sector had to offer.

There was also an idea of a learning centre with "learning by doing" options in order to increase drivers' and other parties' professional knowledge. However there was barely any documented experience to be used in educational purposes, because valuable experience is something one does not want to share. Thus there was implemented learning from finding a solutions system.

The **business and legislative environment** of NTC is currently shaped by the following documents:

- General terms of business for the Port of Aalborg Ltd.
- Special conditions 2011 - Cranes and Services
- Rules and regulations concerning conduct in the harbour area
- The International Maritime Organisation's (IMO) rules on the security and safety of ships and harbours
- Law on ports
- Standard regulations for maintenance of order at Danish commercial ports

As it can be seen, the business environment at NTC is closely connected with the port. However, other documents regulated NTC's operations at different times, and sometimes NTC itself had an influence on them. This will be further described at the "Government support" section.

5.1.2 Demand conditions

NTC currently handles around 50,000 - 60,000 TEU (fully loaded), mainly due to its two large users: Royal Greenland (based on long-term contract) and X-Press Container Line (recently started 2 years contract). NTC has a good demand for its services and thus it has an opportunity to select the goods which it will handle.

The general rule is that goods to be handled by NTC should:

- have realistic added value,
- not have a strong smell,

- not damage other goods,
- Be of high quality, commercially feasible and hopefully innovative.

This means that NTC consciously gives priority to a sophisticated demand, which provides a good commercial margin, but also implies high standards and expectations. This requires an innovative and flexible approach, which increases overall agility and the competitive potential of the Transport Centre.

Handled **goods** examples include:

- computers,
- expensive furniture,
- prawns and crabs from Greenland,
- special vegetables,
- regionally important freight, i.e. goods for Greenland,
- High quality, labour intense, often changing in size products (grills).

The transportation related costs of such products are normally 50-60% of their total final price. NTC handles products that are neither too cheap nor too expensive . Thus NTC had to exclude some of the freight, i.e. bulk, unless its owner could prove its potential.

The services and facilities provided by NTC fully meet demand's expectations. Moreover, NTC provides a variety of **industry support solutions**, which results in big industrial companies interested in using the centre's services. Latest examples are Carlsberg, Weber-Stephen, Siemens and Royal Arctic Logistics:

- **Carlsberg** is optimising its supply chain from September 2010 and decided to move beer and water distribution to the north of Jutland in a newly built cross-docking terminal in East Harbour. Cross-docking centre will occupy 2000 square meters with 6 meter high ceiling. It provides space for the transfer of up to 3 road trains simultaneously - from road trains directly to distribution vehicles without storage constraints. "The whole area is approved for the big road trains and is near the highway. And proximity to the railway track opens additional perspectives for Carlsberg in the long term." - *Bjarne Roost, Logistics Manager, Carlsberg Denmark A / S*
- **Weber-Stephen Nordic** has recently outgrown the storage capacity of Noerresundby. Currently they stopped their search for new capacity and located themselves on a 430,000 square meters plot in East Harbour "which will allow handling and distributing of 250,000 barbecues to Denmark, Norway, Finland and the Baltic States". - *Michael Jensen, Director, Weber-Stephen Norden*

- "Series production of rotor blades of up to 58.5 meters demands excellent logistics and infrastructure. Therefore **Siemens Wind Power** chose to place the blade factory at East Harbour in Aalborg close to both the motorway and quay. To unload a turbine blade on a truck is not just a question of cost, but also of security. Wing Road is good example of Siemens Wind Power's cooperation with Aalborg Havn A/S."- *Soren Kringelholt, Director of The blade production, Siemens Wind Power A/S*
- **Royal Arctic Logistics** is going to get new facilities at NTC, including a large new building ("Multihus") which would collect and integrate all Royal Arctic Logistics A / S activities. "The building will include 4-storey administration, 5,200 square meters Container Freight Station and 4,000 square meters of warehousing". - *Jesper Balthazar-Christensen, Managing Director, Royal Arctic Logistics A / S*

Clearly, each of these customers imposes high requirements on NTC. In order to be able to respond to their specific needs, NTC has to show a high level of flexibility and an individual approach. Obviously, NTC's location, accessibility, intermodality and proximity to all Scandinavian markets enable it to attract clients from industry. However, this requires excellent structuring and spatial planning of the Centre; otherwise new opportunities may be missed. NTC's structuring, layout and overall strategy will be presented in the "Strategy, structure and rivalry" section.

5.1.3 Related and supporting industries

NTC is an optimizer of transport flows in the North Jutland. In this respect it has a deep mutual influence on Northern Denmark's transport network and its users.

As mentioned above, NTC has an opportunity (already partly exploited) to rent land behind the Centre for **production** purposes, which is a part of spatial planning for the future. Then the transportation chain will become shorter and more economical, transport will integrate with production and provide a "full chain" of high quality industry solutions. On the other hand, this would boost the attractiveness, turnover and growth of the Centre itself, turning it from a transport cluster to a business park, which is an interesting development option.

From the transportation network - as a supporting industry – side, NTC is placed on the crossroad of the main lines of communication between Scandinavia and the Continent. It is equipped with all transport modes (highway E45 and other roads, railways, Aalborg Airport and Aalborg Port) and is well integrated in the

regional transport network. In its turn, it is supporting the regional network by providing terminals and services, balancing and attracting cargo flows in the most environmentally friendly and safe way.

5.1.4 Firm strategy, structure and rivalry

In this section NTC's internal initiation and development factors will be presented. This will include goals and process of establishment, ways of expenditure, main concept, spatial planning, organizational structure, pricing policy, and other development factors.

NTC limited company was **established** in 1988 by 16 people with the aim of developing new transport facilities. NTC was lucky to receive 2 million EUR from EU for concept development. It took 2 years to complete the preparatory study involving 876 interviews, which aimed at attracting ideas also from the market and little players. Then detailed planning on the physical aspect was developed. It was decided that:

- NTC should be located near a highway;
- there should be a new understanding between transport modes;
- it should be a real “ambulance” solution to existing problems, mainly for truck drivers;
- the TC should be a cluster sustainable on short, medium and long term;
- There should be possibility to transfer this concept to other EU Member States.

At that time the transport sector was not seen as problematic, however over 20% (perhaps even up to 50%) of transport companies in North Jutland (most of which were small and financially unprotected) had severe commercial problems. And at the same time the region had great developing industries (10 big enterprises in Aalborg area – unusual for Denmark those days). There was no innovation in transport solutions, which could support industry's needs. NTC was a solution for many problems in the transport sector, which were not seen before.

From the very start it was decided not to make a purely public company, since there have been some bad experiences connected to public companies in the 1970-80s. Therefore a limited **company form** was selected due to its transparency and good functioning. That time it was not possible to make a Public-Private Partnership (PPP) as such, which in the end NTC became.

The main rule in forming NTC was equality between small and big companies. This is normal now, but at that time it was often unbalanced. However NTC needed to have members of different sizes and different forms. Also it needed different insights and views. Thus equal conditions, rights and obligations for everyone were essential. There was no difference in impact of more than 10% which happened when a really mega

investment was implemented. This was the case of Aalborg Port, which after all the investment it made needed a guarantee that it will not be taken out from NTC; thus it got 10% veto right.

With an agreement signed, NTC reached the necessary capital and was formally established in 1988. Its public partner was the port (whose shareholder was the municipality), and private partners included truck companies, forwarders, stevedores, rail companies etc. In order to avoid big players coming in and getting large shares, it was decided that none of the NTC's infrastructure elements was for sale.

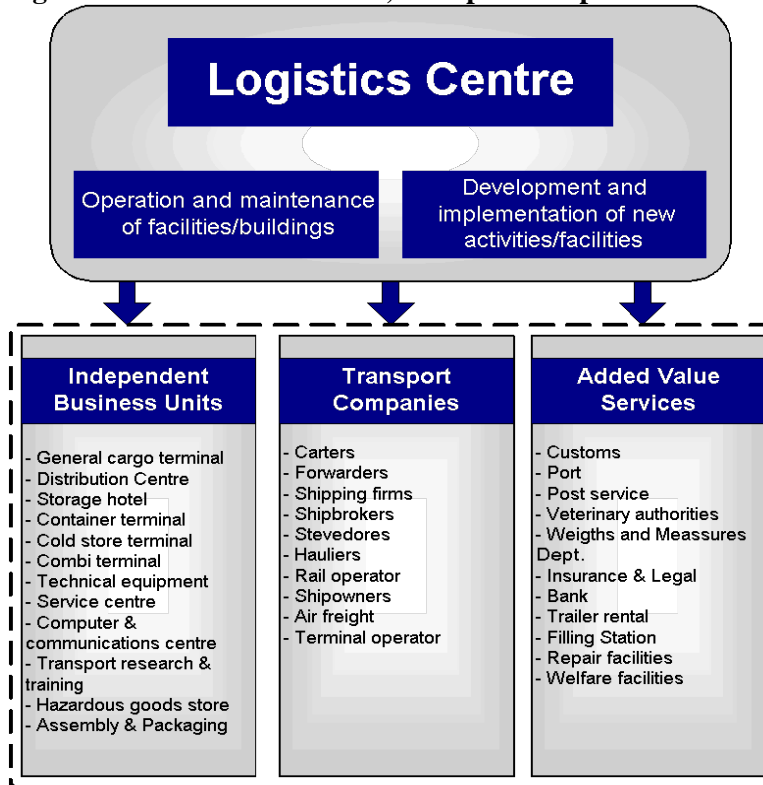
Service providers were admitted to NTC and could sign a contract by proving that they will:

- be part of the working environment of NTC
- follow overall rules,
- not have a monopoly, and
- Be able i.e. to provide the service 24/7, also on weekend and holiday (condition for certain services).

It has been found out that money could be lost by small and medium size companies because of insufficient/excessive terminal capacity at certain time points. This is where flexibility was needed and the planning of a general cargo terminal was started. It had to be neutral and independent. This is where the idea of Independent Business Units (IBUs) as limited companies initiated from. The container terminal was called Aalborg Container Terminal (ACT) and consisted of a simple small warehouse and an old crane. However it was a prerequisite for a multimodal transport centre. Then all tenants could use ACT's services, avoided misbalance in space use, and finally other IBUs in form of limited companies appeared.

Nowadays, the whole **NTC concept** is based on Independent Business Units (IBU), transport firms and additional services (see Figure 13). The concept developed by NTC became over time an overall framework for Logistics Centres' structuring and organisation. This means that NTC has been able to support its tenants and external users by providing all the elements which are now forming the Best Practice concept for services of a Logistics, or Transport Centre. This "service package" had been developing since the creation of the NTC and influenced some elements of the Transport Centre's business model and pricing policy, which will be addressed later.

Figure 13: NTC business units, transport companies and added value services



Source: Bentzen (2003)

As stated above, NTC consists of IBUs, transport companies, public and private added value services providers, and finally a management company, which coordinates everyone's activities. De facto NTC has been run as a PPP where both private and public organisations own and manage the centre. The management company's functions include:

- renting out buildings, rooms, common facilities and equipment;
- marketing of the Transport Centre as a whole;
- property administration, incl. maintenance, cleaning, etc.;
- administration, accounting, finance;
- Constant concept development and planning for the future.

The two principles explaining why these functions were transferred to an independent managing company (NTC A/S) are:

- NTC A/S's functions do not compete with tenants' operations;
- NTC A/S's functions need to be performed in a neutral and independent way.

As for NTC's **pricing strategy**, some prices were fixed by the state, i.e. related to use of port services (payment for a ship, land use). From the point of view of protection of NTC tenants, the price of NTC service use is higher for outsiders than for insiders. Pricing is open and commercial. Different price for one-time and committed users can be also explained by the presence of an "entrance fee" which decreases price for flexible areas and increases constant ones. This ensures realistic benefit for everyone from the beginning.

One of the most important aspects of a company's strategy in the case of the Transport Centre is its **spatial planning**. This is exactly the area where the extension potential and the ability to respond to individual needs are covered. Initially it was very important to figure out how the trucks could come in without destroying the surrounding environment, how to avoid queues and how to generally structure the centre. This was a concept in itself, and 30-40 solutions were implemented then. It was a whole new task for engineers and architects. The main elements included: services and administration in the beginning of terminal, training centre, combined terminal and container-to-ship facilities. With respect to the buildings, instead of having 4 or 5 smaller ones it was decided to make 2 larger buildings on the 10,000 square meters and now the 3rd one is on its way. From the very start, the area was characterized by very large manoeuvring grounds as well as well-defined directions of travel.

Currently, the East Harbour of Aalborg Port (where NTC is located) is covered by local plan 08-066 as a whole, which specifies the establishment potential for buildings and plants in the area. The plan contains the possibility of erecting buildings and installations with heights that range from 30 to 100 metres. The local plan also lays out a 100,000 square meters area reserved for a railway goods yard immediately to the south and integrated into the East Harbour.

As for communication along the transport chain, it should be provided by forwarders. However NTC's function in creating an integrated intermodal chain is to provide various transport modes in one location, and transshipment equipment. On top of that 3rd party logistics and integrated distribution centre are **integrating elements in the transport value chain**.

As already briefly mentioned, NTC has been a test bed for transport **logistics informatics** for electronic data and communication systems. In fact, transport data can be called a "fifth transport mode", thus it is very important to control it. The idea is that the cost of transport decision support data should be 0. Thus all communications inside NTC are free. They are supported by multiple phone lines which allow optimization.

NTC has always wanted to be a front runner in **environmental aspects**. It was not really popular 20 years back, and there was plenty of garbage in the centre area. This is why the need for environmental

management procedures became important. All the construction and waste management was then improved to a high quality, which was extremely expensive. Luckily, NTC got inspired engineers who wanted to test their new solutions. Then NTC got a cleaning facility, which was at that point one of the only two in Aalborg.

Protection was necessary on both maritime and hinterland sides. There was a selection from 16 ideas, and different environment protecting organisations and potentially affected organisations were involved in selection. This resulted in future oriented spatial planning. Again special regulation supported it after 3 major problems related to legal aspects, depth and fishing were solved. Currently NTC possesses cleaning facilities responding to the highest standards and tries to actively protect the environment.

5.1.5 Government

The regional impact from NTC results in:

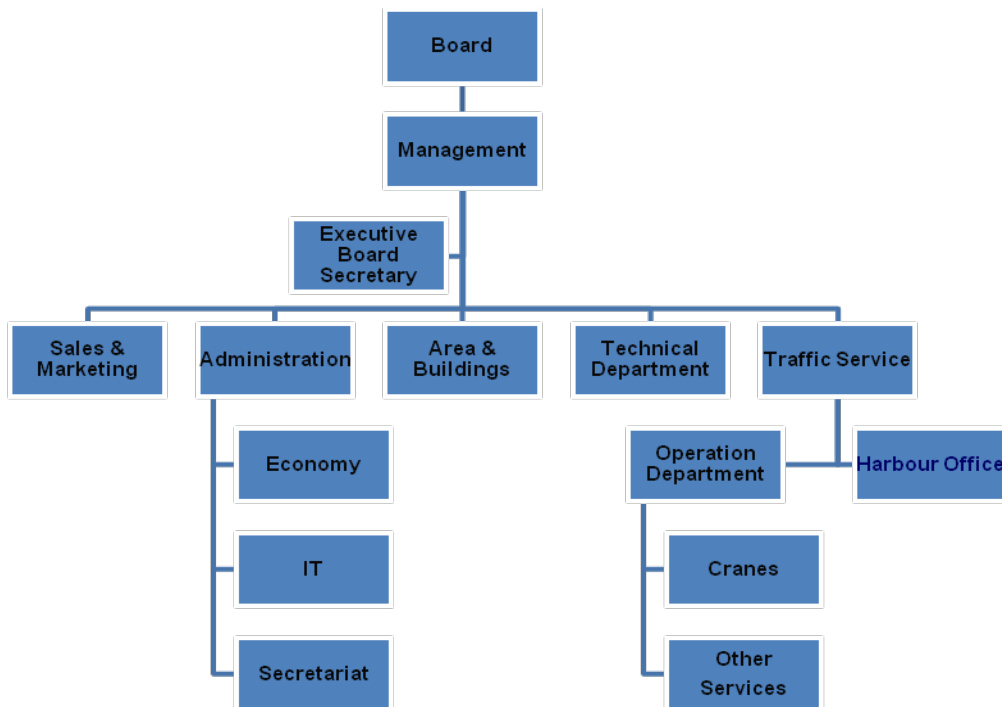
- Improving quality of transport services while reducing associated costs
- Integration of North Jutland with the rest of Denmark
- Physical integration of road, rail, sea and air transport and their cargo
- Reducing local environmental problems
- Relocating freight facilities outside of the city
- Integrating port areas with hinterland
- Regional growth
- Rational and efficient land use
- Support of business

This positive impact naturally cannot be ignored by the government. NTC was supported by research work, policy support, possibility to change rules and regulations. NTC got support from the City, the County, the Ministry of Transport, the Ministry of Industry, and finally the European Community:

- In 1989 the City of Aalborg expressed its hope for NTC and its role in business life of North Jutland. It has made a provisional allocation of DKK 1 million to include NTC in the marketing of Aalborg.
- On the County level, NordTek secretariat has made a grant for a communication centre establishment at NTC.
- The Danish Ministry of Transport supported NTC in its application for an EC infrastructure grant of 2 M EUR to develop a pilot (paradigm) project in the transport sector.
- The Trade and Industry Agency has made a grant for analytical and documentary work for NTC.

Figure 14: Organisational structure of NTC

Today NTC / Aalborg Port is structured in the following way:



Source: Aalborg Port (2011)

5.1.6 Opportunity

NTC was established as an answer to the market's needs. There was an idea which was awaiting realisation and was finally successfully picked up. Stakeholders were gathered together, introduced solutions for different time periods, and it was a success. This is why the NTC founder believes that not everything can be kept under control; there always is an element of luck. It is important to keep one's eyes open and see the "window" which can materialise in a project.

NTC has been always trying to plan for the short, medium and long term. This resulted in steady development. The time perspective was important for the moment of creation of NTC when the overall European transportation system was undergoing change, and the Jutland transportation problems became evident.

5.2 Danmarks Transport Centre (DTC), Vejle

DTC - Danmarks Transport Centre is Denmark's biggest transport centre. It is strategically located near the East Jutland motorway (E 45) and just 3 kilometres north of the Vejle Fjord Bridge where other important Danish traffic route (A 13) starts. DTC was created in the moment when transport structure in Europe started to change. From 1992 national borders were no longer natural stopping points for international transport flows, and thus services for drivers, trucks and goods (three main focus points of DTC concept) were no longer provided there. In the meantime a traffic analysis showed that the region around Vejle had Denmark's largest amount of goods traffic and trade and was the area of greatest growth. Thus this location was selected for consolidation and servicing of trucks, drivers and their goods.

Figure 15: Danmarks Transportcentre



DTC's performance in 2009 and 2010 (see Table 8) shows that the transport centre performs a steady growth.

Table 8: DTC performance in 2009 and 2010

Indicator	2009	2010
Profit after tax	DKK 8,449,000	DKK 10,759,000
Leased area	100%	98.8 %
Capital	DKK 161,300,000	DKK 168,708,000
Gearing ratio	41	39.5

Source: DTC (2010, 2011)

DTC's overview following the cluster shaping factors model is presented hereafter.

5.2.1 Factor conditions

As mentioned in the introduction, even though the main focus of this study is intermodal terminals, at least one unimodal terminal had to be analysed for practical reasons, since there is still no clear decision made concerning the modal structure of potential Regional Freight Terminal outside Aberdeen.

DTC is **located** 100 meters away from the highway E45 exit which provides the best possible location for the road mode focused transport centre. In fact, DTC is a clear example of a hub for co-modal transport, where effective outcomes result from operations with only one transport mode – road. One of the practical questions, for which Aberdeenshire is currently looking for an answer, is whether or not clustering benefits can arise from integrating only road related companies and traffic. DTC is positioning itself exactly as a transport cluster, where all the typical cluster's dimensions are present in relation to road transport.

Indeed, concerning the factor conditions, DTC's spatial structure which will be described in a "strategy" section allows easy access to various individual plots. DTC has recently increased its area in response to increasing demand. Currently it is able to provide adequate space for small, medium and large logistics companies. DTC is operative 24/7, with a majority of services being always available.

The overall **infrastructure** plan of DTC was made 20 years ago, where the Centre tried to separate professional traffic (i.e. lorries) from private cars in order to prevent accidents. Then DTC introduced a "plane" model of spatial organisation. At the same time, they tried to construct every building in such a way that later on it will be possible to enlarge it without destroying it or other neighbouring buildings.

That plan is renewed, because the area which DTC originally bought 20 years back was not sufficient, so the Centre doubled it by buying other 30 ha, which should be enough for the next 20 years. DTC possesses sufficient parking area, storage and warehousing (incl. freezing) facilities. Since it is a unimodal transport

centre, it does not have transshipment equipment and Ro-Ro solutions, though the centre cooperates with the port in Fredericia.

The **work force** in the area is sufficient nowadays. 3 years ago it was a problem, but when the crisis occurred, it became easier to provide DTC with labour. Many people became unemployed, providing their skills to the transport centre, and DTC could fill its vacant positions.. The work force comes from all over the East coast of Denmark.

Initially DTC started up with education as part of its services by joining efforts with Vejle Business College, Vejle Technical College, The Transport Trade's Educational Fund, The Hauliers Employer's Association and SID [The General Union of Workers] for providing course in business management for hauliers, economics, optimization of material assets, transport legislation and the environment. The course was approved by the Ministry of Transport, and aimed at both employees and owners of transport companies.

This educational programme by DTC-U was introduced 20 years ago and was a main factor in training drivers and hauliers throughout Denmark. That was mainly because only 2 schools in Denmark had authorisation for this education. However a few years ago it was liberalized and DTC saw a huge competition in this area. Instead of having 2 very good schools, there were 10 schools of lower quality. Therefore today DTC performs very few activities in this sense. The future opportunities are only possible if the government interferes actively, but so far DTC does not expect it.

5.2.2 Demand conditions

Concerning ITU/TEU **capacity** measurement numbers, DTC does not possess them, because DTC is only an owner of the buildings. This mean that DTC as a company/organisation is not necessarily informed about all figures for goods movements going on within the DTC area, because in a road based Transport Centre traffic is not registered the same way as in harbours. Last year there were 1.2 million trucks coming in and out of DTC, but not all goods of those trucks were actually handled in the Centre. Some trucks were coming for repairing, fuelling or rest for drivers.

DTC meets a vast demand both for public services, vehicles services and goods services. The **goods** handled in DTC are mainly goods for everyday use, such as:

- goods used by production companies
- retail goods (e.g. spares and parts for vehicles)
- on a special terminal – food stuff and beverages

Services provided by DTC initially were developed as a response to market needs, and currently they are still customer oriented. Services include:

- Storage and handling of ordinary and chilled / frozen goods
- Food stuff handling
- Distribution centre
- Forwarding
- Picking & packing, labelling services
- Customs
- Bank
- training facilities, Conference centre
- Road and tourist information
- Diesel tank installations
- Garage, Vehicles Rental
- Lorry parking, Car parking
- Vehicle wash facilities, Repair facilities
- Bathing and dressing rooms (separate women's and men's departments in the basement), laundry, toilets
- Cafeteria, Supermarket
- Rest facilities for drivers

The demand on DTC's services is constantly growing, which leads to the Centre expansion. Being an important part of the regional transportation system, DTC is able to acquire extra territory to accommodate growing needs.

5.2.3 Related and supporting industries

There are manufacturing companies in the surrounding area which use DTC's services. DTC sees it as useful for some production companies in future to be situated alongside the Transport Centre to avoid first transport from the production line to warehouse. For example, all products to McDonald's in Denmark are coming from DTC (bread, salad etc). So if DTC were to have a bakery situated just near the terminal building, there could be a big money saving potential. DTC would like to promote this kind of growth and new thinking to companies.

DTC once decided to be a unimodal centre, however it has cooperation with companies in Billund airport and Billund airport itself. So there is knowledge exchange with air service providers. Also DTC is part of FDT – Association of Danish Transport and Logistics Centres where members share their knowledge and use each other's skills.

5.2.4 Firm strategy, structure and rivalry

DTC was established in 1987. It originates from an **idea** of some Danish hauliers to have truck stops in Denmark. For such a Centre, Vejle appeared to be a perfect location, where a new highway E 45 going to Aarhus and Aalborg would pass. There it was possible to make a truck stop in its original meaning, where drivers could buy diesel fuel for vehicles, as well as eat and meet each other. This was an initial idea, later expanded by investors, who believed that the services for drivers should be complemented by services for trucks and for the goods in transit. So the final **concept** of DTC was built on 3 segments:

- services for drivers (food, toilets, showers, education, rest facilities, meeting rooms)
- services for the goods in transit (warehouses, freezing houses, transit facilities, customs service, haulier and courier companies, logistics partners and so on)
- Services for trucks (selling, buying, hiring and leasing of new and used trucks; repair shops for the lorries, for tires, for freezing and cooling equipment on the truck, parking lots and places for tanking the diesel).

Thus, the main concept comprised three kinds of services for three kinds of elements of transport chain: **persons, materials and goods**. There is no main element, they are all of equal importance, and every element supports others.

Attracting new tenants was not hard. Firstly, DTC had acknowledgement from drivers and hauliers which were used to coming to DTC to rest, tank and meet their needs. And DTC used that to attract new tenants to their company to build more warehouses and freezing houses. Once it started it was easier and easier to attract new kinds of customers and tenants. DTC is located just 100 meters away from E 45 exit, which gives great geographical advantage: it is easy to come in and out.

With respect to its segmentation strategy, the transport centre is **spatially organized** in three concept areas. One area - mainly for repair shops for trucks - is situated along the infrastructure on the left side of the centre. If we were to imagine the plane from the inside, it would be on its left aisle. The middle part is occupied by goods handling infrastructure, and on the right side there are public facilities. This is done in

order to avoid accidents, unnecessary movements, confusion and in order to raise overall Centre efficiency and effectiveness.

Despite its success, DTC feels the future need for more streamline logistics solutions, which means that if it is possible to make more techniques within houses that DTC's tenants are using, there will be more efficient distribution and growth by providing right kind of building with right kind of equipment. This is DTC's strategy for future spatial structuring.

As for the **business model**, following the classification presented in the methodology chapter, DTC is Infrastructure Manager owned and managed, being a fully private undertaking. The DTC managing company is the owner of all buildings in the area, which means that it provides real estate for tenants with a monthly fee so that they can provide their services to their customers. There are approximately 1000 people employed in DTC. DTC A/S is a limited company comprised of the KIRK KAPITAL A/S (90%) and CASA Ejendomme A/S (10%). DTC's share capital is 200 million DKK. The overall financial strength of the participants ensures that the necessary capital for the future development will respond to the growing needs.

Thus, DTC is not aware of **pricing policies** of its tenants. However being a tenant of DTC costs:

- 700 DKK (90 €) per square meter a year for office
- 300-400 DKK (50 €) per square meter a year for a warehouse

There is a quantity discount applied: the bigger the space the cheaper it gets per square meter.

DTC is using a normal internet based systems and emails for **communication exchange**. All tenants are in an email register. 15 years ago DTC had its own email system, but now they use normal internet. The tenants are in the same email groups and new information can be reached within seconds. It is very functional.

As mentioned before, the DTC management company clearly sees DTC as a **cluster**: when things are working out fine in the surrounding environment and there is an economic growth, DTC is a "capitalizer" of the growth and innovation; and when things are going bad in the surrounding areas, DTC is a "shelter" for participating companies. This means that DTC is a little community which supports its tenants: "even when things are going really bad outside the door, it can be still be good inside the door". There is an internal organisation consisting of DTC and tenants which organizes meetings for the purpose of knowledge exchange. Services provided are communicated in full to all members so that they can use them. There is rather **complementarity** than **competition** between the tenants. Even though there are 6 oil companies and 2

restaurants, there is a clear division between their customers in terms of agreements and taste respectively. Otherwise DTC has only one company of the kind with complementary services.

DTC has all kinds of **environmental and quality management procedures**. Snow fight in winter and maintenance of the areas, paved surfaces and buildings are done by DTC's own stuff. Main activities are standardized by ISO and respond to environmental and quality management requirements.

5.2.5 Government

Regional benefits from DTC include:

- Avoiding traffic bottlenecks
- Relocating freight facilities outside of cities
- Regional growth
- New jobs in the area
- Rational and efficient land use
- Support of business

In general there is very good support to DTC from local authorities and national government. DTC has representatives visiting, including Ministers. The support is in the sense of infrastructure with motorways and highways in the area. This makes even easier access to the Centre. The second area of government help is local treatment when new buildings are coming up. This support significantly facilitates and eases development of the Centre, as already mentioned. When DTC has new tenants of new buildings, they are able to make very rapid progress, avoiding red tape.

5.2.6 Opportunity

DTC believes that their main success factor is the concept, resulting in high demand and cluster member's protection even during a crisis. Thus, no uncontrollable factors were mentioned. As for its life cycle, DTC has been in strong growth before, during and after crisis. It was a little lower during crisis, however it was still in growth mode, which means that DTC was not as much hit by crisis as many other companies due to its concept, which makes the difference.

However, things are changing, and what DTC did 20 years back, when establishing the Centre, was right *at that time*. And time has shown that not everything was totally right. It has shown that DTC's infrastructure could have been better if DTC were able to look at the future and foresee developments. Thus, some important points when developing transport centres are:

- to analyse future plans for infrastructure around the Centre;
- to analyse locations for potential development of manufacturing;
- to decide whether the Centre should support production or a transit of goods;
- to estimate where will be the main demand;
- To analyse new trends, such as selling via the internet will make and has already made a big change for goods distribution patterns. Small parcels going here and there should also get attention, which gives future not only for core centres, but also for those handling tiny parcels.

All those future convenience things should be taken into account by future centres.

5.3 Skandinavisk Transport Centre (STC), Køge

Figure 16: Skandinavisk Transport Centre layout



Source: STC website

STC - Scandinavisk Transport Centre in Køge is one of Denmark's fastest growing transport clusters. Good motorway and rail connections, support facilities, and a harbour with increasing goods and passenger turnover promoted STC's intensive development in just a few years. In a short time, STC has become one of the largest transport clusters servicing Zealand and Greater Copenhagen.

5.3.1 Factor conditions

The first and foremost requirement for a logistics centre is its **location** - and STC is located near 1 million consumers living in the Copenhagen area. STC is very close to the European motorways system, to the bridges to Sweden, to Jutland and the future big motorways connections, as well as to port of Køge. The junction of three motorways (E20, E47 and E55) – one of Denmark's busiest hubs - is only three kilometres away from Køge Harbour. There is also a direct railway connection from STC to the Roskilde-Næstved line, and a direct connection to Copenhagen is coming soon, once the Ringsted-Copenhagen line is established via Køge.

This means that STC can use water transport in port, as well as rail, road and also has proximity to airports – both Kastrup and in Roskilde (which is mainly for cargo). Future infrastructure development plans include, besides new railway with a station in Køge, extension of the motorways system and a new hospital, - and will be publicly financed.

Figure 17: Skandinavisk Transport Centre



The Transport Centre's **infrastructure** meets the needs of the industry. This refers, for example, to parking areas of which both STC and port have sufficient. Besides, STC offers good sites for its users, ranging from 5,000 to 200,000 square meters in size, and prices start from DKK 385 per square meter. The port has trailer and Ro-Ro equipments, but not container handling equipment (since this is bulk port, and containers go to Copenhagen). Companies located in the STC invest in their own infrastructure. On the territory of STC various storage facilities are available: open and closed storage areas, cooling and freezing storage facilities.

STC is situated in the area where there are a lot of **people** who would like to work in the transport centre. There is a main motorway from the South of Zealand into the Copenhagen area, and there are many people who take this way every day to work. And they would be more than happy to stop at the transport centre and work there instead of driving long hours to Copenhagen. STC is also very closely linked with the University of Roskilde, with various commercial and trade schools which are situated in Køge. Thus STC has plenty of work force and various opportunities to educate and upgrade the work force in the cluster.

5.3.2 Demand conditions

STC is covering the **area** of 1.3 million square meters at the moment, however in a few years it is going to expand up to 1.8 million square meters. The port currently occupies 350,000 square meters, where the expected increased size should soon reach 500,000 square meters.

Thus, the expectation is that STC will increase by 50% in the next 5 years. **Future requirements** will include demand for higher buildings (up to 40 meters, while now only 25 are available, and with extension plan for 30 meters). This is especially the case for consumer goods which are not that heavy. And of course everybody is constantly asking for an increase in infrastructure efficiency, and in general infrastructure which would suit their specific needs. To sum up, for STC in future location, infrastructure and height will be important.

The **type of goods** that STC handles is general cargo both for the port and the transport centre. This is a vast majority of various commodities in all kinds of consumer goods. In STC there are facilities for Netto shops, for instance. Thus, for STC the main goods are consumer goods in one way or another, while the port is a bulk port.

Examples of **companies** located at STC include:

- Logistics companies
 - DBK's logistics service
 - DKI Logistics
 - HD Ejendomme
 - KP Gruppen - Knud Pedersen Transport
 - Lemvig-Müller
 - NCC
 - Netto

- Service companies
 - Burger King
 - EvoBus
 - Nyscan's
 - OK

The **services** provided by STC include:

- Storage and handling of ordinary and chilled / frozen goods
- Intermodal transport and freight forwarding
- Logistics companies services
- Trans-shipment rail-road
- Bulk handling (in port)
- Supermarket traffic consolidation
- Ro-Ro services
- Diesel tank installations
- Fenced parking
- Vehicles wash, Repair facilities
- Shower, laundry for drivers
- Cafeteria

5.3.3 Related and supporting industries

As mentioned above, STC is located in the consumer area, where consumer goods prevail. Thus there are not as many production enterprises in Zealand as in Jutland. However, areas for production are available in Køge, in close proximity to the Transport Centre (i.e. Køge Business Park). This proximity of business cluster creates further demand for transport cluster services. This is a classic interrelation and mutual development of an integrated business-transport hub.

STC is located in the region with an excellent network of all kinds of transport, and the big development is also foreseen – which makes STC an integral part of a well developed transport complex.

5.3.4 Firm strategy, structure and rivalry

STC is quite different from other transport centres, because it appeared as an initiative to create jobs more than anything else. So what the municipality decided was a development of the area for creating new jobs

with a focus on transport and logistics. Also taking into consideration that the port of Køge was very close by, the whole **idea** was first of all to create jobs in the transport centre, to support activities which were in the port, and in the long run to create logistics cluster in Køge which STC founders succeeded in doing. What was very important is that the Transport Centre conditions were as far as possible adapted to the requirements of industry, and that was first of all to ensure that there was a vast area and a possibility to offer certain building heights to the companies. At that point such height was 25 meters, which was unique for this area of Denmark those days; and soon with the extension plans it will reach 30 meters.

The initial **planning** for STC was started in the year 2000. The first years were used to carefully plan how to structure the transport centre, what kind of companies to target, and how to respond to the main conditions and the requirements of the transport centre. Then there were developed clear conditions, well planned area, and decisions on infrastructure. And also STC and port were marketed as one identity. As stated before, careful planning was important, but so was the location close to Copenhagen area. And STC could offer companies the vast areas where they could start their activities from the scratch.

STC is divided into 4 different **areas**:

1. Very small area called “public service”: petrol tank, mini-market, etc. And this is the only area in the centre where STC would like to see private cars.
2. “Heart” of transport centre as such – repair and service facilities for trucks: parking, diesel tank stations, workshops etc. This way from the very beginning there was conducted a separation between private cars and trucks.
3. Largest area, dedicated to transport and logistics facilities: big warehouses, big logistics facilities.
4. Area under development: STC already now has a small railway terminal in the transport centre, which they expect to expand and develop in the years to come.

STC is **owned** by the City Council of Køge. The port is separated from the city’s economy; that is why STC has to make its own contacts with port, while STC is owned directly by the municipality. Both “wet” and “dry” ports make part of STC which is ultimately owned by the City Council.

If port lends the land, the transport centre sells it (almost 100%) to the individual companies, and **prices** for land vary depending on size and other factors. Even all the storage facilities (terminals and warehouses) are private. This means that the STC managing company is out of the cluster’s members’ prices and operations.

When cluster members are so independent the management company’s function focuses on development of the land, selling of properties and trying to keep everything together. The final outcome is that the transport cluster is “self managing” and the STC director can focus more on port activities. This concept is totally

opposite from DTC. In DTC the purpose is ongoing business which lends the land, while in STC the focus was to create jobs.

There is no common **information system** officially established. There might be special communication systems between some of the companies. What companies do use is normal Microsoft Office for exchange of the data with AS 400 platform as well as Vision. And there are also a lot of them who run SAP. **Intermodal chain** within the cluster is integrated by means of presence of all necessary transport modes (sea, rail, road, air) and their connections (Ro-Ro, terminals, equipment).

STC implements **innovations** all the time. However, this is again left to a large extent to the individual member-companies. The latest innovation was the cold storage which is state of the art. It uses only 30% of the energy which the conventional warehouse for cold storage uses. **Environmental considerations** are also left to the individual companies. They are free to implement their own procedures for environmental management and undertake certification if needed.

Main **success factors** for transport centres, according to STC director, are:

1. careful planning and pre-planning, including identification of companies that the Transport Centre would like to attract, and precise following this strategy, avoiding transformation into the totally commercial area;
2. optimization of infrastructure; and
3. Incorporation of as many transport modes as possible.

5.3.5 Government

The main motive for STC establishment was creating new jobs in the area. Additional advantages from the centre include:

- Connecting cargo handling from the port with other types of cargo at one common transport centre
- Relocating freight facilities outside of cities
- Regional growth
- Rational and efficient land use
- Support of business

Since municipality owns STC and invests in the infrastructure, this shows the highest possible level of the government involvement.

5.3.6 Opportunity

Køge has a historical advantage of good location. Therefore the idea of establishing a Transport Centre there goes back many years. In the early 1990s Køge Municipal Council decided to allocate a 125-hectare site near Nordhøj to be a business park, and in 2001 a town plan was adopted for the establishment of the STC. The first contracts were signed the same year, and such key tenants as OK, Netto and Nyscan, were among the first to take up their positions in the Centre. Many other tenants followed, and it is now necessary to further expand the area to keep up with demand, as STC went from 0 square meters in 2001 to 1.3 million square meters nowadays. The growth was very big in 2001-2008, then slowed down during the crisis (which was in a way fortunate for STC which at that point did not have more land to sell and could during crisis accumulate demand) and currently is back again. Currently STC has great possibilities with the new Fehmern fixed link.

6 Discussion and transferability of results

Following the best practice analysis presented in the previous sections, this chapter will focus on the practical applicability of those findings to a new terminal establishment and development – in this case: Aberdeen City and Shire. As briefly described in the introduction, Aberdeenshire is currently at a preparatory stage of terminal establishment. Currently the discussion over terminal location, ownership/management structure and services/facilities offer is ongoing. This project aims at providing additional decision making support on those issues.

The three Danish transport centres with different concepts, management, services and stages of lifecycle have been analysed based on cluster shaping factors model. During analysis it was identified that not all cluster shaping factors had the same influence on other elements at different stages of the terminal's lifecycle. Basically, the clear difference in cluster shaping factors influence can be made between initiation and development stage. Briefly, on initiation stage, factor, demand and supporting industries conditions determine future terminal location and its structure and strategy. Government involvement and element of chance are of more importance at the initiation stage than at development stage.

On the development stage, terminal structure and strategy is tested and influenced by a demand side. Terminals often have to expand and adjust its capacities to market's needs. Opportunity is of less importance at this stage for well structured and successful terminals able to act as transport clusters, meaning being a "shelter" at difficult times and be "capitaliser" at good times (DTC).

At the development stage level of involvement of government and the terminal's capacity to influence and supporting industry conditions depend on the management structure selected at the initiation stage. This means that if the terminal has a large extent of public sector involvement (in the different form of PPP), it can get government's support for improving factor conditions and stimulating supporting industries. On the other hand, if the terminal is a purely private undertaking, it might need to improve factor condition and liaise with supporting industries by itself. And here good concept and market strategy as well as access to financial resources are important.

After the brief overview of terminals' possibilities, each of them will be presented in depth.

6.1 Terminal Initiation Phase

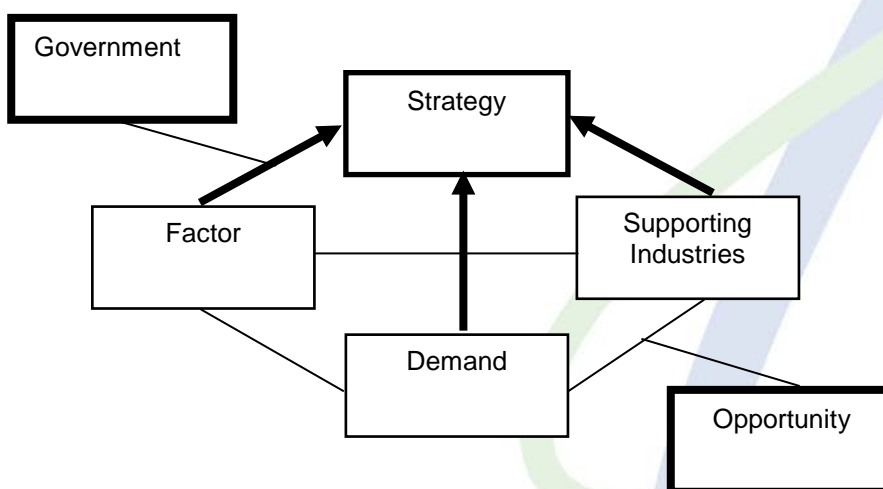
As mentioned by terminal best practices representatives, key success factors for terminals are:

- **Location** close to main transport corridors, centres of production and/or consumption;
- **Concept** containing groups of services and/or facilities and their target customers; and
- **Planning** in terms of potential tenants as well as operational, organisational and spatial structuring.

Each of those factors is influenced by a number of driving forces, which are very important to identify. The whole terminal establishment process starts with a main idea and goals which the terminal is supposed to reach. The balance between private and public goals and interest will eventually result in a management/ownership structure of the terminal. Afterwards such factors as infrastructure, business environment, availability of work force, level of demand and quality of transport network and other supporting industries will result in site selection. The potential demand will help to estimate requirements for terminal capacity and the services and facilities portfolio.

Traditionally the local government can influence terminal establishment in several ways. It can either become a stakeholder and invest in infrastructure, or create legislative and research support. Opportunity is also not to be neglected at the terminal initiation stage, since it can either provide ready ideas to be implemented and generally favour terminal establishment or lead to a situation where a location decision becomes clearly wrong and the success of whole terminal declines rapidly. The overview of force disposition between factors influencing terminal initiation is presented in Figure 18.

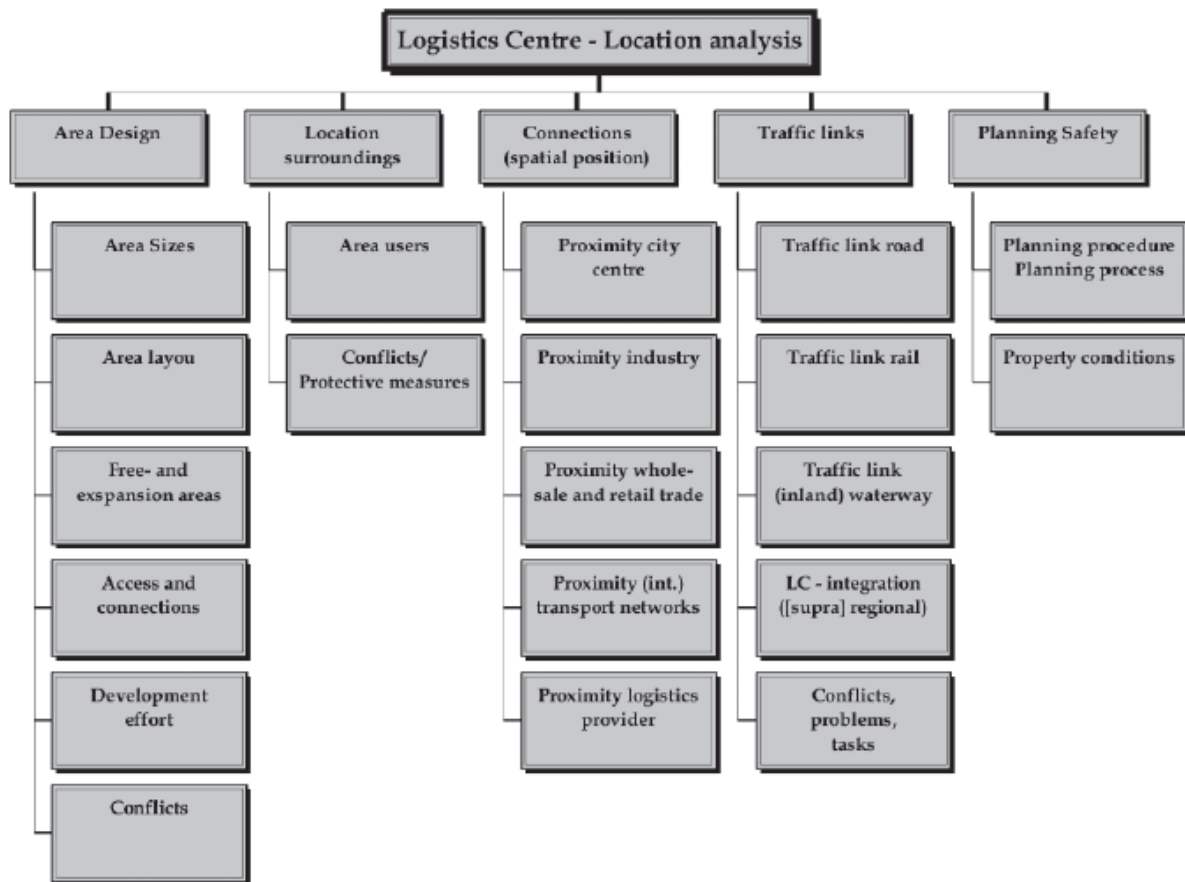
Figure 18: Terminal initiation influencing factors



Coming back to terminal success factors, hereafter they will be presented in more detail.

Location decision is one of the critical decisions which are not possible to change afterwards. There are various methods of location analysis, each of which tries to integrate as many factors as possible. One of them is presented in Figure 19.

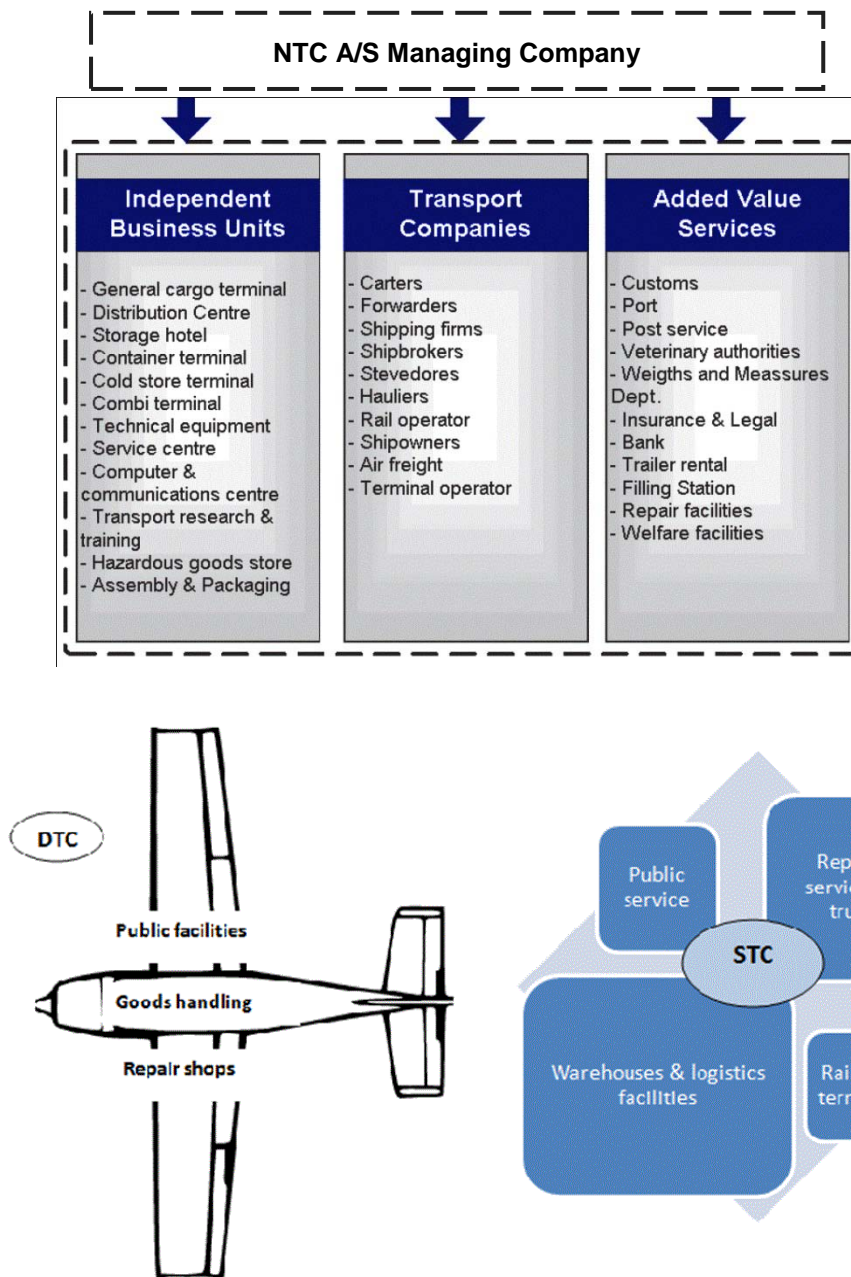
Figure 19: Terminal location analysis



The overall idea of the analysis is that all available options should be evaluated according to their area design, location surroundings, connections, traffic links and safety. Then following the outcome of the multi-criteria analysis the optimum location can be selected. This will determine the factor conditions of the future terminal.

The main **concept** is a core of terminal strategy and structure, defining its organisation. The three Danish transport centres have different concepts, yet similar in their underlying principle – demand segmentation.

Figure 20: Best practice's main concepts



This concept and corresponding spatial planning helps in avoiding conflicts, accidents, inefficiencies in movement of people / goods / trucks and providing the required quality of service and level of flexibility in the short, medium and long term.

The selection of management structure is also one of the key decisions. The possible combinations of ownership and management of different parts of terminals is presented in Table 9. Different business models

result from different levels of private and public sector involvement. The most effective form is claimed to be Public-Private Partnership (PPP) where cooperation between sectors managed by a neutral legal body creates a favourable business environment (public driven) and a sustainable strategic approach (provided by private undertakings).

Table 9: Variants of ownership/management structure

	Private undertaking(s)	PPP	Authorities
Land owned by	DTC, STC	NTC	STC
Buildings owned by	DTC, STC	NTC	
Machinery owned by	DTC, STC	NTC	
Managed by	DTC	NTC	STC

Planning of the terminal is a process at the initiation phase determining how successful the terminal will be in the future. This can take up to several years and result in a number of pre-agreements with potential tenants concerning business plans, master plans, etc. It is very important to structure the planning process. The separate next section will be devoted to the planning process and necessary feasibility studies.

6.2 Planning of RFT and related feasibility studies

Common methodology for terminal planning and feasibility study conduction (e.g. implemented in “*International Logistics Centres for Western NIS and the Caucasus*”, 2011 – Europe Aid financed feasibility study of a number of terminals of regional importance, potentially connected into single transport corridor) suggests the following steps, which can be naturally followed by RFT in the Aberdeen area:

1. Full Stakeholders Analysis and Evaluation of Demand

The further preparation of RFT related studies should be based on a sound stakeholder analysis involving representatives and decision makers from the public sector as well as the private sector. The main objective is to measure the likely degree of involvement of each potential partner and investor. This includes the further identification and specification of types of services which the stakeholders expect to be present at the logistic centre.

The following documents shall be used for coordination, with respect to the selected site:

- List with initial overview of major stakeholders and potential partners
- Interview guidelines for “Logistics Service Providers and Freight Forwarders” and “Industrial and Commercial Enterprises”
- Checklists for required information and data for “Land Owner”, “Public Sector” and “Private Sector”
- Site visits and meetings with potential stakeholders

The main deliverables and results shall include:

- Overview of major stakeholders and potential partners
- Overview of level of interest in a future RFT by the private sector
- Overview of potential degree of involvement of each major stakeholder and potential partner; conclusions for framework and opportunities for PPP
- Estimation of potential RFT market share for main commodity groups in terms of cargo volumes

2. Functional description and concept

The functional description and concept is based on a stakeholder analysis. The intention and general benefits of the future RFT and the related logistics facilities shall be described. The functional description and concept form the base for the further master plan elaboration.

In general the functional description and concept comprise the following main topics:

Table 10: Functional description and concept identification for RFT

Topic	Description
General Objectives	Future development opportunities and potential of the site as well as the overall development concept are briefly described. Furthermore, the stakeholders' interests and potential synergy effects with other regional terminals are outlined
Logistics Trends and Development Vision	Description of relevant international and regional logistics trends, their main impacts and outcomes with respect to a future RFT. Based on these results the overall logistics potentials will be derived and specified
Cargo Volumes	Sufficient cargo volumes of RFT-suitable goods are a fundamental precondition for the establishment of a future RFT. This step shall provide an estimation of potential volume and market share
Planning Guidelines and Potential Synergies	<ul style="list-style-type: none"> • Settlement of logistics-orientated companies of different size categories • Integration of existing suitable transport infrastructure and facilities • Realisation of a functional, urban planning and ecologically compatible overall concept • Development of feasible functional modules/components and their integration into further expansion stages
Functional Areas and Main Transport Infrastructure	Based on the status quo of the general logistics and transport framework, infrastructure and logistics market, a qualitative assessment of the future development potentials shall be made. Further definition of functional areas and concept will consider and focus on the development potentials that are identified as the most promising. Accordingly the identified needs and interests of the major stakeholders and partners in the public and private sectors are included, such as transport, handling, storage and warehousing facilities; logistics and value-added logistics services; non-logistics services; other service facilities.
Functional Concept and Intermodal	The basis for the development of the functional concept is the scaled general site plan, verified with the land owner or operator. This general site plan includes the

Operations	land plot boundaries, adjacent land plots for optional expansion, existing infrastructure and facilities as well as projected transport connections. The available areas for future RFT development shall be marked. Furthermore the development axes of the internal transport infrastructure, access roads as well as road and rail connections to the overall transport network are defined and drawn.
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3. Master Plan Description and Preliminary Layout

The master plan description and preliminary design shall be based on a sound stakeholder analysis as well as functional description and concept elaborated earlier. The master plan description and preliminary design shall be prepared in parallel and in close coordination with the preparation of the business plan for RFT. The master plan description and preliminary design comprises the following main topics:

Table 11: Master Plan description and preliminary design for RFT

Topic	Description
Land acquisition	Identification of land owners of potential further extension areas, conditions and requirements for this land acquisition
External and internal transport infrastructure	<p>Specification, dimensioning and preliminary design of on- and off-site transport infrastructure. The elaboration shall be done based on a projected traffic volume scenario and identified needs for the upgrading or required new construction of transport infrastructure. This includes:</p> <ul style="list-style-type: none"> • External road and railway site access to the urban, regional and national transport network • External maritime link to the regional and international transport network • Internal road transport infrastructure with main axes and roads, traffic nodes, parking and other traffic areas and circulation plan • Internal railway transport infrastructure with main railway yards or facilities tracks and switches (if applicable) • Configuration of entrance / exit gate system • General description of road and railway safety issues • Specification of required civil works (like bridges and ramps) <p>The results shall be graphically presented in the Master Plan layout.</p>
Access to utility networks	Overview and analysis of the existing utility network and facilities based on available documents and surveys. It also addresses the specification, dimensioning and preliminary design of the utility networks based on identified demands and

	<p>needed capacities:</p> <ul style="list-style-type: none"> • Connection to water, energy and telecommunication networks • Sewage water treatment facilities <p>These results shall be also graphically presented in the Master Plan layout.</p>
Overview of envisaged logistics and non-logistics services	<p>Logistics services:</p> <ul style="list-style-type: none"> • intermodal transport and freight forwarding, • transshipment rail-road, • handling of intermodal loading units (container, semi-trailer, swap bodies), • container depot and service centre, • open storage and warehousing services, • bonded warehousing, • picking and packing, labelling, etc. <p>Non-logistics services:</p> <ul style="list-style-type: none"> • general administration and management, • real estate development and facility management, • acquisition and marketing, • repair and maintenance of transport and handling equipment.
Specification and dimensioning of the functional modules	<p>Based on identified demands and capacities the specification, dimensioning and alignment of the functional modules and required land plots shall comprise:</p> <ul style="list-style-type: none"> • Traffic infrastructure, such as <ul style="list-style-type: none"> ◦ parking and traffic areas for trucks, ◦ cars and handling equipment. • Handling and transshipment facilities, such as <ul style="list-style-type: none"> ◦ rail-road container terminal and container depot, ◦ Roll-on/Roll-off. • Stationary and mobile handling and transport equipment (types and amount). • Storage and warehousing facilities, such as <ul style="list-style-type: none"> ◦ open and covered storage areas, ◦ general warehousing buildings, ◦ special warehousing buildings for temperature-controlled and hazardous goods, ◦ bonded warehousing.

	<ul style="list-style-type: none"> • Administration facilities. • Other service facilities and areas, such as <ul style="list-style-type: none"> ◦ truck port with service station and restaurant. • Information and communication systems network, such as <ul style="list-style-type: none"> ◦ management information system, ◦ communication and control systems (CCS) for truck guidance, gate process, combined transshipment module process.
Organisational structure and	<ul style="list-style-type: none"> • Organisational structure with ownership and stakeholder relationships • Specification of suitable PPP-models

4. Business Plan

Revenue is expected to accrue to the RFT owner/operator in three forms:

- Rent from leasing space: open storage areas, warehousing, office premises etc.
- Fees from core services: transshipment, open storage of containers, warehousing, picking/packing/labelling, container stripping/stuffing, etc.
- Ancillary services: facility management, IT services, equipment leasing, vehicle repair, marketing, logistics management, training etc.

Terminal expenditures will include capital expenditures and operating expenditures:

Table 12: RFT expenditures

Capital Expenditures	Operating Expenditures
<ul style="list-style-type: none"> • Site preparation: Land acquisition, earthworks, administration buildings, etc. • Infrastructure: Roads, utilities, etc. • Transshipment and storage facilities • Buildings: Offices, warehouses, etc. • Handling equipment and facilities: Cranes, forklift trucks, shunting engines etc. • Safety and security: gates, fences, fire alarm systems, security cameras etc. • Other facilities: Vehicle service facilities, 	<ul style="list-style-type: none"> • Labour: Operation and administration • Utilities and fuel: Electricity, gas, water, drainage, sewage disposal • Equipment: Energy and maintenance • Miscellaneous: Security, waste disposal, insurance, communication, training, legal advice, maintenance of infrastructure and superstructure, rent (where applicable)

lighting, IT systems etc.	
• Planning, surveying, soil investigation	

The Business Plan is a comprehensive document designed to enable a potential investor or financier to decide whether to commit funds and shall include:

- General description of the location, site and commercial rationale
- Technical details of the site with a conceptual drawing of the proposed development
- Discussion of legal, regulatory and procedural matters including land tenure, land use and site access.
- Assumptions about market size and share; costs; revenues; financing; etc.
- Marketing strategy and plan
- Operational plan, including a business model that defines relationships between stakeholders; management arrangements; equipment etc.
- Financial projections, including the financing plan, profit and loss statement, cash flow forecast, balance sheet and key performance indicators (FIRRs and NPVs).

5. Overview and Assessment of Required Staff

It is essential for an RFT to have professional staff, capable of performing tasks in an effective and efficient way. Preference is usually given to the human resources already located in the region, thus the labour skills available in the market are important. At the same time external expertise and comprehensive training programmes need to be in place.

In case of the creation of an RFT, the staff requirements have to be divided into two phases, as both phases have a completely different personnel requirement plan:

- 1st Phase: Establishment of the RFT, and training of personnel.
- 2nd Phase: Operating the RFT.

With the **establishment** of a new RFT, the staff requirements consist of a small team of professionals that is responsible for all the preparatory work during the development phase (all activities before the actual inauguration of the terminal). The project development team should consist of the following members:

- General Manager: general specialist in the logistics sector with good networking and negotiation capabilities, and good knowledge about cooperation between private and public stakeholders.
- Technical manager: a background in engineering and construction of logistic centres.
- Lawyer: with specialisation in construction contracts.

All the members of the project development team could be selected by the shareholders and/or stakeholders. The project development team should also identify and appoint, in close cooperation with the shareholders/stakeholders, the key staff for the RFT operation.

The staff requirements for the RFT **operation** depend on the types of activities and services the RFT is going to offer to its customers. However, the principal departments for the RFT and approximate operational functions to be filled in at the RFT include:

Table 13: Operational RFT departments and staff requirements

Departments	Administration staff	Operational staff
<ul style="list-style-type: none"> • General management • Administration • IT • Sales and marketing • Operations: all activities related to operating the RFT; • Maintenance • Human resources • Business development 	<ul style="list-style-type: none"> • RFT Managing Director • Manager Logistics • Manager Real Estate • Commercial Manager • IT Manager • Manager Security • Container Terminal Manager • Warehouse Manager • Inventory Agent • Logistics Engineer • Planner • Secretary • Clerical Worker 	<ul style="list-style-type: none"> • Control Counter • Dispatcher • Scheduler • Instructor and Coordinator • Driver (RMG or RTG cranes) • Driver (reach stacker, forklifts) • Driver (terminal tractor) • Loading Master • Wagon Inspector • Warehouse Staff • Security Staff

In general it can be noted that some activities might be outsourced (e.g. IT, administration, maintenance, security etc.).

6.3 Terminal Development Phase

As mentioned above, the terminal development can follow two different models depending on the level of governmental involvement. Those two options are presented on Figures 21 and 22.

Figure 21: Terminal development influencing factors (PPP model)

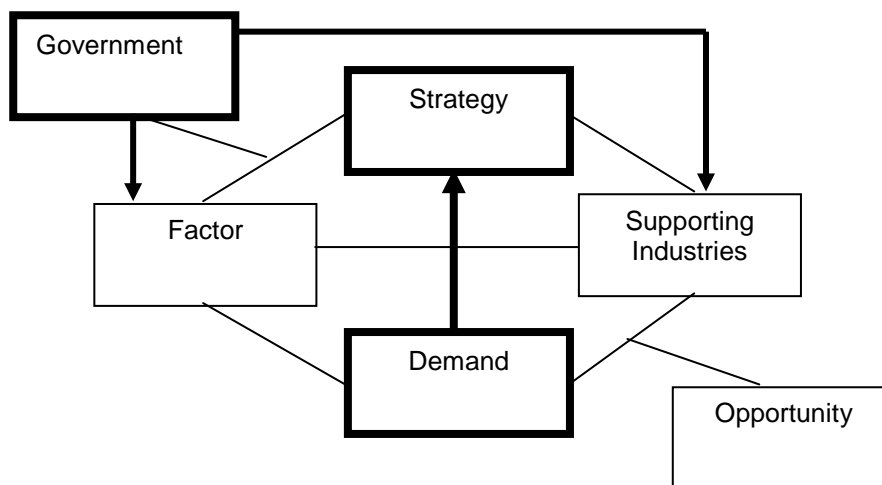
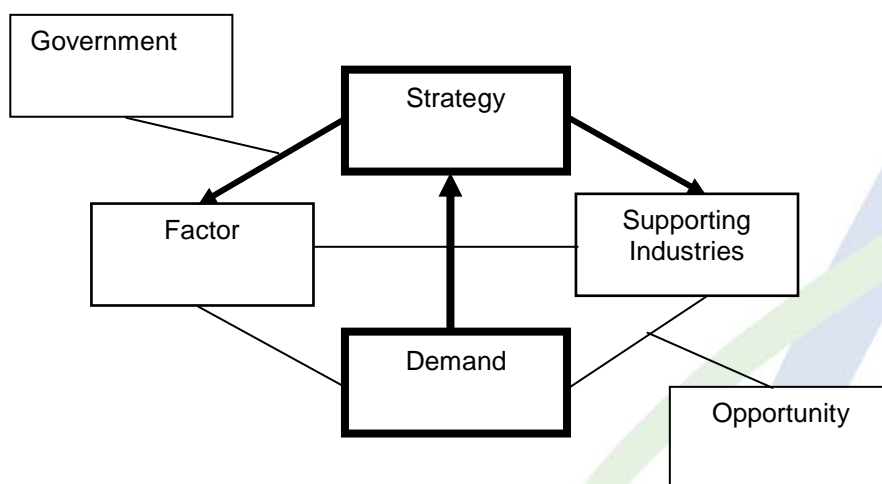


Figure 22: Terminal development influencing factors (Private model)



What remains significant regardless of the organizational model of a terminal is the demand factor. Whether demand is for the terminal's additional capacity, new services or new ways of performing operations, it always calls for flexibility. And flexibility comes from:

- strategy aiming to satisfy market needs;
- spatial structure which allows new construction and effective traffic; and
- access to new space resulting from government support and financial resources.

Either way, an effective terminal is operationally efficient, has potential for growth and provides services which satisfy demand. Each of those arises from flexibility.

The analysis chapter provides good examples of terminals which succeeded in this. NTC's main feature is cooperation: cooperation between different transport modes, the public and private sector, the balance between small and big companies supported by equal and clear rules for all. Cooperation and an individual approach is also the strategy for attracting customers. Individual Business Units (not belonging to any company in NTC cluster) and access to land plots (due to public involvement) ensure technical capacity to meet customers' needs. At the same time great attention is paid to innovation and information flows which further ensure the customers' requirements are met.

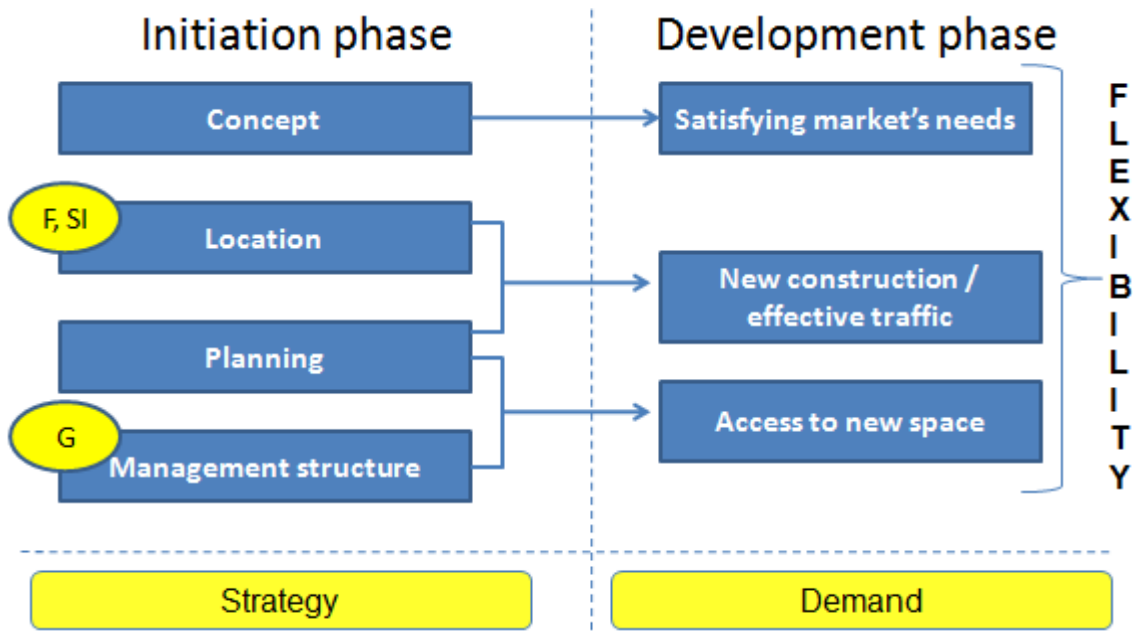
DTC focuses on 3 complementary target groups, each of which is offered special territory, a service portfolio and strategy. Customer focus brought great success in terms of attracting new tenants and creating a transport cluster. In fact, DTC clearly positions itself as a cluster, but replaces competition by complementarity. Being aware of a clustering affects results in vast knowledge exchange, cooperation with supporting industries and use of other cluster shaping factors. In turn, such collaboration opens the door to new solutions required by the market.

Finally, STC is owned by the municipality and has access to land plots, initially aimed at creating jobs. Nowadays it allows companies located in STC cluster a lot of independence. STC chose to sell land instead of renting it out, which means that STC tenants take care themselves of their operations, pricing policy, innovation, information collection and exchange, and environmental management procedures. This decreases the need for management and control and increases flexibility to a very high level.

To sum up, three good practices are different examples of how to structure and manage a regional freight terminal in an effective way. Presenting a different level of modality and governmental involvement, they all stress the necessity of careful location selection and preliminary planning for ensuring both short and long term success via flexibility and high service quality.

This interconnection between decisions taken at the initiation phase and their implications on development phase are presented on Figure 23.

Figure 23: Phases interaction



Note: F – factor conditions; SI – supporting industries; G – government involvement

7 Conclusions

The current report aimed at answering the following question: *How a potential Regional Freight Hub in North-East Scotland should be planned, structured and managed in order to suit the needs of the potential stakeholders and users, the infrastructure and the special commodities of the Aberdeen region?*

A regional freight terminal for the purpose of this report was defined as a *node for storage and trans-shipment of different types of freight (primarily containerised) on an open commercial basis*. Regional freight terminals have a feature of co-modality, meaning that they should provide the most sustainable and effective solutions.

The research was implemented in two stages: firstly the needs of the potential RFT were defined; secondly best practices with similar profiles were identified and analysed. The assumed terminal locations included Craiginches in the short term and Mains of Cairnrobin in the medium and long term. With respect to the need for a RFT, 11 responses were obtained from local government, the regional authority, port, freight advisor, freight-forwarder/shipper, terminal operator and five road hauliers. As for the best practices, they were found in Denmark, where managers of 3 terminals (Nordisk Transport Centre, Danmarks Transport Centre, and Skandinavisk Transport Centre) shared experience of their Centres.

Answering the research question and bearing in mind findings from the needs assessment, the following priorities should be addressed:

- *How the RFT should be planned?* – this is the most important question at the present stage of development, provided that location is not selected yet
- *How the RFT should be structured and managed?* – for this question further research (detailed demand and cargo flow analysis for a selected place, extensive stakeholder dialogue, general feasibility studies etc.) should be conducted; however, at this point there are some preliminary findings and assessments.

Hereafter overall findings for each of the two sub-questions will be presented.

How the RFT should be planned?

Planning of a terminal is of crucial importance, as from the very start it settles several decisions, which cannot be afterwards changed in short and medium term. Later, during the terminal structure and initial strategy is tested by demand. Whether demand necessitates additional capacity from the terminal, new

services or new ways of performing operations, it always requires flexibility in: a strategy aiming to satisfy market needs; a spatial structure which allows for new construction and effective traffic; and access to new space, resulting from government support and financial resources.

Planning steps which we described in detail in section 6.2 and will be highlighted again in the recommendations include:

1. Full stakeholders analysis and demand evaluation
2. Functional description and concept
 - a. Objectives and vision
 - b. Cargo volumes estimation
 - c. Site requirements (factor conditions)
 - d. Functional areas and main transport infrastructure
 - e. Main concept (key services and facilities) identification
 - f. Socio-economic impact analysis
3. Master Plan
 - a. Land acquisition
 - b. External and internal transport infrastructure
 - c. Access to utility networks
 - d. Overview of envisaged logistics and non-logistics services
 - e. Specifications of functional modules
 - f. Expansion stage and implementation plan
 - g. Estimation of investment needs
 - h. Description of main logistics procedures and operations
 - i. Organisational structure
 - j. Estimate of staff required and qualification overview
 - k. Environmental impact assessment
4. Business Plan
 - a. Revenues
 - b. Expenditures
 - c. Financing Plan
 - d. Marketing Strategy and Plan
 - e. Operation Plan
 - f. Financial Performance
5. Overview of Staff Requirements

How the RFT should be structured and managed?

Inspiration for matching all components which are shaping the RFT as a transport cluster can be taken from Danish best practice examples – successful Transport Centres at regional level, some intermodal, some unimodal, but all of which successfully overcame crises and are constantly growing.

Table 14: Best practice summary

	NTC	DTC	STC
Factor conditions	<ul style="list-style-type: none"> 3 transport modes central location in North Jutland well accessible plots good handling equipment and warehouses expansion plans qualified work force favouring legislation 	<ul style="list-style-type: none"> biggest TC in Denmark 1 transport mode located on the intersection of motorways well accessible plots good handling equipment and warehouses expansion plans during crisis solved work force problem 	<ul style="list-style-type: none"> fastest growing TC in Denmark 3 transport modes location near big consumption Copenhagen area well accessible plots expansion plans big choice of qualified work force additional infrastructure development by tenants
Demand conditions	<ul style="list-style-type: none"> sophisticated demand 50-60'000 TEU high quality, labour intense products regionally important goods 	<ul style="list-style-type: none"> traffic in 2010: 1,2 million trucks growth of DTC in response to growing demand production, retail products and food stuffs 	<ul style="list-style-type: none"> consumer goods handling high demand specific future requirement (height of the buildings)
Supporting industries	<ul style="list-style-type: none"> cooperation with academia good transport network demand for plots from industry 	<ul style="list-style-type: none"> good regional transport network future plans for cooperation with industries 	<ul style="list-style-type: none"> Køge business park good transport network proximity of both industry & consumption
Strategy & structure	<ul style="list-style-type: none"> PPP business model strict, equal and clear rules for all members conceptual model: IBUs, transport companies, value added services tenants favouring pricing strategy initial careful spatial planning integrating elements of transport value chain via 	<ul style="list-style-type: none"> private terminal land plots rent out to tenants transit TC conceptual model: “plane” with spatially divided services for trucks, drivers and goods awareness and use of cluster benefits, incl. knowledge exchange tenants’ complementarity 	<ul style="list-style-type: none"> PPP, where municipality owns TC and TC sells land to tenants. high level of independence of tenants careful pre-planning (esp. user identification) Concept based on 4 areas

	distribution centre and 3 rd part logistics <ul style="list-style-type: none"> big attention to communication and IT, innovation and environmental management 	instead of competition <ul style="list-style-type: none"> big attention to quality management 	
Government	<ul style="list-style-type: none"> initial support on local, regional, national and EU level 	<ul style="list-style-type: none"> government support via improvement of infrastructure around DTC and faster approvals 	<ul style="list-style-type: none"> owned by municipality
Opportunity	<ul style="list-style-type: none"> important at initiation stage: idea and location 	<ul style="list-style-type: none"> doing right things at the right time 	<ul style="list-style-type: none"> historically good location growth even during crisis

Currently, in relation to the RFT, the following benefits are expected:

- Population of Aberdeen could benefit from the new economic opportunities, improved air quality, and lower congestion;
- Improved journey times for all modes and lower freight road miles would make the transport system more efficient;
- Joining Aberdeen to Central Scotland and further South would be possible;
- The region could catch business currently going to Central Belt;
- Secure trailer parking removes HGVs out of city centre to a certain degree and substitution by “white van” (smaller delivery vehicles);
- There would be an opportunity to share plant for un/stuffing containers;
- Remote un/loading of containers (not on quayside) would become possible;
- Potential for shippers would include increased shipping, more agencies and stevedoring.

This explains why the local and regional authorities would like to support the project by being its partner/stakeholder/facilitator. At the same time, hauliers do not quite see how they can benefit from the opportunity, and they express an opinion that the concept may also not be clear to the industry. Apparently, demand analysis and stakeholder dialogue should be initiated as soon as possible. Only after that can the management form and business model of the RFT be clearly defined.

Presently Public-Private Partnership seems the most feasible model, where:

- Local Authority would maintain control over the open access of all interested users to the site and fair tariffs, and

- Commercial undertakings (e.g. big logistics service providers) would provide necessary investment, which is required due to the lack of public budget and interest to operate the site alone. Note: sole occupancy of such a site by one powerful company would not lead to healthy and fair competition between 3rd party operators and small companies wishing to trade from the site.

Concerning service/facility package, a container terminal is absolutely essential for the RFT, in line with intermodal transport and freight forwarding, rail-road trans-shipment, and handling of intermodal loading units. All the other handling services require further analysis, as many respondents mention unknown level of demand for them. This means that the services' potential users should be contacted and the level of demand for the short and medium term should be estimated.

Administration/office spaces and facilities for data communications are also an absolute necessity for the RFT, while other value-adding services should be further analysed. Truck stop facilities are required, incl. lorry parking, wash facilities, gated and secured area for parking trucks and trailers, shower and toilet facilities.

Based on this assessment, the following three functional areas and categories have been defined for the RFT:

- Container Terminal
- Logistics Services (mainly intermodal)
- Truck Stop Services

Technically, the site should have easily accessible road and rail connection. Possibility for land plots to be made accessible and construction to commence is necessary within a mid-term (3-5 years) timeframe. Adequate land plots for small, medium and large logistics companies are not required at the start but would be desirable later.

8 Recommendations

Based on the conducted analysis and discussion, the following recommendations can be given to the RFT outside Aberdeenshire at its current stage:

1. **Clear, defined objective and vision for the terminal:** this is important for developing the terminal concept, gathering stakeholders and attracting government support. Without definition of goals it is impossible afterwards to see whether they are reached or not.
2. **Thorough investigation of demand and cargo flows in the region:** this will help to estimate required terminal capacity and services/facilities. Cargo flow evaluation can be done by updating the SustAccess report from 2007 following the same methodology; and demand overview can be obtained by directly contacting potential terminal users and analysis of economic activities and industries in the region, as well as export and import.
3. **Select location:** this is a crucial step, which is impossible to change in the short and medium term afterwards. It has to be based on the decisions mentioned above. The terminal should lie on the intersection of major routes and corridors and within close proximity to cargo flow origination and/or destination points (production and consumption agglomerations). Currently, the location selection is ongoing for the RFT outside Aberdeen, and the issue of land prices is being evaluated among other factors. However this should not be a decisive factor, because it can result in short-term efficiency, but lack of long-term effectiveness, demand and flexibility.
4. **Define main concept:** this means decide upon key services and facilities. This can be done by combining results from demand analysis and market strategy. As seen in the analysis, segmentation strategy is preferred, which helps to satisfy different groups of customers in different areas of the terminal, providing a more individual approach, safety and movement efficiency. The main concept will also provide a basis for spatial planning.
5. **Identify and contact potential stakeholders, possibly arrange preliminary agreements with potential tenants:** this step is necessary to convert analysis results and estimations into more concrete plans and pre-agreements, as well as to ensure local involvement and ownership of the RFH. Based on that the business model can be developed.
6. **Define ownership and management structure:** this is a stage where the terminal's business model is developed and the level of private/public involvement is defined. As mentioned in the discussion, even though public support can also be obtained for fully private terminals (which still provide important community benefits), the public share in terminal ownership allows easier access to

additional land plots and favours the business and legislative environment. Naturally, sufficient financial resources are also of great importance for the RFT.

7. **Conduct careful pre-planning:** this step includes the Master Plan and Business Plan development as well as a Cost-Benefits Analysis. Special attention should be paid to spatial planning, which initiates from capacity estimation and the main concept, but also should be adaptable to future requirements, including possible terminal extension. Storage facilities and equipment requirements, plots accessibility, staff needs and other aspects (information technology, environmental issues etc.) should be also addressed at this stage. This step is crucial for ensuring adequate development possibilities.
8. **Make a concrete business unit in charge of the management and development of the centre and another one for maintenance:** this will help to increase efficiency and create equal conditions for all tenants. At the same time it would provide RFT with a strategic perspective to accomplish the following recommendation – flexibility.
9. **Be flexible:** flexibility is important both at the terminal initiation stage (where market signals and changes in business environment should be tracked immediately in order not to miss arising opportunities and mitigate risks on time) and the terminal development stage (where new capacities and services should be added to terminal's portfolio following emerging demand). For example, it is necessary to keep the possibility open for rail access, if it is not included in the original plans.
10. **Be innovative:** active knowledge exchange between terminal stakeholders and cooperation with academia on research make the terminal more competitive and effective in the long term. Intermodal chain integration, communication and environment protection technologies as well as operations optimisation can be good examples of areas where innovation can take place. The terminal can be a test bed for new and innovative transport solutions suggested by academia.

These recommendations result from best practice analysis, which means that they have proved their applicability in real life. Following them will eventually result in developing an effective and sustainable regional freight terminal.

9 References

1. Bentzen, K., Hoffmann, T., Bentzen L. (2003) *Best Practice Handbook for Logistics Centres in the Baltic Sea Region*. S. Jokuzys Publishing-Printing House, 230p.
2. Cerreño, A. L.C. de, Shin, H.-S., Strauss-Wieder, A., Theofanis, S. (2008) Feasibility of Freight Villages in the NYMTC Region. Centre for Advanced Infrastructure and Transportation Freight and Maritime Program Rutgers, The State University of New Jersey
3. Clarke, G. (2007) North East Scotland SustAccess freight study - Final Report. Faber Maunsell, Riverside House, Riverside Drive, Aberdeen, AB11 7LH
4. Cortright, J. (2006) "Making Sense of Clusters: Regional Competitiveness and Economic Development". A Discussion Paper Prepared for the Brookings Institution Metropolitan Policy Program
5. Fleming, D.K., Hayuth, Y. (1994) "Spatial characteristics of transportation hubs: centrality and intermediacy". *Journal of Transport Geography* 2(1) 3-18
6. Gille, J., Ossevoort, R., Bozuwa, J. (2009) *BE LOGIC – Best practices in Logistics*. Association for European Transport and contributors.
7. Iannone, F., Thore, S., Forte, E. (2007) "Inland container logistics and interports. Goals and features of an ongoing applied research". Italian Society of Transport Economists – Ninth Scientific Meeting – Naples
8. Koch, H., Nestler S., Nobel, T. (2010) *Ranking of the European Freight Village locations – Benchmarking of the European experiences*. DEUTSCHE GVZ-GESEL LSCHAFT MBH BREMEN – Association of German Freight Villages
9. Ockwell, A. (2001) *Benchmarking the Performance of Intermodal Transport*. OECD Division of Transport
10. Porter, M. (1998) *Clusters and the new economics of competition*. Harvard Business School Press, Cambridge, November–December, pp. 77–90
11. Rodrigue, J.P. (2008) "The Thruport concept and transmodal rail freight distribution in North America". *Journal of Transport Geography* 16 233–246
12. Rodrigue, J.P., Debie, J., Fremont, A., Gouvernal, E. (2010) "Functions and actors of inland ports: European and North American dynamics". *Journal of Transport Geography* 18 519–529
13. Roso, V., Lumsden, K. (2010) "A review of dry ports". *Maritime Economics & Logistics* 12, 196–213
14. Roso, V., Woxenius, J., Lumsden, K. (2009) "The dry port concept: connecting container seaports with the hinterland". *Journal of Transport Geography* 17 338–345

15. Sirikijpanichkul, A., Ferreira, L. (2005). Multi-Objective Evaluation of Intermodal Freight Terminal Location Decisions. Proceedings of the 27th Conference of Australian Institute of Transport Research (CAITR), Queensland
16. Steinle, C., Schiele, H., Mietzner, K. "Merging a Firm-centred and a Regional Policy Perspective for the Assessment of Regional Clusters: Concept and Application of a "dual" Approach to a Medical Technology Cluster"
17. Sørensen, S.Y., Moltesen, J., Haahr, J.H. (2008) *EU transport and logistics sector: Location decisions*. European Monitoring Centre on Change / European Foundation for the Improvement of Living and Working Conditions
18. Sørensen, S.Y., Moltesen, J., Haahr, J.H., Møller, K.H. (2008) *Transport and logistics sector: Padborg cluster, Denmark*. European Foundation for the Improvement of Living and Working Conditions.
19. Tsamboulasa, D.A., Kaprosb, S. (2003) "Freight village evaluation under uncertainty with public and private financing". *Transport Policy* 10 141–156
20. Verhoeven, P., (2009) "European Ports Policy: meeting contemporary governance challenges". *Maritime Policy and Management* 35 (1), 79–102
21. Woodburn A. (2008) "Intermodal Rail Freight in Britain: A Terminal Problem?" *Planning, Practice & Research*, Vol. 23, No. 3, pp. 441–460
22. Feasibility Study on Network Operation of Hinterland Hubs (Dry Port Concept) to Improve and Modernise Ports' Connections to the Hinterland and to Improve Networking (2007). FDT – Association of Danish Transport and Logistics Centres, 74p.
23. International Logistics Centres for Western NIS and the Caucasus - Final Report (2011). A project implemented by Dornier Consulting GmbH / NTU / Inros Lackner AG for EU. Contact person: Both, M
24. Logistics centres: Directions for use. A report by EUROPLATFORMS EEIG, 2004, 17p.
25. Regional Intermodal Terminals - Indicators for Sustainability (2004) Strategic design + Development Pty Ltd, Sydney
26. Terminal Study on the Freight Corridor - Final Report (2008). NEA, HaCon, Rapp Trans, Gruppo Clas. Contact person: Crollius, R.. Zoetermeer, The Netherlands
27. <http://www.aalborghavn.dk/> - website of the Nordisk Transport Centre
28. <http://www.aberdeencity.gov.uk/> - website of the Aberdeen City Council
29. <http://www.aberdeenshire.gov.uk/> - website of the Aberdeenshire Council
30. <http://www.dtc-online.dk/> - website of the Danmarks Transport Centre
31. <http://www.fdt.dk/> - website of the Association of Danish Transport and Logistics Centres



32. <http://www.freight-village.com/> - website of EUROPLATFORMES
33. <http://www.stratmos.com/> - StratMoS project website
34. <http://www.stc-koege.dk/> - website of the Skandinavisk Transport Centre

Annex

Annex 1: Interview guidelines for stakeholders of RFT outside Aberdeen

I. Introduction

The core idea and aim of the StratMoS project is to promote and facilitate a shift of cargo from road to sea based intermodal transport, and improve accessibility within the North Sea Region by supporting the implementation of Motorways of the Sea (MoS) and related transport networks in an integrated logistical chain.

The StratMoS project is funded by the EU and the Norwegian government through the Interreg IV B North Sea Region Programme. The project currently comprises for the time being 27 partners from Denmark, Norway, Scotland, England, the Netherlands, Belgium and Germany.

As part of DP-3a / WP C, we are working on the following problem: How the Regional Freight Terminal outside Aberdeen should be organised, structured and managed in order to suit the infrastructure and needs of the Aberdeen region?

II. About the respondent

1. What type of organization do you represent?
2. In which industry/sector does your organization operate?
3. What is the company strategy for promoting sustainable transport (via rail and sea)?
4. Do you feel a need for a regional freight terminal (RFT) in Aberdeenshire and what are the logistics potentials for a RFT in Aberdeenshire?
5. Which benefits would it bring to your organisation and the region?
6. Would a rail connection be a requirement from your side?
7. How would you describe your desired role in relation to RFT?
8. How much space at RFT would you need? When?
9. What could you bring to the RFT development? (resources invested, level of involvement)

III. About the terminal (with assumption on Craiginches / Cairnrobin)

10. How does the site currently respond to the following requirements, and how important are those requirements for RFT?
 - Easily accessible road and rail connection to the site and individual plots
 - Provision of adequate land plots for small, medium and large logistics companies.
 - Unobstructed development potential of the site, with no special construction requirements
 - Unlimited accessibility (24h operation, 7 days a week)
 - Possibility for land plots to be made accessible and construction to commence in a short-term (1-3 years) and mid-term (3-5 years) perspective.
11. Is there educated and skilled work force available in the proximity of the site?
12. How would you assess necessary terminal capacity?
 - Mini: <10'000 ITU/year

- Small: <30'000 ITU/year
- Medium: 30'000 to 120'000 ITU/year
- Large: 120'000 to 300'000 ITU/year
- Mega: >300'000 ITU/year

*** ITU - container, swap body or semi-trailer/goods road motor vehicle suitable for intermodal transport

13. On a scale from 0 to 5 (0 - not needed at all, 5 – the most needed) which services and facilities are necessary for terminal? (Please assess each facility individually):

- Warehouse facilities for ordinary products,
- Warehouse facilities for dried products,
- Warehouse facilities for chilled / frozen products,
- Warehouse facilities for classified goods
- Container Terminal
- Intermodal transport and freight forwarding
- Trans-shipment rail-road
- Traditional long distance heavy goods vehicles (HGV) traffic handling
- LGV delivery and parcels
- Food stuff handling
- Break bulk handling
- Waste recyclate handling
- Supermarket traffic consolidation
- Handling of intermodal loading units (container, semi-trailer, swap bodies)
- Handling of oversized cargo (project cargo)
- Picking & packing, labelling services
- Customs
- Veterinary Authorities
- Facilities for internal and external data communications
- Communication and control systems (CCS) for truck guidance, gate process, combined transshipment module process.
- Diesel tank installations
- Garage
- Trailer Rental
- Lorry parking
- Wash facilities
- Repair facilities
- Fenced areas for parking trucks and trailers
- Gated and secured area for parking trucks and trailers
- Shower and toilet facilities
- Sleeping facilities
- Food facilities

14. Which would be the suitable Business Model for the terminal? (Please mark the best option as “1”, acceptable options as “v” and non-acceptable options as “x”)

	IM	IO	RU	LA	PPP	Concessionaire
Land owned by						
Buildings owned by						
Machinery owned by						
Managed by						

 IM - Infrastructure Manager
 IO - Intermodal Operator
 RU - Railway Undertaking
 LA - Local Authority
 PPP – Public-Private Partnership
 Concessionaire – several private undertakings

15. Which pricing model would you call the most advantageous? Explain
16. Which industries could take most advantage of the opportunity? Which cannot? Why?
17. Describe the pros and cons of the transport network in the North East Scotland.
18. What other issues do you think should influence terminal development?

Annex 2: Interview guidelines for Best Practices

1. When and how was the Transport Centre (TC) established?
2. How did it develop over time?
3. How was it attracting new companies who operate on its territory?
4. How is it structured and what is its space planning?
5. Who owns and operates it? Which is the Business Model of the terminal?
6. Which category does the TC belongs to according to its capacity?
 - Mini: <10'000 ITU/year
 - Small: <30'000 ITU/year
 - Medium: 30'000 to 120'000 ITU/year
 - Large: 120'000 to 300'000 ITU/year
 - Mega: >300'000 ITU/year
7. Which services and facilities does your terminal provide? Which of them are of **greatest demand**?
 - Warehouse facilities for ordinary products,
 - Warehouse facilities for dried products,
 - Warehouse facilities for chilled / frozen products,
 - Warehouse facilities for classified goods
 - Container Terminal
 - Intermodal transport and freight forwarding
 - Trans-shipment rail-road
 - Traditional long distance heavy goods vehicles (HGV) traffic handling
 - LGV delivery and parcels
 - Food stuff handling
 - Break bulk handling
 - Waste recycle handling
 - Supermarket traffic consolidation
 - Handling of intermodal loading units (container, semi-trailer, swap bodies),
 - Handling of oversized cargo (project cargo),
 - Picking & packing, labelling services
 - Post office
 - Customs
 - Veterinary Authorities
 - Insurance
 - Bank
 - Educational and research facilities
 - Facilities for internal and external data communications
 - Communication and control systems (CCS) for truck guidance, gate process, combined transshipment module process.
 - Diesel tank installations

- Garage
 - Trailer Rental
 - Lorry parking
 - Wash facilities
 - Repair facilities
 - RO / RO ramps for vehicular traffic
 - Fenced areas for parking trucks and trailers
 - Shared facilities, canteen etc.
8. How does the site respond to the following requirements?
- Easily accessible road and rail connection to the site and individual plots
 - Provision of adequate land plots for small, medium and large logistics companies.
 - Unobstructed development potential of the site, with no special construction requirements
 - Unlimited accessibility (24h operation, 7 days a week)
9. What is the business environment of the TC?
- Qualified work force
 - Knowledge exchange between TCs and within TC
 - Contractual relations and legal environment
10. What is the condition of the following?
- Traffic infrastructure, such as
 - parking and traffic areas for trucks,
 - Specialised vehicles and handling equipment.
 - Handling and transshipment facilities, such as
 - rail-road container terminal and container depot,
 - Roll-on/Roll-off.
 - Stationary and mobile handling and transport equipment
 - Storage and warehousing facilities, such as
 - open and covered storage areas,
 - general warehousing buildings,
 - special warehousing buildings for temperature-controlled and hazardous goods.
11. Which kinds of additional infrastructure investments are needed / planned?
12. How are different elements integrated into a single intermodal chain?
13. What IT & seamless solutions are used in TC?
14. Which specific industry sector related solutions TC offers?
15. Which pricing model does the terminal use? (for service users)
16. Is TC implemented any innovative solutions in order to raise efficiency? Which?
17. Which are TC's environmental management procedures?
18. Which industries are the most developed in the region where TC is located? How terminal development supports them?

19. What is the condition of transport network of the region? What is its impact on TC and vice versa?
20. Which advantages does TC bring to the region?
21. Does TC get governmental support?
22. How fast does the terminal develop nowadays?
23. Which factors influence terminal development?
24. What are the future requirements for TC?
25. What would be the most important lessons learned if you should transfer your knowledge to other planning to establish the TC?