CONVERTIBLE FLOWS AND VALUES IN SUPPLY CHAINS

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ABSTRACT

The article substantiates the stages of divergence of value management in supply chains, a sequence of formation of the final consumer's relation to the acquired and used value is developed, a methodical approach is proposed to transform the flows of products and services into value flows. The purpose of the research is to clarify the essence of the value of the final consumer of products and services that are the subject of marketing research, and also the formation on this basis of necessary prerequisites for adjusting the theory and the methodology of logistics as a concept of enterprise management.

Keywords: value, flow, final consumer, logistics, divergence, supply chain, transformation.

Background. _The value of a consumer is a relatively new concept for enterprises operating in highly competitive markets. Only in 2004, the American Marketing Association introduced the definition of value-oriented marketing, which is now spelled out in the following edition: «Marketing is an activity, a set of institutions and processes for creating, communicating, delivering and exchanging proposals that are **of value** to consumers, clients, partners and society as a whole» [1]._

This definition is fundamentally important not only from the point of view of marketing, but also from the point of view of logistics, by which we mean «the concept of enterprise management related to the effects of the subject of management on resource **flows** moving along certain trajectories through the links of the logistics system (suppliers and intermediaries) which perform the consolidation/ unbundling of the objects of these flows in order to provide the final consumers located in a certain territory with the maximum **value** within the framework of the application of parameters of quantity and quality of products and services and the agreed parameters of time and costs for production and sale of them» [2].

It is obvious that the value of the final consumer of products and services significantly affects the quality of management of resource flows, and at the same time the quality of management of their trajectories, as well as logistical processes and systems.

Objective. _The objective of the authors is to consider convertible flows and values in supply chains._

Methods. _The authors use general scientific methods, comparative analysis, evaluation approach, economic methods._

Results.

Hierarchy of terms

The conducted analysis of sources on the research topic allowed to reveal the following aspects of the concept of «value» and the accompanying notations:

1) the term «valuable» means «… with great merit, important, necessary» [3];

2) in [4], 31 definitions of value are given, and the most significant are the provisions that:

– this property of a certain object or phenomenon satisfies the needs, desires, interests of an individual, a group of people, society as a whole» [5];

– «there are biological (health, strength), economic (wealth), aesthetic (beauty), moral (virtue), religious (sacral) and other values» [6];

3) the notion of «consumer value» or «product utility» remains a widespread concept in marketing; it is considered «subjective, estimated indicator, depends on the comparative importance of the need, the satisfaction of which is the product, and on the degree of satisfaction of the product» [7];

4) F. Kotler believes that «the overall value for a consumer is a set of benefits that he expects to receive by purchasing a product or a service» [8];

5) for production of the value of the final consumer of products and services, the formation of a value chain or «a sequence of operations for creation of a product (value): research and development, product design, production, marketing, sales, after-sales service» [9];

6) effective formation and functioning of the value chain provides «a process for managing the overall sequence of integrated activities (interpretation of the «sequence of operations for creating a product (value)») and information about product flows throughout the value chain» or «value chain management» [10];

7) «value chain management» or «value management», along with «supply chain management» and «demand management» form the logistics as a management concept [11].

The presented hierarchical dependence of terms makes it possible to determine the degree of influence of the introduced concept of «value» on the essence and content of logistics, the object of research of which is the flow of resources.

Properties (parameters) of consumer's personality		Consumer properties of products and services	
		Typical	Unique
	Stable	Necessity	Habitual lifestyle
	Unstable	Need	Value

**Pic. 1. Classification of prerequisites for consumption of products and services.**

		Perception by a consumer of properties of products and services quality	
		Familiar	Unfamiliar
Type of needs	Primary	Stability of a value with a focus on primary needs	Development of a value with a consumer's focus on primary needs
	Secondary	Stability of a value with a consumer's focus on secondary needs	Development of a value with a consumer's focus on secondary needs

Pic. 2. Classification of states of a value of a consumer of products and services by a type of his need.

		Quantity of value	
		One	Several
Number of consumers	One	Individual value	Combined value
	Several	Collective value	Universal value

Pic. 3. Classification of a value of a consumer of products and services on the basis of ownership.

		Periodicity of occurrence of a value	
		Single	Renewable
Nature of manifestation of a value	Potential	Prototype	Stock
	Real	Object	Flow

Pic. 4. Classification of forms of a value of consumers of products and services.

Clarification of the essence of concepts

The peculiarity of our research is development of classification of prerequisites for consumption of products and services by their end-user. Its basis is shown in Pic. 1 classification characteristics: properties (parameters) of the consumer's personality (stable and unstable) and consumer properties of products and services (typical and unique).

Analysis of the information presented in Pic. 1, allows us to draw the following conclusions:

– **value** is a set of unique characteristics of objects and processes that have positive or negative values for the consumer, depending on his material, mental or spiritual state[1];

– the value differs from the need for the uniqueness of consumer properties of goods (products and services) or, more precisely, their special perception by the consumer, and from the habitual lifestyle – dependence on the material, mental or spiritual state (or stability of the state) of the consumer;

– because the value of the consumer is directly related to his primary and secondary needs, using such classification characteristics as consumer perception of the properties of products and services as familiar and unfamiliar, as well as the type of needs, it is possible to establish the basic conditions of consumer value that can be either stable, or be in development (Pic. 2).

It should be noted that the second state can be provoked both by the consumer (motivation) and the supplier of products and services (stimulation) carried out within the business process «customer

relationship management» – component of value management [12].

In the chain of values, each of its links acts both as a supplier and as a consumer. On this basis, it is advisable to classify the value of a consumer of products and services on such attributes as the amount of value (one unit, two or more) and the number of consumers on which the value is distributed. As a result, we can distinguish four types of value: individual, collective, combined and universal (Pic. 3), each of which has specificity and scope of application in practice.

Before the consumer of products and services receives the necessary value, it acquires its own forms, which can be distinguished with the help of the following classification characteristics: periodicity of occurence of a value (single, renewable) and nature of its manifestation (potential, real). It follows from Pic. 4, such forms are prototype, object, stock, flow.

From the point of view of logistics as a management concept, two last forms are of particular interest, which can be given the following definitions:

– **value flow** – a set of unique characteristics of objects and processes united according to certain characteristics that are consistently perceived by a consumer in space and time, depending on his material, mental or spiritual state. This concept defines the essence of logistics, for understanding of which we should refer to Pic. 5 [13]. On it, the main (primary) object of logistics is value flow, which is formed in conditions of the passive state of the consumer, performing functions of consumption, exploitation, consolidation/disaggregation or processing of resource flow objects that are customary

[1] The definition is based on data of the work [6].

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State of the consumer		
	Passive (waiting for delivery of the object)	Active (moves to the object)
State of the object (value) — Passive (stock)	Object (value) is owned by the consumer	Consumer moves to the object (value)
State of the object (value) — Active (flow)	Object (value) moves to the consumer	Object (value) and the consumer move to each other

Pic. 5. Variants of the state of the product (the object of the logistic flow) and the consumer in terms of flow control.

State of the value flow		
	Stop	Movement
State of value flow — Stop	Value preparation	Value formation on a stock basis
State of value flow — Movement	Value delivery	Value formation on a flow basis

Pic. 6. Classification of stages of obtaining a value by the consumer of production.

		Value characteristic	
		Remains	Changes
Perception of a value by a consumer	Positive	Stability	Improvement of stability
Perception of a value by a consumer	Negative	Unstability	Decrease in stability

Pic. 7. Classification of variants of stability of perception of a value by a consumer of products and services.

		Decision-making stage	
		Information gathering	Research
Contact with the object (-s)/ flow (-s) of value	Without contact	Message	Generalization
Contact with the object (-s)/ flow (-s) of value	With contact	Observation	Approbation

Pic. 8. Classification of the stages of decision-making by the consumer about receipt of a value.

for him, and the remaining functions are taken over by logistical, technological and trade links of the system operating on the principles of outsourcing;

– **value stock** – a set of unique, uniquely being created or created unique characteristics of objects and processes that the consumer seeks to use in space and time, depending on his material, mental or spiritual state.
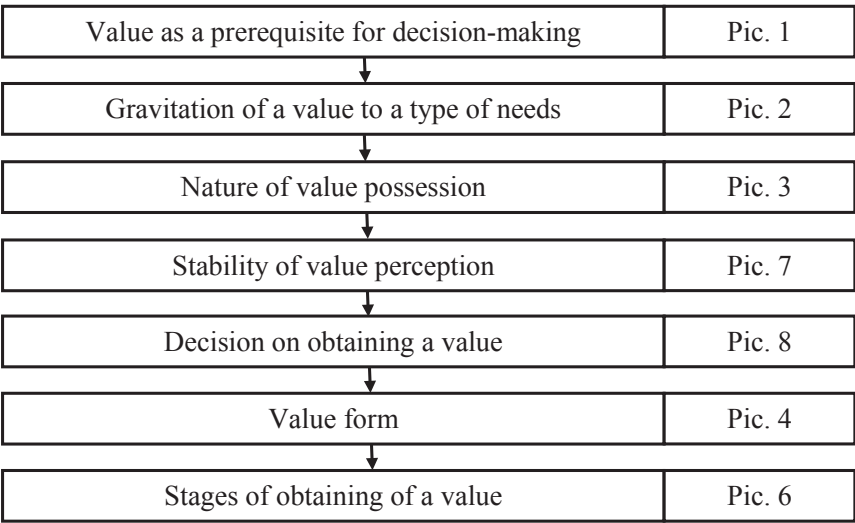
It follows from Pic. 6, the supplier of products and services should identify the following stages of obtaining a value by the consumer: preparation, delivery and value formation, and in two variants – on the basis of stock (time of obtaining a value and time of its use do not coincide) and on the basis of the flow at which the marked mismatch is absent.

Since a significant number of objects and processes of the surrounding reality change quantitative parameters and qualitative characteristics over time, it is necessary to take into account the following options for stability of perception of a value by the consumer of products and services: appearance, increase, preservation and reduction of stability, and transition of a value to an unstable state (Pic. 7). This dynamic has a significant impact on efficiency and effectiveness of value management in supply chains.

The stability of perception of a value by the consumer is constantly exposed to external factors in relation to the consumer environment. As a result, taking into account such classification characteristics as the stage of the consumer's acceptance of products and services of the solution (information gathering, research), as well as contact with the object or the value flow (without contact and with contact), it is possible to distinguish the decision-making stages typical for the consumer: message, object/flow monitoring, approbation and generalization of the results obtained (Pic. 8).

The presented material allows to substantiate the stages of divergence of value management in supply systems (Pic. 9). Recall that the divergence phase is associated with a critical perception of reality, destruction of stereotypes, use of very broad figurative comparisons, extremely distant

Value as a prerequisite for decision-making	Pic. 1
Gravitation of a value to a type of needs	Pic. 2
Nature of value possession	Pic. 3
Stability of value perception	Pic. 7
Decision on obtaining a value	Pic. 8
Value form	Pic. 4
Stages of obtaining of a value	Pic. 6

Pic. 9. Stages of divergence of value management in supply chains.

		Type of need of end user	
		Primary →	Secondary
Period of value possession	Long-term	State of consumer	Possession (exploitation)
	Short-term	Consumption (processing)	Impressions (reaction)

Pic. 10. Classification of results of acquisition and use of values.

		Stability of the state	
		Stable	Unstable
Readiness to act	Absence	Doubt	Apathy
	Presence	Confidence	Excitement

Pic. 11. Classification of consumer's values.

		Purpose of a value	
		For personal purposes	For purposes of other consumers
Periodicity of acquisition of a value	One-time	One-time value acquisition for personal purposes	One-time value acquisition for other consumers
	Periodically arising	Periodically arising acquisition of a value for personal purposes	Periodically arising acquisition of a value for the purposes of other consumers

Pic. 12. Classification of the nature of consumption (processing) of value.

associations. At this stage, the spectrum of various requirements for a future object is formed [14].

The attitude of the end user to the acquired value
In order to clarify the content of the process of formation of the attitude of the final consumer to the acquired and used value, such classification characteristics as the type of demand of the final consumer of products and services (primary and secondary) and the period of possession of a value (long-term and short-term) were applied. These characteristics help to isolate the results of acquisition of values by end-users (Pic. 10): consumer status,

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Variant of possession of value (property)		
	Ownership	Lease, etc.
Nature of possession	Individual	Individual possession of the property	Individual possession of another's property
	Collective	Collective possession of property	Collective possession of another's property

Pic. 13. Classification of the nature of possession of value.

Attitude to value		
	Positive	Negative
Level of impressions of a value	Insignificant	Approval	Disappointment
	Significant	Delight	Irritation

Pic. 14. Classification of consumer's impressions of the use of a value.

State. Impression	Approval	Disappointment	Enthusiasm	Irritation
Doubt	Dbt – Aprl	Dbt – Dspt	Dbt – Ensm	Dbt – Irrtn
Apathy	Apth – Aprl	Apth – Dspt	Apth – Ensm	Apth – Irrtn
Confidence	Cnf – Aprl	Cnf – Dspt	Cnf – Ensm	Cnf – Irrtn
Excitement	Exct – Aprl	Exct – Dspt	Exct – Ensm	Exct – Irrtn

Possession / Consumption	Individual possession of property	Individual possession of another's property	Collective possession of property	Collective possession of another's property
One-time consumption for personal purposes	OTP – Io	OTP – Ia	OTP – Co	OTP – Ca
One-time consumption for purposes of other consumers	OTO – Io	OTO – Ia	OTO – Co	OTO – Ca
Periodically arising consumption for personal purposes	PP – Io	**PP – Ia**	PP – Co	PP – Ca
Periodically arising consumption for purposes of other consumers	PO – Io	PO – Ia	PO – Co	PO – Ca

Pic. 15. Sequence of formation of the attitude of the final consumer to the acquired and used value.

consumption (processing), possession (operation) and impressions (emotions).

The arrows shown in Pic. 10, show the sequence of accounting options when there is a return from impressions (emotions) to the original version – the state of the consumer. In this case, the very state of the end consumer (stable and unstable) and his readiness for action (or lack thereof) lead to substantiation of four consumer states (Pic. 11): doubt, confidence, depression, excitement.

The main variants of the nature of consumption (processing) of a value: local internal, local external, typical internal and typical external (Pic. 12) – can be obtained with the help of such classification characteristics as the purpose of a value (for personal purposes and for other consumers) and frequency of occurrence of a need to possess a value (one-off and periodically arising).

Such classification characteristics, as a variant of possession of a value (owned and leased) and the nature of possession (single and collective), form four variants of possession of a value: individual and collective possession as of own and another's property (Pic. 13).

Finally, variants of consumer's impressions of the use of a value – approval, enthusiasm, disappointment and irritation (Pic. 14) – are highlighted with the help of appropriate classification characteristics: the formed
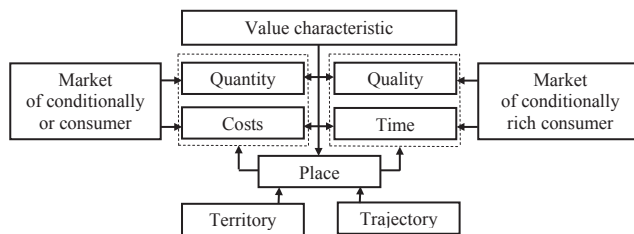
Pic. 16. The main components of the value of the consumer.

Components of the value of the consumer of products and services (material resources)

Value components	Flow 1	Flow 2	Flow ...	Flow N	Total
Quality, Q	$\sum_{i=1}^{l_1} Q_i$	$\sum_{i=1}^{l_2} Q_i$	...	$\sum_{i=1}^{l_N} Q_i$	$\sum_{s=1}^{N}\sum_{i=1}^{l} Q_{si}$
Quantity, K	$\sum_{i=1}^{m_1} K_i$	$\sum_{i=1}^{m_2} K_i$	...	$\sum_{i=1}^{m_N} K_i$	$\sum_{s=1}^{N}\sum_{i=1}^{m} K_{si}$
Costs, Z	$\sum_{i=1}^{n_1} Z_i$	$\sum_{i=1}^{n_2} Z_i$	...	$\sum_{i=1}^{n_N} Z_i$	$\sum_{s=1}^{N}\sum_{i=1}^{n} Z_{si}$
Time, W	$\sum_{i=1}^{p_1} W_i$	$\sum_{i=1}^{p_2} W_i$	...	$\sum_{i=1}^{p_N} W_i$	$\sum_{s=1}^{N}\sum_{i=1}^{p} W_{si}$
Value, V	$\sum_{q=1}^{t_1} V_q$	$\sum_{q=1}^{t_2} V_q$	...	$\sum_{q=1}^{t_N} V_q$	$\sum_{s=1}^{N}\sum_{i=1}^{t} V_{si}$

attitude to a value (positive and negative) and the level of impressions of a value (small and significant).

The data in Pic. 10–14 allow to predict the behavior of the consumer of products and services, taking into account the adjustments in the processes of creating, communicating, delivering and exchanging of messages that are of value to consumers, customers, partners and society as a whole. The aggregate material makes it possible to develop a sequence of forming the ratio of the final consumer to the acquired and used value (Pic. 15).

Analysis of the data presented in Pic. 15, allows us to draw the following conclusions:

– the history of a one-time or periodically arising consumption of a given product (service) affects both the value itself and the nature of owning the future value (arrow 1). At this stage, the priority type of consumption (in Pic. 15 – periodically arising consumption for personal purposes) is consistent with the nature of possession of the value (arrow 2 – individual possession of another's property, for example, rent or mortgage);

– the value obtained by consumption of a product or service has an effect on the consumer's impressions (arrow 3 – apathy), and at the same time the consumer's state (in Pic. 15 – disappointment);

– the combination of «apathy – disappointment», in turn, affects the character of possession of a present (arrow 4), as well as a future value.

This sequence helps to clarify and supplement the theory and methodology of value management in supply chains and from the point of view of marketing, and from the standpoint of logistics as a concept of enterprise management.

Flow transformation process

To effectively manage value in supply chains, it is required to use the main components of consumer value, the number and composition of which are

justified in [15]. The data in Pic. 16 allow to structure the value of the consumer of products and services by quantity, quality, cost and time on the basis of the components of supply chain management – «process», «system», «consolidation», «downsizing», «suppliers», «intermediaries» and additional value management components «territory» and «trajectory», and also to form the necessary set of flows of products and services (Table 1). The methodology for solving the problem is presented in [16].

As follows from Table 1, each of the flows of products and services ensures creation and delivery of a value to their consumers. At the same time, the complex nature of consumption implies a consistent consolidation of flows as a consequence of their preliminary structuring in terms of:

– demand management in supply chains [11];

– forms of a value for consumers of products and services (Pic. 4);

*– stages of obtaining value by the consumer (Pic. 6).*

In addition, at the final stage of value management, there is another problem associated with the transformation of the flow of products and services (supply chain management) into value flows (value chain management in supply chains). The solution of this problem is provided on the basis of the data presented in Pic. 17. Their analysis allows us to draw the following conclusions:

– in the transformation of the flow of products and services into value flows, supplies of products and services are inevitable as a stock of value. For example, in Pic. 17 flow 1 breaks up into two flows of products and services, one of which is directed to consumer A, and the second goes into the state of the stock, waiting for conversion into the flow of value of the consumer B;

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Pic. 17. Scheme of converting the flow of products and services into value flows.
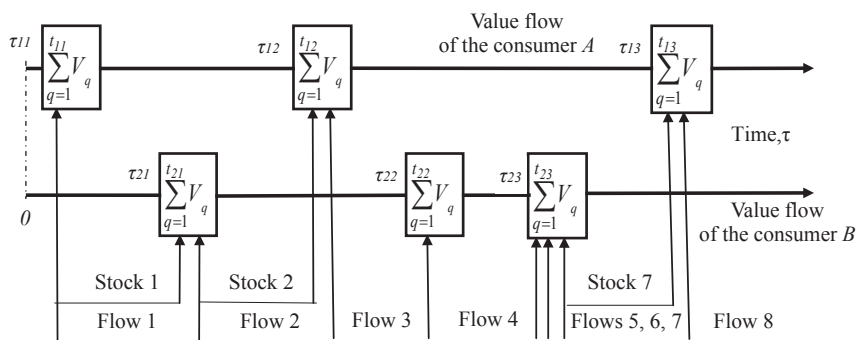
– the stocks of the value of the consumer B (for example, 1 and 2) can go into the flows of products and services when the consumer B moves to another place (territory) and vice versa;

– when the consumer B receives several resources simultaneously (for example, 5, 6 and 7), it is necessary to take into account possible downtime (the appearance of the stock of flow objects), which reduces the value of this consumer.

Conclusion.

Thus, the article permitted to describe some elements of scientific novelty:

– stages of divergence of value management in supply chains are justified (Pic. 9);

– a sequence of formation of the ratio of the final consumer to the acquired and used value has been developed (Pic. 15);

– a methodical approach is proposed to transform the flows of products and services into value flows (Pic. 17).

In the course of further research it is supposed:

– to clarify the methodology for managing resource flows and value flows when eliminating cross-functional barriers in «supplier/consumer» channels;

– to supplement the theory of management of relations between suppliers and consumers in the systems of supply of products and services;

– to study the stages of demand management in the delivery systems of products and services.

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