Potentials for cluster development within transport and logistics in the Green STRING Corridor

COWI A/S
Title: Potentials for cluster development within transport and logistics in the Green STRING Corridor

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1 SUMMARY

The Green STRING Corridor project is coming to an end. To continue and develop the cooperation, five of the project partners have signed a cooperation declaration aiming to strengthen the transport and logistics sector within the corridor by creating new, innovative transport and logistics solutions across industries and geography.

This analysis has three purposes.

One, to create an overview of current transport and logistics clusters in the corridor. This section of the analysis shows that:

- the most developed cluster formation is seen in Hamborg, where the cluster organisation Logistics Initiative Hamburg e.V. holds considerable resources, experience and network, which may useful to future cooperation.

- the corridor is seeing significant development of other cluster initiatives such as the cluster Logistics-Initiative Schleswig-Holstein e.V., which in just a few years has established itself as an important cluster initiative with strong ties to the region's companies. Furthermore, on Zealand and in Scania, specific initiatives have been commenced, aiming at establishing cluster organisations.

- the inclusion of Copenhagen Capacity provides a clear point of entry to cooperation with other industries, such as health care, foods and green tech.

The second part of the analysis treats how the future Fehmarn Belt Fixed Link may be expected to affect the transport and logistics sector. The analysis builds on the assumption that changes to infrastructure affects the supply side of the traffic market, where the transport and logistics sector represents the demand. In other words, there is a direct link between changes to infrastructure and the development of the transport and logistics sector.

Among other things, the analysis indicates that:

- the fixed link will reduce distances and thereby increase density within the corridor and thereby expand market areas for the transport and logistics sector,
and also for industries where transport and logistics make up a key part of the value chain. This means an increase in the volume and speed by which goods move through the corridor. The increased density will mean that new markets reach beyond critical mass and may form the basis for new business areas for transport and logistics companies. Via the tunnel, it will be possible to increase the frequency of transport in the corridor, making it possible to deliver goods within tighter time frames.

- the three large cities in the corridor – Hamborg, Copenhagen and Malmö – will be closer linked, and that the tunnel may be expected to boost growth and development in the three cities in general, but increase the derived need for transport to, from and between the three cities. However, the increased density between the three cities means that the areas in-between increasingly have to define their own roles and, based on existing strengths, translate the improved infrastructure into growth opportunities.

- the consequence of the improved infrastructure will be increased competition within the transport and logistics sector. The potential for growth and development in the sector will depend on internal differences within the industry, based on the assumption that the greater differences across the corridor, the better the opportunities for mutual benefits in the three regions. Also, it is likely that the budding clusters in the corridor will benefit from the strengthened link to the Hamburg cluster and the access to the rest of Europe. Thereby, the improved infrastructure will contribute positively to developing these budding clusters.

The third part of the analysis identifies three industries which hold the potential to create growth in the transport and logistics industry. The starting point is to uncover the possibility of developing transport and logistics solutions as a competency shared by the transport and logistics sector and by one or more of the identified industries.

As the basis for this part of the analysis, it is assumed that the tunnel under Fehmarn Belt may potentially affect the transport and logistics sector on four levels:

1) Logistic structures – the number of warehouses, administration, terminals etc.

2) Commercial relations – the geographical distribution of sub-suppliers and customers

3) Organisation of transport flows – planning and implementation of specific flows of transport to and from companies
4) Organisation of transport resources – choice of modes of transport and route, use of terminals etc.

On this basis, the analysis shows the following:

- The health care and welfare sector is generally strong in the corridor and undergoing a rapid development where new technological solutions such as telemedicine and new centralised hospital units reduce the industry's demand for transport in the traditional sense. At the same time, the industry still depends on a number of specialised transport and logistics services, e.g., focusing on security, just-in-time solutions, tracking of goods and advanced storage solutions (e.g., vendor managed inventory), which along with the development within the industry opens new opportunities for cooperating on new innovative solutions. In other words, currently, changes can be seen on all four levels for the transport and logistics sector. The fixed link across Fehmarn Belt may, however, be expected to affect especially the flow of transport to and from companies (level 3).

- The food sector is affected by a range of development trends. The increasing demand for fresh organic foods, especially in large cities, provides a basis for rethinking what transport solutions are needed to meet this demand. Similarly, the abattoir industry is undergoing a series of changes, and the food industry is increasingly outsourcing production by outsourcing labour-intensive work processes to German and Polish abattoirs, which use cheaper labour. This creates an increasing need for transport across the corridor, which may form the basis for a cooperation. Although developments are seen on all levels, the current development on the organisational level (level 1) may be expected to affect the transport and logistics sector in a similar manner.

- Green transition is high on the political agendas across the corridor, and a number of initiatives are being carried out with green transition in mind. Increased use of alternative fuels, recycling and modern waste management generate a need for specialised transport and logistics solutions, which may set the setting for a future cooperation. Furthermore, the analysis points to the wind turbine industry, which is strongly represented in the corridor and depends on a number of transport services for production and installation, which may be a focal point for a cross-sector cooperation. In this way, the relations among trading partners (level 2) are developing and will affect the transport and logistics sector.
As the result of the above three analysis elements, proposals are suggested for how to continue the cooperation in the corridor. The cooperation is proposed to continue under a new project cooperation aiming at create one or more innovative transport solutions for one or more of the industries identified. A number of recommendations are made regarding the future cooperation:

- It is recommended to involve future project partners early on in the process, to ensure that any problem targeted by a future project truly represents a relevant problem to the industry. Copenhagen Capacity is considered a central actor in terms of entering the three proposed industries. A number of cluster organisations are also considered as relevant entry points.

- It is recommended to focus on a specific delimited project where the project partners possess the competencies to solve the problem. Early on in the project, a clear link should be established between the problem to be solved, the expected results and the planned effect, as well as considerations regarding the project's relevance to other similar problems in the regions.

- In terms of selection of project partners, it is important to include regional actors that may contribute strategic resources and competencies in project management, in addition to relevant cluster organisations. Furthermore, the project will benefit from involving one or more private companies as partners. To identify relevant companies, cluster organisations may once again prove valuable.

The two EU framework programmes Interreg Baltic Sea Region and Horizon 2020 are proposed as potential sources of financing. Both programmes have innovation on their agenda, and both would offer good conditions for inter-regional cooperation.
2 INTRODUCTION

With the "declaration of cooperation" five transport and logistics initiatives within the STRING corridor showed their interested in working closer together. The aim of this cooperation is to strengthen the transport and logistics sector within the corridor by creating new innovative transport and logistics solutions across industries and geography.

This analysis is providing an overview of ongoing initiatives, and suggests how the cooperation partners can continue the collaboration in the STRING corridor.

Chapter 3 of the analysis includes an overview of the current clusters and initiatives within transport and logistics in the corridor. The aim is to characterise each initiative in terms of stage of development and potential input to the future collaboration.

After describing the initiatives it is interesting to investigate how the Fehmarn Belt fixed link can be expected to affect the potential for development in the transport and logistics sector. Thus, chapter 4 draw on existing studies on how infrastructure effect the transport and logistics sector, and provide potential for further development.

For the cooperation it is relevant to identify potentials for cross-cluster collaboration with other sectors, where transport are an important part of the supply chain. The part of the analysis is based on theory that stresses the point that transport services can be more than a cost and a successful collaboration can generate a common competence to the mutual benefit for both sectors. Thus, chapter 5 of the analysis identifies three sectors that due to the impact of the Fehmarn Belt fixed link will provide opportunities for a cross-cluster collaboration with the transport and logistics sector.

In chapter 6 we describe a work process that suggests five steps towards launching a new successful project collaboration. The suggested working process is intended to start on the meeting in Malmö on the 6th of November 2014, and by the end of step five, the cooperation partners will be ready to apply for external funding e.g. through one of the European funding programs.
3 CLUSTER AND INITIATIVE OVERVIEW

3.1 METHOD

In the first part of the analysis, we would like to provide an overview of existing clusters and initiatives within transport and logistics in the STRING corridor. The overview is based on two methods for analysing and characterising clusters:

A parameter-driven approach, which details the clusters and initiatives represented by the five cooperation partners in the Green STRING corridor by means of characteristics like age, size, composition, regional concentration and funding. The inspiration for these parameters comes from the publication Clusters are individuals – New Findings from the European cluster management and cluster program benchmarking, and the parameters are applied to provide a basic overview of transport and logistics clusters/initiatives in the STRING corridor.¹

A stage-driven approach, recognising that clusters and initiatives are dynamic measures in dynamic environments. To account for this, the clusters and initiatives in the STRING Corridor will be characterised by their current development stage and the prospective for further development. The classification of stages will be based on a terminology developed by former Danish cluster academy REG X. This terminology identifies four different development stages of cluster before actual clusters evolve and have the potential to generate new clusters.² While it should be noted that the pre-cluster stages do not conform to theoretic definitions of cluster (requiring a certain LQ level or an established triple helix collaboration), the approach developed by REG X is very useful in identifying what may well become clusters in five to ten years.

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REG X’s definition of the five different development stages of a cluster

Clusters are dynamic and develop over time through different stages. The potential input to the STRING cooperation depends on the development of the cluster. Former Danish cluster academy REG X has defined the following five different development stages for a cluster:

- "Clutter" is defined as scattered companies, which are not yet organised in a formal cluster management organisation.
- In a "potential cluster", the cluster’s specialisation is defined, an informal network begins to appear among companies, and shared knowledge within the cluster is accumulated.
- A "cluster under development" shares common project within the cluster and starts to specialise in export. The cluster is branded and knowledge is systematically shared among the participants.
- In a "mature cluster", a number of analyses are carried out by the cluster, e.g. market intelligence and trend analysis. New companies are formed in the cluster in collaboration with other clusters. Innovation collaborations, open innovation and research and development projects are among the clusters activities.

Out of mature clusters, "spin-off clusters" can appear in a specific link in the supply chain in a mature cluster. For instance, a mature cluster within logistics can generate a spin-off cluster that specialises in a specific product or service that is used by the logistics cluster.

Based on the two approaches outlined above, a basic overview of the existing clusters and initiatives is developed, along with the perspectives for further development.

3.2 CLUSTERS AND INITIATIVES IN THE STRING CORRIDOR

A first look into the transport and logistics sector in the entire STRING corridor area can be provided by looking at employment figures for the area in its entirety, which shows that in 2010, 179,916 were employed in this sector in the STRING corridor (Serin and Holzwerber, 2013). Quite a bit of variation exists between the regions in the STRING corridor, the Hamburg Region and Greater Copenhagen area demonstrating the highest share of employment in transport sector in the STRING region (see figure 1).
Having gained an idea of the size of the transport sector in the STRING corridor, the individual initiatives and clusters can be investigated in depth. We will focus on the cooperation partners, because they have been in close contact to the GSC project and signed the declaration of cooperation.
3.2.1 Logistics Initiative Hamburg e.V.

<table>
<thead>
<tr>
<th>Employment (2010)</th>
<th>78,590</th>
</tr>
</thead>
<tbody>
<tr>
<td>Founded/Established</td>
<td>2006</td>
</tr>
<tr>
<td>No. of members</td>
<td>529</td>
</tr>
<tr>
<td>Financing</td>
<td>Public funding of projects, membership-financed</td>
</tr>
<tr>
<td>Cluster stage</td>
<td>Mature cluster</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.hamburg-logistik.net">www.hamburg-logistik.net</a></td>
</tr>
</tbody>
</table>

The Logistics Initiative Hamburg e.V.\(^5\) was founded in 2006 and is thus the oldest cluster initiative in the STRING corridor partnership. Currently, the cluster has 529 members, of which 90 per cent are small and medium-size enterprises (SME), while the remaining members are large companies, research institutions and universities. The area boasts the highest number of employees within the transports and logistics sector. The cluster is geographically concentrated around the city of Hamburg, but a number of externally financed projects carried out within the cluster were of a more international character.

At the time of this analysis, Logistics Initiative Hamburg e.V. is well-established cluster. The cluster has a solid organisational structuring with 20-24 employees, incorporating both public, private and knowledge actors, and follows a well-defined strategy for further development. The organisation facilitates a number of activities including extensive collaborations with other clusters such as Logistik-Initiative Schleswig-Holstein e.V., and in general maintains a very high frequency of workshops, networking sessions

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\(^3\) Employment in freight transport and logistics in the STRING region, Serin and Holzwerber (2013)

\(^4\) Social security contributions in Hamburg in the logistics sector are approx. 126,000 employees. (Source: http://www.hamburg-logistik.net/fileadmin/user_upload/projekte/Arbeitsmarktmmonitoring_Bericht_2010.pdf)

\(^5\) The term "e.V." is short for "Eingetragener Verein", which means registered association in English.
and conference activities to strengthen and further the logistics sector – within the next five weeks, the organisation has six activities planned.

Based on the cluster's own information, one third of the cluster organisation's budget is financed by the BWVI\(^6\), which is Hamburg’s ministry for economy, transport and innovation. The cluster participants finance another third, while the last third comes from various other sources like sponsors and financial project support. The financial structure of the initiative is another sign of the maturity and strength of this cluster. The maturity and quality of the cluster (as expressed by, e.g., the ability to rely on membership financing) was recognized by the European Cluster Management Excellence, leading to the cluster organisation being the first transport, logistic and mobility sector cluster within Europe to achieve a gold-label certification in the European Cluster Management Excellence\(^7\).

In the terminology of REG X, Logistics Initiative Hamburg e.V. is considered a mature cluster.

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\(^6\) Behörde für Wirtschaft, Verkehr und Innovation

\(^7\) The gold-label certification is awarded to cluster organisations that demonstrate highly sophisticated cluster management and that are committed to further improving their organisational structures and routines for the benefit of an even higher performance.
The **STRENGTHS** identified in the Hamburg cluster are largely driven by the maturity of the cluster:

- Extensive international relations and networks
- Strong contact to public authorities
- Experience with (and capacity for) managing big projects
- Cross-sectoral participation (IT, personnel, security, research).

A potential **WEAKNESSES** for the cluster is that he cluster has a large number of interfaces with other actors and business areas, which means that the cluster might lose interest in the cooperation or prioritise other agendas over the cooperation. Although this could be a potential barrier for the cluster’s collaboration in the STRING corridor, no events point to this being a current weakness. However it is relevant for the cooperation to consider, that the cluster takes on a leading role in the future collaboration, but make sure to leave space for the other four partners to influent the collaboration.

### 3.2.2 LOGISTIK-INITIATIVE SCHLESWIG-HOLSTEIN E.V.

<table>
<thead>
<tr>
<th>Employment (2010)(^8)</th>
<th>49,127(^9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Founded/Established</td>
<td>2008</td>
</tr>
<tr>
<td>No. of members</td>
<td>58 direct members</td>
</tr>
<tr>
<td>Financing</td>
<td>Primarily membership-financed</td>
</tr>
<tr>
<td>Cluster stage</td>
<td>Cluster under development</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.logistik-sh.de">www.logistik-sh.de</a></td>
</tr>
</tbody>
</table>

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\(^8\) *Employment in freight transport and logistics in the STRING region, Serin and Holzwerber (2013)*

\(^9\) Social security contributions in Schleswig-Holstein in the logistics sector are approx. 116,000 employees. (Source: http://www.hamburg-logistik.net/fileadmin/user_upload/projekte/Arbeitsmarktmonitoring_Bericht_2010.pdf)
The cluster was established in 2008 and has 58 participating members, out of which 90% of the enterprises are SMEs. Other members are universities, and Freight Village Kiel (GVZ)\(^\text{10}\), which represents an additional 20 enterprises, and The Trade association for the Danish road transport of goods (ITD)\(^\text{11}\), which represents 650 Danish enterprises that have numerous branch offices in Schleswig-Holstein. The members of Logistik-Initiative Schleswig-Holstein e.V. (LogISH) embodies a complete supply chain from production companies, wholesale, retail, logistic suppliers, consultants and universities. Geographically Logistik-Initiative Schleswig-Holstein e.V. is based in Schleswig-Holstein, involved in transnational collaborations in southern Denmark, northern Germany and the Baltic countries.

While the cluster initiative has operated for six years, the organisational structure is currently quite small: financing covers only one employee, and mainly the private sector is represented in the organisation and the participating partners. In spite of this restriction, Logistik-Initiative Schleswig-Holstein e.V. facilitates a variety of activities such as seminars, professional work groups and informal knowledge sharing on choice topics for their members. However, reflecting the size of the organisational means, the frequency of these activities is relatively low – with twelve own organised/initiated activities being arranged a year on average.

From 2008 to 2013, the cluster was primarily externally financed, as a project funded by the Federal ministry of Schleswig-Holstein\(^\text{12}\) and EU funds. Since the project period ended in 2013, the initiative has primarily been financed by members and additionally by business development funding from federal ministry.

In the terminology of REG X, Logistik-Initiative Schleswig-Holstein e.V. is considered a cluster under development. While there are clear trends of it developing towards a cluster, and the organisation has worked on strengthening the sector in the past six years, strong triple helix collaboration is still under way.

The following **STRENGTHS** have been identified:

- The strong private-sector involvement and an extensive relation to national and international networks

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\(^{10}\) Güterverkehrszentrum Kiel (GVZ Kiel)

\(^{11}\) Brancheorganisation for den danske vejgadstransport - ITD (Source. www.itd.dk)

\(^{12}\) Ministerium für Wirtschaft, Arbeit, Verkehr und Technologie des Landes Schleswig-Holstein.
• Strong contact to public authorities The age and experience of the cluster organisation, e.g. experience with managing large projects and participation in intersectoral activities (IT, maritime industry, research).

While the cluster has developed rapidly since it was established and has the potential for developing further, it does not yet have the same organisational and financial capacity as Logistics Initiative Hamburg e.V., and its potential for further development depends on its ability to secure additional funding, e.g. through public funding.

The main **WEAKNESSES** where a STRING corridor collaboration could help strengthen this initiative have been identified as follows:

- Positioning of the subject logistics and logistic sites in the context of the STRING corridor in Schleswig-Holstein
- Strengthening of public-sector involvement

Being geographically located in the planned Fehmarn Belt fixed link, the cluster can expect to gain a better connection to southern Sweden, which provides a complement and extension route to and from Jutland.

### 3.2.3 LOGISTICS INITIATIVE ZEALAND

<table>
<thead>
<tr>
<th>Employment (2010)¹³</th>
<th>8,700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Founded</td>
<td>Not yet initiated</td>
</tr>
<tr>
<td>No. of members</td>
<td>n/a</td>
</tr>
<tr>
<td>Financing</td>
<td>n/a</td>
</tr>
<tr>
<td>Cluster stage</td>
<td>Clutter</td>
</tr>
<tr>
<td>Website</td>
<td>n/a</td>
</tr>
</tbody>
</table>

The logistics initiative for Region Zealand is currently under development, and a cluster organisation has not yet been founded. However, a number of actors – one being the Municipality of Køge – have identified the potential for a cluster, as seen in the report *Estimation of potentials and recommendations of establishing a regional transport and*

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¹³ *Employment in freight transport and logistics in the STRING region, Serin and Holzwerber (2013)*
logistics cluster in Køge from 2014\textsuperscript{14}, and are working on developing a cluster organisation.

Recent years have seen significant development in infrastructure in the Municipality of Køge, including the city’s harbour and transport hub. In addition, the number of enterprises within the transport and logistics sector in Køge is higher than the average national level, and the companies are centred on SMEs related to road and maritime transport.

Furthermore, the region boasts two knowledge institutions which have worked extensively with the transport sector – Roskilde University (RUC) and the Technical University of Denmark (DTU).

Based on the increasing number of enterprises within the region, and the first steps taken towards becoming a cluster organisation, this region is classified as a clutter according to REG X terminology. The following STRENGTHS have been identified in the analysis:

- Strong contact to individual enterprises
- Triple helix actors involved at an early stage in development of cluster organisation.

The main WEAKNESS faced by the Logistics Initiative Zealand have been identified as:

- It is in a very early stage (lack organisational strength to take advantage of opportunities provided by the Fehmarn Belt fixed link).
- It lacks experience in driving and managing projects.

As it is, the Municipality of Køge has the potential to develop from a clutter towards an actual cluster, in collaboration with other municipalities on Zealand, by establishing a formal cluster management organisation and collaborating on a triple helix organisation. The Fehmarn Belt fixed link will provide an opportunity to further develop the transport and logistics cluster in Køge, as the link will improve the connectivity to the rest of the corridor and further into the rest of Scandinavia and Northern Europe.

\textsuperscript{14} Oxford Research & Quercus Group (2012), Potentialevurdering of anbefaling af en sjællandsk transport – og logistikklyng i Køge.
3.2.4 Copenhagen Capacity

Another highly relevant Danish partner in the cooperation is Copenhagen Capacity (CopCap). Whereas the Municipality of Køge is working towards developing a transport and logistics cluster, the aim of CopCap is somewhat different. Copenhagen Capacity is owned by the Capital Region of Denmark and Region Zealand and supports businesses with foreign investment, which are foreign companies that considering locating or expanding their operations in the Copenhagen area in succeeding and achieving their business goals.

Out of several business areas, CopCap works to create and support networks along the supply chain of transport and logistics. To support clusters is not a key objective for CopCap. The main task is rather to create dialogue and collaborations between the transport and logistics sector and other sectors where transport and logistics play a pivotal role in the supply chain.

It makes little sense to measure CopCap by the REG X terminology as a cluster. However it has focus on promoting a transport and logistics cluster in the Capital Region and with the high level of employment within the sector in the region, it could be characterised as a clutter.

Due to its focus on strengthening networks, the STRENGTH of CopCap within the STRING Corridor can be expected to relate to its ability to support business and facilitate dialogue and collaboration across sectors.

- With its strong ties to other sectors, CopCap has the potential to become a key player for facilitating cross-sector collaboration in the STRING corridor going forward.

Because of its focus and organisation, CopCap has a more general approach to the transport and logistics sector, which could be specialised through STRING corridor collaborations. However a potential WEAKNESS is that:

- A general approach to the transport and logistics sector might lead to a lack on in-depth knowledge of need and potential in the sector transport and logistics sector.
- Potential conflicting agendas with other sectors.
### 3.2.5 Logistik for Tomorrow – Invest in Skåne

<table>
<thead>
<tr>
<th>Employment (2010)&lt;sup&gt;15&lt;/sup&gt;</th>
<th>20,850</th>
</tr>
</thead>
<tbody>
<tr>
<td>Founded</td>
<td>Expected: 2015</td>
</tr>
<tr>
<td>No. of members</td>
<td>Goal: 30</td>
</tr>
<tr>
<td>Financing</td>
<td>To be decided</td>
</tr>
<tr>
<td>Cluster stage</td>
<td>Clutter</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://utveckling.skane.se/utvecklingsomraden/naringslivsutveckling/innovationsystem/">http://utveckling.skane.se/utvecklingsomraden/naringslivsutveckling/innovationsystem/</a></td>
</tr>
</tbody>
</table>

Equal to Copenhagen Capacity, Logistik for tomorrow – Invest in Skåne can be characterised as an inward investment to promote businesses in the region, rather than a cluster. However, Invest in Skåne works to initiate a transport and logistics cluster in the region of Scania. The initiative is relatively new, with the first steps being taken with a series of meetings in 2009. As late as 2013, the cluster initiative was started by gathering stakeholders in the transport and logistics sector. The key actors in the region include Malmø Højskole, Lund University, Malmø University, Copenhagen-Malmø-Port Network Logistics, the region of Scania, Helsingborg, along with six other harbours in the region and a number of municipalities and private enterprises. The goal is to establish a formal cluster management organisation by 2015 and reach 30 cluster participants.

Invest in Skåne is currently supporting the establishment of a cluster which by now can be considered a *clutter* in the REG X terminology. The **STRENGTHS** of Invest in Skåne have been identified as:

- Its geographical location as a transport gateway into Sweden and Norway
- Level of research into transport (knowledge institutions in the region).

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<sup>15</sup> *Employment in freight transport and logistics in the STRING region, Serin and Holzweber (2013)*
The main **WEAKNESS** faced by Invest in Skåne has been identified as:

- It is in a very early stage (lacks organisational strength to take advantage of opportunities provided by the Fehmarn Belt fixed link).

Having a number of key actors involved in the process and a clear strategy to develop the clutter further, it is most likely that Invest in Skåne will be able to develop the transport and logistics clutter into a cluster under development within few years.

### 3.3 CHARACTERISTICS OF CLUSTERS AND INITIATIVES IN THE STRING CORRIDOR

To summarise the characteristics of the clusters and initiatives in the corridor:

- **Logistics-initiative Hamburg e.V.** is a major cluster within transport and logistics, and it is the largest region in the STRING corridor, employment-wise. The cluster adds solid experience in initiating and managing project into the collaboration, as well as strong international relations.

- **Logistik-Initiative Schleswig-Holstein e.V.** – a cluster under development – is the second oldest initiative within the STRING cooperation, and while considerably smaller employment-wise, it has very strong private-sector involvement. The strong private-sector involvement is an asset for the STRING corridor collaboration, and through its involvement, it is likely that Schleswig-Holstein can strengthen its financial model.

- **Logistics initiative Zealand** is on the edge of going from clutter to potential cluster with the potential establishment of a cluster management organisation. While the initiative is still in the early development phase, the big infrastructure investments in the region and its central location in the corridor make it a strategically important player. By participating in the STRING corridor project, the initiative can strengthen the foundation for its coming organisational structure.

- **Copenhagen Capacity and Logistik for tomorrow** – Invest in Skåne support cross-sector dialogue and collaborations across borders. They cover regions that have a very high employment within the transport and logistics sector, and can, through their more overarching roles, encourage cross-sectoral collaboration with other STRING corridor partners. By participating in the collaboration, the initiatives can further develop their involvement in the sector.

- The coming establishment of a transport and logistics cluster organisation in southern Sweden, which Invest in Skåne is currently supporting, can prove to be of high importance for the STRING corridor partners, due to the region's
function as a gateway to the rest of Sweden. Like Logistics Initiative Zealand, the participation in the STRING corridor collaboration can help the initiative strengthen the foundation for its coming organisational structure, by drawing on the experience of the existing organisational clusters.

The five cooperation partners are shown in the map and six additional clusters have been identified. These additional clusters within transport and logistics could play a potential role in future projects collaborations.

Figure 2: The map provides an overview of the different clusters and initiatives and their development stage, described in the chapter above. The black names represents cooperation partners and the names in grey represents initiatives outside the cooperation.

3.4 OTHER TRANSPORT AND LOGISTICS INITIATIVES IN THE STRING CORRIDOR

Apart from the five cooperation partners, there are a number of other initiatives in the five regions are also related to the transport and logistics sector, and will be considered here to give input to potential future collaborations. The activities of the initiatives identified in this section can all be expected to interact with activities covered by the STRING corridor partners, and will to a certain degree experience disruption of trade patterns following the introduction of the Fehmarn Belt Fixed Link. By establishing closer collaboration with some or all of these initiatives, the STRING corridor part-
ners will likely strengthen their positions by being part of a key transport and logistics corridor in Northern Europe.

In the Hamburg area, two major infrastructure facilities form the basis for two clusters. First, Hamburg Airport is the natural centre for the Luftfahrtstandort Hamburg\(^\text{16}\) cluster. The presence of Hamburg Aviation strengthens the knowledge and capabilities within air transport systems in Hamburg, potentially providing a comparative advantage for using air transport in logistics. It is possible that Logistics Initiative Hamburg could benefit from closer collaboration with Luftfahrtstandort Hamburg.

Second, the maritime sector in North Germany – especially Hamburg Harbour – provides the basis for a large number of enterprises, as well as the centre for Maritimes Cluster Norddeutschland (MCN)\(^\text{17}\). The maritime economy in the three states under MCN (Hamburg, Schleswig-Holstein and Lower Saxony) employs approximately 112,600 persons. The centre aims to strengthen the competitiveness of the maritime sector, and thus may both provide a comparative advantage that can spill over in the logistics sector. Also, considering the sheer size of the sector, it may provide a good customer base for the logistics initiatives.

In Denmark, two clusters have been identified – one within the transport sector and one within the maritime sector. The Transport Innovation Network (TINV)\(^\text{18}\) is a national network, which intersects a number of sectors and disciplines. The network aims to gener-

\(^\text{16}\) www.hamburg-aviation.de

\(^\text{17}\) www.maritimes-cluster.de

\(^\text{18}\) www.tinv.dk
ate research and development projects within transport to facilitate innovation. Knowledge flowing from this network may be used by the regions to maintain or improve their competitive positions by identifying and introducing innovations that can decrease the cost of transport.

The **Maritime Development Centre of Europe**[^19] is both a cluster organisation and an EU-level network, which works towards developing the maritime sector in EU. Through the centre, the partners could get insight into research and developments at EU level, as well as gain insight into/participate in maritime project being carried out in EU.

In Sweden, two clusters have been identified – one for the production of heavy trucks and one for the maritime sector. The logistics cluster **Tunga Fordon (Association of heavy trucks)**[^20] brings together actors who produce heavy trucks and materials for these. The presence of a cluster which develops input to the transport sector (trucks used for highway transport) may again ensure a high level of knowledge and capabilities (and superior vehicles), which can provide a comparative advantage for players in the STRING Corridor.

Finally, the maritime cluster **Maritima kluster i Västra Götaland**[^21] has been identified as an especially strong sector in the region in 2011. With 15,000 persons employed in the region – almost 50 per cent of the total employment at national level – Västra Götaland maritime sector must be seen as one of the most important maritime transport clusters in Sweden. Furthermore, the maritime area has strong support from public sector initiatives and is considered one of the areas of strategic growth by public authorities in southern Sweden.

[^19]: www.maritimecenter.dk
[^20]: www.tungafordon.com
[^21]: www.maritimaklustret.se
4 IMPACTS OF INFRASTRUCTURE DEVELOPMENT ON THE TRANSPORT AND LOGISTICS SECTOR

The Fehmarn Belt Fixed Link is expected to have significant impact on the regions in the STRING corridor, and is thus the subject of a number of analyses. In this context, we will investigate how the Fehmarn Belt Fixed Link can affect the transport and logistics sector.

1. The chapter will draw on knowledge from the previous chapter, where the current and future development of the transport and logistics clusters and initiatives were investigated, and we will estimate how the Fehmarn Belt Fixed Link would affect the ongoing development.

2. Finally, the chapter will look at how the Fehmarn Belt Fixed Link will potentially change the conditions for further development and economic growth within the transport and logistics sector.

Figure 3: Figure 2: The figure shows the cause-effect relation we wish to investigate in this chapter. Infrastructure development is expected to have an impact on the transport and logistics sector by changing the structural premises for the sector. This, in turn, is expected to change the demand for transport and logistics solutions, affecting the potential for economic growth in the sector.

4.1 METHOD

4.1.1 KEY STUDIES OF THE EFFECTS OF INFRASTRUCTURE DEVELOPMENT

The background of investigating the correlation between infrastructure development and transport and logistics sector is the mediating role that the transport system have between production and distribution systems and the infrastructure system. Hansen (2005) argue that transport firms, depending on their competencies, have a coordinating function between the transport market and traffic market. Thus, development on infrastructure systems affects the supply on the traffic market, which primarily have an effect on the transport system. Due to the transport systems mediating role, there is a direct correlation from infrastructure development to the transport and logistics enterprises.

Possibly, the correlation between infrastructure development and transport and logistics enterprises can be affected if the infrastructure changes one or more of four concepts. This also means that the Fehmarn Belt Fixed Link are likely to affect all four concepts, and thereby change the conditions for the transport and logistics sector:

- **Distance – how far?** Change in distance between, suppliers, customers are expected to affect the potential for growth in the transport an logistic sector. Thus, the distance in the corridor are "reduced" and markets become more dense.
- **Speed - how fast?** Change in the speed by which goods can be moved between enterprises and companies. This means that travel and delivery times are decreased.
- **Frequency – how often?** Change in the frequency by which goods can be delivered to customers. Thus, "friction" from ferry connection are removed and transport can be more dynamic.
• **Time-windows - When?** Change in the precession by which goods can be delivered. The potential for more dynamic transport means that deliveries can be done in smaller time-windows, which e.g. will optimise conditions for 24 hour deliveries.

I addition, the volume which can be transported across the Fehmarn Belt Fixed Link will increase as large volumes of goods can be transported by train across the belt.

4.1.2 **ANALYTICAL RESERVATIONS**

The aim of this analysis is not to conclude to what extent the Fehmarn Belt Fixed Link will generate economic growth and development within the transport and logistics sector in the corridor. Focus will be on pointing out what mechanisms are expected to impact the correlation between the Fehmarn Belt Fixed Link and the development of the transport and logistics sector.

A key point is that these mechanisms are drawn from different studies and do not necessarily comply with each other. We are aware that comparing results from different studies should be done with caution as contexts vary and significant differences exist between the cases used in the studies and the STRING corridor. We are also aware that results gained from the study of one infrastructure project cannot be applied to the Fehmarn belt fixed link without further analysis.

The results of this analysis should therefore not be used to measure the effect of the Fixed Fehmarn Belt Link directly, rather to point out relevant mechanisms which are likely to affect the effect and which could subject to further investigation.

4.1.3 **TWO MAIN APPROACHES TO MEASURING THE EFFECT OF INFRASTRUCTURE DEVELOPMENT**

The general discussion of the correlation between infrastructure development and economic growth and the extent to which the first affects the latter show that there are two basic interpretations of the correlation.

4.1.3.1 **Cumulative interpretation**

One cumulative interpretation is represented by, e.g., Thomas Woldbye, Director of Copenhagen Airport. Woldbye recently stated that the Fehmarn Belt Fixed Link would have a positive effect on the development of Copenhagen Airport, regardless of the potential competition to the airport that the link inevitably would generate. The ar-

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argument is that improved connectivity will generate an economic cumulative effect, and in the end generate a bigger economic effect to the benefit of all stakeholders.

In this perspective, the Fehmarn Belt Fixed Link will generate value to the potential benefit of all actors in the transport and logistics sector.

4.1.3.2 The zero-sum interpretation

The zero-sum interpretation is represented by, e.g., the Danish Productivity Commission. The commission argues that the economic effect varies significantly from project to project, and that public funded projects from the last ten years, worth DKK 21 billion, have not generated profits comparable to the funds invested.\(^\text{24}\)

In this perspective, improvements in infrastructure are simply regarded as potential reductions of costs for private and public actors. This means that an advantage gained by reducing the costs for one actor is equally lost by another.

It follows that the value remains the same, regardless of the Fehmarn Belt Fixed Link. However, the link will change the conditions of how the value is distributed among the

\(^{24}\) Http://produktivitetskommissionen.dk/media/160574/Rapport%20Infrastruktur.pdf
actors. For instance, the Fehmarn Belt Fixed Link is likely to reduce the costs of transport by train, but the value gained by train companies is equally lost by road transport actors.

4.1.3.3 A more complex cause-effect relation

However, the two interpretations described above reflect two different approaches to economic theory, and the correlation between infrastructure development and economic growth and development is most likely more complex. Thus, the SACTRA study concludes that:

"In the search for empirical evidence, we find that direct statistical and case-study evidence on the size and nature of the effects of transport cost changes is limited." (SACTRA, p. 7).

This indicates that the correlation between infrastructure development and economic growth is complex and depends on other parameters as well. This assumption is supported by The effect of larger infrastructure projects by J. Kristensen, who in 2002 investigated the effect of both the Great Belt Fixed Link and the Oresund Fixed Link.

One of the study’s conclusions was that the correlation between new infrastructure investments and economic development was complex and uncertain in countries that already have well working infrastructure. This indicates that the Fehmarn Belt Fixed Link will most likely redistribute market shares among actors, and only to a limited extent increase the value.

In the next part, we will investigate the mechanisms which will define how value is distributed among the actors in the transport and logistics sector, and look deeper into how it will affect the ongoing clusters and initiatives in the STRING corridor.

4.2 IMPROVED CONNECTIVITY BETWEEN METROPOLISES

Thomas, P. and O'Donoghue, D. have investigated the effect of the tunnel under the English Channel in 2013 in the study The Channel Tunnel: Transport patterns and regional impacts. The study pointed to social and economic interaction among the metropolises of London, Paris and Brussels, which were connected by the new high-speed train line. However, the relative peripherality of the regions in-between the three cities was intensified by the increased connectivity of the metropolises.

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25 One of the most notable studies of infrastructure development and its effects are the Standing advisory committee on trunk roads assessment (SACTRA) under the British Department of Transport.
Thus, the impact of the tunnel in terms of social interaction and economic growth was most present in London, Paris and Brussels, whereas the French city of Lille benefitted from the tunnel on some parameters. As for the areas in-between, Kent and Nord-Pas-de-Calais, the impact of the tunnel was limited, and to a certain extent the new high-speed trains only made it easier to skip the two areas to get from one metropolis to another.

If this mechanism is transferred to the transport and logistics sector, it will mean that the market for transport is expanded for the actors in the STRING corridor. The need for transport and distribution to and from enterprises in Malmö, Copenhagen and Hamburg will increase as well as the need for transport among the three cities. The increased connectivity will also affect the cross-sector interfaces, as markets in the STRING corridor will be closer connected, and specialised actors within the transport and logistics sector can potentially reach a critical mass for their services in the connected regions.

**Key point:** The need for transport and logistics in, out of and between Malmö, Copenhagen and Hamburg is likely to increase. The effect will be expanded markets for transport and logistics enterprises and a potential for more cross-sector interplay.

### 4.3 The relative peripherality of the regions in-between

Most studies show that the direct effect on the areas in-between is limited or, in some cases, even negative. The increased connectivity through Emsland, Germany, is an example of the first. The highway through Emsland connects metropolises in Scandinavia and Northern Europe, but Emsland itself has not benefitted from the improved connectivity, even though the area is also connected to the rest of Europe.

As J. Kristensen argues in his 2002 study of improved infrastructure, the areas in-between are likely to lose workplaces on a small scale as a result of a closed ferry connection or no longer acting as natural stops between metropolises. However, an equivalent number of workplaces are gained on a larger scale because of improved connectivity. The point here is that the workplaces gained often lie in the metropolises, which means that the areas in-between come out short-handed in terms of workplaces because of the improved infrastructure.

How the areas in between can benefit from the improved infrastructure depends on their strength, and how they manage to adapt to a new situation where you may easily skip them. The Danish city of Nyborg lost a number of workplaces when the Great Belt Fixed Link substituted the ferry connection. Nyborg worked to promote the city’s hotel and conference facilities, benefiting from its central location in the middle of Denmark, making it an obvious place for meetings and conferences. The hotel and conference
business has since grown significantly in Nyborg, and the city has reinvented itself as an obvious place to have meetings and conferences with participants from the whole country, because it is easily accessible from almost everywhere in Denmark.

The examples above show that the areas in-between have the most at stake when infrastructure is improved and connectivity between metropolises is strengthened, as it requires a strategic and goal-orientated strategy for the areas in-between to benefit from improved infrastructure.

In most cases, being geographically located between metropolises is a disadvantage, but as the Nyborg case shows, being in the middle can be turned into an advantage. Especially Lolland will be challenged in the same way Nyborg was when the Fehmarn Belt Fixed Link opens, but Lolland may take advantage of its location between the Oresund region and Hamburg. By strengthening hotel and conference business or the distribution of food products in the region, Lolland would be able to take advantage of its location.

The consequence for the transport and logistics sector will most likely be that actors based outside of Malmö, Copenhagen and Hamburg will not naturally benefit from the Fehmarn Belt Fixed Link. In this way, the potential to benefit from the link depends much more on how they use existing strengths to take advantage of the improved infrastructure.

The Municipality of Køge is in some ways much like Nyborg, as Køge is very proactive in the effort to establish a transport and logistics cluster, which will potentially make Køge play a key role in transport and logistics in the STRING corridor, although Køge will automatically benefit from the Fehmarn Belt Fixed Link.

In addition, actors in Schleswig-Holstein are naturally challenged by this mechanism, but in the same way as the Municipality of Køge, Schleswig-Holstein has the potential to proactively establish itself as a key player. One possibility could be to combine its place in the STRING corridor with the interfaces with the Jutland Route, which runs through Jutland to Hamburg, to make it a natural centre for the two corridors to meet.

**Key point:** Schleswig-Holstein and the Municipality of Køge will, as the rest of the areas between Malmö, Copenhagen and Hamburg, not automatically gain value from the Fehmarn Belt Fixed Link: They have to proactively define their role in the corridor.
4.4 THE TWO-WAY ARGUMENT

When infrastructure is improved, accessibility across geography is strengthened, which means that markets are expanded and distances between cities shorten.

The study *Spatial planning and provincial cities* initiated by the Danish Ministry of the Environment, Nature Agency, in 2013 argues that when two areas are connected, one is likely to benefit from the other. The areas in-between have the opportunity to benefit from the metropolises as they become closer connected by the improved infrastructure. Since the Oresund Fixed Link opened, there has been an ongoing discussion about whether Copenhagen or Malmö has benefitted the most from the fixed link. Though some claim that Malmö has gained most benefits, the common assumption is that both cities benefited equally from the fixed link.

Thus, the argument in *Spatial planning and provincial cities* is that when two areas are connected, they benefit more when there are significant differences between the two areas. This means that two cities that are alike tend to gain less each from increased connectivity, and one is likely to benefit on behalf of the other. On the other hand, when a new connection is established between two cities that differ in terms of labour market and business activity, economic and social activity is more likely to accumulate to the benefit of both.

A key point is that a certain level of activity in both areas is needed to provide a mutual positive output. Thus, it is unlikely that an area with few relevant actors and little business-related activity will gain a positive effect through increased connectivity to more attractive areas.

In terms of the transport and logistics sector, the effort to establish clusters in the Municipality of Køge and Scania will most likely benefit from the increased connectivity to Hamburg. But transport and logistics services provided only in Denmark or Sweden will also add value to enterprises in Hamburg.

**Key point:** Increased connectivity in the STRING corridor is likely to create a positive effect for the transport and logistics sector in Denmark and Sweden, but as far as the services offered in Denmark and Sweden differ from those offered in Germany, German enterprises are also likely to benefit.

4.5 BARRIERS TO POSITIVE EFFECT

Barriers that could prevent or limit a positive effect from improved infrastructure are worth taking into consideration in the STRING corridor. The study of the English Channel tunnel showed that a number of parameters impeded the positive effect of the
tunnel between England and France. For instance, different cultures and language limited the social interaction between England and France. Also more practical things like border and passport control often caused delays in travel between England and France, which basically means that reduced travel time gained through improved infrastructure was lost by delays due to border and passport control.

The cultural differences between England and France should be seen in a historical context and the example from the Oresund Fixed Link shows that a connection between two countries can be much smoother and have fewer barriers. When the Fehmarn Belt Fixed Link connects Sweden, Denmark and Germany, it is unlikely that barriers like those seen between England and France will limit the effect of the improved infrastructure. However, the potential for limitations of the positive effect is worth taking into consideration, even though language barriers between Denmark/ Sweden and Germany are likely to be a barrier to some extent.

Key point: Only minor barriers may be expected to decrease the mutual benefit from the Fehmarn Belt Fixed Link.

4.6 SUMMARY

To sum up the key points from this part of the analysis, the Fehmarn Belt Fixed Link will change the needs and patterns for transport and logistics in the STRING corridor, but only to a limited extent add more value to the transport and logistics sector.

In terms of changing patterns, transport to, from and among Malmö, Copenhagen and Hamburg will most likely increase because of increased connectivity among the three cities. However, the increased activity in the three cities will most likely come at a cost to the areas in-between, which means that the Municipality of Køge and Schleswig-Holstein will not naturally benefit from the Fehmarn Belt Fixed Link, but will have to play a proactive role and define their own niche.

A major opportunity emerging from the Fehmarn Belt Fixed Link is the expansion of markets, which will most likely mean that new markets will reach a critical mass where it is profitable for transport and logistics enterprises to engage in a cross-sector collaboration to develop new transport and logistics solutions to the mutual benefit of both sectors.

In the next chapter, we will investigate three sectors which are interesting in terms of developing cross-sector collaborations to the benefit of both sectors.
5 CROSS-CLUSTER DEVELOPMENT THEMES

The idea of cross-cluster development in the Green String Corridor is that development in specific business sectors can provide a basis for development in the transport and logistics sector under certain conditions. In this chapter we have described development in three sectors where development in either localisation, trade relations, organisation of product and transportation flows or organisation of transport resources means development in the relations between industrial sectors and the transport and logistics sector.

The motivation to focus on cross-cluster development is based on the argument, that transport "... is an integrated part of the competitive advantage for single firms' production system, and for local networks of industrial organization" (Krugman 1991, 1995 in Hansen, 2004). Thus common knowledge of the demand for transport services between a given sector and the transport and logistics sector will provide a mutual advantage. Which means that "... Knowledge from each involved firm is being transformed into a common competence, which generates a collective efficacy in the organization of input and output flows". As such transport can be more than a cost for others sectors if dialogue about demand and supply is used to facilitate cross-sector collaboration.

Based on the previous analysis by COWI "Social and business-related effects of a Green STRING transport corridor Öresund-Hamburg" from 2014, we have identified three sectors which provide relevant interfaces with the transport and logistics sector, and could provide a cross-sector potential for mutual growth and development. It is stressed that the selected sectors must be considered as examples of cross cluster development and that a similar development may be observed in other industries as well.

When looking on the relations between industries and transport and logistics solutions changes will be seen in one or more these four factors. The factors can be seen as different levels of decisions which are made by the firms as regards their transport and logistics solutions when major changes in the infrastructure is implemented26.

- Logistical structures: e.g. the number and localisation of factories, warehouses, administration and terminals.

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• Trading relations: Localisation of suppliers and customers.
• Organisation of material and transport flows: planning and implementation of production and implementation of production.
• Organisation of transport resources: e.g. use of one’s own or external transport modes, rout choice, transhipment via terminals and capacity utilisation.

Whereas the first level represents decisions regarding major changes in structures of transport and logistics (and major investments) the fourth level represents day-to-day decisions taken by the manufacturer, transport firm or distribution firm.

5.1 GREEN TECH

The green tech industry is a very broad terminology but it can be defined as products or services which include sustainability, cradle-to-cradle design, source reduction, innovation etc., and which include both renewable energy, recycling, waste management, sewage treatment etc.\(^{27}\)

There is a cross-sector potential for mutual development between transport and logistics and green tech. The potential emerges for the significant development and change which the green tech sector is currently undergoing. In addition, more of the green-tech sector’s represent distinctive and economically important areas, both in terms of economic and political importance. Among relevant trends are:

• Efforts to reduce CO\(_2\) emissions
• Conversion of energy supply from coal or nuclear power to biomass (wood, agricultural products etc.)
• Recycling – by collecting and processing materials to new products
• Efficient waste management either by converting waste to energy (by combustion) or recycling
• Renewable energy technology is an important issue in a Danish context, since production and distribution of wind turbines is a major Danish industry.

There are two approaches to the green tech sector which are interesting in relation to transport and logistics.

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\(^{27}\) Green Tech is also defined in GREEN PRODUCTION IN DENMARK, The Danish Energy Agency. 2012.
5.1.1 Renewable energy technology

In the renewable energy industry – especially in the wind industry - a strong field of competences is build up, the two largest global companies being German and Danish, namely Siemens Wind Power and Vestas.

Previously, Denmark was dominant until Siemens acquired the Danish company Bonus Energy in order to acquire know-how and production methods in this field. There are now research and development departments in Copenhagen – including Risoe DTU – and at Siemens' headquarters in Hamburg. Recently Vestas has established a department with key business functions in Copenhagen. Together, holding world-class positions, these core competencies are capable of developing future energy supply systems, including wind energy in the corridor.

Production and installation of wind turbines set special demands to transport from production sites to harbours where the wind turbines are shipped to the rest of the world or to local sites.

Waste management is an example of an industry where concentration and specialisation is growing. Economies of scale means that handling and recycling of waste are concentrated on fewer facilities and the residual products are incinerated and converted to heat and power. Since the amount of residual waste is expected to be decreasing, the number of waste incinerators and other waste handling facilities is also expected to decrease. This process requires efficient logistics solutions and the transport sector is a key factor in efficient waste handling.

Finally, the conversion of energy sources from fossil fuels to renewable energy sources also means new ways of distribution, since the origin of the sources often changes from a global transport set-up (of coal, oil and gas) to more local, regional or interregional transport of biomass sources such as wood chips and wood pellets, organic resources for biogas etc.

The development in the green tech industry means that transport distances for some products are increased – especially for the most specialised products in the technology
sector. The development in the scale of wind turbine also shows that there is a limit how far you can transport these installations.

As parts of the green tech industry is project based (construction of wind farms and other projects with renewable energy technology etc.) where speed and frequency has less importance, handling of waste, biomasses etc. is highly dependent on speed and especially frequency as these resources are parts of the energy supply.

The green tech industry is very much characterized by voluminous goods with great importance as regards both technologies and resources and just-in-time deliveries are essential. This means that there is a focus on the time-windows for both the sender and the receiver of the goods.

5.2 HEALTH CARE

Health care is one of the major business sectors in the corridor and numbers more than 200 companies in Denmark alone, including leading companies like Novo Nordisk and Novozymes. Especially the Medicon Valley in the Oresund region represents a remarkable density of companies in the sector. The Welfare Tech cluster is a certified gold cluster in the European Cluster Excellence Initiative (ECEI).

Figure 5: Illustration of Enterprises in Medicon Valley in the Oresund Region.

http://www.medicoindustrien.dk/default.aspx?id=3985
The interface between health care and transport and logistics is identified as a potential for further development, based on the assumption that both sectors will benefit from a closer collaboration.

In general, the role of transport and logistics in the health-care sector has changed significantly in recent years. Some of the most notable changes have been:

- The spread of new technologies to deliver health-care services, where distance is a critical factor, known as 'telemedicine'. Information and communication technologies are used for the exchange of valid information and diagnosis, treatment and prevention of diseases and injuries, research and evaluation etc. Telemedicine reduces the need for transport and logistics, thereby reducing costs for the health-care sector and inconvenience for the patients.

- Secondly, specialisation within the health-care sector increases the need for specialised labour, both in the public health-care system, but also in private companies. This links to the effects of improved infrastructure. As concluded in several studies, improved infrastructure can potentially expand markets, thereby also labour markets. Thus, the Fehmarn Belt Fixed Link opens up an opportunity to expand the labour market for the health-care sector which is a key factor for this industry.

- Currently, the physical structure of the health-care system is centralised around fewer and bigger hospitals. This changes the needs for distribution of goods to the hospitals towards just-in-time deliveries directly to the large hospitals instead of repacking and distribution to smaller hospitals.

These three tendencies are mutually related, and indicate that technology and innovation in general reduce the needs for transport and logistics in the health-care sector. At the same time, the standards for transport and logistics in health care are changing towards more specialised demands, which require new transport and logistics solutions.

Whereas the general need for transport in the health-care sector is decreasing, new niche markets are emerging, which can potentially be the subject of further collaboration in the STRING corridor. For example transport solutions with focus on safety, just-in-time solutions, tracking systems for special goods and advanced storage solutions (eg. vendor managed inventory), which in combination with developments in the industry allows for collaboration on new innovative solutions.
The health care sector has always been highly specialised and based on manufacturing and distributing high value goods. This means that products has always been sold on relatively long distances and with focus on quick delivery.

But the change in customer needs based on e.g. new hospital structure, means the demand regarding frequency changes dramatically. Hospitals changes from a local health care service to a regional or national service with high efficiency and a big number of patients coming in and out every day. This means that the need for high frequency is going up and that there will be smaller time windows for delivery.

5.3 FOOD SECTOR

In recent years, consumer demands have changed in the food sector, and a large number of consumers are requesting higher standards for food products and are at the same time willing to pay more for these products. This means that new markets are emerging and solutions for transport and logistics are needed.

5.3.1 DEMAND FOR FRESH ORGANIC FOOD REQUIRES NEW INNOVATIVE TRANSPORT SOLUTIONS

In the Capital Region of Denmark, the breakthrough for healthy living and organic products is significantly greater than in Germany. Danish consumers buy twice as many organic items (per capita) as they do in Germany and Sweden. Organic production has increased tenfold in eight years. There will still be a huge growth in this area.29

Germany's annual food trade with Scandinavia amounts to some EUR 9 billion. Denmark is a net exporter to Germany while the rest of Scandinavia is a net importer from Germany. Around three-quarters of the total Scandinavian food trade occurs between Denmark and (northern) Germany. This trade is rather transport-intensive. Exports from Germany include agro-industry, feed for farm etc., while Denmark produces many meat and dairy products – often bioorganic. Eight years ago, Denmark's organic

29 Danish Agriculture & Food Council, Link: http://www.lf.dk/Aktuelt/Handling_bag_ord/Bidrag_til_vaekst/okologiens_muligheder.aspx#.UfPLuG2yqyk
sales to Germany reached 16 per cent of the total food export, but now almost 50 per cent of all Danish products exported to Germany are organic.

The fresh organic goods intensify the need for a fast and reliable transport. The green standard of living involves higher production quality, and thus setting higher environmental specifications for logistics, leading to higher costs.

Danes and Swedes in the Oresund region and the citizens of the metropolitan region of Hamburg in many ways share the vision of a good and healthy life, while a relatively high consumer and purchasing power (GDP per capita) means that the preconditions for the development of the green corridor in this organic aspect are actually present.

5.3.2 INCREASING NEED FOR TRANSPORT IN THE MEAT INDUSTRY

Another change in the food sector is the consolidation of the meat industry. In Denmark, automation is implemented with the loss of workplaces as a consequence. At the same time, workplaces are moved to Germany and Poland where the cost of labour is a significantly lower. This changes the need for transport as livestock, processed products and final products are transported across borders. This change in work processes can potentially be an opportunity to innovate new transport and logistics solutions to the mutual benefit of both sectors.

As argued in the chapter describing the correlation between infrastructure development and economic growth, improved infrastructure expands markets. This will be the case when the Fehmarn Belt Fixed Link opens, and an expanded market will most likely generate a critical mass of consumers and providers, which will make it profitable to innovate new and more efficient forms of transport in the STRING corridor.

In the food industry the changes in distance is the main new factor regarding transport and logistics, but for farmers who produce livestock for meat production with high efficiency, the time-window for collection and transport of animals is also very critical.

5.4 SUMMARY

The potentials for cross-sector development are based on a few main development drivers. Whereas public services, industrial production, environmental treatment production of renewable energy etc. tend to concentrate on fewer and bigger facilities, the natural resources used in these sectors still tend to come from a big catchment area, whether it is waste for recycling or combustion, farming products for food, bio-

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30 http://www.industriarbejdet.dk/index.html?action=view-virtual-item&id=170&type=Article&tid=10
mass for energy production etc. On the other hand, consumers and recipients of services will still be settled in a large area, which means that the need for transport and logistics solutions will grow.

With reference to the four levels of decisions which were introduced earlier in this chapter we can conclude that the tendency to *concentrate facilities* can be observed in more sectors already and it is likely the this trend will be increased when the new Femarn Belt fixed link is in service, but it is also obvious that these changes requires long term decisions and thorough considerations.

In a longer perspective the new fixed link will also open up for *new trading relations* – specially for firms for whom speed, frequency and time-windows are essential. For firms who has considered ferry transport as "friction", the fixed link will be a major improvement.

On a more daily basis the firms decisions regarding *organisation and planning of distribution* and *organisation of transport resources*, e.g. transport modes, choice of route etc. is also affected and will affect the cooperation between the firms and transport firms. The increased focus on speed and frequency etc. will mean new and closer cooperation between the firms and the transport and logistics sector.

There will continue to be incentives to optimise transport and logistics solutions, which also means that there will be a potential need for innovative solutions with a concrete focus on reducing costs. This tendency is combined with a rising demand for more flexible and specialised transport solutions.
6 Logistics cooperation in the STRING corridor

With the Green STRING corridor project coming to an end, it is relevant to investigate how the previous analytical findings can be used to contribute to supporting and establishing permanent collaboration in the STRING corridor. This will allow knowledge and relations built in the Green STRING corridor project to continue to add value to the five regions in the STRING corridor.

With the declaration of the cooperation the partner have already shown an interest in the following topics, which the future project collaboration should reflect:

- **STRING logistics network** – that provides internationalization, matchmaking and events for their members.
- **Innovation support** – that creates opportunities for innovation for their members where innovation process establishment and development are the driver for their activities.
- **Knowledge exchange platform** – that provides cross-cluster knowledge and act as a knowledge and information hub.

To fulfil the ambitions for a future collaboration three basic prerequisites should be provided by the cooperation partners:

- **Commitment**. Cooperation partners should be committed to the future collaboration in the cooperation. This means that each of the cooperation partners should be willing to keep the collaboration high on their own agendas, by acknowledging the relevance of the cooperation and the future collaboration.
• **Identify common problems and challenges.** A key to keep the cooperation collaboration high on each of the partner’s agenda is by basing future collaboration on common challenges, acknowledged by the partners.

• **Find resources internally and externally.** Both external funding and internal dedication of resources is a key to a successful collaboration. Intentions and acknowledgment of common problems will not provide basis for future projects alone. Each cooperation partner should be willing to dedicate resources to future collaborations.

### 6.1 WORKING PROCESS

To support the cooperation partners in the future collaboration, we have proposed a systematic working process, illustrated in the figure below:

![Figure 6: Illustrates, five steps for the cooperation partners to consider in their future collaboration. The five steps spans, from the meeting on November 6th in Malmö, where new ideas for projects will be discussed, to the cooperation are ready to apply for funding of the new project.](image)

The model above suggest five steps the cooperation partners should go through to establish a future project collaboration. The suggested working proces is accustomed to the preparatory work for an aplicaiton to the european fundning programs.

In the following chapters we will point out a number of topics in each step to be considered by the cooperation partners. Step 1 should be entered at the meeting in Malmö on November 6th, by starting a dialog of what problems or challenges could be adressed in future projects. When step 5 is accomplished the projects will have a delitiald project description which can provide a basis for an application for external fundning.
### 6.1.1 Step 1: Defining the Challenge - Themes for Further Collaboration

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Define the challenge a future project should address</td>
</tr>
<tr>
<td>2A</td>
<td>Clarify which internal resources the cooperation partners can provide</td>
</tr>
<tr>
<td>2B</td>
<td>Clarify the need for external resources provided through collaboration with e.g. private companies</td>
</tr>
<tr>
<td>3</td>
<td>Describe a consistent correlation between the solution and the effect on the problem</td>
</tr>
<tr>
<td>4</td>
<td>Detailed planning of activities and preparation for application for external funding</td>
</tr>
</tbody>
</table>

### Questions for inspiration in step 1

- Why is it a challenge?
- For who is it a challenge?
- What are the potentials in solving the challenge?

By discussing themes for future projects in the cooperation, the partners have already started to identify the challenge the future project wish to address. Thus, the partners have already entered step 1 in the working process.

The challenge the project wish to address could both be a current problem an innovative transport solution could solve, or a potential for more efficient transport and logistic solution that the projects wish to redeem.

There are by now a number of possible approaches to a future collaboration in the STRING corridor:

- The cooperation partners are currently collaborating on a project idea based on smart specialisation in the STRING corridor. The ideas are already articulated in a project description, and it is the most obvious idea for future collaboration.

- Second, health care has been discussed as a cross-sector potential for further collaboration. A discussion of the subject among the STRING partners indicated that the partners recognised the sector as a possible relevant interface with
transport and logistics. The discussion also indicated that it will be possible to identify a number of cases which can be used to articulate a possible project description.

- Third, green tech is recognised by the STRING partners as an obvious interface with transport and logistics due to its key interface with transport and logistics. However, there are no concrete project ideas within this interface yet.
- As with green tech, the food sector is recognised as a relevant interface with transport and logistics, but at the same time there are currently no concrete ideas for projects that involve this sector.

Each of the themes above could potentially be defined as a challenge a future project could address. It is essential that each of the cooperation partners acknowledge the relevance of the challenge, and feel motivated to work towards a solution. We will get back to how to define the challenge in relation to specific European funding programs in the next chapter.

6.1.2 **STEP 2: CLARIFYING INTERNAL AND EXTERNAL RESOURCES**

1. **Step 1**
   - Define the challenge a future project should address

2A. **Step 2A**
   - Clarify which *internal* resources the cooperation partners can provide

2B. **Step 2B**
   - Clarify the need for *external* resources provided through collaboration with e.g. private companies

3. **Step 3**
   - Describe a consisting correlation between the solution and the effect on the problem

4. **Step 4**
   - Detailed planning of activities and preparation for application for external funding
After defining the challenge the future project wish to address, it is essential to clarify the project's need for internal and external resources.

First, the resources the cooperation partners will be able to provide, in terms of time, co-funding, knowledge, competences, should be clarified. As inspiration for this step, we suggest that the partners revisit the first part of this analysis "Cluster and initiative overview"; which provide a description of the strengths of each cooperation partner, and thus what could be the possible input for the collaboration between the cooperation partners.

Second, the need to provide external resources should be clarified. In this chapter we will focus on:

- Internal and external project funding
- The potential of collaboration with actors outside the cooperation
- How to define the challenge in relation to European funding programs

6.1.2.1 Project funding – One Way to receive Financial support

Funding is fundamental to the possibilities for further collaboration in the STRING corridor, and in principle public funding can be accessed through four administrative levels summarised in the table below. In principal, a future project could gain financial support from more than one of the levels in the table, and the funding sources could be both internal and external.

| Local funding | Local funding and strategic resources are important to support a strategic effort to establish clusters and cross-sector collaborations. In this context, the municipality of Køge supports the Logistics Initiative Zealand, and the City of Copenhagen funds Copenhagen Capacity. Also, the city of Malmö and Hamburg city are involved in their respective initiatives. Thus, local actors in terms of cities and municipalities can potentially be relevant partners by co-financing future collaborations. |

Questions for inspiration in step 2A and 2B

- Does the cooperation partners recognise the challenge?
- Are they motivated to solve the challenge?
- Are they willing to allocate the resources needed?
- What are the need for external funding? e.g. European funding programs?
- How can internal and external funding be combined?
- Should a future project include external partners?
| Regional funding | Danish and Swedish regions along the German bundesländer are relevant as potential collaboration partners. Partly because they manage funding to strengthen regional development, and partly because they represent a considerable strategic resource towards running or participating in large projects. This is evident as Region Zealand is leading the STRING project. However, the capital region and public actors on regional level could also be relevant partners. |
| National funding | Public actors on a national level, such as the governments in all three countries could potentially provide both funding and considerable strategic input. However, national public actors, may be limited in their ability to support future collaboration, due to the possibility that a future project might support the STRING corridor on behalf of other projects with conflicting agendas. |
| European funding | European funding is a highly relevant funding possibility to future projects, and could provide the main funding for future projects. Innovation is high on the European agenda and is considered a main driver for future growth in the European Union. Thus, both the Interreg programmes and the Horizon 2020 have innovation as major themes. In the following, we will focus on how to finance future projects through one of the two programmes. |

Table 1. Overview over funding possibilities. The funding possibilities includes both internal and external funding possibilities

6.1.2.2 Defining the problem in relation to project funding

Both the Interreg and the Horizon 2020 demand a well-defined problem that potential projects want to solve. As for the Horizon 2020, the calls define a problem that the project should address, and for the Interreg programme, applications without a specific problem in mind will be rejected.

Thus, abstract problems are not wanted by either of the two funding programmes, therefore should defining the problem be in principle the first approach. The problem should be concrete, demarcated and operational. This means that it should be clear what the specific problem is, why it is a problem, where the problem is, for whom it is a problem and what are the positive perspectives of solving the problem? In general, a modest and specific approach to this process is definitely preferable.
Involving the relevant partners is crucial in relation to define the problem that the project wishes to address. Thus, a cross-sector orientated project needs to involve actors from both sectors early on in the process. It is important that the problem in mind is perceived as a problem by both sectors, and that a solution to the problem will add value for actors in both sectors.

A concrete way to do this is by arranging a workshop for relevant actors, with the aim of creating a common understanding of challenges in both sectors and of discussing interfaces between the two sectors with mutual potential for development.

6.1.2.3 Choosing the relevant partners

The number of partners and what partners to involve are critical for a successful application and, eventually, a successful project.

First, projects are advised to be deliberate about the numbers of partners, and a project should have no more than 10-12 partners involved. The main reason is that a higher number of partners will imply that funds are spread too thin among the partners with the likely result that none of the partners will have enough funding to finance activities that will contribute to the concrete solving of the problem.

Second, partners should be chosen by their ability to solve the problem – or the other way around, the problem should reflect what the partners are able to solve. In both perspectives, the point is that there should be a strong coherence between the problem the project aims to solve and the partners’ ability to solve it.

This means that a future project in the Green STRING corridor should address a problem that the project partners will in principle be able to solve. This is a critical question when the project partners articulate the problem, as described as the first step in a future collaboration: Will the project partners be able to solve the problem?

In addition, projects with private enterprises as partners are favoured by the Interreg programme. However, history has shown that enterprises which are involved in projects with a short-scale financial gain as motivation are often problematic. The reimbursement period in the Interreg programme is relatively long, and both the Interreg and the Horizon 2020 programmes demand that results will be made publicly accessible. Enterprises that are motivated by the knowledge in the project tend to be better suited for these kinds of project.

As for the three potential cross-sector collaborations we have described in the previous chapter, it is suggested that a future collaboration is initiated through a relevant cluster management organisation.
• First, because a cluster management organisation has in-depth knowledge of relevant challenges in their respective sectors.

• Second, because the cluster management organisation has knowledge and direct access to its members, which normally include private enterprises, research institutions and public actors.

Thus, cluster management organisations can be relevant partners themselves, but could also work as gateways for other relevant partners. In the table below, we have suggested relevant cluster management organisations for each of the three potential cross-sector collaborations.

Table 2: Table 2: Overview over potential project partners.

<table>
<thead>
<tr>
<th>Health care</th>
<th>Welfare Tech</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Biopeople</td>
</tr>
<tr>
<td></td>
<td>Medicon Valley Alliance (MVA)</td>
</tr>
<tr>
<td>Green tech</td>
<td>CLEAN – Connecting Danish Cleantech</td>
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<tr>
<td></td>
<td>EnergyVision</td>
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<tr>
<td></td>
<td>Hub North</td>
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<tr>
<td>Food sector</td>
<td>FoodNetwork</td>
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<tr>
<td></td>
<td>Future Food Innovation</td>
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<tr>
<td></td>
<td>VIFU - knowledge center for food development</td>
</tr>
</tbody>
</table>

• Information and descriptions of additional cluster management organisations can be accessed via this link: [http://ufm.dk/forskning-og-innovation/samspil-mellem-viden-og-innovation/klynger-og-innovationsnetvaerk/professionelle-klynger-og-netvaerk](http://ufm.dk/forskning-og-innovation/samspil-mellem-viden-og-innovation/klynger-og-innovationsnetvaerk/professionelle-klynger-og-netvaerk)

• Information on European clusters management organizations can be accessed via this link: [http://www.cluster-analysis.org/](http://www.cluster-analysis.org/)
The third step should be to create a strong coherence between problem, solution, results and impact. This means that the project should be clear about what problem the project aims to solve, as described in step one, and by means of what activities. There should be a clear understanding of how the project activities affect and interact with the problem. Second, there should be a clear understanding of what results are expected to be achieved by the interaction between the activities and the problem, e.g., who will gain competencies to address the problem, or how will the activities make actors behave different. Last, how will the results make a social or economic difference which complies with the overall purpose of the programme? This last link between results and impact is by far the hardest to provide convincing proof of. This emphasises that systematically collected knowledge is used to underpin the projects assumptions of how the given activities will provide the expected impact.

Figure 7: The figure shows four questions which is a helpful tool to create a clear coherence between problem, solution, results and impact.
The figure above can be a helpful tool to establish clear logical structure in the project. By answering the four questions in the figure, it is possible to describe how the project intend to solve the specific challenge.

### 6.1.4 Step 4: Detailed Description of Activities and Formal Project Organisation

<table>
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</table>

As the fourth step, the project should establish a formal project organisation, including a steering group with representation of the relevant stakeholders in the project. A managing organisation with the overall responsibility for the progress of the project and a secretariat, which should keep track of the formal documentation for the project. Also, if relevant leaders of work packages should be appointed.

In addition the partners should work out a detailed description of the projects. Including descriptions of:

- The challenge the project wish to address
- The distributions of roles and allocation of resources among cooperation partner and external partners
- The coherence between problem, solution, results and impact
- A detail description of how the project are intended to progress in the project period.
6.1.4.1 European Funding

With inspiration from Interreg, 5V Figure 8 The figure show six main steps the flow of a project financed by European funding sources.
In this chapter we focus on funding through either the European Interreg programme or the Horizon 2020 program. The figure below illustrates the six main steps for a European funded project, and describe the projects working process from the fourth step in the suggested working process in the previous chapter.

6.1.4.1.1 Interreg – Interregional Projects

The Interreg funding programme supports cross-border projects, and the Interreg 2014-2020 programme for the Baltic sea region is about to open for applicants. In general, the Interreg programme has developed from supporting projects with general knowledge sharing as a goal and other equivalent purposes in the beginning of the 90s to now, where projects have to be much more concrete and address well-defined problems to obtain funding through the Interreg programme. The Interreg programme is a favourite funding source among the Green STRING partners, as the partners are familiar with the procedure for applying and the Interreg leaves room for the partners to define the idea for the project.

The potential projects in the STRING corridor should be financed through "Priority 1, Capacity for innovation" and the sub category "non-technical innovation", as this programme allows new cross-sector collaborations which are not necessarily connected with inventing new products, but may include new collaboration interfaces and workflows.

In addition to this brief description, we have collected the following three links, where more information on the Interreg program can be accessed:

- General information on the Interreg funding programme can be accessed via this link: [http://www.interreg4c.eu/](http://www.interreg4c.eu/)
- Further information on the Interreg Baltic Sea Region in general can be accessed via this link: [http://eu.baltic.net/](http://eu.baltic.net/)
- The full Interreg program can be accessed via this link: [http://eu.baltic.net/download.php?type=file&id=2561](http://eu.baltic.net/download.php?type=file&id=2561)

6.1.4.1.2 Horizon 2020

The Horizon 2020 framework is narrower in terms of defining the future project. Horizon 2020 has innovation as an overall theme, and has a wide perspective in terms of what problems could be addressed through the programme. However, Horizon 2020 has a large number of calls for project applicants, where each call defines exactly which problem should be addressed, leaving only little room for defining and developing project ideas. The Green STRING partner at Lund University is currently working on an
application to the Horizon 2020, and it has been agreed that relevant interfaces between the application and the project idea about smart specialisation in the STRING corridor should be investigated further.

Although the Interreg programme is favoured as possible source of funding for a future collaboration project, the Horizon 2020 programme should be kept in mind as a solid alternative.

The following four links provide information on the Horizon 2020 programme in relation to how to access funding through the programme. The first link provides general information on the Horizon 2020 programme, and the second link provides a step-by-step guide on how to file a proposal. The third link provides access to specific information on how to achieve funding to transport-related proposals. The fourth and final link is to the Brussels office in Region Zealand. The process for working out a proposal and applying for the relevant call is complex and might be considered difficult to work with, but the Brussels office provides support for this process, and can be relevant to work with in the first part of a future project.

7 LITERATURE


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