On Logistics Service Quality Evaluation – Case Study

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This research intends to identify and analyze quality performance measurements used in logistics service companies. As a result, author presents the main definitions of quality and logistics service quality. Later, author investigates the main evaluation models and measures of logistics service quality which are known in the literature. In the next step, there are presented obtained quality analysis results in comparison with the knowledge about the case company present condition. The chosen case company is one of the biggest transport and logistics service providers operating in Poland.
Keywords: logistics service, logistics service provider, quality measurement

1. INTRODUCTION

Quality is one of the most important factors for companies in their relationship between suppliers and customers. It is always relative to a set of inherent characteristics and a set of requirements being defined by given supply chain elements and participants.

There are several definitions of quality. According to American Society for Quality, quality is defined as *a subjective term for which each person or sector has its own definition. In technical usage, quality can have two meanings: 1. the characteristics of a product or service that bear on its ability to satisfy stated or implied needs; 2. a product or service free of deficiencies. According to Joseph Juran, quality means "fitness for use;" according to Philip Crosby, it means "conformance to requirements."*[1] ISO 8402-1986[2] standard defines quality as "*the totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs*".

Different approaches to quality definition are presented by Ghobadian et al.[3] In the mentioned work definitions of quality are classified into five broad categories: transcendent, product led, process or supply led, customer led and value led.

When thinking about logistics function performance, the emphasis is put on "*assessing a provider's ability to consistently deliver requested products within the requested delivery time frame at an acceptable cost"*[4]. Thus, logistics operational and relational performance is strictly connected with proper service quality definition.

Most of known service/logistics quality definitions fall within the customer-led category[5]. In the 1990s, few empirical studies have been developed to investigate the status of quality

[1] *American Society for Quality Online Glossary*, 2011, available at: http://asq.org/glossary/

[2] ISO 8402:1986 Quality – Vocabulary, revised by: ISO 9000:2000 Quality management systems - Fundamentals and vocabulary.

[3] A. Ghobadian, S. Speller, M. Jones, *Service Quality Concept and Models,* International Journal of Quality and Reliability Management, 1994, Vol. 11, No. 9, pp. 47-49.

[4] T. P. Stank, T. J. Goldsby, K. Savitskie, *Logistics service performance: estimating its influence on market share*, Journal of Business Logistics, 2003, Vol. 24, No. 1, p. 27.

[5] A. Ghobadian, S. Speller, M. Jones, *Service Quality…,* p. 49.

management practices in logistics. For example, in 1995 Millen and Maggard in their work have surveyed the largest 500 US firms[6]. In their research, they have asked respondents how they had defined logistics quality by identifying its three most important components. As it has been showed, most of the respondents had perceived the logistics quality in terms of on-time delivery (81% of responds), total support of customer needs and error-free transactions. The next work has been based on a field study of 165 Australian firms[7]. The respondents being asked the same question have indicated the same elements. However, the total support of customer needs has been defined as the most important element of logistics quality (69% of responds). Other research studies, which provide an extensive investigation of the concept of logistics service quality, confirm the necessity of this problem examination[8].

Following this considerations, the focus of this study is on 1. reviewing the main studies that have investigated the problem of logistics service quality (LSQ), 2. reporting the main quality evaluation models and measures being developed in literature, 3. investigating the case study where logistics service company uses 16 different logistics metrics to evaluate the level of service quality being offered to its customers.

As a result, the rest of this paper is organized as follows: Section 2 presents the different approaches to logistics service quality definition. In the Section 3 author investigates the main evaluation models and measures of logistics service quality which are known in the literature. Later, there are presented the obtained quality analysis results in comparison with the knowledge about the case company present condition. The definition of logistics service quality is compliant with ISO standard.

2. LITERATURE REVIEW

One of the most often analyzed problems is connected with supply chains performance. "*In today's global marketplace, individual firms no longer compete as independent entities, but rather as an integral part of supply chain links*[9]".

The literature in this research area is well developed. For example, a basic model of service quality in the supply chain based on the gap analysis is proposed by Seth et al.[10]. Later, Batson and McGough introduced supply chain quality models[11] with the use of network modelling issues. Authors provided examples of discrete and continuous network supply chain models with service quality considerations.

Withal, the literature expansion is on service quality domain in a logistics context[12]. The interest in logistics service quality problems has become one of the most important issues for companies since 1980s. Extensive literature research of service quality modelling issues are provided e.g. by Parasuraman et al., Ghobadian et al., Brady et al., or by Saura et al.[13]

However, the proper understanding of service quality is determined by the main characteristics of services – intangibility, heterogeneity, and

[6] R. Millen, M. Maggard, *The change in quality practices in logistics: 1995 versus 1991*, Total Quality Management, 1997, Vol. 8, No. 4, p. 175.

[7] R. Millen, A. Sohal, S. Moss, *Quality management in the logistics function: an empirical study,* International Journal of Quality and Reliability Management, 1999, Vol. 16, No.2, p. 167.

[8] See e.g.: A. Parasuraman, V. A. Zeithaml, L. L. Berry, *A Conceptual Model of Service Quality and Its Implications for Future Research,* Journal of Marketing, 1985, Vol. 49.; J. T. Mentzer, D. J. Flint, J. L. Kent, *Developing a logistics service quality scale*, Journal of Business Logistics, 1999, Vol. 20, No. 1.

[9] N. Seth, S. G. Deshmukh, P. Vrat, *A conceptual model for quality of service in the supply chain,* 2006, Vol. 36, No. 7, p. 547.

[10] N. Seth, S. G. Deshmukh, P. Vrat, *A conceptual model…*

[11] R. G. Batson, K. D. McGough, *A new direction in quality engineering: supply chain quality modeling,* International Journal of Production Research, 2007, Vol. 45, No. 23, pp. 5455-5464.

[12] J. T. Mentzer, D. J. Flint, J. L. Kent, *Developing a logistics…*, p. 9.

[13] A. Parasuraman, V. A. Zeithaml, L. L. Berry, *A Conceptual Model …*; A. Ghobadian, S. Speller, M. Jones, *Service Quality…*; M. K. Brady, J. J. Cronin, R. R. Brand, *Performance-only measurement of service quality: a replication and extension,* Journal of Business Research, 2002, Vol. 55, pp. 17-31.; I. G. Saura, D. S. Frances, G. B. Conri, M. F. Blasco, *Logistics service quality: a new way to loyalty,* Industrial Management and Data Systems, 2008, Vol. 108, No. 5, pp. 650-668.

inseparability[14]. Because of those service characteristics, authors claimed, that firms may find it difficult to proper define how consumers perceive services and service quality. To overcome this problem, authors in their work defined ten main determinants of service quality: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding the customer, tangibles. Following this, the SERVQUAL multi-item scale to measure service quality was developed[15]. The evaluated concept is based on the gap theory, which suggests that there exist five main gaps between consumers' expectations and the tasks associated with service delivery to consumers. The SERVQUAL is a 22 item instrument that includes five dimensions (tangibles, reliability, responsiveness, assurance and empathy). This scale was formulated based on the data gathered from different kind of service industries (e.g. telephone service, retail banking).

The mentioned method of service quality measurement scale was widely introduced in the literature and used for different applications. For example, Cronin and Taylor[16] in their work compared the two methods of service quality measurement approaches - SERVQUAL and SERVPERF. Moreover, authors investigate the relationships between service quality, consumer satisfaction, and purchase intentions, providing extensive literature review in this research area.

Later, Teas investigated the problems associated with the SERVQUAL P-E (perceptions-minus-expectations) quality measurement framework[17]. Empirical tests carried out in this study were limited to an examination of the validity of perceive quality measures. In the next work[18], authors attempted to re-examine and clarify the key issues raised in works mentioned above[19].

In 2002, authors in their study[20] replicate and extend SERVPERF model introduced by Cronin and Taylor[21]. Authors examine the ability of the performance-only-measurement approach by carrying out three studies and investigating the quality - consumer satisfaction relationship.

Mentzer et al.[22] developed the logistics service quality scale based on the information gathered from eight market segments of Defence Logistics Agency. Later, the problem of quality evaluation of logistics services was investigated by Franceschini and Rafele[23]. Authors compared the classic logistics indicators with service dimensions defined by Parasuraman et al.[24].

Mentzer et al.[25] in their work conceptualized logistics service quality as a process. Authors identified potential components of LSQ and examined whether different customer segments place different weights on components. The analysis regarded to nine LSQ concepts of measurement of personnel contact quality, order release quantities, information quality, ordering procedures, order accuracy, order condition, order quality, order discrepancy handling, and timeliness. The developed measurement scale was used in other research analyses. For example, Saura et al.[26] analyzed quality, satisfaction, and loyalty sequence in the logistics service delivery

[14] A. Parasuraman, V. A. Zeithaml, L. L. Berry, *A conceptual Model of ….,* p. 42.

[15] A. Parasuraman, V. A. Zeithaml, L. L. Berry, *A Conceptual Model …*, p. 47.

[16] J. J. Cronin, Jr., S. A. Taylor, *Measuring Service Quality: a Reexamination and Extension,* Journal of Marketing, 1992, Vol. 56, pp. 55-68.

[17] R. K. Teas, *Expectations, Performance Evaluation, and Consumers' Perceptions of Quality,* Journal of Marketing, 1993, Vol. 57, pp. 18-34.

[18] A. Parasuraman, V. A. Zeithaml, L. L. Berry, *Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: Implications for Further Research,* Journal of Marketing, 1994, Vol. 58, pp. 111-124.

[19] See: J. J. Cronin, Jr., S. A. Taylor, *Measuring Service…,* R. K. Teas, *Expectations, Performance…*

[20] M. K. Brady, J. J. Cronin, R. R. Brand, *Performance-only measurement…*

[21] See: J. J. Cronin, Jr., S. A. Taylor, *Measuring Service…*

[22] J. T. Mentzer, D. J. Flint, J. L. Kent, *Developing a logistics…*

[23] F. Franceschini, C. Rafele, *Quality evaluation in logistic services,* International Journal of Agile Management Systems, 2000, 2/1, pp. 49-53.

[24] A. Parasuraman, V. A. Zeithaml, L. L. Berry, *A conceptual Model of ….*

[25] J. T. Mentzer, D. J. Flint, G. T. M. Hult, *Logistics Service Quality as a Segment-Customized Process,* Journal of Marketing, 2001, pp. 82-104.

[26] I. G. Saura, D. S. Frances, G. B. Conri, M. F. Blasco, *Logistics service…*

context and researched the effect of information and communication technologies in the defined relationships. Later, similar logistics process quality dimensions delineated in the LSQ model were used by Bienstock et al.[27] Authors in their work developed an expanded LSQ model incorporating a framework of technology acceptance model (TAM), logistics information technology use, and logistics process.

3. QUALITY EVALUATION IN LOGISTICS SYSTEMS

Service quality, being an elusive and abstract concept, is difficult to define and measure. In the literature[28], there are many quality tools, which can be used to investigate a chosen company performance level. Those methods include:

- cause analysis (cause-and-effect diagrams, pareto charts, scatter diagrams),
- evaluation and decision-making tools (decision matrix, multi-voting),
- process analysis (flowchart, FMEA, mistake-proofing),
- data collection and analysis (box and whisker plot, check sheet, control chart, design of experiments, histogram, scatter diagram, surveys),
- idea creation (affinity diagram, benchmarking, brainstorming, nominal group technique, an improvement project (Gantt chart)), and
- management tools (relations diagram, tree diagram, matrix diagram, L-shaped matrix, arrow diagram, process decision program chart)[29].

Moreover, many methods have been suggested over the years for supply chain management evaluation. The most popular approaches to measure supply chain performance include:

- the Balanced Scorecard,
- Supply Chain Operations Reference (SCOR) Model,
- The Logistics Scoreboard,
- Activity-Based Costing (ABC),
- Economic Value Analysis (EVA)[30].

In the first three of this methods quality is one of the critical functions, which can be measured.

Additionally, to properly manage any logistics system, there is a necessity to obtain adaptable and accurate performance metrics. The reliable performance measurement systems should capture the critical elements of the logistics process, as time, distance and money[31]. Moreover, process quality also is one of the most important factors when thinking about perfect customer service level assessment.

The extensive literature review of the logistics performance measurement systems is provided e.g. by Caplice and Sheffi[32], Gunasekaran et al.[33], or by Bhagwat and Sharma[34]. However, despite having a lot of conceptual frameworks and discussions on logistic/supply chain performance measurement systems, companies still have to develop their own solutions in this area.

4. CASE STUDY

Analyzed company is one of the world's leading transport and logistics operators in Poland. It has over 1700 employees working in seventeen

[27] C. C. Bienstock, M. B. Royne, D. Sherrell, T. F. Stafford, *An expanded model of logistics service quality: Incorporating logistics information technology,* International Journal of Production Economics, 2008, Vol. 113, pp. 205-222.

[28] see e.g. L. A. Fish, *Supply Chain Quality Management* In: D. Onkal, *Supply Chain Management – Pathways for Research and Practice,* InTech 2011.

[29] *Ibidem*, p. 25-26.

[30] A. Bora, S. Chiamsiri D. Krairit, *Developing Key performance indicators for performance controlling of a supply chain,* Proceedings of the Fifth Asia Pacific Industrial Engineering and Management Systems Conference, 2004.

[31] Ch. Caplice, Y. Sheffi, *A Review and Evaluation of Logistics Metrics,* The International Journal of Logistics Management, 1994, Vol. 5, No 2, p. 11.

[32] Ch. Caplice, Y. Sheffi, *A Review and Evaluation of Logistics Metrics,* The International Journal of Logistics Management, 1994, Vol. 5, No 2, p. 11-28; Ch. Caplice, Y. Sheffi, *A Review and Evaluation of Logistics Performance Measurement Systems,* The International Journal of Logistics Management, 1995, Vol. 6, No 1, pp. 61-74.

[33] A. Gunasekaran, C. Patel, E. McGaughey, *A framework for supply chain performance measurement,* International Journal of Production Economics, 2004, Vol. 87, pp. 333-347.

[34] R. Bhagwat, M. K. Sharma, *Performance measurement of supply chain management: A balanced scorecard approach,* Computers and Industrial Engineering, 2007, Vol. 53, pp. 43-62.

Polish divisions[35]. The examined Logistics Service Provider implemented Integrated Quality, Environment and Work Safety Management System consistent with the following norms:

- ISO 9001:2000 applies to all of the company's units and the full range of services, including domestic and international land transport, warehouse logistics, air & ocean, and rail logistics;
- ISO 14001:2004;
- the occupational health and safety standard OHSAS 18001:2007;
- the Information Security Management System ISO 27001:2005;
- the standard for food safety management systems ISO 22000:2005.

Moreover, in 2005, company implemented HACCP management system.

The above mentioned logistics operator offers complex services combining all transport and logistics solutions for all shipment types, sizes and destinations. Customers may choose from:

- Land transportation services,
- Rail Freight services,
- Air Freight services,
- Ocean Freight services,
- Warehouse logistics services
- Oversized freight services, or
- Specialist services (e.g. ADR, HACCP).

However, there are little freights, which analyzed logistics operator does not deliver, e.g.:

- freights demanding specialized transhipment and means of transport,
- freights being delivered in fixed temperature,
- plants and animals,
- value parcels,
- mail messages,
- freights which are longer than 4 m.

4.1. CHARACTERISTIC OF CUSTOMER SERVICE PROCESSES

Chosen logistics company is oriented to the best relationships with its customers achieving and maintaining by e.g. providing the highest quality of given services. As a result, to measure the quality of logistics services, there is a necessity to know how customer service processes are performed. One of the most important processes in this area is delivery order fulfillment process.

Customers' orders are placed to the Customer Service Centre via internet, e-mail, telephone, fax or personally. All orders, which are placed before 10:00, are fulfilled at the same day. The rest of orders are fulfilled at the next day. Order content is confirmed by a bill of lading generation.

After the customer's order acceptance, a dispatcher informs a chosen internal-movement driver about goods receipt place and destination terminal. At the terminal, the goods are sorted and prepared for shipment (general cargo). Small deliveries are directed on sorting table, where are scanned and given to the special bins. Every bin has its own district number, which defines a destination place. At fixed time, every general cargos and small deliveries are taken by drives and delivered to the defined district terminals, according to the daily schedule. Later, goods are delivered to the final receivers. If the addressee is absent, he has 3 days for delivery reception. In the situation, when nobody contacts with logistics operator, the delivery is brought back to the sender, who has 10 days to decide what to do with it. The analyzed customer order fulfillment process is illustrated in the Figure 1.

Next issue is connected with delivery acceptance and price assessment. The delivery is accepted on the basis of bill of lading information. This document is filled in by the delivery sender. The proper filled bill of lading is a proof of concluding a freight agreement between a consumer and analyzed company. Consumer is obliged to prepare the secured and labeled goods for the delivery.

The price assessment is defined on the basis of logistics operator's price list. Every change made during the customers order's fulfillment, which are not included in a bill of lading, are additionally paid. Usually, the payments for transportation service performance are paid in cash by customer or the person defined in the bill of lading. The payment is made before goods reception by logistics service provider.

[35] A. Cierniak, *Logistic processes' quality assessment in the example of X company* (*in Polish*), MA thesis (unpublished), Wroclaw University of Technology, Wroclaw, 2010, pp. 27.

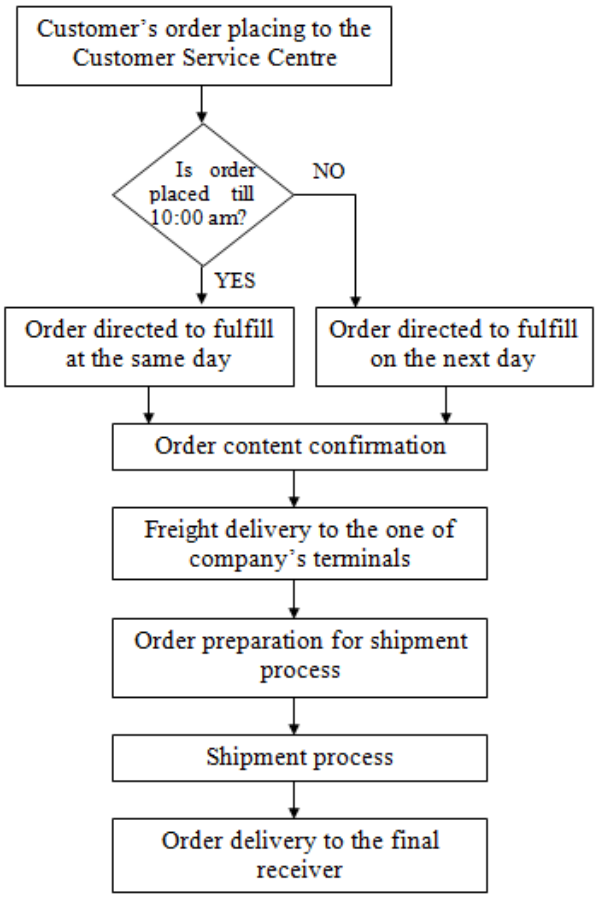

Figure 1. Customer's order fulfilment process

The last problem connected with customer service performance is a complaint process. Logistics operator is responsible for freight since the moment of its receipt from the sender to the moment of its delivery to the receiver. The company's responsibility for fulfilled orders is determined by carriage law.

The letter of complaint can be raised by a sender or a receiver of goods. The time for considering a claim is 30 days. The company can admit or reject a complaint. However, the decision should be sending in a written form to a claimant.

4.2. LOGISTICS SERVICE QUALITY METRICS USED IN A COMPANY

In the analyzed company, quality is perceived in terms of achieved customer satisfaction level. It is determined by on-time delivery of undamaged goods and quick performance of additional services. Moreover, the quality level is analyzed in the company with the use of monthly track records, which include chosen customer satisfaction level metrics. The continuous monitoring of customer satisfaction level let company quickly react when disruptions occur.

As I have mentioned before, logistics service provider uses 16 different logistics metrics to evaluate the level of service quality being offered to its customers. This measurement system is helpful to:

- company's actual condition evaluation,
- goals for next year definition,
- defined goals achievement assessment.

The quality analysis is carried out by conducting survey research of consumers, suppliers, company's employees, and delivery receiver's satisfaction level. The logistics metrics, which are analyzed, are given in the Table 1. The track record of chosen company's logistics service quality level, obtained in 2008 and 2009, are presented in the Table 2. Moreover, the chosen analysis results are illustrated in the Figures 2-11.

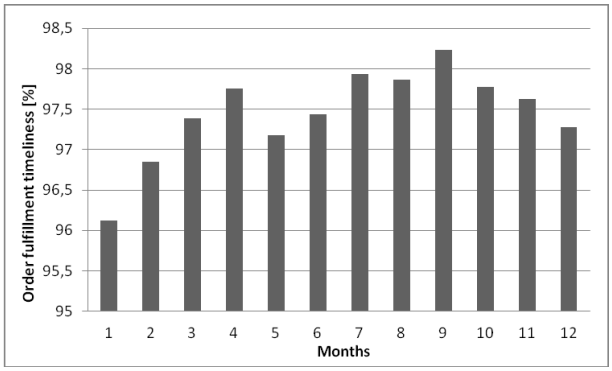

Figure 2. Chosen company's order fulfillment timeliness in 2008

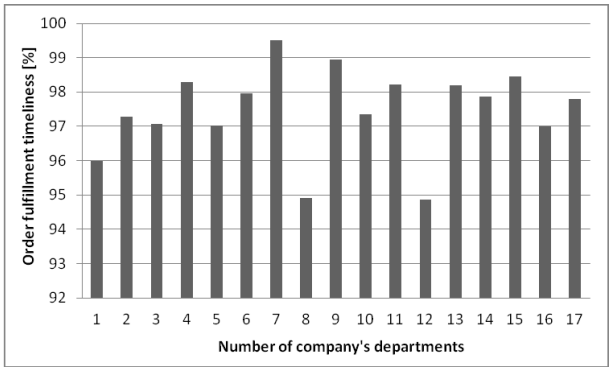

Figure 3. Obtained order fulfillment timeliness level in company's departments in 2008

Table 1. Logistics metrics used to evaluate the level of service quality

No.	Metric's name	Responsible person	Metric's formula	Unit
1	Orders delivery timeliness	Carrier	Number of fulfilled orders / Number of orders to be fulfilled	[%]
2	Long-distance orders delivery timeliness	Shift boss, charge hand, dispatcher	Number of imported deliveries being accepted till unloading day / Number of all imported deliveries being accepted	[%]
3	Regularity of shipping process	Shift boss, charge hand, dispatcher	Cyclicality of cars shipping / Demanded number of cars shipping	[%]
4	Timeliness of long-distance transit	Shift boss, charge hand, dispatcher	Number of long-distance deliveries fulfilled on-time / Number of all long-distance deliveries	[%]
5	Timeliness of reshipping process	Shift boss, charge hand, dispatcher	Number of reshipped freights delivered according to the schedule / Number of all reshipped freights destined to daily reshipping	[%]
6	Timeliness of deliveries fulfilled till 10:00 a.m.	Shift boss, charge hand, dispatcher	Number of deliveries fulfilled till 10:00 / Number of all deliveries destined to be fulfilled till 10:00	[%]
7	Number of lost deliveries	Shift boss, charge hand, terminal's employee	Number of all lost deliveries for which company is responsible	[unit]
8	Number of transportation damages	Shift boss, charge hand, terminal's employee	Number of all transportation damages for which company is responsible	[unit]
9	Employees being on call	CSC employees, shift boss, dispatcher, , sales manager, sales assistant, logistics consultant	Number of picking up phone (during 30 seconds) / All phone calls	[%]
10	Timeliness of international deliveries sending in domestic movement	Shift boss, charge hand, dispatcher	Number of international deliveries being sent in domestic movement at fixed time intervals / Number of all international deliveries being sent in domestic movement in the division	[%]
11	Timeliness of international deliveries confirmation	Carrier	Number of imported deliveries confirmed in a system till the day of their unloading / Number of all imported and confirmed deliveries in the division	[%]
12	Timeliness of international deliveries shipping in domestic movement	Shift boss, charge hand, dispatcher	Number of international deliveries being fulfilled / Number of all international deliveries shipped in domestic movement in the division at the same time interval	[%]
13	Completeness of deliveries fulfilment process	Shift boss, dispatcher, carrier	Number of deliveries fulfilled completely / number of all deliveries fulfilled during a chosen time interval	[%]
14	Number of complaints per 1000 bill of ladings	Shift boss, charge hand, terminal's employee	Number of complaints raised in the chosen division / 1000 bill of ladings	[unit./1000 bill of ladings]
15	Time of claims considering process	Claims coordinator, claims specialist	Average claims considering time since the day of their raising to the day of their admitting or rejecting	[days]
16	Timeliness of information system updating	Dispatcher, CSC employee, specialist of complains	Number of information codes updated in a system / Number of all registered information codes	[%]

Source: A. Cierniak, *Logistics processes' quality assessment in the example of X company* (*in Polish*), MA thesis (unpublished), Wroclaw University of Technology, Wroclaw, 2010, pp. 63-64.

Table 2. Obtained company's metrics values in 2008 and 2009.

No. of metrics	Values of metrics in chosen operational time				Unit
	Year 2008		Year 2009[1]		
	Target level	Obtained level	Target level	Obtained level	
1	95	97,46	**97**	**95,53**	[%]
2	99	99,81	99	99,86	[%]
3	70	73,57	**97**	**98,09**	[%]
4	95,5	97,86	98	98,62	[%]
5	97	98,18	98	99,05	[%]
6	93	90,37	95	94,51	[%]
7	6125	4953	3600	1116	[unit]
8	26545	25468	60000	56401	[unit]
9	85	85,5	90	90,26	[%]
10	99	99,62	99,5	99,39	[%]
11	98	97,55	99	99,17	[%]
12	97	98,34	99	99,09	[%]
13	100	97,84	100	98,27	[%]
14	0,61	0,51	0,45	0,33	[unit./1000 bill of ladings]
15	10	7,38	8	5,46	[days]
16	95	90,92	97	98,17	[%]

[1] measures done for data gathered since January 2009 till November 2009

Source: A. Cierniak, *Logistics processes' quality assessment in the example of X company* (*in Polish*), MA thesis (unpublished), Wroclaw University of Technology, Wroclaw, 2010, pp. 61-114.

Orders delivery timeliness is one of the most important metrics defining the level of customer satisfaction. For analyzed company, the target level of this metric is 95% defined for 2008. In this year company achieved the level of over 97% with standard deviation equals to 0.56%, and the monthly metric levels are presented in Fig. 2. According to the Fig. 3, in two departments the level of orders delivery timeliness was underneath the target level. The most frequent events, which affect the delivery time, are: car failures, car accidents, detours which were not predicted earlier, and late terminal leaving because of late loading process performance or problems with payments.

Since may 2009, this metric has been substituted by the new one, called one-shot orders delivery timeliness (which include e.g. corresponding or export orders). This metric is defined as the number of one-shot orders being delivered divided by the number of all one-shot orders being accepted to the delivery. The target level for this metric is 97% and the achieved level is only about 95%.

Because of this metric change, the results in this area, being achieved in 2008 and 2009, should not be compared.

Next metric, timeliness of long-distance orders delivery, being achieved on a very high level – 99,8% in 2008 and 99,86% in 2009, indicates that there were no problems with customers' orders performance in that particularly area (Fig. 4). The standard deviation is less than 0,16%.

There is also worth taking a note about the third metrics. The regularity of shipping process' target level was 70% in 2008. The low metric level was connected with some problems regarding the shipping process performance organisation.

It may happen, that there is too small number of working dispatchers according to the number of orders being delivered. The dispatchers have to optimise the transportation routes. As a result, sometimes the situation happen, when the driver has to wait for a

permission to leave (connected with acceptance of the transportation routes and loaded freights) despite having ended the loading process.

In 2009, this metrics has been changed by the metric called "reporting about any anomaly to customers". This metric is calculated as the number of e-mails being sent do the customers with the information about anomaly occurrence divided by the number of e-mails which should be sent. As a result, the achived in 2008 and 2009 results also should not be compared.

Another interesting metrics is number 6 – the timeliness of deliveries fulfilled till 10:00 a.m. (Fig. 5). For this metric the target level is defined as 93% for 2008 and 95% for 2009. As it can be seen, the metric regards to the one of company's weaknesses. Almost in every month the obtained metric level was below the defined target level. This situation was connected with the time delays, which occur during the shipping process performance. Moreover, the irregularity of this delivery timeliness can be confirmed by calculated standard deviation, which is equal to 4.52% in 2008 and 1.93% in 2009.

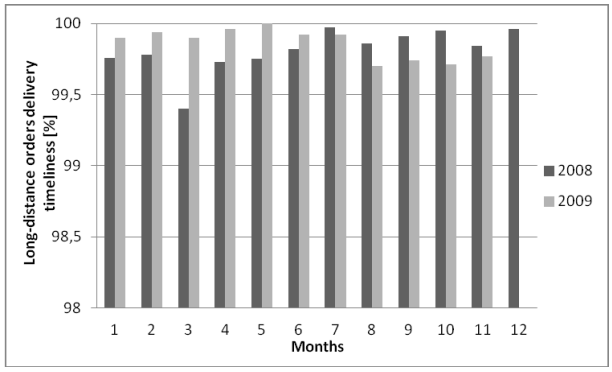

Figure 4. Chosen company's long-distance orders delivery timeliness

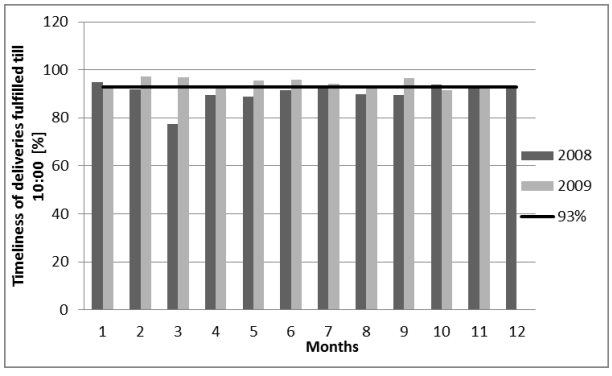

Figure 5. Chosen company's timeliness of deliveries fulfilled till 10:00 a.m.

Next problem is connected with the number of lost deliveries (Fig. 6 and Fig. 7). This metric includes all deliveries which have been lost, or partially lost and chosen company's department is responsible for that situation. The target level for this metric is defined individually by every department. The total number of lost deliveries – which is the target level – encompasses more than 6000 deliveries for 2008 and 3600 in 2009 (see Table 2., metric number 7).

The high number of lost deliveries is connected with shipping process performance in which many people have contacts with freights. If delivery is lost during a warehouse process, there is almost unlikely to find the thief. In another situation, if freight is stolen or lost during the transportation process performance, driver takes the responsibility.

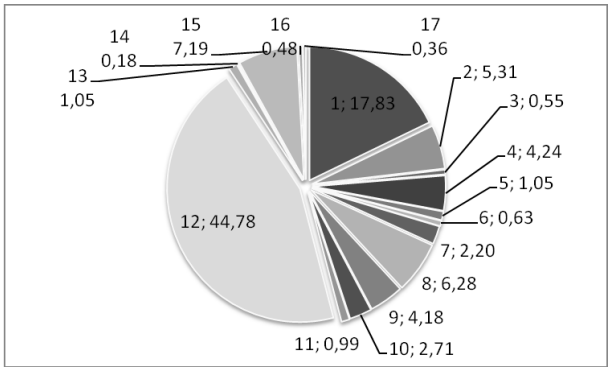

Figure 6. Number of lost deliveries in company's departments presented as a percentage of all lost deliveries for which departments are responsible for (2008)

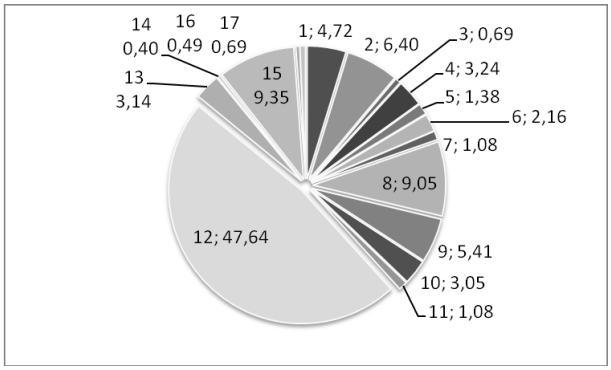

Figure 7. Number of lost deliveries in company's departments presented as a percentage of all lost deliveries for which departments are responsible for (2009)

Except lost deliveries occurrence, there is also a problem with damaged deliveries during transportation process performance (Fig. 8 and Fig. 9). The next metric defines the number of damaged deliveries for which given company's departments are responsible. For this metric, the target level is also defined individually for every department. The total number of transportation damages – which is the target level – encompasses more than 26500 deliveries for 2008 and 60000 in 2009 (see Table 2, metric number 8).

One of the main reasons of transportation damage occurrence is usually connected with improper deliveries' treatment (e.g. small deliveries dropping or hauling). In this situation, there is also a problem to find a person who is responsible for delivery damage.

Moreover, customer usually does not want to accept the delivery with damaged package. Then, the delivery is sent back to the company and may be sold by auction. Another interesting problem is connected with company's completeness with deliveries fulfillment process (Fig. 10). During the chosen operational time interval, the target level for this metrics was equal to 100%. Company did not manage to achieve such a high metric level. However, the company's results reach about 98%.

The company's average time of claims considering process performance is presented in Fig. 11. The target level for this metrics is equal to 10 days in 2008 and 8 days in 2009. Worth taking a note is that the company in their customer service program defines, that the time for making a decision equals to 30 days. The real time of consumer's waiting for the decision was not longer than 8 days in 2008 and 6 days in 2009 (an average) (see Table 2, metrics number 15).

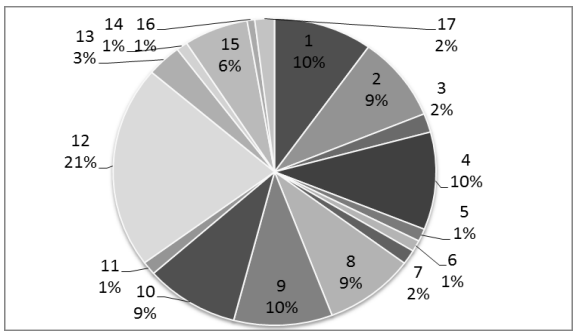

Figure 8. Number of transportation damages in company's departments presented as a percentage of all transportation damages for which departments are responsible for (2008)

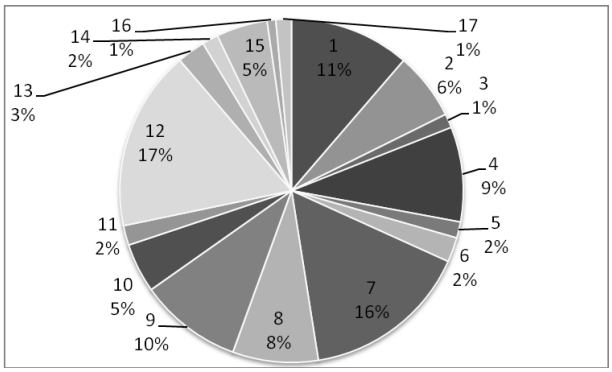

Figure 9. Number of transportation damages in company's departments presented as a percentage of all transportation damages for which departments are responsible for (2009)

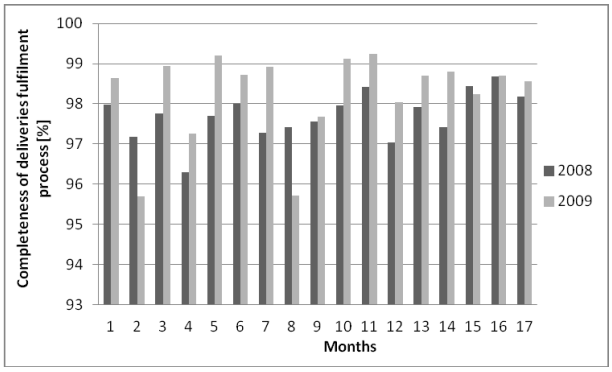

Figure 10. Company's completeness of deliveries fulfilment process

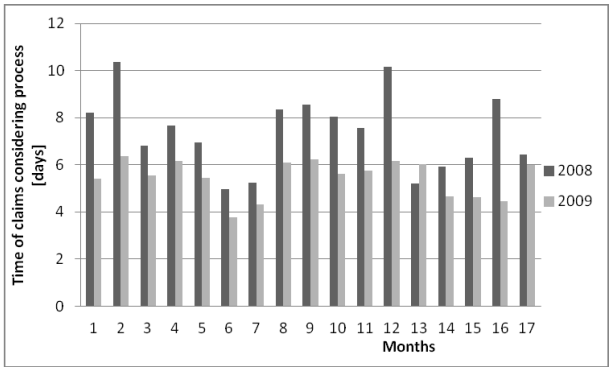

Figure 11. Company's time of claims considering process performance

5. SUMMARY

Logistics services market is the place, where every company has to compete with other participants in the changeable environment with

taking into account various customers' requirements, which may change. As a result, logistics service companies try to continuously improve their offer for sale. Moreover, the quality issues are becoming more important when thinking about customer satisfaction.

The analysed company attaches importance to logistics services quality level. This is confirmed by e.g. different quality certificates obtaining. Besides, logistics operator defines 16 quality metrics, which let him for continuous monitoring of quality level in every department. The analysis results can be used to effectively manage the customer services processes performance and give a possibility to react when any disturbance occurs.

For the defined operational time interval, company' quality metrics levels were obtained on satisfactory level. In 2008 and 2009 four metrics levels was below the target levels. The problems occurred with delivery timeliness and completeness.

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