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LOGISTIC SERVICE IN INNOVATIVE PRODUCTS DISTRIBUTION CHANNELS AS A FACTOR OF OPTIMAL STRUCTURE

The article studies logistic service under the conditions of optimal structure of the innovative products distribution channels, which provide the delivery of innovative products or services from producer to consumer, taking into account the interests of both parties.

Keywords: *logistics; distribution channel; innovative product; optimal structure.*

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ЛОГІСТИЧНЕ ОБСЛУГОВУВАННЯ У КАНАЛІ РОЗПОДІЛУ ІННОВАЦІЙНОЇ ПРОДУКЦІЇ ЯК ЧИННИК ЙОГО ОПТИМАЛЬНОЇ СТРУКТУРИ

У статті досліджено логістичне обслуговування в умовах формування оптимальної структури каналів розподілу інноваційної продукції, що забезпечує доведення інноваційного товару чи послуги від виробника до споживача, враховуючи одночасно інтереси обох сторін.

Ключові слова: *логістика; канал розподілу; інноваційна продукція; оптимальна структура.*
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ЛОГИСТИЧЕСКОЕ ОБСЛУЖИВАНИЕ В КАНАЛЕ РАСПРЕДЕЛЕНИЯ ИННОВАЦИОННОЙ ПРОДУКЦИИ КАК ФАКТОР ЕГО ОПТИМАЛЬНОЙ СТРУКТУРЫ

В статье исследовано логистическое обслуживание в условиях формирования оптимальной структуры каналов распределения инновационной продукции, что обеспечивает доведение инновационного товара или услуги от производителя к потребителю, учитывая одновременно интересы обеих сторон.

Ключевые слова: *логистика; канал распределения; инновационная продукция; оптимальная структура.*

Problem statement. One of the main challenges for domestic producers is prompt satisfaction of demands, formed by marketing, with minimal expenses. It should be provided by efficient movement and products preservation while delivering them to final consumers, and permanent increase of the level of logistic service. The basic tool to perform such tasks is optimally structured distribution channels, which is applied by the enterprise to bring end products to target consumers. At the same time distribution channels not only affect the entire marketing program of an enterprise, but also provide long-term commercial agreements with its participants, which are difficult to be changed in future. Depending on the size, power of a producer, products variety and other factors, an enterprise may have one, few or many distribution channels. Besides, they may differ by structure, trade intermediaries' types and intermediate storages, carriage, transport types etc. Within this framework, the topical problem is to form optimal distribution channels and this needs to be investigated further.

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Latest research and publications analysis. National and foreign scientists pay considerable attention to the theoretical and methodical grounds for distribution channels management. In particular, they present the approaches, which are connected with channel forms and structure choice. The above researches have been accomplished by D. Bowersox et al. (2000), P. Kotler (2011), A.V. Woichak (2000), Y.V. Golubin (2006), O.M. Trydid (2003), L. Stern et al. (2002), V.G. Shcherbak et al. (2013) and others. The problems with controlling streams in distribution channels are reflected in the works by M.P. Gordon and S.B. Karnaukhov (2001), D. Johnson et al. (2002), D.O. Ivanov (2006), Y.V. Krykavskyi et al. (2009), R. Handfield and E. Nickols (2003) and others. Methods to organize product distribution channels are presented in the works of V.V. Apopiy (2007), A.M. Vynogradska (2006), N.O. Goloshubova (2004) and others. The research on nonconformities between real service quality and consumers' expectations is described by A. Parasuraman et al. (1985), K. Grongroos (1978), R. Lewis and B. Booms (1983). D. Lambert and A. Sharma (1990), D. Stock and D. Lambert (2002) explored the issues related to service audit.

In practice, the optimal structure of innovative products distribution channels is an unresolved issue. It provides the effective logistic service and bringing innovative goods or services from producers to consumers, taking into account the interests of both parties.

Thus, **the research objective** is to improve theoretical and methodical approaches to form the optimal structure of innovative products distribution channels, based on the logistic service.

Key research findings. *Optimal structure of innovative products distribution channels* is considered as a ratio of quantity and distribution line participants' types, which deliever innovative products or services from producers to consumers, taking into account their interests.

We suppose that the optimal distribution line formation is based on qualitative analysis of channels length and width, intermediaries' types, included in to it, and is conducted upon their conformances to two main *requirements* (Figure 1):

1) potential to create conditions to achieve the objectives set by commodity producer (new market penetration, desired market segment providing, support for new good differentiation measure etc.);

2) adequate service of target markets consumers.

Let's observe them in details.

The realization of the *first requirement* is possible, if you take into consideration the following *factors* (Stern et al., 2002):

1. Market type determination.
2. Sales volume at the market typical for the enterprise.
3. The level of purchasers' concentration by geographical feature.
4. Consumers' habits.
5. Profit level.
6. Necessities in sale and post-sale technical services.
7. Enterprise size and its financial situation.

R. Lewis and B. Booms (1983) wrote that service quality essence consists in how much it satisfies consumers' expectations on average. It assumes that clients may have nonconformities between real received logistic service and expectations. To analyze

the mentioned differences one suggests to use the adapted model of A. Parasuraman et al. (1985), which defines the place of nonconformities (Gap) on the way to meet consumers' expectations of logistic service (Figure 2).

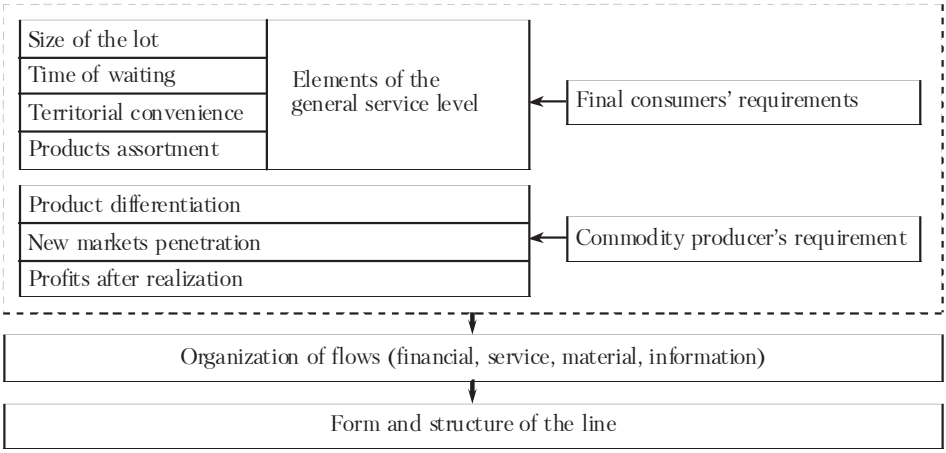

Figure 1. **Requirements to form and structure of the distribution line,** *authors' constructions*

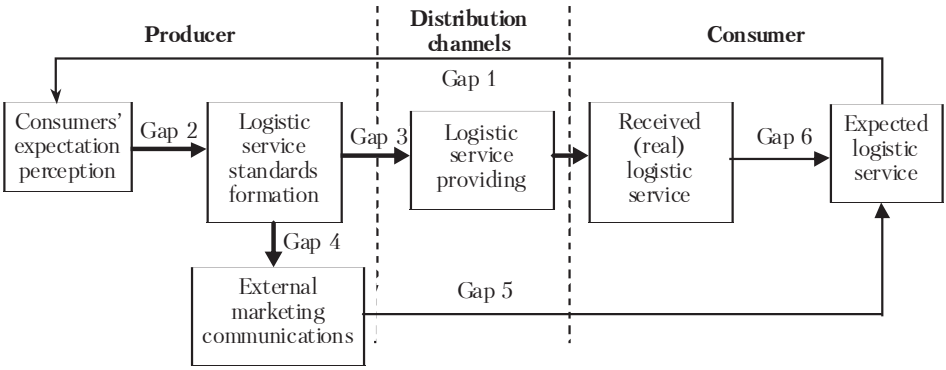

Figure 2. **Adapted Gap-model of nonconformities on the way to meet consumers' expectations of logistic service,** *authors' constructions*

As we see from Figure 2, there are the following gaps on the way to meet consumers' expectations of logistic service:

- a gap between consumers' expectation and producer's perception of these expectations (*Gap 1*);
- a gap in the conversion process of consumers' perceived expectations by producer into logistic service standards (*Gap 2*);
- a gap in the process of logistic service provision affecting distribution channels participants' impossibility to interpret the settled logistic service standards in the right way (*Gap 3*);
- a gap in the process of interpreting logistic service standards into marketing communications (*Gap 4*);

- a gap in the process of external marketing communications impact on consumers' expectations formation (*Gap 5*);
- a gap between received and expected by consumers logistic service (*Gap 6*).

Hence, internal and external to reveal the abovementioned gaps is suggested. D. Stock and D. Lambert (2005) among the main tasks of ***external audit*** emphasize the following ones:

- to determine important service elements for consumers to make a decision to purchase;
- to define how consumers accept the service, offered by sellers.

Thus, the external audit results in information obtaining on real service level and the level, expected by consumers from producers (*Gap 6*).

The main aim of ***internal audit*** is to reveal the nonconformities in techniques, used by a company, and those, which cause the gaps between real and expected by consumer logistic service.

By the data, received through the audit, it is proposed to create the matrix of competitive positions with such coordinates: weighting and estimation of the proper factor (Figure 3).

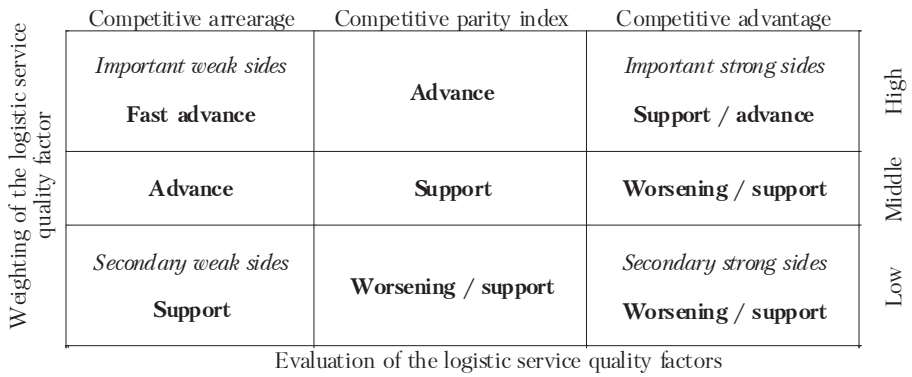

Figure 3. **Competitive positions matrix,** *improved by the authors on the basis of* (Golubin, 2006; Trydid, 2003)

The weight of the logistic service quality factor is determined by the expert method (Novosad et al., 2009). It is necessary firstly to form representative experts groups, which may be found in formal and informal ways. While using the formal way the experts' quantity is determined on the basis of special calculations (Novosad et al., 2009; Mironova and Grabovetskyi, 2009). The informal method involves an indefinite number of experts (10–20 persons), although in some cases there may be more or less of them.

An expert group is formed by competent persons in logistic service representing interests of various groups. Particularly it may include managers and leading specialists at the enterprise, for which this analysis is conducted, and counter-agents, who participate in logistic service and involved experts concerning working conditions at the analyzed market.

Weighting of each factor is calculated by the formula (Novosad et al., 2009; Mironova and Grabovetskyi, 2009):

$$W_{Ei} = W_{Mi} \frac{\sum_{j=1}^{m} W_{ij}}{\sum_{i=1}^{n} (\sum_{j=1}^{m} W_{ij})}, \quad (1)$$

where m – the quantity of experts; n – the quantity the factors observed; W_{ij} – the rank, obtained by the i-th estimated factor, set by the j-th expert.

The sum of weights is equal to 1.

After that one should find experts' thoughts conformity while evaluating the logistic service quality factors. We propose to use the Kendall's concordance coefficient (agreement) W (K_{conc}) and the Pearson's criterion (X^2).

Concordance coefficient is calculated by the formula (Novosad et al., 2009; Mironova and Grabovetskyi, 2009):

$$K_{conc.} = \frac{12\sum_{j=1}^{n} d_j^2}{m^2(n^3 - n) - m\sum_{i=1}^{m} T_i}; \quad (2)$$

$$d_j = S_j - \frac{\sum_{j=1}^{n} S_j}{n}; \quad (3)$$

$$S_j = \sum_{i=1}^{m} R_{ij}; \quad (4)$$

$$T_i = \sum_{i=1}^{L} (t_e^3 - t_e), \quad (5)$$

where l – the quantity of connected (similar) ranks; t_l – the quantity of connected ranks in each group.

The concordance coefficient is changed within $0 \le K_{conc} \le 1$. The bigger concordance coefficient is, the higher is the level of experts' agreement, with full agreement of experts' thoughts $K_{conc} = 1$, and full disagreement $K_{conc} = 0$. Its low value may be received either without all experts' thoughts generalization, or with opposite thoughts between experts' subgroups, although the group has high agreement level.

Statistical significance of the concordance coefficient is checked by the Pearson's criterion (X^2) (Novosad et al., 2009; Mironova and Grabovetskyi, 2009):

$$X_p^2 = \frac{12\sum_{j=1}^{n} d_j^2}{m \times n \times (n+1) - \frac{1}{n-1}\sum_{i=1}^{m} T_i}. \quad (6)$$

The calculated value (X_p^2) is balanced with the table value (X_m^2) for n-1 freedom stages and trustful probability (P = 0.95 or P = 0.99). If $X_p^2 > X_m^2$, the concordance coefficient is essential, if $X_p^2 < X_m^2$, it is necessary to increase the experts' number in the group.

In order to estimate the characters of low, middle and high weighting factors concerning logistic service quality it is necessary to determine the maximum (max)

and minimal (min) value for matrix analysis. Intermediate values (k_1, k_2) are calculated by the formula:

$$k_1 = \min + (\max - \min) \div 3; \qquad k_2 = \min + 2 \times (\max - \min) \div 3. \tag{7}$$

Factors, appearing in the box "competitive advantage – high weighting" are the strongest in producers' hands. And another most important but weak point here is "competitive arrearage – high weighting". These factors need fast improvement, because they are very important for consumers. Factors in the box "competitive advantage – low weighting" is the secondary strong side of enterprises. They are not important for consumers, that's why it is necessary to support and persuade consumers that they are important, otherwise one has to decrease the level of resource provision for their support.

The choice of options to form the *line structure* is determined with such *objectives*:

- to provide sales;
- to decrease the maximum expenses for intermediaries' service.

Analyzing the distribution channels structure, it is obvious that each line has its own features depending on economy branches and differences while creating each of them. Differences in distribution channels are evidenced within one enterprise due to separate product categories. It is attributable to goods consumption specificity.

More firms, engaged in products distribution, propose them to the market through intermediaries. Each of them tries to form its own channel.

Thus, while choosing *distribution line structures* the following *factors* for technical and economic analyses are:

- to define the number of possible intermediaries due to the distribution policy type (exclusive, intensive or selective), marked price (with and without discount), from formed market price and probable trade margins, made by each channel participant;
- to choose intermediaries' type by legal and economic features and by volumes, which they are able to buy;
- to choose the line's organization scheme (functional and linear, divisional or matrix);
- to define the principles of clearing payments;
- to estimate the variety of stocking logistics (storage is on the enterprise's territory, how close to consumers etc.) and transport logistics (own or rented transport etc.).

Thus, the mechanism to make decisions on the distribution line optimal structure is based on economic and technological distribution reasonability analysis, beneficial for both producer and final consumers. Besides, one should take into account the intermediaries' motivation system while making decisions concerning their participation in the line, possibility to control their actions and joint work risk level.

Conclusions and perspectives for further research. Intermediaries, who are in the channel and do the same work, not always conduct it up to the same level: relations with some intermediaries will be more beneficial, than with the others. To determine which line makes more profit for a company, it is necessary to analyze each relation aspect with separate intermediaries. Having divided intermediaries into groups by

profitability, the company-supplier may conduct differential policy towards its partners, at the same time optimizing sales.

Nowadays distribution channels structure, particularly, to analyze the existing situation is an important constituent of enterprise activity. That's why it's important to investigate this problem further.

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