

WAREHOUSING LOCATION DECISION IN NORTHERN EUROPE: TRANSPORTATION MODE PERSPECTIVE

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1 INTRODUCTION

Globalization and manufacturing concentration to certain competitive geographical areas has increased the need for warehousing services. These two themes combined with emphasis of Just-In-Time (JIT) deliveries (high frequency, lower lot sizes and in the end higher amount of transactions) and efficient global inventory management has favoured warehousing (Bowen, 2007). For example, it is well-known that USA is having very serious trade deficit with China and South-East Asia (Turner, 2008; Pisano & Shih, 2009). This has in turn decreased the manufacturing employment in the country in large-scale, but has on the other hand increased warehousing jobs. Similar development is experienced in Europe (Baker & Canessa, 2009), which is having widening trade deficit problem with China. As Europe is more culturally and country-wise diverse, reaching entire area requires to use different countries within the journey (this has resulted on high amount of transit transports, e.g. in Poland, Hungary and Finland). Therefore, we could argue that warehousing is not simply ensuring smooth and low cost distribution with respect of manufacturing units and regional customers, but also to act more as final customization point to each local markets (or local factories). In general in Europe we could argue that hinterland transportation is completed merely with road transports, but also need for intermodality (combining road and rail) is increasing, not only due to environmental demands (European Commission, 2001 & 2011), but also because of old Soviet bloc heritage (Mäkitalo & Hilmola, 2011) as well as liberalized railway markets (Laisi, 2010). However, it should be emphasized that not only intermodality is driving warehousing and terminal operations needs – also arranging road based distribution within larger scale requires road-to-road unloading and loading operations through cross-docking terminals, not to mention that deliveries are sorted to different regions in terminals (leads to opening of cargo unit, e.g. container, and sorting and later on loading items to different regions; see more from order picking importance (De Koster et al., 2007).

In this research work we are interested from warehousing location decision within two major manufacturing country actors of Northern Europe, namely Finland and Sweden. These two countries have numerous multinational large

brands operating around the globe (e.g. Ikea, Nokia, Ericsson, H&M, Kone, SKF, Electrolux, UPM Kymmene etc.), and they have continuous need to have efficient distribution structures to reach final customers in large geographical area. Of course these multinational corporations are not only having manufacturing solely in Europe, but more so in other continents. This increases the complexity of warehousing network establishment and coverage. We are simply interested in this research work from warehousing criteria, and importance of different criteria in overall in interconnected world, where environmental regulations and scarcity of resources play increasingly important role. Among this we are examining in this manuscript, how warehousing location in Finnish and Swedish organizations differs within larger European context. Under interest are emerging CEEC markets, which have provided growth in recent two decades.

This research work is structured as follows: In Section 2 we introduce research environment of distribution using European transportation statistics from selected countries of interest. Thereafter in Section 3 is introduced our multiyear survey research methodology and warehousing location criteria findings. In final Section 4 we conclude our work, and provide further avenues for research in warehousing structures within North European companies.

2 RESEARCH ENVIRONMENT: TRANSPORTATION VOLUME AND MODE SELECTION IN EUROPE

After the collapse of Soviet Bloc, all East European countries experienced and developed through demand collapse of railway transports (concerning both, passengers and freight; see e.g. Blackshaw and Thompson, 1993; Tanczos, 1999; Lukasiak, 2001), and replaced this transportation need with road transports (in both sub-groups; analysis from Baltic States, see Buchhofer, 1995). Due to considerable economic development taken place within two decades time period, as well as increase of transit transports of particular CEEC countries (like Hungary, Czech and Slovakia), the volumes of road transports have increased substantially. For example, in Czech Republic increase has been approx. 50 % and in Slovakia more than 75 % from year 1995 level; this means also increasing harm for environment through emissions and enlargement of roads, but also greater dependency on oil, and increased trade deficit for oil producers (due to scarcity of oil and price hike caused by it; Sandalow, 2008; from peak oil see, Maggio and Cacciola, 2009). In Poland and Baltic States corresponding growth figures of road transports are several hundred percents (good description from current situation, see Komornicki & Miszczuk, 2010), at least double to Czech and Slovakian growth.

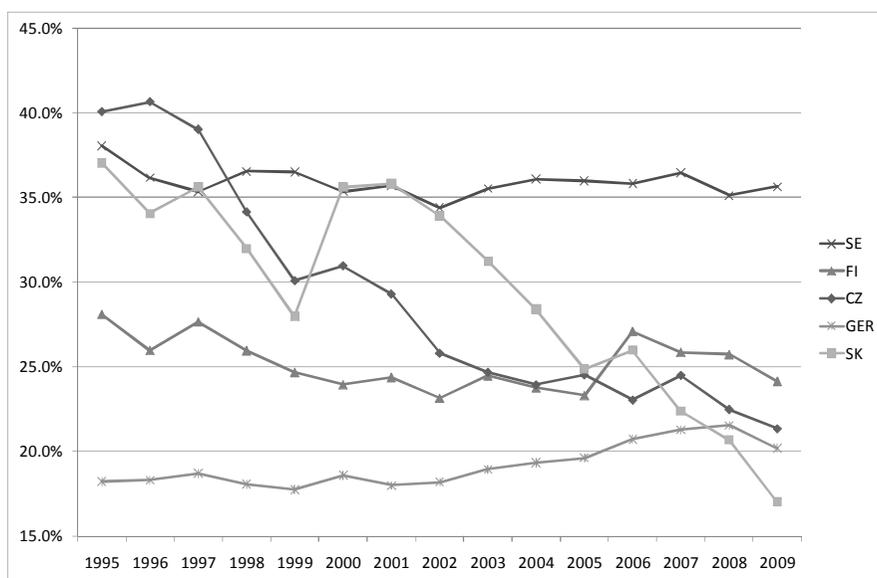


Figure 1 – Share of railway transports from total transportation production (incl. railways, road, inland waterways and pipelines) during years 1995-2009 in selected EU countries of interest. Source (data): European Union – Eurostat (2011)

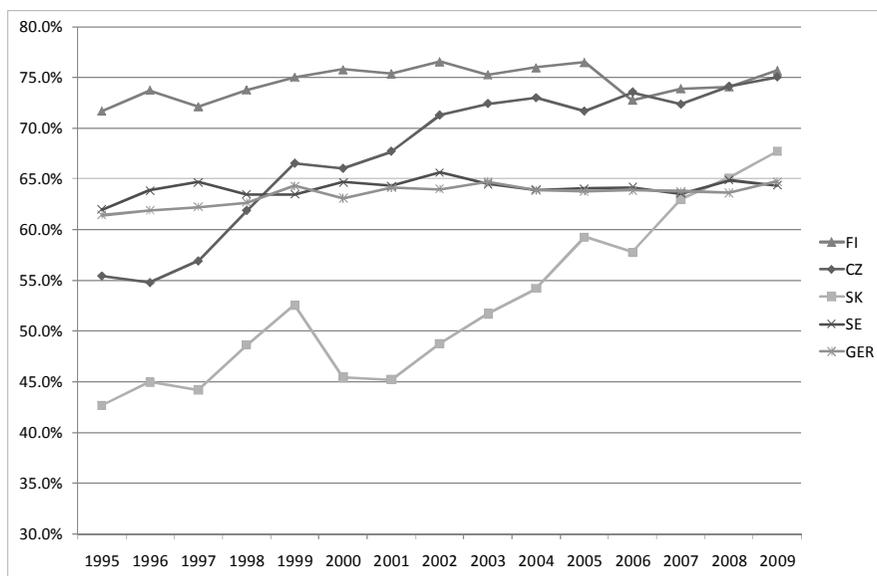


Figure 2 – Share of road transports from total transportation production (incl. railways, road, inland waterways and pipelines) during years 1995-2009 in selected EU countries of interest. Source (data): European Union – Eurostat (2011)

If future is extrapolated through market share statistics of CEEC countries in freight transports, we still have problem of defining bottom for railways (Figure 1). This mostly concerns those CEEC countries, which are not on the main routes of Russian, Kazakh and Belarussian raw material exports. So, even if Czech and Slovak railway transportation market share has declined by factor of 50 % from year 1995 level, we can't detect any reversal on this declining trend. Similar, but opposite behaviour, could be detected from road transports – both Czech and Slovakia are reaching level of Germany, Sweden and Finland with this regard (Figure 2). However, it should be reminded that particularly in Sweden and Finland, transportation sector activity in terms of volume has progressed very little within last decade (actually in Finland it has slightly declined). Even taking into account USA led credit crunch caused economic crisis effects, transportation sector is still on growth mode in long-term perspective in Czech and Slovakia, and this connected to increasing use of road transports is very threatening future scenario. This not only on oil consumption side, but also demands very significant investments on infrastructure by local governments and national level.

Popularity of road transport is caused by different factors, but seamless Just-In-Time emphasis in supply chains (inventories very low, and preferably placed in transportation devices), tight and frequent deliveries, and enlarged trade areas are to name of few. Also liberalization (free competition on road transports), easy market entry and very low infrastructure usage fees are other factors. Railways are still in European scale mostly dominated by governmentally owned enterprises. Some bright spots could be detected from Germany and Sweden, where new entrants have taken approx. 20-40 % market share within approx. last decade time period (Mäkitalo & Hilmola, 2011). This could also be detected from Figure 1, where in Sweden railway market share has remained as high, and in Germany it has considerably increased. Growth is nearly solely accounted by neoclassical terms revenue keen new entrants, which have been motivated to challenge road transports in competition, and have gained their foothold on the market (e.g. Vogt, 2008; Laisi, 2009).

For the purposes of this research work, we could expect a priori that among Finnish and Swedish companies warehouse location would be more complex, and would contain different transportation modes. However, in European context, economic growth within last two decades has mostly been happening in CEEC countries, and therefore we could rightly argue that road transports is single most important criteria for establishing warehouse, and rest of the criteria would be significantly dependent on it. Among this, sea harbours, and particularly container transports have favoured road transports to and from warehouses, and therefore this is second major factor to work for its dominance.

3 RESULTS OF LONGITUDINAL SURVEY RESEARCH

In the following used survey research findings have been gained through online questionnaire, which was sent in years 2006, 2009, 2010 and 2011 for the largest companies in Finland and Sweden, taken from respective countries TOP500 lists. Due to the reason that TOP500 lists include numerous banks, investment funds, insurance companies etc., our number of target companies was much lower than two TOP500 lists together. In each year we sent from 500-700 emails, and received 150 valid answers (altogether in four survey times). In the following the number of observations is lower than 150, but this is due to the reason that not all parts of the questionnaire were responded properly. Responses in survey have been Finnish biased, as 60-70 % from answers per year have come from Finnish companies.

Table 1 – Most important warehousing location criteria (ranked as first) in four different surveys taken place during years 2006-2011 (n=2011: 26; 2010: 20; 2009: 23; 2006: 43; n (total) = 112)

Warehouse Location Criteria	2006	2009	2010	2011	Average
Low distribution costs	41.86%	21.74%	40.00%	38.46%	35.52%
Road transportation connection	4.65%	26.09%	10.00%	15.38%	14.03%
Assembly/manufacturing plants near-by	16.28%	13.04%	10.00%	15.38%	13.68%
Selected place appears to hinder future potential	4.65%	4.35%	5.00%	15.38%	7.35%
Third party logistics solutions are widely available	9.30%	8.70%	0.00%	7.69%	6.42%
Inbound logistics were easy to connect	13.95%	4.35%	0.00%	0.00%	4.58%
Infrastructure support for intermodal transportation	0.00%	13.04%	5.00%	0.00%	4.51%
Sea transportation connection	4.65%	0.00%	10.00%	0.00%	3.66%
Low cost of labour	0.00%	4.35%	5.00%	0.00%	2.34%
Railroad connection	0.00%	4.35%	5.00%	0.00%	2.34%
Company specific warehouses available for lease/rental	2.33%	0.00%	5.00%	0.00%	1.83%
Enlargement space in the future	2.33%	0.00%	0.00%	3.85%	1.54%
Availability of labour	0.00%	0.00%	5.00%	0.00%	1.25%
Air transportation connection	0.00%	0.00%	0.00%	3.85%	0.96%

In overall from four different survey rounds we may say that the most important warehouse location criteria are very clear (see Table 1). Firstly, with above 35 % average amount comes ‘low distribution costs’. This is followed by ‘road transportation connection’ and ‘assembly/manufacturing plants near-by’. Only a bit different is year 2009, where low distribution costs were challenged by road transports as well as infrastructure support of intermodal transportation. During year 2011 we did experience similar inconsistency, but only within smaller fashion: ‘selected place appears to hinder future potential’ and ‘air transportation connection’ were having highest rating in some of the responses.

For second to fifth most important criteria, situation does not remain so clear as illustrated in Table 2. Actually all different criteria are having some importance, and neither one of these dominates the big picture. In longitudinal perspective it could be argued that companies are seeing other transportation mode connections as increasingly important (air, but also sea and rail). Also rather striking is that low distribution cost and road transport connection are not dominating, and in

most recent survey they lost substantially their importance. In long-term perspective ‘low cost of labour’, ‘infrastructure support for the intermodal transportation’, and ‘selected place appears to hinder future potential’ hold their popularity.

Table 2 – Second to fifth most important warehousing location criteria (ranked as 2nd to 5th) in four different surveys taken place during years 2006-2011 (n=2011: 26; 2010: 20; 2009: 23; 2006: 43; n (total) = 112)

Warehouse Location Criteria	2006	2009	2010	2011	Average
Road transportation connection	17.44%	8.70%	17.02%	3.33%	11.62%
Low distribution costs	11.05%	11.96%	19.15%	2.61%	11.19%
Low cost of labour	6.40%	8.70%	10.64%	9.50%	8.81%
Infrastructure support for intermodal transportation	8.14%	8.70%	8.51%	8.55%	8.47%
Inbound logistics were easy to connect	8.72%	7.61%	10.64%	3.80%	7.69%
Selected place appears to hinder future potential	6.40%	8.70%	8.51%	7.13%	7.68%
Third party logistics solutions are widely available	6.98%	11.96%	0.00%	8.55%	6.87%
Enlargement space in the future	9.30%	7.61%	0.00%	9.50%	6.60%
Air transportation connection	1.74%	5.43%	8.51%	10.45%	6.54%
Availability of labour	4.65%	2.17%	8.51%	7.60%	5.73%
Sea transportation connection	4.65%	7.61%	0.00%	9.98%	5.56%
Company specific warehouses available for lease/rental	5.23%	6.52%	8.51%	0.48%	5.18%
Assembly/manufacturing plants near-by	4.07%	3.26%	0.00%	9.03%	4.09%
Railroad connection	5.23%	1.09%	0.00%	9.50%	3.96%

So, in macro-level it seems that companies are generally tied upon road transportation strategies, but are more than aware that changes in the structure and modes of physical distribution could occur in the future. At least this is the impression, what could be gained from Table 2 findings – all other three transportation modes have become increasingly important, and also long-term issues (infrastructure) as well as efficiency of operations are being considered more thoroughly.

One explanation in the diversity of warehousing location criteria (second to fifth most important item) could be the actual warehousing network presence in Europe. Our sample is Finnish organization biased, and this has its implications on warehousing network. Typically Finnish companies are more active and present in CEEC markets (shown in Figure 3) than Swedish ones. During first three survey years this difference was really remarkable, but in the most recent survey gap has been shrinking (absolute difference, please do note that Swedish responses are fewer so proportionally Swedish presence in CEEC is approaching parity with Finnish companies during year 2011). In these countries flexibility and adaptability is the key issue to succeed in the fast changing markets, and this could be one reason, why other transportation modes are being increasingly preferred in the survey responses (particularly during years 2010-2011). However, main transportation mode in CEEC is nowadays in general cargo road based, and this combined to low distribution costs is the key to profitability. In some products local production (e.g. car production in some product groups in Russia) is reality, but still numerous items are being produced in West European

countries (like Spain and France), and these are then shipped to consumers located in Urals. For long transportation distances infrastructure, flexibility and cost efficiency are more than needed.

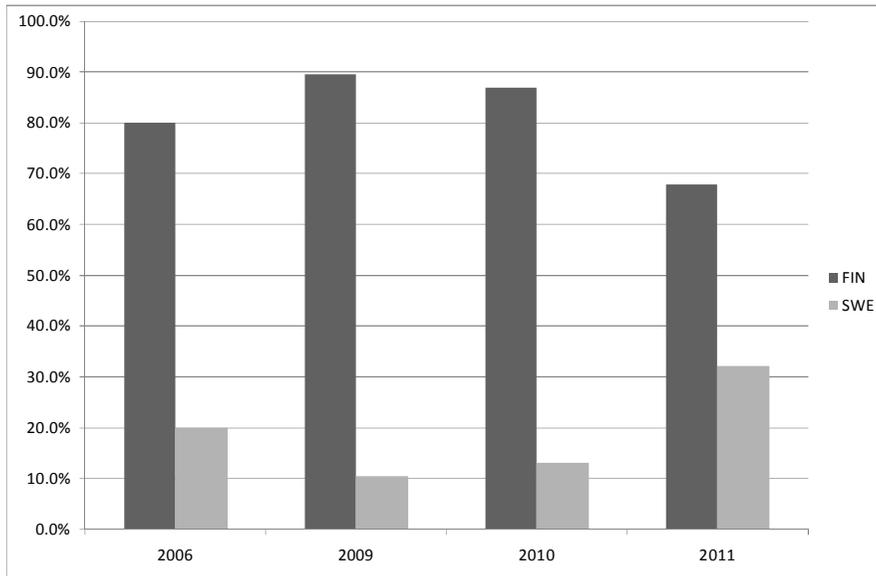


Figure 3 – Share of warehouses (from absolute numbers) in Central and Eastern European Countries (CEEC) during observation period among Finnish and Swedish respondents.

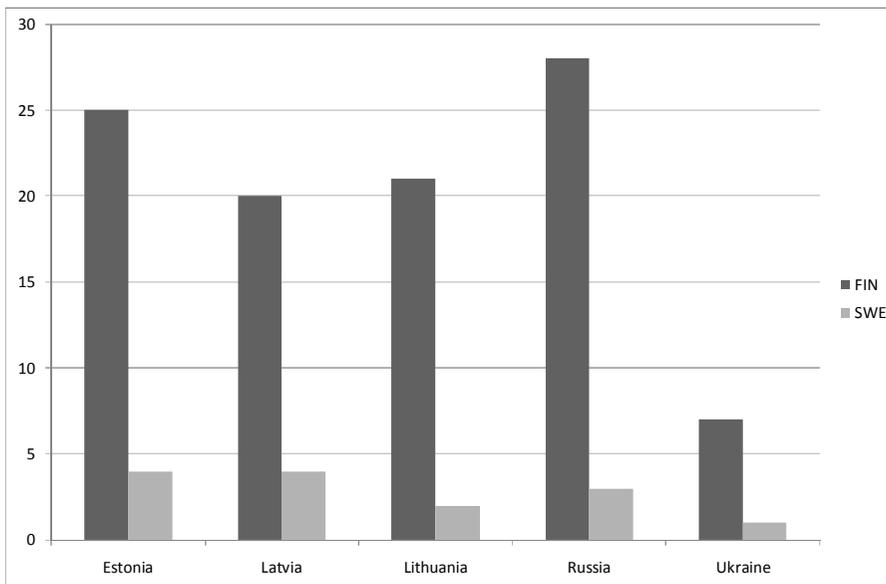


Figure 4 – Number of warehouses (absolute) in five selected Central and Eastern European Countries (CEEC) in total during observation period among Finnish and Swedish respondents.

As Finnish companies dominate presence in CEEC markets through warehousing networks, this strength and difference is mostly tied upon five countries shown in Figure 4. So, Baltic States, Russia and Ukraine are having numerous warehouses from Finnish market actors, but very few from Swedish companies. For Baltic States this could be explained by good connectivity of Sweden with daily sea ferries (to all three countries). However, Finland is having very frequent and short lead time sea ferry connection to Estonia also, but still numerous warehouses are located in its southern neighbour. Lack of Swedish warehousing in Russia and Ukraine could not be explained with any better transportation connections – actually Finland is having highest volume transportation border from EU countries with Russia, and still companies are having numerous own warehouses in this country. Also railway connections and same gauge width (4 mm difference; in Finland 1524 mm, while in other historically Russian influenced countries it is 1520 mm) with Russia and Ukraine could be taken as asset, and item of decreasing warehousing needs, but opposite is the case. So, better connections mean high probability for trade and these together result on higher need for warehousing. This is evident by examining trade statistics (United Nations, 2011): Finnish trade with Russia has been more than double as compared to Sweden counterpart during years 2006-2010. Similarly trade with Estonia (+46.7 %) and Ukraine (+11.1 %) has been higher in Finland. However, Latvian and Lithuanian trade is clearly higher in Sweden.

4 CONCLUSIONS

Larger trade areas, increasing free trade and liberalization have changed distribution structures within two decades time period. As shown in transportation mode statistics, road transports dominates nowadays in Europe, and ex-eastern bloc countries have started to favour road in larger scale. Change to prefer this mode has been very rapid, and has its downside too, e.g. companies and national economies are more dependent on oil, need to invest heavily on road infrastructure and external costs are high (pollution). This has been the main theme in Baltic States, Poland, Slovakia, Czech Republic, Hungary etc. This research confirmed that road transportation connection is playing important role in warehousing location decisions, however, most important criterion is clearly low distribution cost. Among these two, proximity to factories plays important role too. Behind these hard contemporary criteria, we found that Finnish and Swedish companies gave importance as secondary to quinary for transportation mode flexibility, low labour costs of warehouse, infrastructure issues as well as future potential of location. Therefore, we could argue that companies are increasingly becoming aware of stricter emission demands, and oil scarcity – this means that they should start to favour more railway and water (river) based transportation modes. Also new emerging markets in Europe, CEEC, demand more diversity in distribution process, which requires adaptability and flexibility from distribution. So, this makes warehousing location decision a bit more

complex, but still in macro-level age old cost minimization with respect of customers and suppliers exist.

As our interest in this research work was warehousing location criteria in Northern Europe, it should be stressed that between two countries of interest, warehousing network differs greatly with respect of different European countries. Based on our multiyear observation period, Finnish companies are more active with Baltic States, Russia and Ukraine as compared to Sweden (this was also apparent concerning entire group of CEEC). We explained this difference with trade volumes, as Finnish companies are having more intensive trade with its eastern and southern neighbour. Even if connectivity from Finland to these two countries is good, higher trade volume corresponds higher need for warehousing (to fulfill customer expectations and ensure availability). This in turn has its implications on warehousing criteria and location of warehouses – emerging markets are always reached with mixture of different supply methods. Operations are not necessarily optimal, but they maximize sales currently and in uncertain future (e.g. suppliers are not aware, which actors will have market dominance in future, since markets are under continuous change).

In the future we would like to continue with North European countries and their company warehousing solutions. Of course Europe, and particularly CEEC is our interest, but other emerging countries play key role nowadays. For example, how practice of warehousing differs in markets of China, India and Brazil, or are Swedish and Finnish companies behaving similarly. Currently it is increasingly reported that e.g. UK (Baker, 2007) and Swedish (Hilletoft & Eriksson, 2011) companies have lost a lot within the efficiency of warehousing in Chinese originated manufacturing (delays are really long, and cause very high warehousing investments in the transportation pipeline).

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