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Enablers and constraints of peripheral air cargo – A case study of Estonia

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1. Introduction

Air cargo is a dynamic sector combining changes in macro environment, business solutions and customer requirements. This text comments upon air cargo enablers and constraints in Estonia, a rather peripheral country in the European Union. In the Baltic Sea area, the role of Estonian air cargo is mostly to serve spoke connections to nearby cargo hubs in Scandinavia and mainland Europe. The guiding idea is to analyze the viewpoints of local service providers and stakeholders and, having generally charted the future scenarios, to focus more specifically on two research branches:

1) Geographic/locational enablers and constraints – how is air cargo service sector development in Estonia affected and enabled by the location factor of clients and service providers from site-level to macro-level issues; and
2) Perceived innovativeness in the sector – on what kind of innovation is present and are innovative initiatives by service providers even needed in a relative periphery with modest hinterland for exports and limited market size for imports.

In this construct, elements of location factor are describing the quality of local operating environment. Innovation elements combine the perceived market outlook of the stakeholders with existing capabilities as change is the synthesized result of a variety of factors, of which perhaps the most important are inner motivation, competences, external forces and perceived opportunities.

Understanding local strengths and development constraints offers input for better informed management decisions. A typical case in various regional airports in Europe with similar size (and smaller) appears to be having substantial over-capacity and operating capabilities. This paper analyses Tallinn airport and surrounding air cargo service area from similar view. The foundational research goal is to identify, if the situation in the sector could be further improved from the inside to induce demand by increased service attractiveness or has such supply-based growth approach already exhausted its potential. To contribute to such general goal, this study more specifically combines two research branches by applying established constructs from location and innovation analysis.

The case study is founded upon various efforts carried out in research project BACN Baltic Air Cargo Network that mapped air cargo outlooks in the Baltic Sea Region. The key priorities of the BACN project were contrasting the situation of larger hub-airports to smaller local airports to discover ways of avoiding suboptimal management, policy and investment decisions and to outline realistic development scenarios.

Firstly, we present an overview of research object – Tallinn Airport and Estonian air cargo sector – with included focus on current estimations of development outlooks. Following literature review treats briefly some general comments of air cargo development and then focuses on location and innovation as theoretical lenses. Subsequently, the methodological part explains the research strategy, data sources and collection. The results are then discussed with the aim of placing the findings into the context of volume growth and development.

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2. Research background – Tallinn Airport and Estonian air cargo sector

Estonia has one international passenger and cargo airport: Lennart Meri Tallinn International Airport. The other airports are of comparably marginal importance (e.g. in Tartu). The annual cargo volume of Tallinn Airport is roughly 20,000 tonnes, being comparable with other major Baltic airports in Latvia and Lithuania, but over an order of magnitude smaller compared to major European air cargo hubs. In close proximity to Tallinn (~90 km), the relatively prominent air cargo center is Helsinki, Finland. More distantly, routing local cargo through Copenhagen, Frankfurt and Amsterdam is often used. The export volumes from Tallinn leave mostly either as "belly cargo" (i.e. with passenger airlines) or boarding a road-feeder service (RFS) truck. Only seldom are few transit clients using dedicated charter flights. There is not much demand locally for dedicated air cargo lines with the exception of global integrator services.

Historically, the activity in Tallinn Airport was growing rapidly almost constantly until 2009. The effect of following recession was felt quite notably in all transport sectors in Estonia (land and air transport mostly due to recession itself, railway and port activity due to unfavorable political climate in relations with Russia and also partially as a result of heavy investment into transport infrastructure in Russia). Current cargo volumes in Tallinn are slowly recovering from the recession lows. The air cargo volumes in Tallinn Airport have typically been dependent on few key customers. The record volume in Tallinn Airport in 2008 (40,000 t) was by and large transit cargo and more specifically mainly consisting of a volume from single client routing cargo between Turkey and Russia. The current theoretical cargo capacity of Tallinn Airport has been estimated between 50,000 and 100,000 tonnes, depending on the demand pattern and type.

Tallinn Airport is located right next to Tallinn center. Regardless, possible expansions are not as limited as it would seem. In 2012, the state passed nearby plots of 395,000 m^2 over to airport, with runway and traffic area extension plans in mind currently scheduled for 2016–2017. In 2006–2008, a notable expansion catering for passenger traffic took place. Throughout the years, reconstruction and renovation projects at Tallinn airport have improved the quality for both passengers and cargo operations. However, probably Tallinn will always be a single-runway airport.

Local air cargo is a sum of exports, imports and transit. According to statistics, import volume has a dominant share, whereas export accounts roughly for only 10%. This, however, has at least two shortcomings. Firstly it classifies multimodal transit as import. Secondly, it does not account for all the RFS activity, i.e. air cargo exports leaving the country in a truck. It is highly likely that RFS is a dominating component in actual exports, followed by integrators and belly cargo. There are no dedicated cargo airlines in this mix.

A pressing issue in regional air cargo is future uncertainties and therefore it seems appropriate here to expand on the gap between optimistic and pessimistic development scenarios. In previous surveys with local air cargo industry stakeholders, it appeared that the maximum planning horizon of strategic forecasts is not exceeding five years and in individual company cases it can be much shorter. Notable uncertainty is stemming from the general health concerns of EU economy, coupled with political threats, which both entail worst-case scenarios that, although with a small likelihood, can have grave economic consequences.

The most optimistic "dream" scenario for Tallinn airport would be to attract considerable investments of airlines to increase the number of direct flight connections. Essentially, the most optimistic idea would have the airport to become an east-west transit hub similarly to relative success of Helsinki, Finland in a not-so-distant past. That would require direct connections to at least some East Asian hubs. In this vision, Tallinn would become one linking hub between Asia, Western Europe and US and could facilitate imports to Russia from both directions. While local market is still limited, that critical mass would become from various transit flows between US-EU-Asia. If that scenario would ever become realistic, Tallinn airport would need to develop substantial amount of new infrastructure for cargo handling and distribution and improve intermodalism with rail.

One hindering issue with regular flights from Asia to Tallinn would be the lack of returning cargo from the Baltics to Asia. This means that the price would not be too competitive comparing with hubs in Germany and Scandinavia which have manufacturing businesses located nearby that could send their cargo to Asia. In terms of China, the attractive destinations could be smaller secondary cities that haven't yet been well connected to Europe but have exporting industry.

Even though this scenario is very difficult to initiate, grand plans of increasing flight destinations, at least on the European level to begin with, have been around in the past and can, at least in theory, still be argued for today. Since 2010, the local government-owned airliner Estonian Air applied a bold investment strategy in trying to break Tallinn out of the "insignificant spoke" reality. Essentially the plan failed and perhaps not for lack of trying or competence but more for the lack of profitability, government patience and for meeting unfavorable economic conditions. The local government stood firmly behind Estonian Air for a while but that resulted in pouring more and more investments into the airline. Late 2013, change of direction was made to avoid crash-landing by "back-to-basics" strategy and cutting down destinations to bare minimum. However, the investments already made were in 2015 deemed as illegal government aid on the EU level. This resulted in bankruptcy of Estonian Air and a new national carrier is still struggling to establish a foothold.

Currently, the more realistically optimistic outlook of air cargo in Tallinn would just hope to regain the peak volumes of 2008 given similar network and connections. However, a serious issue is related to recent Russian recession coupled with sanctions, which has had direct "red light" impact to some previous transit supply chains. The "Russian issue" would seem to be one of the main concerns in Estonian air cargo. The most likely scenario, at the moment, appears to bear the label "nothing big happens" – the situation is not getting worse nor is it improving considerably in terms of economic and political climate and service network and the big business on the world scale that touches Scandinavia or Eastern Europe is routed through other channels. It could be said that in terms of air cargo volume in Estonia, the pessimistic scenario of five years back is today's reality. This scenario requires mostly only to keep the current service level and systems running.

The current pessimistic view would see the transit volumes declining further and Estonian exports losing volume due to declining competitive position of Estonia to attract international investments in manufacturing. All in all, the recent history of Estonian air cargo shows how vulnerable a local airport can be dealing with external risk factors. In periods of improving macro environment, such as in early 2000s, growth can be notable and lucrative. When environment turns around, the airport ends up with unused capacity.

3. Theoretical background and considerations

The air cargo business is closely interlinked with world economy. Alongside economic growth, the main demand drivers of air cargo are globalization, liberalization and lean inventory strategies (Senguttuvan, 2006), which can result in air cargo growth superior

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to general economic growth. From 2000's data, global exports by volume have outpaced production by volume, which in turn has outpaced economic growth; still, air cargo growth trumps all (Kasarda et al., 2006).

According to Chiavi, airfreight forwarding is a key driver in globalization and that through the second half of the 20th century, airfreight business has evolved from a niche product to a global service integrated into 3 PL "one-stop shop" business model. (Chiavi, 2005). Delfmann et al. have brought attention to the observation that whereas airlines have encountered the importance of strategic decision-making for a long time, this is only slowly beginning to transcend to airports and their organizations (Delfmann et al., 2005). Whereas airlines have rather large pool of levers influencing competition at their disposal (product features, price differentiation, customer segmentation, advertising etc.), airports and airport operators are still in some cases seen as local monopolies and are limited in their actions, proposing that one of the development bottlenecks is lack of strategic planning at airport.

There are two principle types of airports: 1) hub airports with focus on longer, often intercontinental flights, and 2) regional airports that are located in more remote regions and are foremost providing access from the region to hub airports. The network airlines operate mostly inter-hub flights with higher range and capacity aircrafts. Smaller aircrafts are oriented to serve hub-and-spoke connections (Sugiyantoa et al., 2015). This paper deals quite clearly with Tallinn as a regional airport.

The relationships between air transport and regional development can be described via supply-side and demand-side theories. According to Ndoh and Caves, improving accessibility can have a direct impact on clients locating decisions, which would mean that improving the supply of service induces demand (Ndoh and Caves, 1995). Following supply-side approach, the availability of sufficient service infrastructure and provision of transport services will lead to economic development. Alternatively, according to demand-side theory, economic growth increases the demand for the transportation services (Rodrigue et al., 2013). Then it is up to the service sector to make supply meet the demand.

The approaches are not technically mutually exclusive – it is apparent that relations can be both ways in parallel and the causation is up for debate (Button et al., 2010). It is, however, logical to assume that improving supply side availability might not, in some cases, automatically lead to regional economic development (Halpern and Bråthen, 2011). While airport and economic development are related in many papers, they are often focusing on hub-type rather than small regional airports (Mukkala and Tervo, 2012). This is the ideological starting points of this paper given the research context in question – should the local peripheral air cargo service supply side make directly additional efforts or is the future growth outside the makings of the local air cargo participants.

Airport effect on the economy has been explained by Malina via following categorization: direct, indirect, induced and purchasing power effects of an airport's activities on regional growth. The induced effects are caused by the consumption demand of associated employees, whereas purchasing power effects arise due to an inflow or outflow of demand for goods (Malina et al., 2007). A similar but extended model of impact levels has been described by Baum with a model of four impact channels:

1. Airports generate economic activity as investment factor.
2. Airports function as economic factor relating to services in the airport (airport operators, airlines and secondary services such as shops).
3. Eventually airports unfold catalytic economic effects as a location factor. This is reflected in productivity gains, market expansions, cost reductions and also fostering of structural change and settling of companies, all leading to employment and synergy.
4. This welfare growth is counteracted by losses through damages caused by air traffic (noise, air pollution and effects on public health and climate change risk), which also have to be considered in an airport economical assessment (Baum, 2005).

Expanding this approach, he proposes that location factor has been neglected in the literature compared to direct benefits (Ibid.)

Technically, it is not airport, but rather logistic services providers that execute passenger and airfreight services. An airport provides the required hard (e.g. runways, terminals, warehouses, catering, etc.) and soft (e.g. security regulations, air cargo screening, sky-guiding, etc.) infrastructure (Beifert, 2016). In this study's context, air cargo service provider's role would need to be included in the supply-side approach as well as the airport.

In providing air cargo service, spatial and facility factors play a major role in affecting costs, available service quality and market size. The importance of facility location have been long debated regarding various fields of business. Location is an essential factor that affects the value of property and contributes to success of economic activities in a given area. The location of economic activities is *a priori* dependent on the nature of the activity and on certain location factors, such as the attributes of the site, accessibility and the socioeconomic environment (Rodrigue et al., 2013).

Location quality has been analysed comparatively much more thoroughly in other business sectors that air transport, such as in distribution centers and logistics operators (Thai and Grewal, 2005; Lashine et al., 2005); industrial operations (MacCarthy and Atthirawong, 2003; Pangarkar and Yuan, 2009; Ciaramella and Dettwiler, 2011); SMEs (Bennett and Smith, 2002; Mazzarol and Choo, 2003; Rasmussen et al., 2011) *et cetera*. Gardiner has studied airport choice factors from non-integrated cargo airline viewpoint (Gardiner, 2006). The paper divides the impact factors to location decisions according to whether they are positive or negative. According to Gardiner, the main positive factors are origin-destination demand, freight forwarder presence, passenger airline operations, presence of partner airlines, flying time and cost, access to market and location of competitors whereas bilateral restrictions, night operations capability, noise regulation, infrastructure availability and congestion were listed as main negative factors. Furthermore, Gardiner (2006) and Buyck (2002) have found that both flying times and costs are notably influenced by cargo airlines location choices.

Location of economic activities in transport systems is fundamentally based on geographical properties of the site and situation. Site relates to the characteristics of a specific location while the situation concerns the relationships of a given location in relation to alternatives at various scales. The site is mostly related to location attributes with physical, infrastructure and economic characteristics. The situation reflects the connectivity of a location (Rodrigue et al., 2013).

Switching to the foundations of second research topic, it is a popular statement that innovation is the source of most trustworthy competitive advantage. Growth, success and survival all depend on the organisations ability to innovate on a continual basis (Varis and Littunen, 2010). According to many authors, development of new and young firms is founded on innovation (Wright et al., 2007).

An often debated question is, if small companies are better innovators than large companies. Clearly smaller companies have the advantages of simpler organization structures, flexibility and also more focus to customized and personalized services due to smaller scale. Furthermore, smaller organisations are claimed to be more successful in creating, transferring and exploiting innovations

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(Autio, 1998; Kuratko and Hodgetts, 2001). The counterarguments are that larger companies have the resources to invest into research and innovation and even though their services might be more directed towards one-size-fits-all approach, once resources and focus are directed towards improvement, it can create value not achievable by smaller participants. It is definitely also reasonable claim that many small companies are more reactive to innovation than proactive, that they can face more substantial problems in networking and the innovation development is based mostly on the experience and needs external support (Forsman, 2008; Scozzi et al., 2005; Forsman and Rantanen, 2011).

Innovation can take many forms and their level of penetration is definitely industry-specific. In the area of manufacturing, innovation development is often studied with emphasis on the technology intensity of sector (Heidenreich, 2009; Kirner et al., 2009) while within service enterprises the emphasis has been on the knowledge intensity of sector (Amara et al., 2009; Leiponen, 2005). While knowledge intensity is probably a relevant viewpoint for air cargo service, technological, in the current case mostly IT-related issues, should not be underestimated. Innovation has been defined as the sum of theoretical concept, technical solution and business usage (Trott, 2008).

4. Research methodology

The location quality study was aimed at finding out whether the current location factor in Estonian air cargo is sufficiently enabling sector development in more favorable international environmental conditions or would some aspects of nearby location elements also constitute a growth bottleneck. The relationships between location quality and air cargo sector are treated with a goal to identify specific issues to overcome for better sector development. Specifically, 3 L model was used in studying the spatial aspects of environment. According to 3 L approach, the success of real estate development depends on three factors: location, location, and location (Peiser, 2003, 127). 3 L proposed that holistic location quality should be studied on three hierarchy levels: 1) macro location, 2) micro location and neighborhood and 3) actual site of operations. Macro location for our case is a general air cargo service area of Tallinn airport, regardless of the administrative borders. Micro location and neighborhood are analysed by indicators that characterize the area in close proximity to the airport and airport site level indicators characterize the actual property in question.

A customized 3 L model of location quality analysis was used for evaluation and we propose that a similar assessment approach can be used for other regional spoke-themed airports, which would allow a comparison between airports including their hinterland and service environment.

The study entails summarized evaluation results of regional air cargo service providers, via in-depth interviews, including forwarders, terminals, airlines and airport representatives. The key point of such approach is to study the interlinked relationships between the factors of location, property and service development. The idea is that a wide variety of factors have to contribute to facilitate proper development, i.e. the air cargo sector realities and perspectives can initiate site development and site quality has to serve as an enabler for business growth.

The innovation study relied on a survey approach and analysed the level and types of innovation in the sector in question. According to Trott, an enterprise can apply five types of innovation: product/service innovation; process innovation (new technological process); organizational innovation (e.g. new company structure); management innovation (new way of process management within enterprise); and marketing innovation (e.g. new sales or marketing approach) (Trott, 2008). The first category is directly aimed at external customers, whereas others are applied firsthand internally. The central hypothesis was that the level of innovation in the air cargo sector is both benefiting the existing cargo customers as well as sufficiently supporting the entrepreneurship development by attracting new customers to locate in the area and utilize air transport for their export despite the region not being an airfreight hub on international scale.

The survey included sections of regional air cargo outlooks and development issues; innovation level and its resulting effects in companies and the actions undertaken to reach innovation. The questionnaire was built on the five types of innovation identified by Trott (2008) and surveyed the resulting effects of innovation in four categories: price, service quality, service volume and differentiation. Most questions used rating scales to elicit respondents' view of the level of engagement of their organization with the activities embedded in the statements.

Web-platform questionnaire was sent to companies' mid- or top-level managers or alternatively used as a tool in an interview setting for supplementary comments. In the case of Estonian air cargo service providers, the total number of relevant companies was, during the time of initiating the study, estimated to be around 50, of which over 40% participated in the survey. The variety of company sizes ranged from micro companies (dedicated air cargo forwarders) to large multinational companies. The exact classification is difficult due to latter being large in employees and in turnover but with possibly only a few people focusing on air cargo.

5. Location factor analysis

It is apparent that Tallinn Airport covers easily the entire territory of Estonia as even "far corners" are in 300 km range. The transit time to Tallinn is marginal. The main export volume-generators are located closely in Harjumaa (county surrounding Tallinn), which is mostly due to availability of industrial infrastructure and better access to labour. As notable share of exports uses RFS and so has to relatively suffer from schedules and longer transit time, one could argue that the exporter location inside country is not by and large significantly impacting the big picture of logistics costs nor total transit time. A few cargo exporters are also located on islands, where initial ferry leg can require extra time up to around half a day. All in all, while Tallinn Airport has a limited number of direct passenger flight connections (around 20 regular, plus selected seasonals), the sector benefits from close integration in the Baltic Sea region and good accessibility to major cargo hubs.

For logistics service providers (LSP), the focus is to locate near multimodal solutions. In such typical mix of LSP location attractiveness factors, airport proximity is rather insignificant, compared to maritime cargo volumes. Tallinn Airport is located compactly in 10 km range of Port of Tallinn. The use of "air-to-ship" intermodal solutions is currently mostly only theoretical. Similarly, the railway connection is nearby and this might be useful for future supply chains, but is irrelevant for air cargo still today. Existing transit is mostly "air-to-road".

In general, geographical macro location of Tallinn Airport is favorable and does not constitute a growth bottleneck. Overall, as Table 1 summarizes, potential exists to serve new air cargo customers, both in export and in transit volumes. Even though the size of local economy is only around 0.2% of European Union and air cargo exports are therefore naturally limited, Estonia is located in an attractive location for transit. There have been clients using Tallinn Airport as a gateway to Russia, which can be seen as an indicator of both local airport operational advantages as well as of relative challenges in routing cargo directly to Russian airports.

Tallinn Airport positioning on a micro level is mostly supportive of future growth. Neighborhood restrictions are not currently

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Table 1
Location quality aspects of Tallinn Airport.

Indicators	Findings
Macro location	
Catchment area	Approximately 45 000 km^2; up to 300 km radius
The locations of current air cargo clients	Sufficient, not a logistical bottleneck for most clients.
The distance from the airport where collection time would be considered as unimportant	All distances, i.e. up to 300 km.
Importance of airport proximity in cargo client facility location decisions	Airport proximity has mostly marginal role in client facility location decision.
Distance to nearest substantial industrial park/science park with potential air cargo clients	Many industrial parks located in 20 km range from the airport, some within 5 km.
The availability of industrial parks in the region	Strong support, multiple options for new cargo clients.
Distance to the nearest substantial commercial seaport	Optimal, locating 5–10 km distance.
Distance to the nearest commercial railway depot	Optimal, distance to Tallinn railway is less than 10 km.
Port capacity and support to air cargo development	No capacity bottleneck as is mostly irrelevant for current air cargo.
Railway capacity and support to air cargo development	No capacity bottleneck as is mostly irrelevant for current air cargo.
Air cargo effect on the sustainable development of the region on macro level	Playing marginally positive role with no substantial effect nor sustainability concerns.
Overall potential of the region to attract air cargo customers	There is moderate growth potential.
Current regional development plans concerning the airport and its effect on the future of air cargo in the region	Airport is moderately developing on demand.
Cargo clients' location pattern outlook	New exporters are expected to locate nearby due to infrastructure and labor availability, distance is a secondary consideration.
Micro location	
Airport location inside the neighborhood	Sufficient for air cargo service.
The condition of road infrastructure in neighborhood	Sufficient for air cargo service.
Neighborhood restrictions for air cargo development	No restrictions, low future threat, positive role.
The influence of local air cargo sector on industrial real estate development in the neighborhood	Average-to-low with some new real estate development projects initiated.
Site perspective	
Shape and size of the plot for providing air cargo service	Enables to serve necessary functions.
Conformity to plot building rights for air cargo service	In conformance with requirements.
Alternative use: attractiveness on the property market	The site is attractive due to proximity to businesses and 1/3 of Estonian population.
Functionality of commercial building for air cargo service	Functional: high floor space efficiency, rational layout and flexible usage.
Condition of airport structures	Good – renovated or new buildings.
Need for replacing existing facility/renovating	No special need for renovation in near future.

presenting a problem – an issue much different in many larger airports due to noise concerns. The LSPs opinion tends to be that the airport location is optimal for businesses and passengers. In theory, it might not appear be the best for general public as roughly 435 000 inhabitants live in 10 km range from the airport. In addition to noise issue (which could get more pressing in long term with increased volumes and aircraft sizes), there is a risk to town's clean water supply as the airport lies right next to lake Ülemiste. However, neither of these issues are a political topic nor an issue of public activism.

The airport is accessible and there are numerous industrial parks closely nearby. The connecting road infrastructure would require some throughput increasing investments to properly facilitate substantial volume growth in the long term (including parking facilities) but these can be assumed to be realized on demand without much complications. As Tallinn is not expecting volume peak in the near future, the road infrastructure is sufficient.

On micro level, real estate development in and around Tallinn is moderately active. Air cargo sector influence is only a secondary contributor to that at best. Only a few new real estate development projects can be linked to air cargo sector. Even a decade ago, when the development outlook in local air cargo was as positive as it has probably ever been, the link between real estate development and air cargo was weak – this suggests that the expected cargo volumes are so moderate that it is not inducing dedicated larger investments.

The size of Tallinn Airport site is 213 ha including 89 ha under facilities. The airport has one 3070 m long and 45 m wide runway (able to accept most common but not the biggest aircraft) with feasible extension options in length only. Runway is capable to allow the operation of practically all aircraft types. Tallinn Airport has 4 cargo terminals with ca 5000 m^{2}warehouse space. The central terminal is 3601 m2 and 2066 m2 is dedicated for the office area. The cargo terminals are operated by several freight forwarders, integrators and cargo handling companies, where Tallinn Airport acts as a lessor.

According to LSPs, the site enables to fulfill necessary functions. Current functionality is designed for over 5 mln yearly passengers (whereas the record so far is 2.2 mln) and support 3–4 times of freight volume growth. The airport site is sustainable in the near-to mid-term future and is expected to remain the heart of Estonian aviation for the next 20–30 years. Generally, existing facilities are in suitable condition and allow for functional and flexible operations. Tallinn airport has recently acquired new adjacent land, which, if needed, can be utilized for additional cargo capacity. Efforts have also been made to improve road connections to ensure better accessibility.

6. Innovation in Estonian air cargo sector

The innovation-themed survey gathered opinions of 21 companies operating in the field of air cargo services (including forwarders, handling companies and airline representatives) in Estonia. The survey asked respondents to evaluate the developments on the local market in 13 categories listed in Table 2. The question utilized a five-point scale ranging from significant decline to significant development. The answers presented are supporting similar findings from the expert interviews carried out earlier with other stakeholders.

The respondents estimate only shy development in sector capacities and some potential increase in flight frequencies of passenger airlines and RFS. In contrast, introduction of dedicated chartered cargo airlines is seen as rather improbable. As Table 2 shows, similarly to service volume and capacity, service quality

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Table 2
Dominant viewpoint of local air cargo stakeholders on general market developments.

Development factor	Dominant view
Passenger airline frequency and number of destinations from the airport	Slight development (62%)
Charter cargo flight frequency	No changes expected 47%
Regular cargo airline situation	No changes expected 67%
RFS truck frequency	Slight development (57%)
RFS coverage	No changes expected (57%)
Competition density in air cargo forwarding	No changes expected (47%)
The number of cargo terminals at airport	No changes expected (91%)
The price of air cargo from the end customer point of view	Slight development (81%)
Cargo handling quality at airport	Slight development (81%)
Customs speed and quality at airport	Slight development (76%)
The number of exporters using air cargo in the region and volumes	Slight development (67%)
Total attractiveness of airport to customers	Slight development (53%)
The effect of air cargo service to entrepreneurship activity in region	Slight development (53%)

(handling quality, customs clearance quality) is expected to conservatively increase over time. The effect on total attractiveness of the airport to cargo customers is also estimated to be modest – the customer base is expected to grow, but it will only have marginal influence on entrepreneurship activity in the region. The survey queried the developments in two timeframes: over a 2-year and 5-year horizon. The latter view is largely similar, if ever so slightly more optimistic, representing a cautious expectation of growth.

The overall average level of innovation in local air cargo sector was 2.8 out of maximum 5. It can be suggested that the local sector mostly observes and reacts to market dynamics and furthermore would be more open for changes if the market demand clearly called for it – at the moment the big picture is more "business as usual" and therefore service providers are not overly stressed about striving for unique value creation via innovation.

In finer detail, another question was specifically aimed to determine if the changes were more initiated by company's inner motivation or by perceived existing market pressure. The respondents' view is that development stimulus from competitors is mostly felt clearly. However, in comparison with data of other regions suggested that the comparative competitive pressure in Tallinn is not as strong as in otherwise similar airport cases but with more optimistic outlooks and more dynamic competitive environment.

The respondents also evaluated various types of innovation in their company, which is summarized on Fig. 1. The data points out that the stakeholders foremost declare process innovation. In many cases this is substantial enough to also reflect in evolving service characteristics – i.e. better perceived by the customers. Organizational and management innovation is not prioritized, which can in some cases by explained by rather small scale of operations, in which work structuring is relatively less challenging task. This potential is heavily contextual – the fact that some companies are applying managerial innovation does not automatically translate to lost opportunities for others.

Perhaps surprisingly, marketing innovation appeared rather relevant for many stakeholders. This reinforces that these companies are indeed in tight competition and are focusing their efforts not only on services for existing customers but also on ways to reach new customers.

In a detailed look of outcomes of innovation, four categories of impact were queried: the effect on service price, the effect on service quality, the effect on service volume and the effect on being able to differentiate on the market. Similar scale was used. The figures treat service (Fig. 2), and process innovation outcomes (Fig. 3).

The data suggests that the main arguments for service innovation are quality and differentiation, while the argument for attracting larger cargo volumes is not ranking comparably. So regardless of marketing efforts, service innovation is not directed towards expansion rather than current customer satisfaction. This again hints that the total market in the region has only marginal growth outlook. Service innovation can also have impact on service price, though in this case it can be interpreted as a secondary cost optimization perspective rather than applying bargaining power and utilizing the improvements in service as leverage.

It appeared from the accompanying interviews that primary examples of improvements are cases of enhancing the ability to offer wider pool of transit routes to customers. This is achieved via

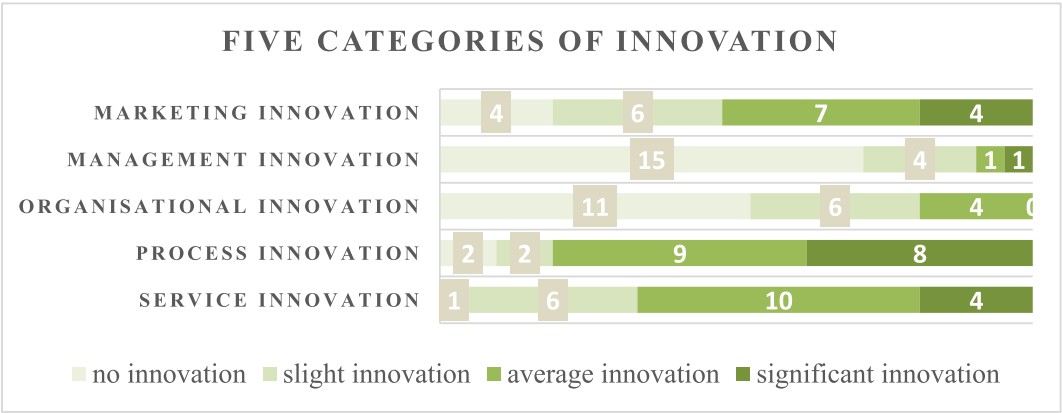

Fig. 1. Five categories of innovation in Estonian air cargo sector.

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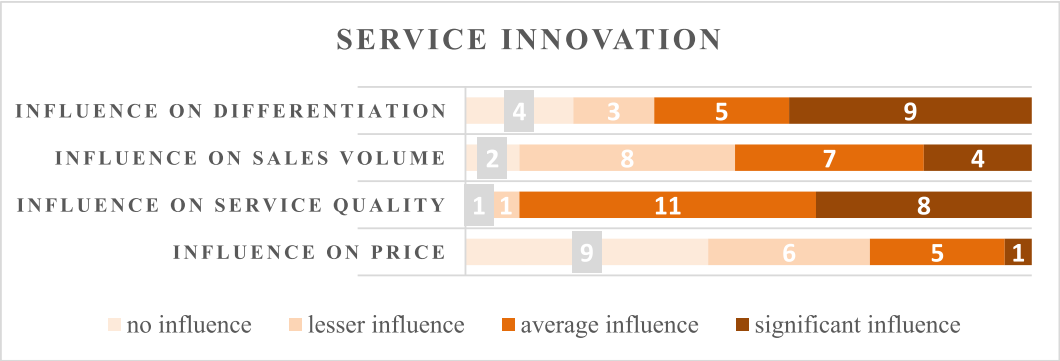

Fig. 2. Service innovation impact in Estonian air cargo sector.

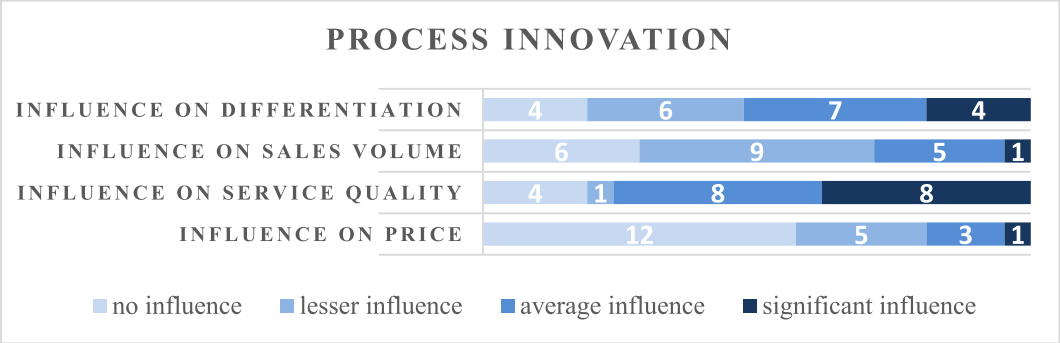

Fig. 3. Process innovation impact in Estonian air cargo sector.

cooperation networks and joint databases, which can also shorten customer quotation processing cycles and facilitates easier transactional negotiations.

In terms of process innovations, the focus, as expected, is still on quality, but in this case not so much on differentiation compared to service innovation – after all, this follows the logical defining line between process and service innovation categories. The views on price and cost element remain roughly similar and again market expansion is not seen as a priority. Most respondents pointed out IT-system advancement as main example of process innovation. Similarly, replacing paper documents with digital communication is still an ongoing effort in the sector (relating to initiatives such as IATA eFreight). In selected cases it can be used to attract new customers, whereas in most it is aimed at higher satisfaction of existing customers.

In terms of marketing innovation, social networking is a prominent keyword also in the air cargo business and it is perceived to have some potential to increase customer base. Additionally, finding new ways to approach customers also can have an effect total perception of service quality (see Fig. 4).

In summary, the market pressures and self-evaluated level of innovation in Estonian air cargo business are significant enough to offer service quality improvements over time. So even though the market is not expected to grow quantitatively, it is evolving qualitatively. However, it appears rather difficult to substantially differentiate service offering in this context and it can be speculated, that higher level of customer loyalty in air cargo sector is rather difficult to achieve (see Fig. 3).

Fig. 5 comments on some underlying areas of action to facilitate innovation. The case is that most companies claim to have made efforts in attracting skilled workforce and are trying to learn from industry best practices to improve processes. Cooperating element with research institutions is notably weak. This suggests either that the businesses can do their R&D in-house relatively easily or that universities are not seen as a strong partner with value adding potential.

Also of significance, roughly one third of companies appear to be operating routinely without eyeing much about industry best practices nor worrying about customer satisfaction. So the sector in total still has room of improvement and possibilities for further changes if market pressures would demand it.

7. Conclusion

The regional air cargo situation was in this paper approached through intertwined viewpoints of general development outlooks and volume projections, location quality evaluation and innovation factor inside the organizations of air cargo service. As the area of linkages between air cargo sector and economic development is an area with some prior research, we'd like to emphasize including various viewpoints into such analysis as the problem is rather complex and there is a need to tackle the topic with extensive and multidisciplinary approach.

The first study treated location factor around Tallinn airport from site-level to macro-level issues (which in this context was country-level as catchment area). The study showed that the location aspect, in terms of positioning of LSPs and airport itself, is largely favorable and does not constitute a principal bottleneck for growth. It appears that the location decisions are quite simple in case of service providers for local air cargo – mostly to find optimal micro location. Proximity to airport is required. The availability of sites is usually not a bottleneck. For many respondents, site quality issues were rather secondary in their decisions.

Looking at the 3 L layers through the eyes of potential air cargo

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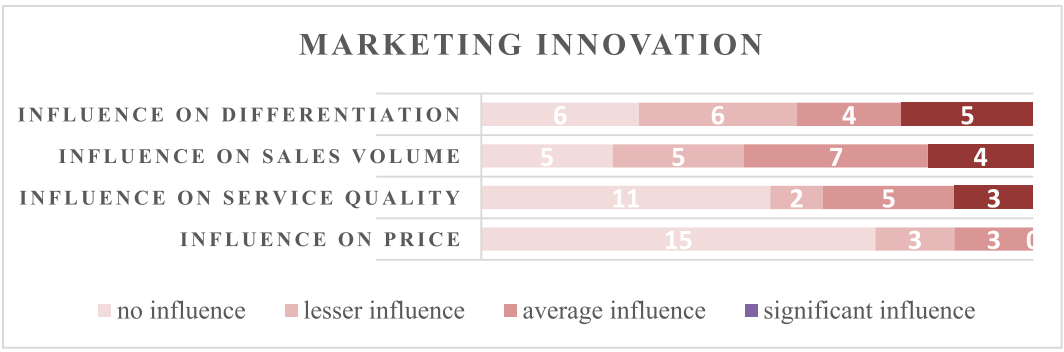

Fig. 4. Marketing innovation impact in Estonian air cargo sector.

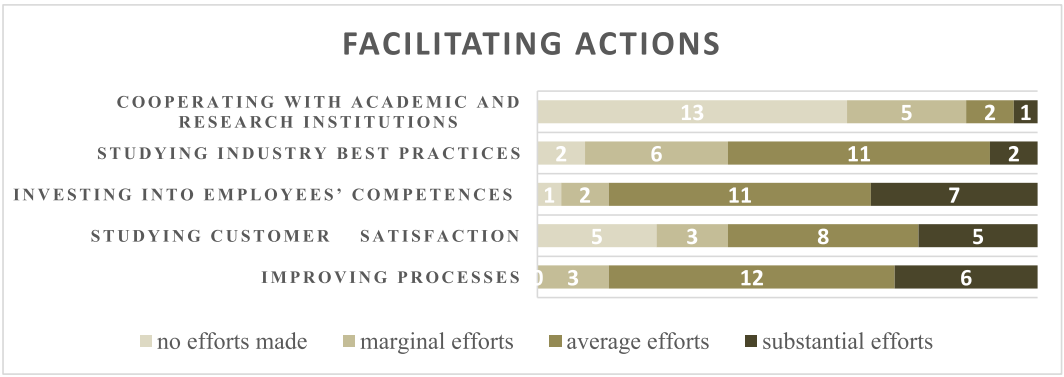

Fig. 5. Facilitating actions to achieve innovation in Estonian air cargo sector.

customers, it appears that what really matters for air cargo is the principal decision to locate manufacturing in Estonia or not. This decision mixes aspects of global context, supply chain specific characteristics and local entrepreneurship support issues. Airport characteristics and air cargo service characteristics can also be important for certain types of clients (due to cargo specifics, volumes or time-sensitivity), but then it is mostly yes/no answer and there is little that the local airport or providers could do to influence that. If country selection has been made then logistically logical choice would be to locate near the airport but due to how small and compact Estonia is, it mostly is a secondary consideration. Intermodal solutions are not seen as a business development opportunity even though, especially in the case of Tallinn, nearby infrastructure creates feasible alternative options for intermodalism.

Even when some volume growth is expected in the airport, it appears not to have strong influence on industrial property market nor the other way around. The few specific infrastructure bottlenecks identified are influential to future air cargo service quality but nothing that would overnight induce more demand. The airport surroundings are not a bottleneck for growth – if demand is growing, supply capabilities can be realized. In summary, the location study allowed to suggest that growth can take place driven by demand but there is not much significant to be done to support supply-side theory.

The second study focused on innovation element in the air cargo service providing sector. It is clear that innovation contributes to performance and success also in air cargo sector. The survey showed that innovation is taking place in multiple forms and it is induced by perceived competitive pressure. The innovation study reinforces the demand-driven model of future growth. Currently, service providers are focusing on improvements to better serve existing clients. Such success results in increasing the individual market share of the innovator, rather than attracting new customers and inducing volume growth. It can be argued that generally making the local air cargo market more attractive for the customers is outside the scope of service providers' innovation. There is only little room to induce quantitative growth through qualitative advancement. What was found here was that there appears to be no lack of innovativeness through the eyes of providers that would be in itself a growth obstacle – should the global environment turn significantly more positive, the sector appears ready to react on short notice and catch up. The skills and competences are developed and best practices monitored. It was not expanded upon in this paper, but viewpoints of local air cargo clients seem to suggest the same – the local air cargo sector is reasonably innovative. The case of Tallinn shows that even without any substantial growth outlooks, the service providers don't generally see the market as in stagnation, but instead focusing on qualitative improvements.

In summary, the bottlenecks to greater air cargo growth in Estonia lie outside of inner location factor and also outside innovation factor. The regional and global economic and political situation are the main issues at play influencing the future. It stands to reason, based on findings here, that should the external environment factors improve, the local air cargo industry is ready to react to the changes both mentally and in actual service capacity and readiness. If the right mix of macro aspects and entrepreneurship environment is present, the cargo volumes served can easily return and there is long growth room until physical volume-related capabilities get exhausted – and by that time, no doubt, the supply side has reacted. For further research, we foremost propose expanding the location environment analysis to include various continental and global issues.

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References

Amara, N., Landry, R., Doloreux, D., 2009. Patterns of innovation in knowledge-intensive business services. Serv. Ind. J. 29 (4), 407–430.

Autio, E., 1998. Evaluation of RTD in regional systems of innovation. Eur. Plan. Stud. 6 (2), 131–140.

Baum, H., 2005. The Impact of Airports on Economic Welfare. chapter in "Strategic Management in the Aviation Industry. Ashgate Publishing, p. 672.

Beifert, A., 2016. Regional airports' potential as a driving force for economic and entrepreneurship development – case study from the Baltic Sea Region. Entrepreneursh. Sustain. Issues 3.

Bennett, R.J., Smith, C., 2002. Competitive conditions, competitive advantage and the location of SMEs. J. Small Bus. Enterp. Dev. 9 (1).

Button, K., Doh, S., Yuan, J., 2010. The role of small airports in economic development. Airpt. Manag. 4 (2), 125–136.

Buyck, C., 2002. Location, location, location. Air Transp. World 39 (5), 70–74.

Chiavi, R., 2005. Airfreight Development Supporting the Strategy of Global Logistics Companies", pp. 489–516 in "Strategic Management in the Aviation Industry. Ashgate Publishing, p. 672.

Ciaramella, A., Dettwiler, P., 2011. A relocation model of European manufacturing firms: cases from Italy and Sweden. J. Corp. Real Estate 3 (4).

Delfmann, W., Baum, H., Auerbach, S., Albers, S., 2005. Moving Targets. Strategic Trends in the Aviation Sector", p1-15 in "Strategic Management in the Aviation Industry. Ashgate Publishing, p. 672.

Forsman, H., 2008. Business development success in SMEs". J. Small Bus. Enterp. Dev. 15 (3), 606–622.

Forsman, H., Rantanen, H., 2011. Small manufacturing and service enterprises as innovators: a comparison by size. Eur. J. Innov. Manag. 14 (1), 27–50.

Gardiner, J., 2006. An International Study of the Airport Choice Factors for Non-integrated Cargo Airlines. Doctoral thesis. Loughborough University. https://dspace.lboro.ac.uk/2134/7821.

Halpern, N., Bråthen, S., 2011. Impact of airports on regional accessibility and social development. J. Transp. Geogr. 19, 1145–1154.

Heidenreich, M., 2009. Innovation patterns and location of European low- and medium-technology industries. Res. Policy 38 (No.3), 483–494.

Kasarda, J., Appold, S.J., Mori, M., 2006. The Impact of the Air Cargo Industry on the Global Economy. The International Air Cargo Association, Air cargo Forum, Calgary, p. 12.

Kirner, E., Kinkel, S., Jaeger, A., 2009. Innovation paths and the innovation performance of low-technology firms – an empirical analysis of German industry. Res. Policy 38 (3), 447–458.

Kuratko, D.F., Hodgetts, R.M., 2001. Entrepreneurship: a Contemporary Approach. Harcourt, New York.

Lashine, S.H., Fattouh, M., Issa, A., 2005. Location/allocation and routing decisions in supply chain network design. J. Model. Manag. 1 (2).

Leiponen, A., 2005. Organization of knowledge and innovation: the case of finnish business services. Ind. Innov. 12 (2), 185–203.

MacCarthy, B.L., Atthirawong, W., 2003. Factors affecting location decisions in international operations – a Delphi study. Int. J. Op. Prod. Manag. 23 (7).

Malina, R., Wollersheim, C., Peltzer, S., 2007. Die regional wirtschaftliche Bedeutung des Dortmund Airport. Industrie- und Handelskammer zu Dortmund, Dortmund.

Mazzarol, T., Choo, S., 2003. A study of the factors influencing the operating location decisions of small firms. Prop. Manag. 21 (2).

Mukkala, K., Tervo, H., 2012. Regional airports and regional growth: which way does the causality run?. In: ERSA Conference Papers, Oct 2012. European Regional Science Association.

Ndoh, N.N., Caves, R.E., 1995. Investigating the impact of air-service supply on local demand a causal analysis. Environ. Plan. 27 (3), 489–503.

Pangarkar, N., Yuan, L., 2009. Location in internationalization strategy: determinants and consequences. Multinatl. Bus. Rev. 17 (2).

Peiser, P., 2003. Professional Real Estate Development, second ed. Dearborn Financial Publishing, p. 414. Unc., ULI.

Rasmussen, E., Jensen, J.M., Servais, P., 2011. The impact of internationalization on small firms' choice of location and propensity for relocation. J. Small Bus. Enterp. Dev. 18 (3).

Rodrigue, J.P., et al., 2013. The Geography of Transport Systems. Hofstra University, Department of Global Studies & Geography. http://people.hofstra.edu/geotrans.

Scozzi, B., Garavelli, C., Crowston, K., 2005. Methods for modelling and supporting innovation in SMEs. Eur. J. Innov. Manag. 8 (1), 120–137.

Senguttuvan, P.S., 2006. Air cargo: engine of economic growth and development – a case study of asian region. In: National Urban Freight Conference METRANS2006, p. 30.

Sugiyantoa, G., Santosaa, P.B., Wibowoa, A., Santib, M.Y., 2015. Analysis of hub-and-spoke airport networks in Java Island, based on cargo volume and freight ratio. Procedia Eng. 125, 556–563.

Thai, V., Grewal, D., 2005. Selecting the location of distribution centre in logistics operations: a conceptual framework and case study. Asia Pac. J. Mark. Logist. 17 (3).

Trott, P., 2008. Innovation Management and New Product Development. Pearson Education Limited, UK.

Varis, M., Littunen, H., 2010. Types of innovation, sources of information and performance in entrepreneurial SMEs. Eur. J. Innov. Manag. 13 (2), 128–154.

Wright, M., Westhead, P., Ucbasaran, D., 2007. Internationalization of small and medium-sized enterprises (SMEs) and international entrepreneurship: a critique and policy implications. Reg. Stud. 41 (7), 1–17.

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