Scientific and Methodical Approach to Formation of Optimal Structure of Innovative Products Distribution Channels

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Introduction

One of the main problems faced by domestic producers is a quick and timely satisfying demand formed by marketing with minimum cost by providing efficient movement and safety products storage during their delivery from producer to end user, as well as constantly improving level of after-sales service. The main tool capable to perform such tasks is optimally structured distribution channel, which uses company for bringing manufactured products to target consumers. Moreover, distribution channels are not only a fundamental impact on almost all marketing program of enterprise but also involve conclusion of long-term commercial agreements with its agents that are very difficult to change.

Depending on size, power of manufacturer, diversity of products and other factors, company may have one, several or many distribution channels, and different of them may vary in structure, types of resellers and intermediate warehouses, methods of goods delivery, means of transport etc. Based on this, the problem of optimal distribution channels is actual and requires further study.

1. Analysis of the last researches and publications

In the works of foreign and domestic scientists (Donald J. Bowersox, David J. Closs, 2005; Stern JI.B., El-Ansari A.I., Koflan, E.T., 2002; Kotler F., Armstrong G., Saunders D., Wong V., 2006; Robert B. Handfield, Ernest L. Nichols, Jr. 2003; Daniel L. Wardlow, Donald F. Wood, James C. Johnson, Paul R. Murphy, jr., 2002; K. Lysons, M. Gilingham, 2005; Ivanov D.O., 2006; Vinogradska A.M., 2006; Voichak A.V., 2000; Garkavenko S.S., 2006; Gertsik V.A., Fedorova J.K., 2007; Golobushova N.O., 2004; Golubin E.V., 2006; Gordon M.P., Karnauhov S.B., 2001; Kalchenko A.G., Kryveschenko V.V., 2008; Krykavskiy E.V., 2004; Trydid M.O., Tankov K.M., 2005; Scherbak V.G., 2004) and others deeply elaborated theoretical and methodical bases of managing distribution channels, highlighted approaches related to a study on management of flows and relationships in distribution channels. But as practice shows, there is an unresolved problem of choosing optimal distribution channels for innovative product. Therefore, the purpose of this paper is development scientific and methodical approach to formation of optimal structure of innovative products distribution channels.

2. Essence and meaning of optimal structure of innovative products distribution channels

Under the optimal structure of innovative products distribution channels is meaning a ratio of members number per distribution channel that provides bringing innovative product or service from producer to consumer which takes into account interests of both parties at the same time.

In other words, in order to build an optimal structure of the channels it's required to find out the aspect ratio (ratio of the number of members of a channel between them), required to use the services of certain members of the distribution channel for bringing innovative products or services to the final consumer. At the same time the interests of both the producer and the consumer needs to be taken into account.

For finding out an optimal structure of distribution channels, we offer to perform a certain sequence, which provides seven steps, which are united in 5 stages (Fig. 1).
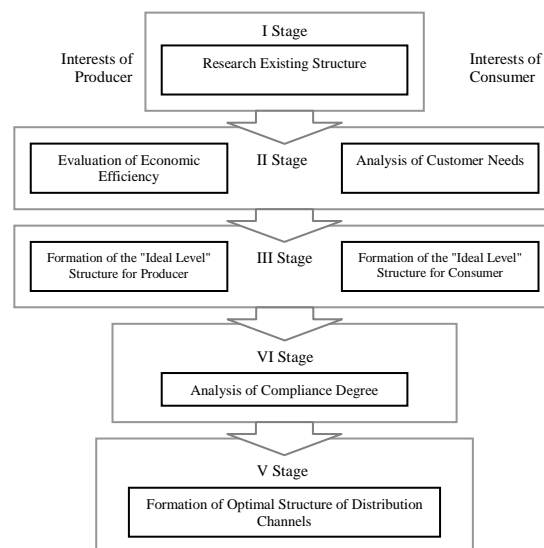

Fig. 1 A Scheme of Formation of Distribution Channels Optimal
Structure from Standpoint of Producer and Consumer

3. Investigation of the existing forms and patterns of distribution channels provides the analysis of length and width of channels, types of resellers, that relates to it, and is made on the basis of their compliance with two basic *requirements* (Fig. 2):

1) ability to create conditions for achieving manufacturer's goals (entering the new markets, ensuring desired market share, maintaining a degree of differentiation of a new product, etc.);

2) compliance with the level of customer service on the target markets, creation of an appropriate system of guarantees of timely and appropriate delivery of goods.

Let's consider them in details.

Thus, realization of the *first requirement* is possible, if such factors are taken into account (Trydid, 2005):

1. *The definition of market type* – it can be vertical (if a company sells its goods to one or a few industries in terms of a small number of companies in each) or horizontal (it exists in presence of a large number of buyers from many industries. In the second case it is advisable to involve key resellers.

Size of Consigment		
Waition Time	Elements of General Level of Service	Requirements of the End Consumer
Territorial Convenience		
Product range		

Product Differentiation		
Entering New Markets		Requirements of the Manufacturer
Profit from Sales		

Flow Organisation (Financial, Service, Material, Information)
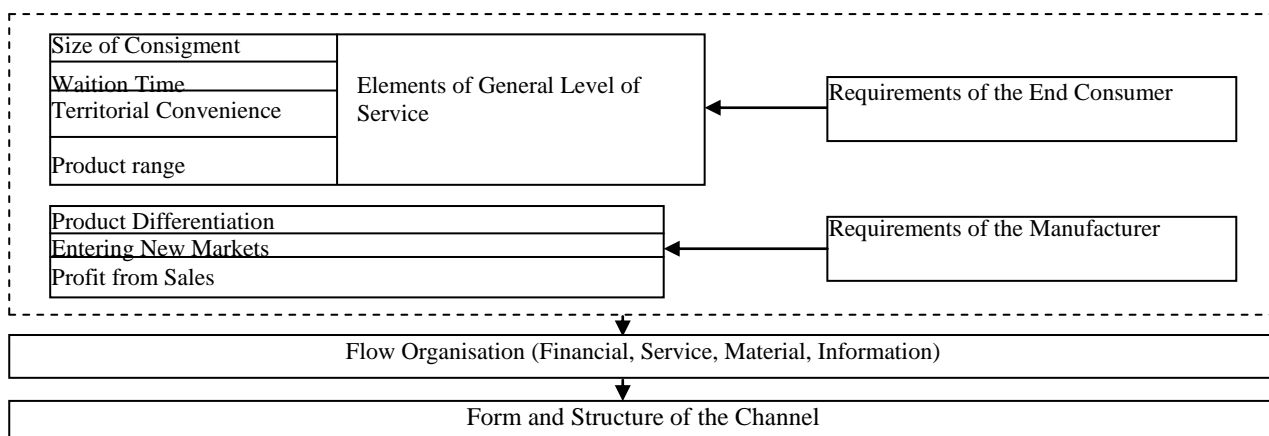
Form and Structure of the Channel

Fig. 2 Requirements Regarding the Form and Structure of Distribution Channel

2. *The Size of the sale on the enterprise market.* The company on each market selling products in large quantities forms channels zero level for the sales conditions. In the case of small volume of sales that channel can be inefficient from the sales cost point of view.

3. *The determination of the level of concentration of buyers on a geographic basis.* High geographical concentration of customers determines the feasibility of channel zero level.

4. *Consumer habits.* The company determines the habits of consumers in respect of quantities of the goods, delivery terms and other.

5. *The definition of the rate of profit.* The existence of tangible difference between the cost of the item and sell price gives an opportunity to form a more complex and expensive distribution channel.

6. *The definition of needs in sales and after-sales technical service.* The high complexity of the supplied equipment requires the direct participation of the manufacturer in conducting installation, pre-commissioning and supervision of its operation by the consumer. In these circumstances the formation of channel zero level or with the involvement of service structures is inevitable.

7. *The size of the company and its financial state.* The possibility of creation of the enterprise with necessary units and adequate financial support give grounds for the formation of the channel zero. Otherwise it leads to involving wholesale brokers.

The *second requirement* is possible under condition of implementation of the approach developed by L. Baklin (Stern, 2002), which determines that in order to ensure their existence in the long term, channel member should perform marketing function in order to reduce the time of searching, waiting time after purchase, storage costs and other expenses. Even when other characteristics of the products can be the same (especially the price), the end user will choose the place of purchase, that will provide a higher level of service. That is why service level has a determining influence on the structure of the channel and is a crucial factor in the choice of the consumer.

The overall level of service is determined by the following main factors (Stern, 2002):

1) territorial convenience;
2) the size of the party;
3) the waiting time or delivery;
4) assortment (width and depth).

Territorial convenience achieved through decentralization wholesale and retail selling points, increases customer satisfaction because it reduces the need for transportation and the cost of searching for the right product. For example, local shopping centers, regional supermarkets, vending machines, etc., designed to meet the requirements of territorial convenience.

Furthermore, it is clear that *the number of items* that is purchased by each transaction affects the welfare of the final consumer, which may be as large industrial enterprises and small private company. If the system of marketing channels

allows buyers to purchase goods in small batches, the buying process can proceed directly to the process of consumption. If customers need to buy large quantities of goods, there is a discrepancy in the acquisition and consumption, and consumers need to make additional costs for storage and maintenance of purchased goods. Therefore, the smaller the size of the consignment consumer can buy in the channel is, the higher the overall level of service in the channel and the price of the goods to the buyer will be.

The third element that determines the overall level of service is the *waiting time*, i.e. the time that is necessary to wait by the final consumer (eligible for both either manufacturing or consumer goods) from the date of placing an order for a product till obtaining it. In this case, the larger the waiting time is, the more the inconvenience a buyer will have, trying to plan their consumption to maximize long term. Typically, if the consumer agrees to wait, that waiting is compensated with lower prices for goods or services, such as when you order products from catalogs. And the wider *range of products* available to consumers is, the higher the overall level of service marketing channels will be. This also applies to the spending on distribution of products, because diversification makes it necessary to hold bigger inventory.

The main goal of all these elements is to provide the highest quality of service. Quality of service is defined as the degree of consistency between expectations and the perception of the consumer. In other words, the quality of service is high, if the actual level of service is greater than or equal to the customer's expectations, and low if it does not meet these expectations.

The higher the requirements for General service level are, the more likely inclusion in structure of the reseller channel will be. Therefore, if consumers want to buy goods in small batches, then, most likely, numerous intermediaries that perform sorting operations between the mass producer and the final consumer will appear on market. The reduction of the waiting time will lead to decentralization of sales points and to increasing the number of intermediaries in the structure of the channel (Stern, 2002).

Thus, the final shape and structure of the channel is formed under the influence of the need for achieving economic efficiency of each of the flow in the channel and satisfaction of requirements of consumers in spheres of various elements of service. This would be optimal structure in which the total costs of the system (both commercial and costs for the final consumer) are minimized by setting the appropriate level of service.

Among other factors, used for distribution channels analyze, it is necessary to call:
– the enterprise's reputation as a business partner;
– financial condition;
– minimizing the cost of merchandising;
– stability of supply;
– availability of information;
– risk level reduction etc.

Choice options when forming the structure of the channel are determined by the following purposes:
– providing reliable sales;
– minimizing the costs of services of intermediaries.

By analyzing the structure of distribution channels, it becomes obvious that each channel has its particular qualities depending on the sectors of the national economy and the differences in the structure of each of them. Differences in distribution channels exist even within the same company because of different product categories. This can be explained by the specifics of consumption of certain goods, which are being sold.

The channel width analysis implies the determination of the number of independent participants of product distribution at each stage. *The length of the channel* depends on such characteristics of consumers (Golubin, 2006):
– quantity;
– geographical distribution;
– consumer habits;
– attitude to different methods of sales.

The most companies that distribute products offer them on the market through resellers. Each of them is trying to form their own channel.

Thereby, the following indicators are eligible for technical and economic analysis when selecting *structure of distribution channel (Marketing, 2004):*
– the definition of the quantity of possible intermediaries, depending on the type of distribution policy (exclusive, intensive or selective), selling price (with and without discounts), the current market prices and the possible distribution margins made by each channel members;
– the selection of the type of intermediaries on the legal and economic characteristics and the volume of goods they can buy, and also based on analysis of the advantages and disadvantages of each type on the key tasks of the company in the sphere of distribution;
– the scheme selected for channel organization (functionally-linear, divisional, or matrix);
– the definition principles of settlement between the manufacturer and resellers;
– the assessment of variability of warehousing logistics (if the warehouse is located on the territory of the enterprise, how close is it to the consumer, etc.) and transport logistics (availability of own or rented transport, etc.).

Usually the manufacturer is focused on different distribution channels. They take into account that a small number of intermediaries is easier for ensuring close links with them, and, by doing that, guarantee a significant impact on their work and achieve thorough training of sales staff and others. However, the focus on a small number of agents that are working on the market in parallel, and the failure to complete the contract by one of them may cause considerable

commercial losses. The manufacturer must not only define the optimal number of intermediaries, but also to choose the most suitable ones for it (small commercial company sales agency; large wholesale company with powerful storage facilities; the wholesaler exporter and others). Therefore, in countries with a developed market economy reseller is chosen on the basis of careful analysis of all positive and negative sides; this analysis, unfortunately, have not been used yet massively in domestic practice.

There are such general recommendations for *the choice of the intermediary type:*

1) Use the services of the retailer makes sense if:

− the company is entering poorly understood market;

− the company does not have enough financial strength;

− after-sales service of goods in insignificant in volume and complexity;

− the product can be shipped to the buyer without pre-sale service;

− "vertical" market type, that means the goods are used in several areas, but by low amount of consumers in each;

− the quantity of segments is low.

2) Wholesale retailer selling is recommended when:

− "horizontal" market type, that means it requires a strong distribution network, abut company lacks the funds for its organization;

− the urgent deliveries of small consignments of goods are required (and multiple stores of large wholesaler will cope with this job quicker and better);

− the difference between the sale price and the cost is negligible, i.e. the organization of own distribution network is unreasonable;

− it's possible to save a lot of money on transportation costs by supplying large quantities of goods to the small number of wholesalers.

Often domestic manufacturers prefer wholesale resellers. However, following factor have *influence on choosing a wholesale broker* (*Goloshubova*, 2004):

1) if the products can complement the item, sold by reseller;

2) the area of wholesaler business and if this traversed with other resellers that may cause undesirable competition;

3) how reliable is a commercial status of reseller (it depends on the duration of business in this market, the dynamics of the reporting of indicators in recent years, capital structure, average age of management personnel and its professionalism);

4) how a particular wholesaler is evaluated by his colleagues and other resellers (manufacturers);

5) how skillfully wholesaler attracts new customers and if he operates on the market professionally;

6) equipment of reseller warehouses;

7) how convenient are access roads to these warehouses;

8) how the inventorisation of goods in warehouses is organized;

9) if the wholesaler agrees to follow he prices policy, chosen by the manufacturer.

Foreign experience shows that wholesale resellers are active in expanding their market opportunities. Wholesalers make decisions about the selection of the target market, formation of commodity assortment, providing services to their partners, pricing, sales promotion and other based on marketing research. After selecting of target market, wholesaler has an opportunity to consider the peculiarities of his clients and to arrange the service based on it. In local selling practice the wholesaler aims to serve everyone at once, but the effect of that measure is quite low.

The selection of reseller is connected not only with the choice of their types, but also with most profitable one, which brings the manufacturer maximum result. Such choice is made after analysis of customer bases, with which candidates do cooperate, but also after checking their ability to perform appropriate functions promotion organization of the goods to consumers. This means that is vital to make a list of criteria that are decisive in the selection of resellers, and to test the potential ones to meet these criteria. However, not only the manufacturer chooses resellers, but also resellers may select producers, therefore, are very important conditions that offer the latest (*Golubin*, 2006).

Resellers, which operate in one channel and perform the same work, not always do it the same way: relations with some relessers will always be more profitable than with others. To find out, who is who, thanks to whom the company earns the most money, and who brings her only loss, it's required to analyze every aspect of company relations with each individual agent. However, it may happened that the retailer, through which the company sold the largest volumes of goods, actually brings the manufacturer almost no profits at all, and, on another side, a small trading firm has significant potential. By dividing resellers on groups depending on the profitability, the company gets an opportunity to lead a differentiated policy in respect of each of its partners, thereby optimizing its sale.

4. The evaluation of the economic efficiency of channels.

4.1 The income distribution between participants of distribution channels. In order to find the share of income accruing to each of the channels, it's required to use the sales volume of each of them. That means the revenue from each member of a channel is proportional to the volume of selling through him.

4.2 The calculation of costs on maintenance of channels.

The maintenance costs of distribution channels represent the sum of all costs associated with bringing products from the place of their production to the place of their consumption (Bilovodska O. A., 2011), i.e. the total amount of logistics

and marketing costs. Logistics costs are expenses for management and implementation of logistics processes for the movement of material and accompanying flows in the channel of distribution. Usually this includes the expenses on the transportation, storage, processing, storage of stocks, etc. Marketing expenses for maintenance of the distribution channel are the costs associated with the organization of sales and costs of promotion of the goods (production, distribution and spreading of the necessary quantity of advertising materials, outdoor advertising with the logo of the manufacturer for a shop or place of sale and its placement; conduct tastings of products and various types of promotions at points of sale; purchase and installation of proprietary equipment (e.g. refrigerators, cabinet shelves) for storage products and etc (table. 1). Each item of expenditure is considered separately for each channel member.

Table 1. Main costs on maintenance of distribution channel

Cost item	General characteristics
Logistics costs	
The costs of processing orders	These expenses are associated with the preparation for shipment to the consumer relevant products, it involves the selection of a customer and verification of his solvency; the adoption of a decision on sale of goods; obtaining information about existing stock of goods; the issuance of an order for the warehouse; execution of invoices and transport documents to the customer; accounting the changes of inventory.
The costs of finished product transportation	A total cost of transporting the product depends on the species and of the means of transportation. Products may be transported by the following transport: railway, river, marine, air and road. Each of the listed types of transport has its own tariffs for transportation of cargo and certain factors that affect the amount of the tariff. When transporting goods by rail amount of costs depends on speed, distance of transportation, type of shipment, cargo amount the type of container wagon and the accessories of the container wagon. When transportation is made by road a total cost depends on distance, weight, capacity of the vehicle, volumetric weight, total distance, time of use, the type of car and the area in which transportation is made. In river transport the shipping companies estimate total cost of transportation manually. The main factors that affect rates in marine transport are: market members, cargo characteristics, and conditions of freight. The mass or the volume of cargo determines air transportations expenses. It should be noted that it's very important who carries out the transportation. For example, if the wholesaler (retailer) transports products by his own transport, the company that is the manufacturer does not incur any costs for transportation.
The costs of storing products	Products can be stored in the warehouses, which are owned by the manufacturer of goods and the reseller or the company that provides storage space for rent. The cost of storage of goods in warehouses generally depends from the square, which takes the products, i.e. the number of products. An inventory cost includes the costs of heating, electricity and other infrastructure costs associated with warehouses. The larger the volume of products stored at the warehouses is, the larger expenses will be. Also the cost of storage products includes expenses for the unloading and loading goods, insurance costs, costs associated with unexpected situations (spoilage of products, theft, etc.). If the products are delivered directly to the place of its implementation and do not require storing it in warehouses, the cost of its storage are excluded.
Marketing expenses	
The costs of product promotion	The costs of promotion (advertising) of products include: cost of production, allocation and spreading of advertisements in places of sales, retail points; expenses for carrying out degustation, demonstrations of products in the sales points; expenses on the purchase, installation of equipment for product placement and other costs associated with the promotion of products.
Expenses on organization of sales	Expenses on salaries of sales managers calculated in a percentage of sales. General corporate expenses for sales and marketing, broken down by product group. Expenses on organization of service maintenance of the consumers by commodity groups or specific products. Expenses for sales for managers responsible for maintaining relationships with a particular reseller. The costs of unplanned supply of goods. Overheads (representations, customer relations support), weighted by the share of sale of specific products. The costs associated with visits of workers of the manufacturer to the sales points of products with the purpose of monitoring of assortment, determination of necessity of new products and other activities related to the management and controlling products. This applies to those locations where the sale is implemented not by the manufacturer (chain stores). The costs of organizing the return of goods by the consumers. Direct financial costs associated with a specific intermediary (the cost of funding by deferred payment, insurance, reserver in case of non repayment of the debt). General management costs are calculated in proportion of sales volumes of specific products through specific intermediaries.
Other expenses	It includes the cost of paying premiums, rewards to the participants of distribution channels, repair costs and other expenses that may arise in co-operation with distribution channels.

*4.3 **The determination of the profit the manufacturer from the distribution channel members.*** It is possible to estimate the income of manufacturer from the selected members of distribution channel based on the income efficiency data received for each participant of a channel and costs on their servicing expenses.

*4.4 **Determination of the profitability of the producer from the distribution channel members.*** Based on the obtained data on profit for each participant channel and costs on their servicing it's possible to calculate the profitability of the participants of the channels of distribution by formula (1):

$$R_{DK} = \frac{\text{Income of the manufacturer from the member of channel}}{\text{Service costs for the member of channel}} \cdot 100\%. \qquad (1)$$

5. The analysis of consumer needs

To identify the needs of consumers it's required to carry out qualitative and quantitative analysis using the method of a consumer survey. *The qualitative analysis* needs to be performed for the purpose of detection as many of the characteristics of the channel members. *The quantitative analysis* provides an extensive survey of a large enough number of respondents required to identify the priority of each of the qualitative characteristics.

6. The formation of an "ideal" structure for producers and consumers and the analysis of the degree of their conformity. Using the indicators of profitability of the manufacturer for each of the participants in the channel find the ratio of the use of distribution channel members, that is „Ideal Level" for a manufacturer channels (conditional example - table. 2)

Table 2. The Calculation of "Ideal Level" of Distribution Channels Stucture for Manafucturer

Channel members	Profitability, %	"Ideal Level" of distribution channels stucture for manafucturer, %
1	6,28	39
2	2,76	17
...	...	...
n	4,11	26
Total	$\Sigma = 16,11$	100

The formation of an "ideal" structure for the consumer assumes the definition of conformity of the quality characteristics of the distribution channel members with expert method.

7. The analysis of the degree of conformity and forming the optimal structure of channels is performed on the basis of calculation of the amount of the deviation of the „ideal level" for manufacturer and consumer patterns of distribution channels (conditional example table. 3). At the same time it is possible to have 4 leveles of affinity option for two «ideal» structures, for each of which has a size limit deviations is determined in following values:
1. full compliance - the size of deviation is up to 25%;
2. partial mismatch - from 26% to 50%;
3. partial compliance - from 51% to 75%;
4. full discrepancy – is more than 75%.

Table 3. The Calculation of the Amount of Variation and Optimal Structure of Distribution Channels

Member of channel	Ideal structure for the producers of maekrting channels, %	Ideal structure for the consumer of marketing channels, %	Variation, %	Optimat structure for marketing channels, %
1	39	24	± 15	31
2	17	16	± 1	17
...	18	26	± 8	22
n	26	34	± 8	30
Total variation			± 32	

In accordance with the criteria of the degree of variation to the case being considered the typical situation is a *partial compliance* (26%≤32%<50%) of two «Ideal Level» structure.

Conclusions and perspectives of further research.

Summing up, its possible to conclude that the proposed approach for making the decision on forming the optimal structure of distribution channels is based on the analysis of the economic and technological feasibility of the logistics of goods in a way that will bring benefits to the producer and the final consumer. In addition to that, it is necessary to consider the system of motivation of resellers in the case of a decision on their participation in the channel, possibility of control over their activity and the risk of joint work.

Further studies of the authors should be aimed at the practical application of the proposed approaches at the enterprises of different property forms, sizes and branches of economic activity.

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Summary

Essence and meaning of "optimal structure of innovative products distribution channels" is reviewed in the article. Also scientific and methodical approach to its formation, which provides bringing innovative product or service from producer to consumer, which takes into account interests of both parties at the same time, is proposed in the article.

Keywords: distribution channel, innovative products, optimal structure.

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