

THE EFFICIENCY OF INTEGRATORS OF A METALLURGIC PRODUCTS DISTRIBUTION NETWORK

Marzena Kramarz*

* Department of Management and Organisation, Silesian University of Technology,
Gliwice, Poland,
Email: makram5@wp.pl

Abstract Specialization of enterprises in distribution networks realizing processes connected with adaptation of product to specific customer requirements, causes a growing complexity of manufacturing and logistic processes. That is why it is essential for selected enterprises to take over risks associated with co-ordination of processes in so complex systems. The study presented in the article concerns the integrator model in the distribution network which is a prevailing model in the metallurgic products distribution sector. The efficiency of the integrator was examined by means of the the *customer satisfaction index* (CSI).

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1. INTRODUCTION

Building the potential of an enterprise, enabling competitive struggle and using opportunities appearing in the environment is difficult in a turbulent environment where most enterprises must operate. One of the options is gaining resources through cooperation in the network. Such a strategy makes it possible to increase the flexibility of the organization and raises its adaptability to changes in the environment. Networks of enterprises are created in order to develop a new product, exchange resources, obtaining advantages of scale, reduce costs, increase their competitiveness (Ciesielski, 2005), (Ciesielski, 2009). A network of cooperating enterprises distinguishes different business models of enterprises competing with one another. The literature includes the three most often mentioned models (Schweizer, 2005, pp. 31-56): the operator, the integrator and the conductor. The study presented in the article concern the model of the integrator which is a dominant model in the metallurgic products distribution sector. An integrator is a subject most strongly developing in the sector, which accepts the dominant position in the network thanks to the combination of its competences, skills and resources and the potential which it develops thanks to cooperation.

Shaped interorganizational relations are a particularly essential element of the improvement of the efficiency in business lines in which the distribution sector takes over tasks connected with the so-called postponed production. The intensity of collaboration of enterprises within networks increases together with the growth of the uncertainty of orders and the turbulences of the environment. Hence the logistic literature underlines that networks of cooperating enterprises are characteristic for the agility supply chain (Harrison & Van Hoek, 2010). The integrator, as the node synchronizing distributional tasks in the network, must effectively respond to needs reported by the customers. In this context part 2 suggests that the efficiency of the integrator should be measured with the indicator of customer satisfaction. The indicator captures elements of the logistic customer service which were examined empirically in part 4.

The empirical research presented in parts 3 and 4 concentrated on networks of cooperating distribution enterprises in the metallurgic industry. The study presented in part 3 aim at separating from among distributors of metallurgic products those enterprises which fulfil the assumptions of the network integrator model. The purposes of the study whose results were presented in part 4 was to select the crucial elements of the logistic customer service deciding about the efficiency of the integrator in the service of individual segments of consumers. When building the customer service policy through adaptation of standards to particular segment increases a chance for maintaining the customer loyalty.

In order to define the customer expectations and assess the fulfilment of the requirements which individual segments of consumers demand from metallurgic

products and reduce transaction with which customers are not satisfied, the author used a survey among customers of two selected integrators.

2. THE LOGISTIC CUSTOMER SERVICE AS AN INDICATOR OF THE EFFICIENCY OF THE DISTRIBUTION NETWORK INTEGRATOR

The distribution network integrator is a logistic node which is responsible for the duty of synchronization of materials flows and co-ordinations of tasks commissioned to partners in the network. In the analysed metallurgic products distribution network the integrator additionally combines tasks resulting from the realization of the push strategy and therefore tasks of traditional warehouses of metallurgic products as well as tasks resulting from the realization of the pull strategy, resulting from logistic and production processes for the product differentiation strategy. The complexity of tasks for that subject indicates the need to adapt the strategy of the logistic customer service to the preferences of individual market segments.

The logistic customer service includes transactional elements of the customer service. Therefore, wanting to assess the level of customer satisfaction with the logistic customer service one ought to take into account such elements as: the lead time, punctuality, certainty, completeness, complexity, flexibility, availability of products from the stock, competences of the service staff as well as communication convenience. When assessing such elements of the logistic customer service it is worth mentioning such notions as quality or the level of satisfaction. Mitreęa (2008) provides the following definition of satisfaction: "it is a state experienced by an individual and connected with comparing perceived the features of a product and expectations of an individual concerning those features."

The quality of service is formed in the process of exercising it, which involves interaction of the performer with the customer. Differences in notions connected with the customer service can be noticed while analysing gaps in the quality of service presented on Fig. 1.

The first gap arises when the supplier works out the customer service standards which is not adequate to real customer preferences. The second gap concerns the difference between standards established by the supplier and with the in fact performed service. The third gap concerns the situation when the customer perceives the performed service differently than the supplier. The fourth gap arises when the customer cannot describe his or her requirements and perceives his or her requirements and describes it in a different manner. All four gaps must be taken into account in the process of establishing standards and the measurement of the level of customer satisfaction. Selecting the assessment measures inappropriately

will therefore result in wrong operation and strategic decisions, which can then cause losing customer loyalty.

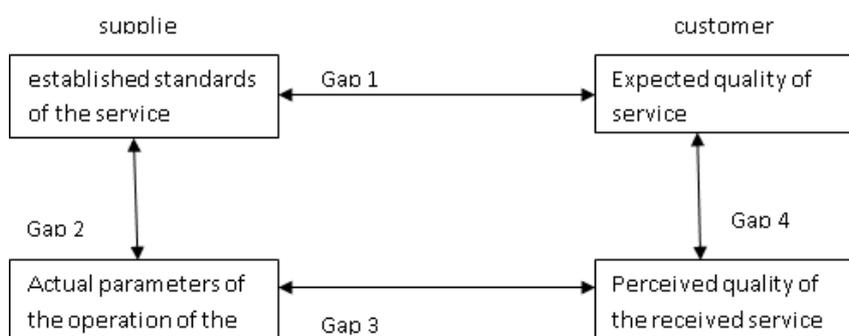


Fig. 1 Gaps in the logistic customer service; Source: (Mitreğa, 2008)

Table 1 The elements of the quality of service, own work

Measures	Characteristics
Availability of products from the stock	Quantity of orders completed realized completely and punctually from the warehouse stock as compared to the entire number of orders
Flexibility	Number of special orders (in respect of the lead time/ordered batch/the form of the product) realized completely and punctually as compared to the entire number of orders
Reliability (certainty, completeness, punctuality)	Quantity of orders realized unfailingly (punctually/surely - not unreliably/completely) as compared to the entire number of orders
Parameters of deliveries	Frequency of deliveries - the number of orders realized within a time unit Size of deliveries - the quantity of goods sent within a time unit or the quantity of goods sent in one delivery Size of the ordered batch
Lead time	Speed of activity - the period from the moment of the arrival of the order to the moment of the acceptance of goods by the customer
Completeness	Quantity of orders realized completely (in respect of ordered assortment) in the time limit required by the customer

The customer loyalty refers to the customer behaviour, it is whether he or she wants to return to a given firm, and is a consequence of noticeable customer satisfaction from the accomplished purchase expressed by the level of the customer satisfaction.

Based on the presented elements forming the customer satisfaction level as regards the logistic customer service, Table 1 provides a lists of key measures allowing quality measurement.

The key issue in creating an appropriate management system for customer relations and achieving the customer satisfaction is to adapt the service policy to the identified customer needs. The most important tools which are used in this purpose include segmentation of customers and marketing research, thanks to which one can identify determined groups of customers and define their needs and requirements towards the supplier (Czekańska, 2009). The above mentioned marketing tools make it possible to develop a customer service policy adapted to individual needs of a given group of buyers.

The level of the logistic customer service is a consequence of suitably designed logistic processes. Therefore, using market segmentation for creating the competitive advantage through diversification of the logistic customer service one should:

- carry out an analysis of the present approach towards market segmentation
- define new market segments (optionally)
- identify purchase behaviours of customers characteristic in each segment
- analyse values for the customer
- identify determinants of the logistic strategy in each segment and define logistic strategies for each segment.

Regardless of the perspective (an enterprise, a supply chain, a network) of formulating a strategy of the customer service the first stage of research is market analysis. Completion of the market research stage provides an enterprise with information about the manner in which the customer expectations and preferences are shaped with relation to the issue of customer service. It allows not only defining which elements of the service are essential for customers, but also what is the relative importance credited to them. It is the basis for carrying out a segmentation of the whole market through distinction of groups with similar requirements.

A segment will be understood here as a group of consumers (customers) of a given enterprise which is characterizes by the same requirements and expectations towards to the level of the customer service. As regards the homogeneous market, the segmentation process is closed in treating the whole market as a specific segment. In such a case a uniform service pack for all consumers is used, obviously taking into account the list and the importance of its particular elements on this list. However, considerably more frequently one can observe differentiation among customers, and consequently it becomes essential to use one of segmentation techniques.

One of measures examining the customer satisfaction is the *Customer Satisfaction Index* (CSI), used in part 4. The *Customer Satisfaction Index* (CSI) serves as a tool for measuring the customer satisfaction with the offered products and services (Gadde & Hakansson, 2001). This is the most complex indicator for assessing the customer satisfaction. Since on one hand it allows a complex analysis of all elements of the logistic customer service and on the other hand it

gives a possibility to rank individual elements according to the preference of individual segments of consumers, it becomes a useful and essential tools for assessing the efficiency of the a distribution network integrator. An integrator obtaining high values of the CSI for individual segments of consumers builds a competitive advantage allowing further development of network relations. On the other hand, suitably designed network relations supporting logistic processes and widening the range of processes connected with product differentiation raise the level of customer satisfaction and therefore the value of the CSI for individual segments.

Determining the CSI requires executing a survey and allows measuring and analysing the level of customer satisfaction on all levels of contact with the customer (the analysis of processes before, in progress of and after sale). It is a tool to support making decisions connected with the marketing strategy and determining the standards of the customer service.

Thanks to the results of CSI several questions can be answered as follows:

- what the customer expects,
- which of the expectations are the most important for the customer,
- to what extent the customer expectation are fulfilled,
- which elements connected with service and products are worth investment

The CSI was determined in the following steps:

- Survey
- Analysing segments of consumers according to the degree of importance of individual elements of the logistic customer service
 - Determining average assessments of individual elements for individual segments and assigning the degree of importance to them

Determining the CSI according to the formula (Gadde & Hakansson, 2001):

- Weighed significance of the feature for and the i requirement was calculated on the basis of the formula:

$$w_i = \frac{\sum_{j=1}^K w_j}{\sum_{i=1}^N \sum_{j=1}^K w_{ij}} \quad (1)$$

where:

w_i - the coefficient of significance (importance) of the i requirement,

j - next customer,

K - the sum of the respondent customers

i - the number of the next requirement,

N - the number of examined requirements

- CSI indices, and proportional assessments of individual CSI indices using the formulas (2)-(4):

The indicator CSI:

$$CSI = \sum_{i=1}^N w_i * C_i \quad (2)$$

where:

CSI - the customer satisfaction index,

c_i - assessment of the customer satisfaction with the i requirement

The indicator of maximum obtainment of the CSI_{max} result expressed by means of the formula:

$$CSI_{max} = \sum_{i=1}^N w_i * C_{i_{max}} \quad (3)$$

where:

CSI_{max} - the maximum possible CSI,

$C_{i_{max}}$ - the maximum possible assessment of i requirement,

The proportional CSI was calculated using the formula below:

$$CSI_{\%} = \frac{CSI}{CSI_{max}} * 100\% \quad (4)$$

where:

$CSI_{\%}$ - the CSI value expressed in percentages,

CSI_{max} - the maximum possible CSI.

3. THE INTEGRATOR OF THE METALLURGIC PRODUCTS DISTRIBUTION SECTOR

The metallurgic products distribution sector is a mature sector. The group of Polish leaders in steel distribution has remained almost unchanged for several years. As regards the steel turnover, the leading position has been held by ThyssenKrupp Energostal for four years. In 2009 the second position was occupied by Budmat, and the third position by ArcelorMittal Distribution Solutions (Raport Roczny PUDS 2009). It must be underlined that the ranking embraces enterprises which are members of the Polish Steel Distributors Group, hence it does not take into account such a strong player on the market as Stalprodukt.

Simultaneously the metallurgic products distribution sector in Poland is changing constantly. The changes are connected with consolidation of the sector. The enterprises in the distribution network have already been consolidated to a significant extent but not to such a degree as in the production part of the supply chain. It is underlined that consolidation of the distribution sector aims at separating the strongest subjects strongly diversifying their activity. Other

participants of the distribution network will compete by means of strong specialization and concentration on market niches.

The strongest subjects in this business integrate the processes along the added value stream. Actors of this type will be named network integrators. Among the criteria for distinguishing integrators in a network, the following items were taken into account: product flow streams (as regards enterprises in the metallurgic products distribution sector they are defined by their position in the top 30 according to tonnage), the number of processes completed in the value added stream, the scope of the enterprise's influence, the width of one's own distribution network, the turnover of products according to the ranking list by the Polish Steel Distributors Union, the assortment variety. In the process of distinguishing integrators in a network the discriminative analysis was used.

On the basis of the analysis of the steel distributors market, including the share of individual enterprises in the market and the intensity of the formed relations, it can be noticed that 20 enterprises from the database of the Polish Steel Distributors Union are definitely distinguished from the collection of all the participants of the metallurgic products distribution sector. At the same time it was hypothesized that these subjects are potential integrators of the network. The discriminative analysis taking into account selected attributes of the integrator indicated the correctness of the preliminary classification.

The next stage of the study included in part 4 presents an evaluation of the efficiency of selected integrators of the metallurgic products distribution network from the perspective of the logistic customer service.

4. THE EFFICIENCY OF DISTRIBUTION NETWORK INTEGRATORS

Distribution network integrators are chain links of the supply chain directly evaluated by final customers. Hence, the evaluation of the efficiency of integrators takes into account elements of the logistic customer service. The assessment of customer satisfaction used the *customer satisfaction index* (CSI). The research was carried out on two selected integrators of the metallurgic products distribution network classified to the group of integrators in part 3. For this purpose surveys were carried out directed to customers of selected integrators. Respondents evaluated integrators on the basis of mentioned elements and they ranked individual elements. The CSI was developed for individual segments appointed on the basis on business lines according to sections and industrial manufacture departments (Table 2).

Table 2 CSI Indicators

Segment	CSI index	Approximately for a business line		
		CSI	CSI ^{max}	CSI%
S1 electricity, gas and water production and supply	356.8	374.4535	500	74.890
	391.5			
	375.0			
S10 production of other transport equipment	330.7	380.3831	500	76.076
	435.3			
	375.2			
S11 production of household appliances	360.1	381.4977	500	76.299
	418.5			
	365.9			
S12 - individual consumers	361.3	340.5836	500	68.116
	293.5			
	293.5			
	333.8			
	390.3			
	371.2			
S2 - construction industry	363.1	363.1000	500	72.618
S3 - production of metal products	424.0	406.0117	500	81.202
	388.1			
S4 - production of machines and devices	474.4	381.8345	500	76.366
	317.4			
	336.7			
	423.3			
	369.1			
	338.4			
S5 - production of office machines and computers	385.0	377.5769	500	75.515
	370.2			
S6 - steelworks products trade	341.2	341.2000	500	68.241
S7 - production of radio and television equipment	349.2	375.6276	500	75.125
	402.1			
S8 - production of medical, precision and optical instruments	393.3	377.8095	500	75.561
	362.3			
S9 - production of motor vehicles, trailers and semitrailers	296.5	354.169	500	70.833
	411.8			

The findings presented in Table 2 indicate slight differences in assessment of the quality of customer service in individual segments. Most of the findings indicate that customer service standards are ensured in above 70 % by the investigated enterprise. This is not a satisfactory result. The integrator of the distribution network should endeavour to form its potential and network relations in order to ensure the standards in above 90% and the key segments even in above 95%. Fig. 2 presents findings as regards the CSI for individual lines of consumers.

Indicating elements of the logistic customer service which are priority in building the policy of customer service requires re-segmenting consumers on the basis of other criteria than those used so far. It is so because the business line of consumers is not a criterion which significantly differentiates customer preferences. The elements which were the most weakly evaluated were: flexibility in reactions to non-standard orders both as regards the product form or the ordered batch and the availability of the product from the stock, which with the highest significance of this parameter contributed to a low final assessment expressed with the CSI. It is these parameters which will decide about the integrator's efficiency. Simultaneously they indicate two segments of consumers: ordering standard products on the basis of the push strategy (priority availability of the product from the stock) and requiring product differentiation and completion of an order on the basis of the pull strategy (priority flexibility). The remaining elements obtained a high assessment above 4.5. Therefore, thanks to cooperation with other participants of the network, integrators of the metallurgic products distribution network should strengthen those two parameters properly selecting forms of collaboration in order to raise efficiency.

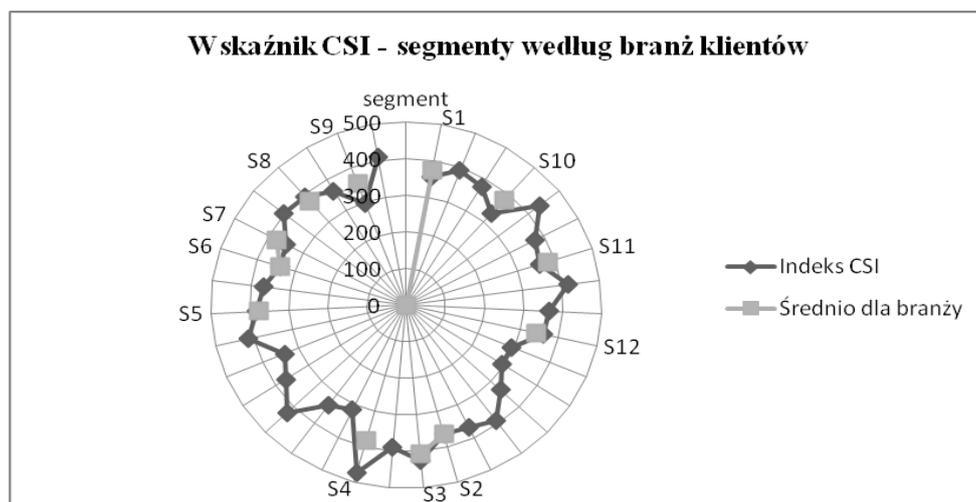


Fig. 2 The CSI according to customers' business lines, Source: own work

5. CONCLUSION

The metallurgic products market surrenders to very dynamic changes, which forces enterprises to adapt marketing and logistic activities to the present requirements. The presented investigations identify crucial elements of the logistic customer service which decide about the efficiency of an integrator of a metallurgic products distribution network. The study also indicated attributes which allow distributors to take the role of an integrator of a metallurgic products distribution network.

The customer satisfaction index (CSI) applied in part 4 indicated that when raising efficiency an integrator should pay attention to improving such elements as flexibility in reacting to non-standard orders and the availability of products from the stock. However, adapting the service strategy to the buyer preferences requires re-executing the segmentation of consumers.

The specialization of enterprises realizing processes connected with adapting a product to specific customer requirements, results in a growing complexity of manufacturing and logistics processes, and what is connected with it, requires differentiated resources for realization of these processes. Cooperation strategies are mentioned as some of innovative strategies which have to provide an enterprise with flexibility via access to specialized resources and the use of innovative knowledge from their partners in the environment. The integrator's cooperation with other network participants gives an opportunity to enlarge the potential enabling complex realization of highly individualised and difficult to predict customer orders. Hence, that the integrator makes an appropriate choice of network partners is extremely essential for increasing the evaluation of flexibility of completed orders.

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BIOGRAPHICAL NOTES

Marzena Kramarz, doctor, engineer, an Assistant Professor at the Institute of the Management and Administration on the Faculty of the Organization and Management the Silesian University of Technology. Her research interests: supply chain management, management of logistic processes in supply network, logistic strategies, strategic alliances, organization of distributions network, partnership.