Examination of importance and range of comprehensive service for refrigerated containers in seaports

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Abstract: The article concerns the problems of comprehensive service for refrigerated cargo performed at maritime container terminals. It aims to determine the services range forming the comprehensive service of refrigerated containers in seaports and to examine the opinion of container terminals on customer satisfaction with the complexity of handling refrigerated containers. An approach to assess the customer satisfaction with the complexity of handling refrigerated containers has been proposed. The results of the survey conducted at five Polish maritime container terminals have been analysed. The research revealed that according to the seaports opinion the comprehensive service is important for their customers. The high-level customer satisfaction and shorter service time are the main benefits of service. The importance rating for services groups within comprehensive service of analysed cargo has been analysed. It was stated that seaports need to strengthen the implementation of logistic services group for refrigerated containers under their comprehensive service.

Keywords: comprehensive service; customer satisfaction; refrigerated containers; quality of services; seaports.


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Examination of importance and range of comprehensive service

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1 Introduction

Increasing globalisation, international trade development influences the increase in the volume of transported cargo by maritime transport, including food in refrigerated containers. On the basis of the Drewry Maritime Research report worldwide perishable reefer trade of goods in 2014 reached almost 190 million tons (Drewry Maritime Research, 2015). The growth of seaborne trade of perishable reefer goods was also strong (increased by 4.9% in 2014) and is projected to maintain the upward trend at least until 2018. This perspective force ports to adapt to forecasted changes taking into account not only infrastructure and port facilities improvement, but also relations and cooperation with their customers.

Loads of perishable cargoes have limited shelf life and require efficient service and care during port handling (Filina-Dawidowicz and Troynina, 2015). The requirements of flexible adjustment of the quantity of goods to changing demand for these loads cause that the owners of these loads more often decide to transport goods in refrigerated containers. These containers allow them to ensure i.e. cargo protection and continuously monitoring of its storage conditions, as well as sending small commodity loads through regular containerised supply chains (Rodrigue and Notteboom, 2014).

The European ports services market is characterised by high competition level (Pluciński, 2013). The development of logistics in seaports is accompanied by tightening of customers’ requirements for the variety and quality of seaports services (Grzelakowski and Matczak, 2006). The possibility to access additional services often determines the clients’ choice of a container terminal. This forces the seaports to adapt their services package to customer requirements. Therefore, the comprehensive service becomes nowadays not only a tool to attract customers, but also a certain service standard, tending to meet customers’ expectations and raise the level of their satisfaction.

Along with the development of logistics, some changes in the approach and the way of transport and logistics chains functioning were observed. The role of seaports as an integral links in these chains is highlighted (Rodrigue and Notteboom, 2014; Lorenc and Więcek, 2014; Hanssen and Mathisen, 2011). These seaports in their development strategies pay attention to services improvement, including logistics services group. This involves the logistics centers construction in seaports’ close area. Therefore, ports tend to
offer growing number of high quality services to their clients and aspire to the role of logistics service providers (Filina-Dawidowicz and Gajewska, 2016).

In order to improve the customer satisfaction of the port services the surveys among ports customers are carried out. These are generally questionnaires surveys filled by ports customers, including shipping lines and agencies, etc. The scope of the research includes both port and its authority, as well as selected terminals operators. Zhang et al. (2010) analysed the quality management of customer satisfaction in the port authority. Jafari et al. (2013) accessed the satisfaction of container shipping lines from port services as well as conducted the prioritisation of the factors affecting customer satisfaction in Iraqi container ports. While Dehdaril and Jafari (2013) conducted an empirical study on customer satisfaction in Pakistani container ports, where Kano model have been applied.

Literature analysis showed that there have been no research papers containing the evaluation of scope of comprehensive service for refrigerated containers in seaports, as well as importance of particular services for customers. That is why it is interesting to investigate the set of logistic services and to assess their implementation in maritime container terminals, as well as importance for ports’ customers. These could be done evaluating the port clients and services providers’ opinion. Examination of port’s opinion concerning importance of offering services will allow to understand better the viewpoint and implementation of comprehensive service concept in seaports.

The article aims to determine the services range forming the comprehensive service of refrigerated containers in seaports and to examine the opinion of chosen container terminals on customer satisfaction with the complexity of handling refrigerated containers. The research covers Polish container terminals located in cities of Gdansk, Gdynia and Szczecin.

2 Comprehensive service of refrigerated containers in seaports

The idea of the comprehensive cargo service in seaports has been mentioned in several publications (Filina-Dawidowicz, 2016; Grzelakowski and Matczak, 2006). It is related to a number of ordered sequences of technical and technological, organisational, logistical, economic and legal processes and activities accompanying the loads moving from their origin place to the final consumers (Grzelakowski and Matczak, 2006). These actions allow to perform the duties in shorter time, reduce the number of formalities during separate services implementation by many contractors, best match of seaport offer to the clients’ expectations, enrich ports offer of value added services etc. Under comprehensive service in the seaport, the customers do not have to contact various services providers, as port ensures it. In addition, one agreement could be signed between the customer and a port provider, covering particular needed services under of a comprehensive logistics service. The port ensures the execution of whole services necessary for the proper logistics service of the refrigerated containers (Filina-Dawidowicz and Gajewska, 2016).

Comprehensive service of the refrigerated containers can be defined as “the possibility to perform many activities at the same time in one place or by one operator who is responsible for these steps completion” (Filina-Dawidowicz and Gajewska, 2016).
The specificity of perishable cargo service in seaports is connected with the necessity to ensure and monitor cargo storage conditions by seaport and plug in containers to the electrical power source. A comprehensive service of refrigerated containers in the maritime container terminals may consist of different activities. The services for refrigerated containers could be divided as follows (Filina-Dawidowicz and Postan, 2015):

- **Basic** (e.g., cargo overloading from/to ship, at the terminal, from/to land transport means, storage, transportation within terminal and port, etc.).
- **Additional** (e.g., customs control, container weighing, X-ray, container washing, filling or emptying container, etc.).
- **Specific** (e.g., regular monitoring of cargo storage temperature, refrigerated container plug in/plug off to the power supply, put on/put off portable generator Gen Set to a container, veterinary and phytosanitary control, change of temperature settings, etc.).
- **Logistics** (enabling to obtain detailed information by clients about the stage of cargo service, consulting, including calculation of customs duties, an optimised matching of maritime and land transport schedules, distribution, advertising, certification and expertise, cargo insurance, formation of consignments, vehicles hiring, repair and service of reefer containers, trailers, organisation of multimodal transport, documents execution, etc.).

On the basis of observations and analysis of services offered by European container terminals the package of logistics services groups forming the comprehensive service for refrigerated containers has been developed:

1. cargo handling, storage and transportation within the port
2. customs, veterinary and phytosanitary cargo control
3. X-ray, washing, weighing of container, refrigeration unit service
4. cargo storage conditions ensuring
5. information, consulting
6. inventory management, forecast of demand
7. advertising, marketing, commercial and financial services
8. preparation and coordination of transport documentation
9. distribution and forwarding, cargo insurance, hire of transport means.

These packages cover different activities and may be used for comprehensive service analysis in seaports.

### 3 Customer satisfaction of comprehensive service

Service quality and customer satisfaction are two very closely related and sometimes even identified concepts (Filina-Dawidowicz and Gajewska, 2016). The study on service quality suggests that, customers determine the quality of services. These services have
been defined as a service encounter where customers directly interact with services, the usage of this service encounters in service organisations, 'world class customer service' (Coye and Murphy, 2007), and it is a commitment to match services with expectations. It is the result of effective delivery and its outcome against expectations. The notion of service quality involves more than the outcome quality; the methods and manner by which the service is delivered are of great importance. The quest for service quality has been an essential strategic component for firms attempting to succeed or survive in today’s competitive environment. Everyone recognises good service when they see or experience it. What stands out in the customer’s mind is excellent service that exceeds their expectations. The real quality revolution has come to services (Islam et al., 2011). Moreover, quality improvement efforts should be carried out for each stage of the supply chain (Liu and He, 2015; Shao et al., 2014).

Customer satisfaction is a key factor in assessing the quality of a service. If it is difficult to define the quality of service; it is even harder to determine the level of customer satisfaction (Meidute-Kavaliauskiene et al., 2014). The concept of customer satisfaction can be defined in different ways in literature. According to Kotler’s definition customer satisfaction is feeling, that to experience purchaser after the service is used which fulfil his expectations (Kotler et al., 2000). According to an exhaustive review of Yi (1989), customer satisfaction may be defined in two basic ways, either as an outcome, or as a process.

1 The first approach defines satisfaction as a final situation or as an end-state resulting from the consumption experience.

2 The second approach emphasises the perceptual, evaluative and psychological process that contributes to satisfaction.

Although different approaches of defining customer satisfaction may be found in the literature, the most popular of them are based on the fulfilment of customer expectations (Grigoroudis and Siskos, 2010). Due to Shaltayev et al. (2016) transaction cost decreases as demand variability increases or as targeted cycle service level increases, as well as customer service level gets worse when supply or demand variability increases.

Satisfaction measurement delivers information to the point function about organisation and satisfaction level of customer needs in an effective way. During customer satisfaction evaluation different scope of guild services can be considered (Gajewska and Lisińska-Kuśnierz, 2014). Customer satisfaction measurement is one of the most important issues concerning business organisations of all types, which is justified by the customer-orientation philosophy and the main principles of continuous improvement of modern enterprises (Gajewsk and Grigoroudis, 2015; Chakrabarty et al., 2013).

Thus, both logistics service quality and customer satisfaction are especially important in the current business environment, as the relationship between the service provider and the client is usually long-term (or at least it is attempted to keep them as such). One of the most significant elements in service markets is the support and development of relationship with the customer (Caceres and Paparoidamis, 2007). For the relationship to be long term, a logistics service provider has to provide a service in line with the customers’ expectations, leading to the appropriate level of customer satisfaction.
4 Criteria for comprehensive service analysis

Evaluation of comprehensive customer service in the seaport should be carried out due to the set of criteria. On the one hand these criteria have to take into account customer needs, on the other hand – allow making complex view on problem analysed. This analysis should consider the specificity of refrigerated cargo and logistic approach for performed services. For example, the dimensions concerning port services have been proposed by Lu et al. (2011). They cover, i.e., port facilities and equipment, customer orientation, port costs, IT service, service efficiency, staff service ability, general service etc. However, mentioned dimensions do not take into consideration the quality of port services.

The selected criteria for the assessment of complexity of logistics services in seaports have been proposed (Table 1). There is a set of aspects used for the assessment of the logistics services quality, due to authors, such as: Brdulak (2012), Filipiak and Panasiuk (2008), Kempny (2008) and Kisperska-Moroń and Krzyżaniak (2009).

The analysis comprised 12 criteria of logistics services influencing the customer satisfaction. Proposed criteria are divided into three groups:

- six typically logistics criteria: timeliness of deliveries, faultlessness of deliveries, completeness of deliveries, reliability of deliveries, frequency of deliveries, flexibility of deliveries
- five general criteria: availability of services, deep assortment, level of customer service, innovativeness, computerisation
- one other criterion: price.

These criteria allow examining and evaluating the seaport services using logistic approach essential from the viewpoint of whole transport and logistics chains.

Table 1 Evaluation criteria for complexity service of refrigerated containers

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeliness of deliveries</td>
<td>Criterion typically logistics: Punctuality, delivery exactly within the prescribed time (Kisperska-Moroń and Krzyżaniak, 2009).</td>
</tr>
<tr>
<td>Faultlessness of deliveries</td>
<td>Compliance assortment of supplies to customer specification without unexpected replacements or mistakes (Kisperska-Moroń and Krzyżaniak, 2009).</td>
</tr>
<tr>
<td>Completeness of deliveries</td>
<td>Ability of suppliers to provide the full specification of the ordered products, delivery according to the order (Kempny, 2008).</td>
</tr>
<tr>
<td>Reliability of deliveries</td>
<td>Reliability means that the products will be delivered in accordance with the due date, without cargo damage, invoices will be properly prepared, without mistakes, delivery will go to the appropriate place, as well as compliance assortment and number of ordered products will comply with the order (Kempny, 2008).</td>
</tr>
<tr>
<td>Frequency of deliveries</td>
<td>Specifies the traffic number at set time (during the day, week, month) (Kempny, 2008).</td>
</tr>
<tr>
<td>Flexibility of deliveries</td>
<td>Ability to adapt time (eg. the day and night), size, assortment and way of delivery to the needs and expectations of customers (Kempny, 2008).</td>
</tr>
</tbody>
</table>
Table 1 Evaluation criteria for complexity service of refrigerated containers (continued)

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Availability of**  | **General criterion**  
| services             | Deals with company localisation, opening hours, services waiting times, the availability of information about the company and offered services, easy and smoothly contact, etc. (Frąś, 2014) |
| **Deep assortment**  | Refers to a merchandising strategy where the logistic provider offers to stock a number of variations of the same product/service line (Zimon, 2015) |
| **Level of**         | **customer service**  
|                      | It is the act of taking care of the customer’s needs by providing and delivering professional, helpful, high quality service and assistance before, during, and after the customer’s requirements are met (Frąś, 2014) |
| **Innovativeness**   | Logistics innovation is “streamlining, the new value from customer point of view, which is reflected in the market value and is the basis for the development of logistics services and strategy building on the market” (Brdulak, 2012) |
| **Computerisation**  | Process of introducing IT solutions that support enterprises or institutions operation (Adamczewski, 2005) |
| **Price**            | **Other criterion**  
|                      | The cost of delivery is one of the main categories which determines the processes occurring in the market. The price is a value expressed in monetary units, which the buyer agrees to pay for goods or services (Filipiak and Panasiuk, 2008) |

5 Material and methods of research

The algorithm of total research is shown in Figure 1. In order to accomplish the research aims, after problem identification the special questionnaire was developed. This questionnaire is designed to examine the opinion of seaports and their customers concerning comprehensive service in seaports. In particular, it was developed to:

- investigate the importance of services complexity and the level of satisfaction with the complexity of services in seaports
- define and analyse the profits of services complexity
- examine the importance with services complexity due to proposed criteria and implementation of these criteria in chosen seaports
- examine the range of services forming a comprehensive service, their importance and application in seaports.

Presented study shows the results of services providers’ survey.

Developed questionnaires were sent online to Polish seaports located in Gdansk, Gdynia and Szczecin in December 2015. Representatives of five container terminals performing refrigerated containers service filled the forms expressing their opinion on the questions asked.
The conducted research had quantitative character. The questionnaire included eight questions aimed to investigate the opinion of container terminals. The content of the questionnaire was as follows:

1. port and terminal identification
2. assessment of importance level of services complexity for the terminal’s customers
3. assessment of satisfaction level with the complexity of services in a terminal
4. identification and assessment of profits of services complexity
5. assessment of importance of the specified criteria connected with services complexity
6. assessment of implementation of the specified criteria connected with complexity of services on the terminal
7. assessment of importance of particular services forming the container’s comprehensive service on the terminal
8. assessment of application of particular services forming the container’s comprehensive service on the terminal.

Additional question concerned the person completing the survey, i.e., employment status, experience on the current position, education. Proposed questions had both closed and semi-opened character, where the questions 4–8 were semi-opened enabling respondent to give his own opinion.

**Figure 1** Research algorithm
6 Polish seaports characteristics

Currently in Poland five maritime container terminals are involved in refrigerated containers handling (Filina-Dawidowicz and Troynina, 2015). There are: Deepwater Container Terminal Gdansk (DCT Gdansk), Gdansk Container Terminal (GTK), Baltic Container Terminal in Gdynia (BCT), Gdynia Container Terminal (GCT) and DB Port Szczecin (DB PS). These terminals are equipped with specialised infrastructure and devices enabling transhipment and storage of different container types, including those with perishable cargo (Table 2).

Table 2  Chosen parameters of Polish container terminals (data of container terminals in Gdańsk, Gdynia and Szczecin)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Gdańsk</th>
<th>Gdynia</th>
<th>Szczecin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DCT Gdańsk</td>
<td>GTK</td>
<td>BCT</td>
</tr>
<tr>
<td>Quay length [m]</td>
<td>650</td>
<td>367</td>
<td>800</td>
</tr>
<tr>
<td>Quay depth [m]</td>
<td>16.5 (on lth 412 m), 13.5 (on lth 265 m)</td>
<td>9.8 (on lth 205 m), 8.5 (on lth 105 m)</td>
<td>12.7</td>
</tr>
<tr>
<td>Quay gantry cranes</td>
<td>6</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Overloading rate per crane [cont/h]</td>
<td>35</td>
<td>35</td>
<td>31</td>
</tr>
<tr>
<td>Storage capacity [thd. TEU]</td>
<td>29</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Plugs number</td>
<td>420</td>
<td>95</td>
<td>600</td>
</tr>
<tr>
<td>Annual handling capacity [thd. TEU]</td>
<td>1,250</td>
<td>100</td>
<td>1,200</td>
</tr>
</tbody>
</table>

Overall container handling in analysed container terminals is shown in Figure 2. A total number of containers overloaded in 2015 in Polish seaports is 1,862 million TEUs (Data from BCT terminal; DB Szczecin terminal; DCT terminal; GCT terminal; GTK terminal, 2016). The decrease in number of containers handled in 2015 was connected, i.e., with market changes and didn’t affect the slowdown in their development. Terminals continue to invest in line with their development strategies.

The share of refrigerated containers handled in seaports is about 5–7%. For cargo temperature conditions assurance the terminals provide plugs for containers connection to an electrical power source. The total number of plugs in Polish seaports is 1,656, that describes refrigerated containers storage capacity (Table 2).

The leader among Polish terminals is rapidly developing DCT Gdańsk with total storage capacity of 29,000 TEU. It handles annually approximately 57% of overall throughput of Polish container terminals located in seaports. However, the greater number of plugs for refrigerated containers has BCT in Gdynia, where 600 units could be plugged in simultaneously (Table 2) (Filina-Dawidowicz and Troynina, 2015).
7 Research results

The results of the interviews conducted with operators of five Polish container terminals cover all examined questions relating to the importance of services and its complexity in seaports. The respondents filled out the questionnaires using the five-point Likert scale (1 to 5), where 5 signify the highest value and 1 the lowest one. The questionnaires were evaluated by terminals managerial stuff, highly qualified and educated employees with substantial experience in seaports operation, transport and logistics area.

**Figure 3** Importance of services complexity and level of satisfaction with the complexity of services in a seaport

*Source:* Filina-Dawidowicz and Gajewska (2016)
Figure 3 presents the survey results concerning the importance of services complexity and level of these services execution in examined seaports’ container terminals. In the opinion of respondents the comprehensive services are very important in seaports functioning (average grade point is 4.4). The similar opinion terminals operators had regarding the level of customer satisfaction in the field of comprehensive services in their ports, providing high evaluations (average grade point – 4.6). Satisfaction with services complexity is slightly higher than its importance. Among terminals representatives only one (DCT Gdańsk) evaluated the importance of comprehensive services on average level. Therefore, it may be assumed that due to DCT Gdańsk the analysed services are less important for customers (Filina-Dawidowicz and Gajewska, 2016) and clients draw attention to other aspects of terminal operation. In turn, GTK considers that it has to improve the comprehensive service of refrigerated containers.

The results of respondents’ evaluation concerning the profits of services complexity are shown in Figure 4. It was revealed that among proposed criteria from seaports point of view the high-level customer satisfaction and shorter service time form the main profits. The average grade point in these cases was 4.8 pt. Cost-cutting and limitation of formalities received average grade 4.4. However, seaports providers indicated that services complexity does not have significant influence on the increase in demand for seaports services (average grade point – 3.2 pt.). It may be supposed that Polish seaports do not link together comprehensive service with the ability to attract new customers and loads to the port.

**Figure 4** Profits of services complexity

![Graph showing profits of services complexity](image)

**Source:** Filina-Dawidowicz and Gajewska (2016)

In Figure 5 the hierarchy of importance criteria due to examined container terminals is presented. The evaluation was carried out according to twelve attributes influencing the comprehensive services provided for refrigerated containers in seaports. Respondents assessed, that good level of customer service (general criterion, average grade point – 4.6 pt.) and timeliness of deliveries (typically logistic criterion – 4.4 pt.) are the most important criteria. In turn, the least important classified criteria are: flexibility of deliveries and wide range of assortments (3 pt.). Analysing the results it may be concluded that flexibility of deliveries as the typically logistic criterion is not essential for
Examination of importance and range of comprehensive service

refrigerated containers service in Polish seaports, since it is associated with the ability to adapt time, assortment and way of delivery to the customer’s needs. This fact may also be connected with the role of container terminals as a transfer points for refrigerated cargo. The services for analysed loads have to be performed timely, but ports are not focused on flexible reaction on changes in deliveries through the logistic chains. Ports pay attention to the good level of customer service with respect to the currently services provided, considering wide range of assortment less important for customers.

**Figure 5** Importance of the criteria connected with services complexity

![Importance of the criteria connected with services complexity](source)

**Source:** Filina-Dawidowicz and Gajewska (2016)

**Figure 6** Implementation of the criteria connected with complexity of services

![Implementation of the criteria connected with complexity of services](source)

**Source:** Filina-Dawidowicz and Gajewska (2016)
Moreover, examining the opinion of the representatives of five terminals in the field of implementation 12 chosen criteria, it was revealed that the good level of customer service and appropriate price are mostly respected on the terminals (Figure 6). In both cases evaluation rates were 4.8 pt. It means that terminals pay significant attention to customers’ satisfaction assurance and price policy creation for comprehensive services. The lowest level of compliance among proposed criteria respondents attached to wide range of assortment (average grade point – 3 pt.). It means that services providers least implement this criterion in assessment of comprehensive services of refrigerated containers.

Comparing providers opinions concerning importance and implementation of the evaluation criteria connected with complexity of services it can be stated that due to seaports good level of customer service is the most important criterion and it is implemented to the greatest extent. In turn reliability and flexibility as typically logistic criteria, as well as wide range of assortment (general criterion) are less important and implemented in the examined seaports.

Furthermore, the study attempts to examine importance and scope of services included in the comprehensive service of refrigerated containers. In order to conduct the research the service were divided into nine groups. The results of assessment of these groups made by services providers are shown in Figure 7. Assessing the importance of services complexity among listed groups the respondents highlighted customs, veterinary and phytosanitary cargo control (average grade point – 4.8 pt.) and cargo storage conditions ensuring (4.6 pt.), that are specific for refrigerated containers handling, as well as cargo handling, storage and transportation within the port (4.2 pt.). Due to the seaports opinion the less important are advertising, marketing, commercial and financial services (average grade point – 2.2 pt.) and inventory management, forecast of demand (2.4 pt.), distribution and forwarding, cargo insurance, hire of transport means (2.6 pt.). It may be concluded that seaports believe that all mentioned groups are important, but in varying degrees.

**Figure 7** Importance of services complexity

<table>
<thead>
<tr>
<th>Services Provided</th>
<th>Average (in points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising, marketing, commercial and financial services</td>
<td>2.2</td>
</tr>
<tr>
<td>Inventory management, forecast of demand</td>
<td>2.4</td>
</tr>
<tr>
<td>Distribution and forwarding, cargo insurance, hire of transport means</td>
<td>2.6</td>
</tr>
<tr>
<td>Preparation and coordination of transport documentation</td>
<td>2.8</td>
</tr>
<tr>
<td>X-ray, washing, weighing of container, refrigeration unit service</td>
<td>3.2</td>
</tr>
<tr>
<td>Information, consulting</td>
<td>3.8</td>
</tr>
<tr>
<td>Cargo handling, storage and transportation within the port</td>
<td>4.2</td>
</tr>
<tr>
<td>Cargo storage conditions ensuring</td>
<td>4.6</td>
</tr>
<tr>
<td>Customs, veterinary and phytosanitary cargo control</td>
<td>4.8</td>
</tr>
</tbody>
</table>
However, assessing the implementation of comprehensive service for refrigerated containers in the analysed container terminals, a clear division in analysed services groups can be noticed (Figure 8). In the providers’ opinion the four groups of services are mostly applied on their terminals and form comprehensive service. Among them there are: cargo handling, storage and transportation within the port (4.8 points), customs, veterinary and phytosanitary cargo control (4.6 pt.), cargo storage conditions ensuring (4.4 pt.) and information, consulting (4.4 pt.). The remaining groups of services were evaluated below three points. The least points gained the services group of inventory management, forecast of demand (1.2 pt.). It means that these services are weakly implemented in Polish container terminals. The same applies to advertising, marketing, commercial and financial services (2 pt.), preparation and coordination of transport documentation (2.6 pt.), distribution and forwarding, cargo insurance, hire of transport means (2.6 pt.). Analysing the results it can be stated that seaports mediate the exchange of goods and do not take part in distribution, which is a typical logistics service.

Figure 8  Application of services complexity in the port

The special attention should be paid to the survey result related to a group of services as X-ray, washing, weighing of container, refrigeration unit service, which is ranked in the middle of the survey. The importance of these services was rated at 3.2 pt., while application received – 2.8 pt. This result leads to the conclusion that this type of service in Polish seaports are pursued, but are not very important in the seaports opinion. This is intriguing, because these services are commonly performed in seaports. For example, in order to load the new cargo to the refrigerated container it should be washed and cleaned, as well as operation of its refrigeration unit should be checked. Food exported and imported abroad European Union may require scanning (Filina-Dawidowicz, 2016). It can be supposed that for container terminal customers this criterion will be more important and influential on the choice of seaport offering comprehensive services for refrigerated containers.
Conducted analysis revealed that typical logistic services (such as inventory management, forecast of demand, advertising, marketing, distribution and others) are not forming the strength of the comprehensive service on Polish seaports example. The implementation of logistics services can be enhanced within the seaports.

8 Discussion

Examining the satisfaction level with the complexity of services for refrigerated containers in seaports it is worth to investigate not only the customers viewpoint, but also the opinion of services providers. It allows exploring and understanding the seaports position concerning importance of comprehensive service and particular services development. This position influences the ports development strategies and a way to cooperate with the customers. However, the confrontation with respect to future evaluations and opinions of seaports services customers should be made.

Comprehensive logistic service in seaports requires implementing the special approach to the ports management. Different services have to be available for seaports customers. The studies and observations indicate that these services could be performed by a number of providers responsible for individual activities. In turn, the idea of comprehensive logistic service takes in consideration performing of different services by one provider. That is why the implementation of this concept in European seaports should be improved. The need of particular services and the way of their integration and management within one complex service may be discussed.

Furthermore, received research results are also interesting. Seaports signed that wide range of assortment is less important for their customers, but at the same time they do not apply wide scope of services. The situation may change in coming years, taking into account the development of logistics, changes in customer needs and market. Regarding this it would be interesting to investigate the opinion of seaports customers and find out whether the deep assortment of services and easy access to them are essential.

9 Conclusions

Presented paper is one of the first dedicated to the complexity of refrigerated containers service in seaports, assessing the services range and customer satisfaction with analysed containers handling. The approach to evaluate the customer satisfaction with this service was shown. Considering refrigerated cargo specificity and trends in logistics services development, the criteria for assessment of the level of customer satisfaction were proposed, the range of services forming comprehensive service for refrigerated containers was defined and the survey among chosen container terminals was carried out. Achieved results should be interesting for different seaports providers and companies interested in comprehensive service of refrigerated containers.

Conducted research revealed that seaports aspire to implement comprehensive service of refrigerated containers considering its importance. Services providers indicated the importance of various services groups on different levels. The hierarchy of services importance and implementation was achieved. The most important services groups in opinion of seaports are: customs, veterinary and phytosanitary cargo control, as well as cargo storage conditions ensuring. In turn, among less important services groups
 providers mentioned advertising, marketing, commercial and financial services, as well as inventory management, forecast of demand. However, it must be said that logistic services group isn’t fully implemented in seaports. Despite investments in infrastructure and handling equipment, ports should pay significant attention to developing of logistics services in order to raise the level of customer satisfaction with the port service.

The future work will deal with the examination of container terminals customers’ satisfaction in the field of complexity of refrigerated containers handling in seaports. The survey will cover shipping lines and agencies, freight forwarders etc. Comparing the results received from customers with seaports providers’ opinion, recommendations for seaports strategy development will be compiled.

References
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Examination of importance and range of comprehensive service

