Ministry of Education and Science of Ukraine

ODESSA NATIONAL ACADEMY OF FOOD TECHNOLOGIES

International Competition of
Student Scientific Works

BLACK SEA SCIENCE 2020

PROCEEDINGS

ODESSA, ONAFT 2020

Ministry of Education and Science of Ukraine

Odessa National Academy of Food Technologies

International Competition of Student Scientific Works

BLACK SEA SCIENCE 2020

Proceedings

Odessa, ONAFT 2020

UDC 001.8(063)

Black Sea Science 2020: Proceedings of the International Competition of Student Scientific Works / Odessa National Academy of Food Technologies; B. Yegorov, M. Mardar (editors-in-chief.) [*et al.*]. – Odessa: ONAFT, 2020. – 621 p.

Proceedings of International Competition of Student Scientific Works «Black Sea Science 2020» contain the works of winners of the competition.

The author of the work is responsible for the accuracy of the information.

Organizing committee:

Prof. Bogdan Iegorov, D.Sc., Rector of Odessa National Academy of Food Technologies, Head of the Committee

Prof. Maryna Mardar, D.Sc., Vice-Rector for Scientific and Pedagogical Work and International Relations of Odessa National Academy of Food Technologies, Deputy Head of the Committee

Prof. Stefan Dragoev, D.Sc., Vice-Rector for Scientific Work and Business Partnerships of University of Food Technologies (Bulgaria)

Prof. Baurzhan Nurakhmetov, D.Sc., First Vice-Rector of Almaty Technological University (Kazakhstan)

Prof. Mircea Bernic, Dr. habil., Vice-Rector for Scientific Work of Technical University of Moldova (Moldova)

Prof. Jacek Wrobel, Dr. habil., Rector of West Pomeranian University of Technology (Poland)

Prof. Michael Zinigrad, D.Sc., Rector of Ariel University (Israel)

Dr. Mei Lehe, Ph.D., Vice-President of Ningbo Institute of Technology, Zhejiang University (China)

Prof. Plamen Kangalov, Ph.D., Vice-Rector for Academic Affairs of "Angel Kanchev" University of Ruse (Bulgaria)

Dr. Alexander Sychev, Ph.D., Assoc. Professor of Sukhoi State Technical University of Gomel (Belarus)

Dr. Hanna Lilishentseva, Ph.D., Assoc. Professor, Head of the Department of Merchandise of Foodstuff of Belarus State Economic University (Belarus)

Prof. Heinz Leuenberger, Ph.D., Professor of the Institute of Ecopreneurship of University of Applied Sciences and Arts (Switzerland)

Prof. Edward Pospiech, Dr. habil., Professor of the Institute of Meat Technology of Poznan University of Life Sciences (Poland)

Prof. Lali Elanidze, Ph.D., Professor of the Faculty of Agrarian Sciences of Iakob Gogebashvili Telavi State University (Georgia)

Dr. V. Kozhevnikova, Ph.D., Senior Lecturer of the Department of Hotel and Catering Business of Odessa National Academy of Food Technologies, Secretary of the Committee

2. ECONOMICS AND ADMINISTRATION

DISTRIBUTION ACTIVITY MANAGEMENT OF CORPORATION

Author: Mariia Karasova
Supervisors: Olena Dolgaleva, Yuriy Grytsuk
Donbas National Academy of Civil Engineering and Architecture (Ukraine)

Abstract*. Theoretical aspects of distribution activity organization were considered in the research work. distribution activity of corporation «Zeus Ceramica» as an example was observed and mechanism of modernization was proposed. The implementation of optimization tasks with the help of MS Excel and the new storage opening is proposed as one of the main direction to improve the organization of distribution activity.*

Basic thesis and results of the scientific work were made public by the author on the scientific-practical conference: on the 24-25th of April 2019, Kramatorsk city: Donbas National Academy of Civil Engineering and Architecture;on the 30th of November, 2019., Kherson city: Kherson State Agrarian University.

According to the theme of research work the article and thesis were published:

1. Karasyova M.O., Dolgalyova O.V. Modern problems of distribution activity in Ukraine. Electronic scientific and practical journal «Collection of scientific works of DonNACEA». Kramatorsk. 2019. №. 2 -2019 (16). C. 111-116.

2. Karasyova M.O., Dolgalyova O.V., Gryzuk Y.V. Optimization of the enterprise transportation plan with the use of MS Excel. Modern computer systems and networks in control: materials of the second all-Ukrainian scientific-practical Internet conference of students, graduate students and young scientists (Kherson, the 30th of November, 2019.). Kherson: FOP Vyshemyrskyi V.S.., 2019. C. 325-328.

Key words*: distribution, distribution activity, management distribution system, mechanism of modernization, optimization, optimisation tasks.*

Introduction.

In terms of market economy every corporation was immersed into new conditions and has got an opportunity to carry out and regulate its activity by itself. Today, in terms of unstable economical situation in the country, work conditions became worse for every corporation, the level of competition at the market has increased, demand for products has diminished because of the considerable increase in prices, the price of purchasing accessories and transportation cost has also increased. All these factors have caused an essential influence on the worsening the conditions of corporation's distribution activity. That is why, nowadays the question of searching for the ways to improve supplying and distribution has become actual.

Misunderstanding of the importance of distribution activity in a practical work of the management subjects leads to the worsening of the work efficiency in any corporation. Beforehand the cleared negative distribution factors and the reasons of their creation or the ways of optimization and improvement give an opportunity to the corporation not just to save the part of income, but also to diminish essentially the amount of expenses and to get necessary level of income for the further development of corporation. So, today the question of organizational improvement of supplying and distribution the production arises for every corporation, thanks to that, the general efficiency of functioning and profitableness increases.

Analytical outlook.

Learning the problems and developing the ways of the improvement of corporation's organization of supplying and distribution can be referred to the narrow circle of native and foreign researchers which searched different aspects in supplying and distribution organization of the enterprises.

The problems of organization of supplying and distribution goods was searched by these researchers: G.J. Bolt, O.O.Bruch, L.E. Vardanyan, V. M. Vlasova, S. S. Garkovenko, J.S.Zavadsky, V.Y.Kardash, A. Kus, I.Y. Kutlina, T. I. Lukyanets, S. S. Nesterenko, A. O. Starostina, N. V.Terenteva, V. P. Khlusov.

But the subject distribution activity improvement is very actual nowadays, in spite of that, the industrial programme and results of management activity depends on the efficiency of distribution organization.

The object, subject and methods of research.

The purpose of this work is to research the theoretical approaches to the indication of the essence and management of corporation's activity and improvement on the base of the knowledge in distribution activity, which we've got from «Zeus Ceramica». According to the purpose of research the following tasks were put and solved: to research the meaning «corporation's distribution activity»; to open up the essence of the process of distribution management; to give common characteristic of the corporation «Zeus Ceramica»; to fulfil the analyse of supplying- distribution activity of «Zeus Ceramica»; to propose the ways to improve distribution activity of «Zeus Ceramica».

The object of research is distribution activity of the corporation.

The subject of research is theoretical, methodical and practical questions of improvement of distribution activity of the corporation.

The following methods of research were used: the method of abstraction (for specification the meaning of the term «distribution» and «distribution activity»), the method of optimization modeling (for fulfilment of optimization tasks with the help of MS Excel on the «Zeus Ceramica» and others.

The informational ground of research includes the monographs, articles, educational textbooks of native and foreign researchers on the corporation's management and marketing, legislative acts, posts of practices in management and marketing, statistic and practical materials.

The results of the work.

The majority considers that the determination of the word «distribution» is obvious. But searching of the special literature, it is easy to mention that it doesn't exist the only description of «distribution». Moreover, a lot of such descriptions sometimes principally differ from each other. Distribution is often identified with such terms as sales, goods' movement, division, implementation. That's why for the further research it is necessary to analyse existing descriptions and give all-round exhausted formulation. Only in such a way we can determine the meaning of the given concept in the corporation's management system. The determination of the right term «distribution» would promote the further planning of corporation's activity including the strategy of distribution.

Let's consider the different approaches to the term «distribution» of different researchers (t.1.1) [14].

Table 1.1 – Approaches to the term «distribution» [14]

Author	Term	Determination
1	2	3
Bolt G.J.	selling	Personal two-sided communication which is directed on achievement the concrete aims on receiving the profit from distribution that demands certain knowledge, skills and level of competence
Bruch O.O.	distribution	Gradual movement, promotion of goods (ready production) to the further element of distribution circle on the base of the marketing strategy and establishment of relationships with consumers and goods sales on the base of satisfaction of people's needs
Vardanyan L.E.	distribution	Personalised direct two-sided process of accomplishment the contacts and conviction with the aim of sales increase on the market
Vlasova V.M.	distribution	Transportation, warehousing, saving, refinement and promotion to wholesale and retail points pre-sale preparation and exact selling the goods
Garkavenko S.S.	distribution	The organization of the web for effective selling of made production
Zavadsky J.S.	distribution activity	Promotion of the goods from the place of production to the place of consumption and distribution operations (warehousing, saving, refinement, packing, completing of consignment of goods, transportation and so on)
Kardash V.Y.	distribution	Directly connected to the promotion of goods from manufacturer to the consumer, there is a totality of organization-technological and commercial activities for direct realization of goods and services
Kus A.	distribution	The totality of marketing activities and selling goods activities
Lukyanets T.I.	distribution	The movement of goods from the manufacturer to customer
Staristina A.O.	distribution (marketing)	Different activity that provides the movement of goods to the consumers which is connected to the offset of producing process and consumption according to the place, time and shapes
Khlusov V. P.	distribution	Different activity which helps the seller to communicate with the consumer

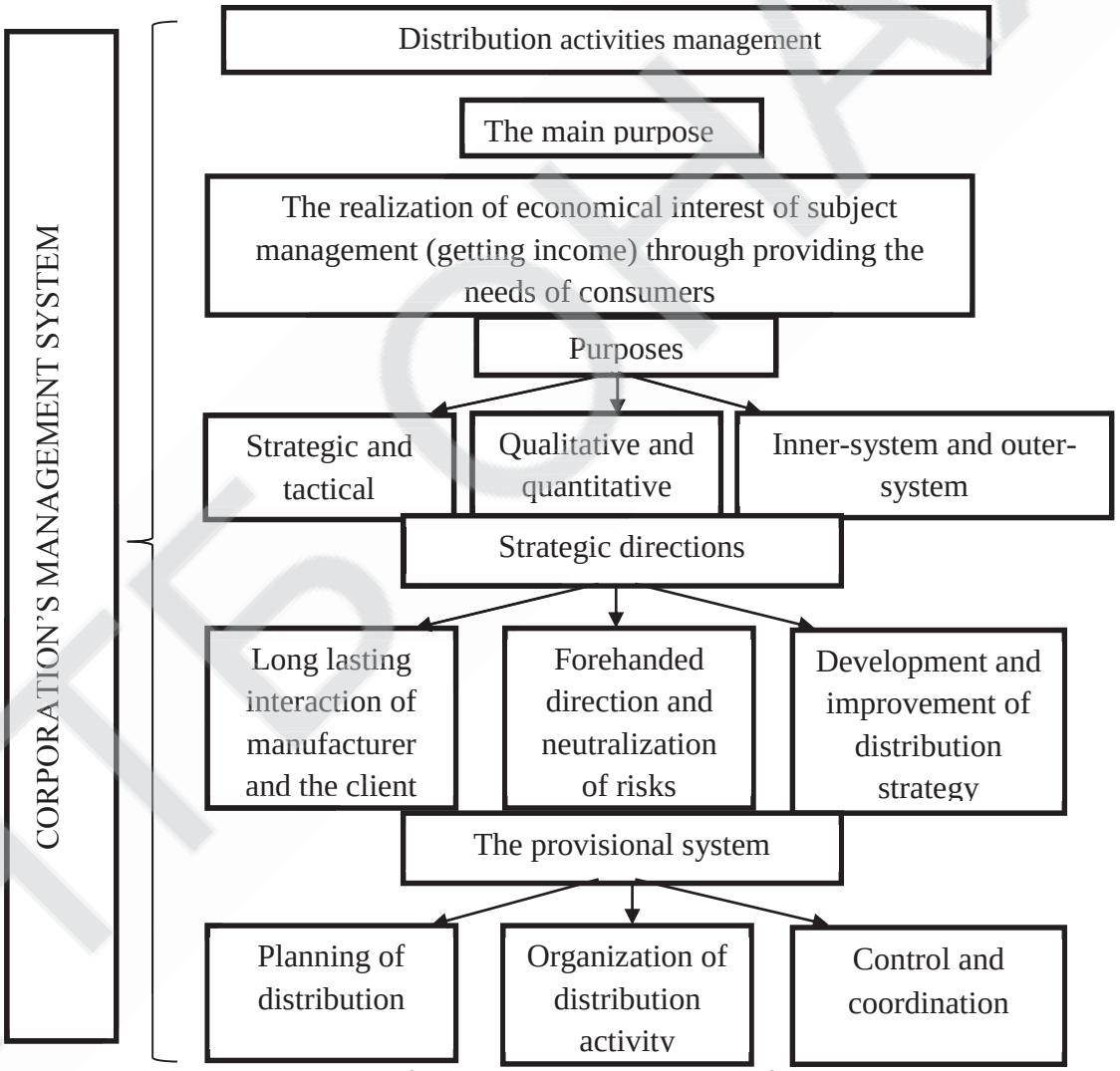
Have searched the different thoughts about interpreting the meaning «distribution» we've got the conclusion that «distribution» considers the transfer of production from manufacturer to consumer according to the orders and contracts.

To the distribution operations belong: the development of the prediction of the market conjuncture and of production realization, calculation and justification of financial distribution costs and approval of marketing distribution standards, the choice of alternative ways of distribution, creating distribution communications, development of distribution reporting, modelling the selling processes and final results of distribution operations.

We consider the distribution is a complete aspect of corporation's activity along with the finance, accounting, stuff, manufacturing and supplying. So, it is time to move to the definition of the place of distribution activity in the system of corporation's management.

The system of corporation's management include the main purposes, aims of activity (that means the division on strategic and tactical, qualitative and quantitative, inner-system and outer-system), strategic focus (which denotes long lasting interaction of the manufacturer and the client, forehead detection and neutralization of risks, development and improvement of distribution strategy) and system provision (distribution planning, distribution activity organization, control and coordination) depicted in details on the pict.1.1

To achieve the efficiency in management of corporation's distribution activity is necessary to create the distribution system which is directed on the gaining the aims and strategies of sales oriented the needs of final consumer.



Picture 1.1 – The place of management process of distribution activity in the system of corporation's management [developed by the author]

It should be mentioned that, as a rule, the purposes of distribution flow from the corporation's purposes, among them there is the aim of maximization of the income

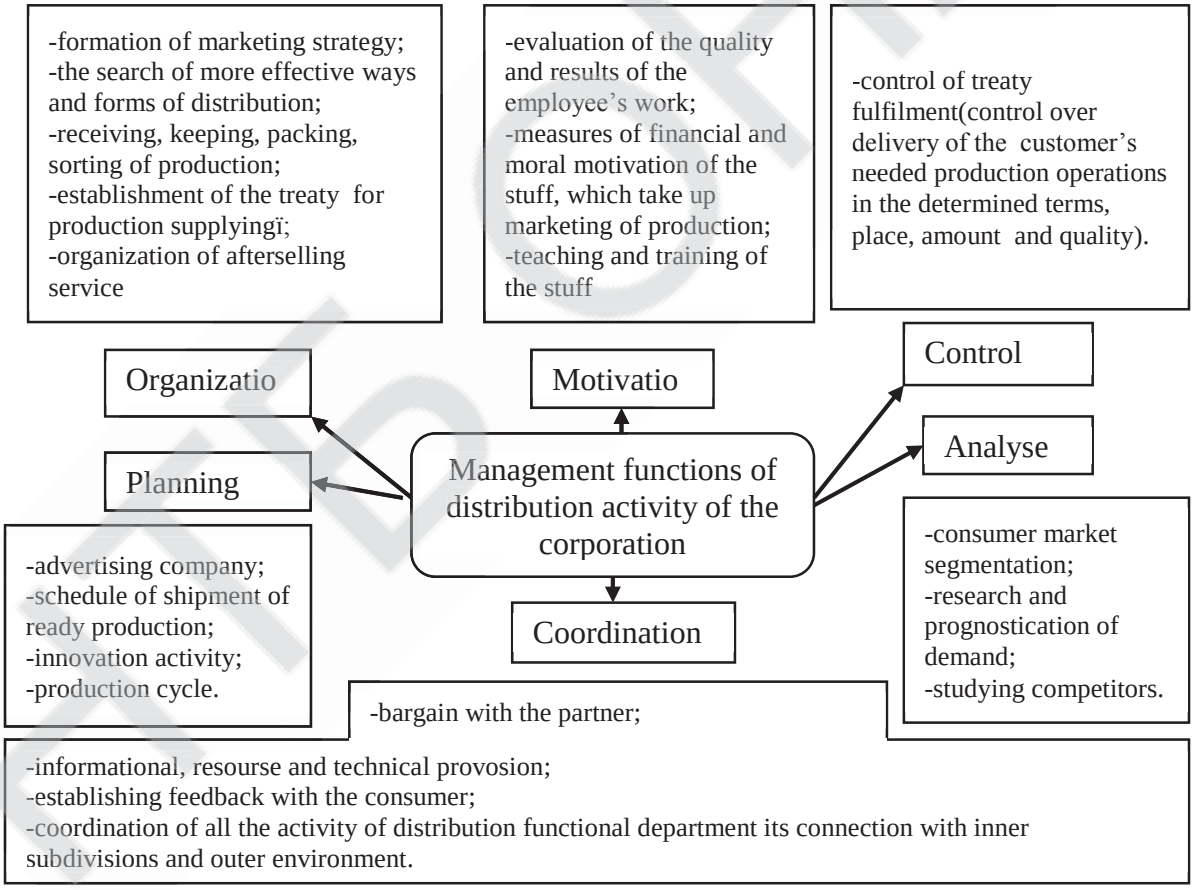
first of all. To achieve the aims is possible through successful fulfilment of the following tasks in the sphere of distribution activity:

- Optimal download of manufacturing power with the needs of consumers;
- The rational choice of the distribution ways;
- Minimization of the amount of joined costs in the life cycle of goods that includes the costs of self-service.

The key-elements of distribution are system, form and route of selling. The combination of these elements in different distribution situations gives an opportunity to the manufacturer to realise efficiency according to the aims of selling.

The distribution management system represents the totality of elements which are connected and subordinated the one goal – optimization of supplying management. The special attention in its activity should be paid to the evaluation of efficiency because the back connection between economical streams of the management supplying system and the strategy of corporation's development fulfils.

So, we consider, the formation of effective management decisions about distribution activity predict systematized and planned usage of certain management functions – planning, organization, motivation, control, analyse and coordination. More detailed management functions of distribution activity are depicted in the pict. 1.2.



Picture 1.2 – The management functions of distribution activity of the corporation [17, c. 131]

Represented functions create the base of systematic provision of corporation's distribution management and competitiveness of the corporation.

The organization of distribution activity should be a part of the management strategy of the corporation. It provides the development of optimal partner relationships, marketing analyse, quality management and advertisement policy of the corporation.

The organization process of distribution activity would be appropriate to consider as the one formed in two directions:

- First of all, it must provide optimal connection and effective usage of all kinds of economical resources for gaining financial results from producing-distribution activity;
- Secondly, the process of organization through realizations of management functions must coordinate and control distribution activity.

Based on the laws and regularity of market development and denoting the direction of activity of all competitors of manufacturing as agreeable process, we'll make the following principles of distribution activity management of the corporations:

- The principle of justified choice of strategy of goods politics according to the main strategy of corporation development;
- The principle of orientation on the achievement of the final result of distribution which means the provision of needed level of corporation's profitability;
- The principle of adaptation to the demands of internal and external environment with the aim to provide the needs, to renovate close connection between the elements of distribution system and distribution conditions;
- The principle of systematic provision of resources of distribution activity anticipates the formation of close internal corporation effective connections of management activity of structural units, that take up distribution activity;
- The principle of monitoring of the market predicts constant research of the changes of the marketing conjuncture and needs of consumers;
- The principle of innovation predicts usage of leading innovation mechanisms not just in producing goods, increasing their demands and consumptive cost, but also the usage of innovation approach in formation of mechanisms of distribution activity [17, c. 135].

So that, as we think, distribution system of the corporation is the totality of subjects of distribution activity with some functional authorities, duties and indicated official and legislative connections and relations.

We suggest toobserve distribution system of «Zeus Ceramica», which is a private corporation, as an example. It was created according the constituent agreement on the 17.09.2002 and registered by the executive committee of Slovyansk city council on the 06.03.2003, registration number 10716. The basic document of corporation is Regulations. According to it the corporation acts followed the principles of full economic calculations and self-funding, responds its duties before partners, banks and budget according to the made agreements.

The founder of the corporation is: «Emilceramica S.P.A.», legal entity which is created and exists according to the legislation of Italy, certificate of registration № 01016070367 on the 25th of November, 1980, which is situated at Fiorano Modenese (MO) – Via Ghiarola Nuova n.29 – Italy, (further - Emilceramica).

Private Corporation was created according to the civil and economic code of Ukraine, the Law of Ukraine «About private corporations» and other legislative documents of Ukraine.

According to the classification of kinds of economical activity «Zeus Ceramica» takes up the producing of building materials out of clay that is production of ceramic tile and flagstone [10].

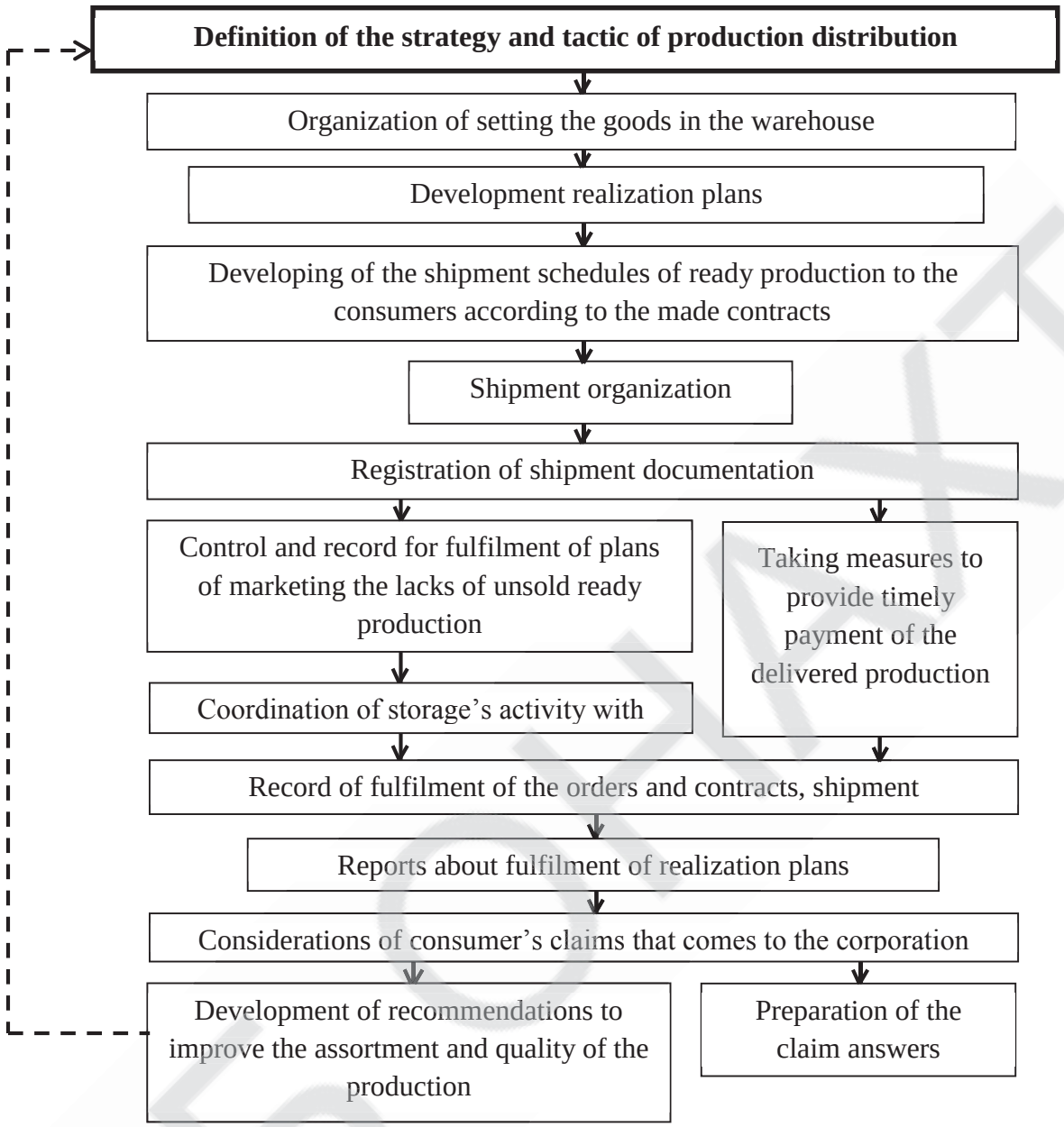
The corporation has being existed for 17 years on the Ukrainian market that gives a lot of advantages: availability of the circle of loyal consumers (long lasting base), the popularity of corporation because every design project is developed by leading Italian specialists, great experience of work in Ukraine and abroad, transaction external economical activity, availability of strong relationships with partners and organizations, availability of personal approach to every client, the system of personal managers, informational openness and transparency.

The process of management on the corporation is fulfilled thanks to the availability of line-functional organizational structure. Direct management accomplished by the line ruler, the structure of which consists of subdivisions and teams of workers. There also exists functional subdivisions in the corporation, which directly carry out the put questions, prepare the projects and plans, meanwhile helping the leading ruler.

All decisions come either through the leading ruler or through rulers of certain subdivisions within the authority.

The ruler of distribution department denotes the strategy and tactics of distribution the goods, develops recommendations about improving the assortment and quality of production, watching the goods are shipped to the consumers in time in demanded amount, provides the participation of the department in preparing the projects, perspective and annual plans of production and realization of production, search the demands on the production of corporation, watches the supplying of ready production to the consumers and denotes the needs in transport means, mechanized loading means, containers, working hands and shipment of ready production. [15].

Distribution managers take up organization and control shipment of ready production in time according to the concluded contracts, provide control for the fulfilment of consumer's order according to contract responsibilities in an established terms, for the amount of realized production, assortment, completeness and quality, the condition of supplying of ready production in the storages, accomplish the registration of conducting documents for shipment of the production to the consumers. The system of distribution activity of «Zeus Ceramica» is represented on the picture 1.3.



Picture 1.3 – The system of distribution activity of «Zeus Ceramica» [developed by the author]

The corporation «Zeus Ceramica» has wide net of distribution but nowadays has jut one storage in Slavyansk city in the Goncharna street, 7. Production is transported from this storage to the rest of the sales points in the other regions in Ukraine which are situated far from.

We've prepared the scheme with the logistic ways of distribution on the map of Ukraine. (pict. 1.4).

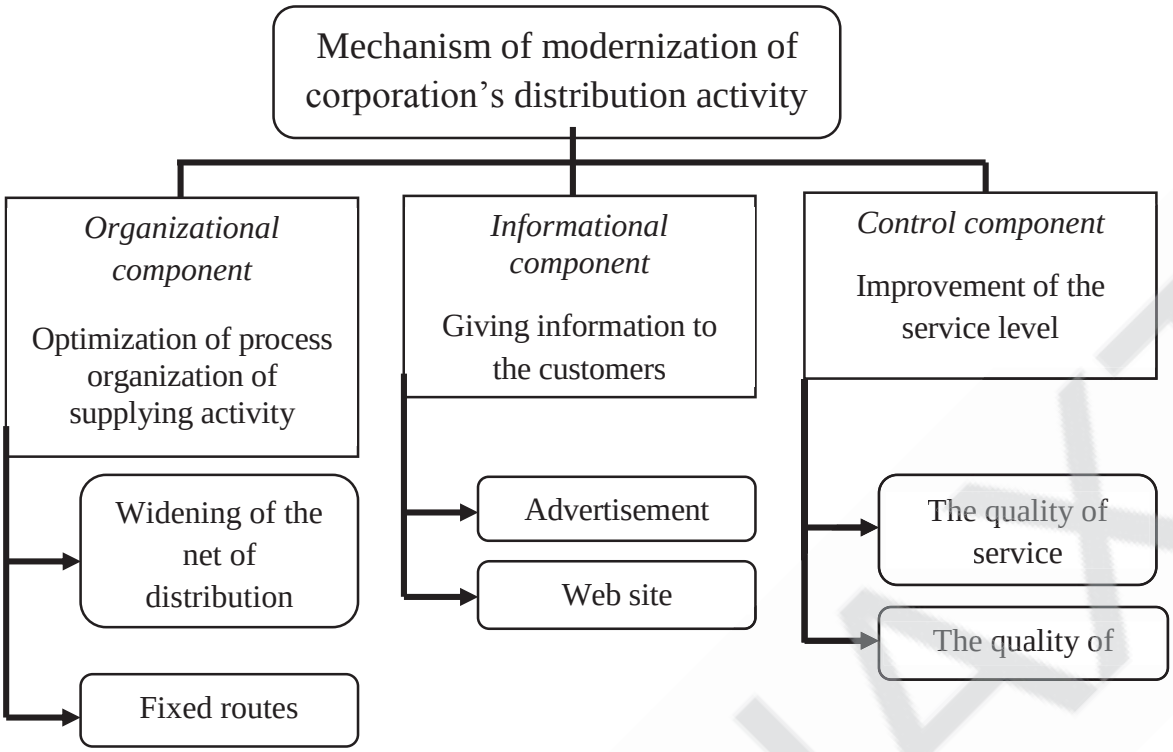
This scheme was made with the help of data from the table 1.2, which consists of the names of consumer-cities, their needs and transport costs.

Picture 1.4 – Logistic ways of distribution of corporation «Zeus Ceramica» in Slavyansk city [developed by the author]

Table 1.2 – The names of customer-cities, their needs and transport costs

	Customer	Needs, K. t	S, Km	Transport costs, K.UAH/t
1	2	3	4	5
1	Kharkiv	1 992	174	4 735,62
2	Vinnitsa	1 594	837	687,12
3	Dnipo	797	240	3 338,80
4	Zhytomyr	1 132	808	1 157,29
5	Zaporizhzhia	996	287	1 209,71
6	Kiev	2 988	675	5 782,42
7	Kropyvnytskyi	1 195	487	1 872,63
8	Lutsk	796	1 087	2 793,63
9	Lviv	2 386	1 209	2 487,17
10	Mykolaiv	1 195	701	2 690,40
11	Odessa	1 394	833	4 691,26
12	Poltava	1 129	337	682,28
13	Sumy	996	279	766,15
14	Kherson	598	629	1 393,59
15	Cherkasy	996	571	1 693,60
16	Chernihiv	1 394	733	3 432,35
Total:	**16**	**21 578**	**9 887**	**39 414,00**

After we've got acquainted and analysed distribution activity of «Zeus Ceramica», we proposed common scheme of modernization of corporation's distribution activity (pict. 1.5). It consists of organizational, informational and control component. Thanks to its successful functioning, the corporation will successfully develop and broaden the borders of distribution activity.



Picture 1.5 – Mechanism of modernization of corporation's distribution activity [developed be the author]

Instead, one of the key-indexes of success of distribution activity in the process of satisfaction of manufacturing and consumer demands, is the usage of transport logistics, which is irreplaceable component of logistical chain.

Major part of corporation's costs make transport costs which are needed to organize the delivery of goods, so the main attention should be paid to the question of lowing costs for transport-expeditionary services.

We think that all the corporations which are connected with transport-logistical ways should pay much more attention to solve questions of optimization. As well as the corporation can fulfil the put tasks more effectively with its help for less time and with less transportation costs.

As a rule, mathematical model of such tasks can be observed as a model of transport tasks of lineal programming. Transport tasks are the tasks of choice of optimal variant of goods logistics from the producer's point to the distribution point considering all real opportunities. Using of the calculation lets to diminish transport costs in many cases for 10-30%.

To solve typical tasks of optimization the use of electronic tables MS Excel. The advantage of this method is universality, flexibility and convenience in the process of calculation of the task of optimization that can make the work easy and save the time.

That's why, proceeding the analyse of activity and problems of «Zeus Ceramica», we consider reasonable to solve the optimization tasks with the help of MS Excel. We suggest looking over two variants of logistical task solving in details which are actual for the given corporation.

The first variant is the task that can be lead to solvation by the method of minimal cost. As the origin data we should set specific value to the parameters of corporation «Zeus Ceramica» (look table 1.3).

Table 1.3 – Volumes of supplying and usage and transportation cost of the goods between the storage and places of consumption

Place and volume of consumption/ place and volume of production	Kharkiv 1992 t	Poltava 1129 t	Dnipro 797 t	Zaporizhzhia 996 t
Storage №1 1359 t	4 735,00	728,00	3 228,00	1 210,00
Storage №2 1893 t	4 610,00	682,00	3 400,00	1 197,00
Storage №3 1665 t	4 800,00	650,00	3 338,00	1 253,00

According to the purpose-oriented function of this very transport task in a mathematical setting can be written in the following way:

$$4735x_{11} + 728x_{12} + 3228x_{13} + 1210x_{14} + 4610x_{21} + 682x_{22} + 3400x_{23} + 1197x_{24} + 4800x_{31} + 650x_{32} + 3338x_{33} + 1253x_{34} \to \min_{x \in \Delta\beta}, \quad (1.1)$$

where great number of admissible alternatives form the following system of limitations of the type of equality:

$$\begin{cases} x_{11} + x_{12} + x_{13} + x_{14} = 1359 \\ x_{21} + x_{22} + x_{23} + x_{23} = 1890 \\ x_{31} + x_{32} + x_{33} + x_{34} = 1665 \\ x_{11} + x_{21} + x_{31} = 1992 \\ x_{12} + x_{22} + x_{32} = 1129 \\ x_{13} + x_{23} + x_{33} = 797 \\ x_{14} + x_{24} + x_{34} = 996 \\ x_{ij} \geq 0, \forall i \in \{1,2,3\}, \forall j \in \{1,2,3,4\} \end{cases} \quad (1.2)$$

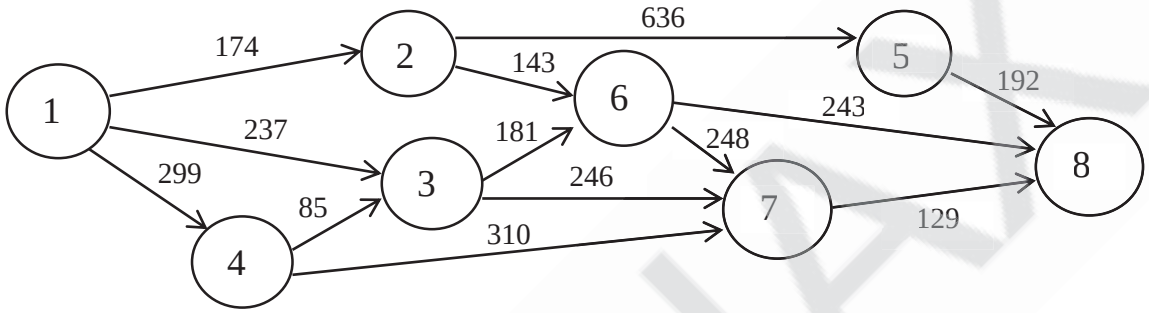
We should mention that the first three limitations of the given task respond to the common limitation according to which it is impossible to export more then they have, the next four limitations respond the common limitation according to which city-consumer cannot get more then needs. The last limitation tells about the fact we cannot get negative number of quantity of goods but otherwise total volume of consumption equals the sum of needs. Common limitations correspond the demands of balanced transport task because the existing quality of goods equals the needs of city-customers – 4914 t.

After calculation of MS Excel we'll get the qualitative solution which has the following view picture A. 1 (appendix A).

As the result of transport task solvation, optimal values by variable are found: x_{11} = 102, x_{12} = 0, x_{13}= 797, x_{14} = 660, x_{21} = 1890, x_{22} = 0, x_{23} = 0, x_{24} = 0, x_{31} = 0, x_{32} = 1129, x_{33} = 0, x_{34} = 536, to which the objective function values correspond: 13730644 UAH.

Analyse of founded solution shows us that we have to transport 102t of production from the first storage and 1890t from the second storage to fulfil the needs of Kharkiv, we have to transport 1129t of production from the third storage to fulfil the needs of Poltava, we have to transport 797t of production from the first storage to fulfil the needs of Dnipro, we have to transport 460t of production from the first storage and 536t from the third storage to fulfil the needs of Zaporizhzhia. The total cost of this very plan of transportation equals 13730644 UAH.

The second variant that is represented as the sum about minimal way in the graph [1; 6; 12], where we should choose the shortest route of movement passing different intermediate places. Let's observe the solvation of this task using the existing data of corporation «Zeus Ceramica» (Slovyansk). The corporation covers almost all the Ukraine with logistical ways, but, as an example we'll take a part of ways which unite 8 settlements. This district is represented as a scheme which is formally oriented connected graph, which is consists of 8 tops and 13 arcs (pict.1.6). Relevant settlements are represented on the scheme in the following way: Slovyansk – 1, Kharkiv – 2, Dnipro – 3, Zaporozhzhia – 4, Kyiv – 5, Poltava – 6, Kropyvnytskyi – 7 and Tcherkassy – 8.



Picture 1.6 – The scheme of logistic ways [developed by the author]

The length of the road between two settlements is represented in km and equals the value of the weight function for every arc which is showed next to the picture of corresponding arc in the graph. We have to find the route connecting the beginning point 1 – Slovyansk which is corresponded the top $1 = v_s$, with the ending point 8 – Tcherkassy which is corresponded the top $8 = v_t$, in such a way that the common length of the road was minimal.

Mathematical model variables of data of individual task about minimal way in an oriented graph are 13 variables: v_{12}, v_{13}, v_{14}, v_{25}, v_{26}, v_{36}, v_{37}, v_{43}, v_{47}, v_{58}, v_{67}, v_{68}, v_{78}. We attach to the review Boolean variable x_{ij}, which are interpreted in the following way. The variable x_{ij}= 1, if the arc $(v_i; v_j)$ is included to the route of minimal length and x_{ij}= 0, otherwise. Then, mathematical formulation of the observed personal task about minimal way in the graph can be written in the following way:

$$174x_{12} + 237x_{13} + 299x_{14} + 639x_{25} + 143x_{26} + 181x_{36} + 246x_{37} + 85x_{43} + 310x_{47} + 192x_{58} + 248x_{67} + 243x_{68} + 129x_{78} \rightarrow \min_{x \in \Delta\beta}, \quad (1.3)$$

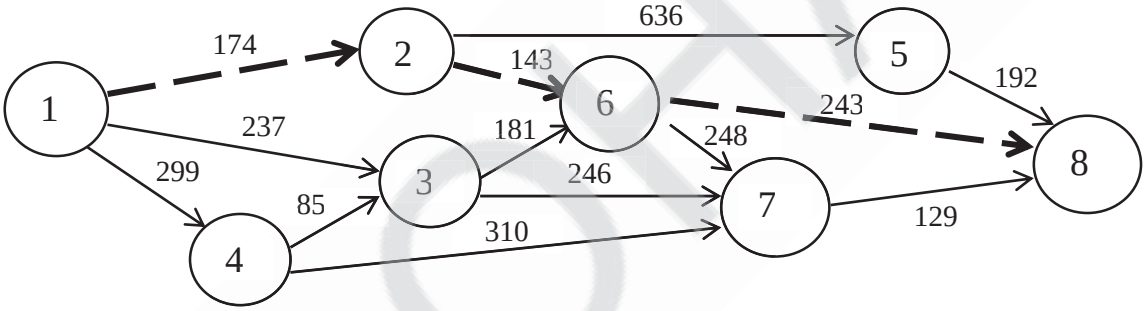
where the set of acceptable alternatives $\Delta\beta$ form the following system of limitations of the type of equality and inequality:

$$\begin{cases} x_{12} + x_{13} + x_{14} = 1 \\ x_{58} + x_{68} + x_{78} = 1 \\ x_{12} - x_{25} - x_{26} = 0 \\ x_{13} - x_{36} - x_{37} + x_{34} = 0 \\ x_{14} - x_{34} - x_{47} = 0 \\ x_{25} - x_{58} = 0 \\ x_{26} + x_{36} - x_{65} - x_{68} - x_{67} = 0 \\ x_{67} + x_{37} + x_{47} - x_{78} = 0 \end{cases} \quad (1.4)$$

Let's note that these variables x_{ij}, to which weighting function of arcs h is undetermined and equal 0, are not included to the mathematical formulation of the task (3) and (4). To solve this task with the help of MS Excel we'll arrange original data on the page (pict. B.1, appendix B) and will use superstructure «the search of solution» (pict. B.2, appendix B).

After performing calculations by MS Excel the qualitative solution will be received. The result of task solvation in the minimal way in the graph is optimal value of varieties which is found $x_{12} = 1,\ x_{26} = 1,\ x_{68} = 1$, another varieties equal 0. To the founded optimal solution correspond the value of the objective function $f_{opt} = 560$.

The analyse of the founded solution shows that minimal way in the original oriented graph connect the top 1 – Slovyansk with the top 8 – Tcherkassy include the following arcs (1.2), (2.6), (6.8). So, the founded optimal route of moving from starting point Slovyansk to the final – Tcherkassy includes consistent moving between neighbour settlements: from Slovyansk to Kharkiv, from Kharkiv to Poltava, from Poltava to Tcherkassy (pict. 1.7). moreover, the common length of the way will be minimal and equal 560 km.



Picture 1.7 – Oriented connected graph of logistics ways with optimal way

The storage in Slovyansk provides the needs of customers of East region of Ukraine with the production of corporation. The cities of this region are located not far from the storage so the corporation doesn't have large transport costs.

The central region of Ukraine provides maximum volume of distribution the production of the corporation and large turnover. In this region, Kiev particularly, large wholesale consumers of the corporation's production are situated, a great number of shopping hypermarkets and shops which sell ceramic production, different kinds of tile, mosaic and so on.

The territory of Western Ukraine is the farthest from the storage place, the delivery of production to the cities of western Ukraine needs the largest transport costs.

So, we suggest, as an alternative or as an addition to the usage of optimization tasks with the help of MS Excel in distribution activity of «Zeus Ceramica» to locate additional distributional storage in Kyiv. This solution can save transport costs and improve the indicators of logistical principles – the delivery of production to the consumer in certain place in time with minimal transport costs.

Also, to improve the organization of distribution activity we recommend to interrogate the clients permanently about periodicity and time of production delivery and on the ground of this data to plan fixed routes of delivery to the key-clients. It will

give an opportunity to load exactly the truck, will reduce transport costs and the client will know the exact time of delivery.

To optimize the danger and to use full opportunities of corporation it is necessary to inform the consumer with the help of advertisement and web-site about the corporation's events (every actions or new product appearance), to keep the existing level of prices and accent the attention of consumer on the service quality and production quality, to use actions and discounts more frequently, to widen the net of production distribution.

Conclusions. Today it is necessary to pay much attention to the process of organization of distribution activity for more effective work of corporation and receiving good indexes of activity in general. In terms of increased level of competition on markets and increased consumer's requirements to the production quality and service, decreased consumer's paying ability and demands it is needed to introduce effective working system for organization corporation's distribution activity, because today almost every corporation asks actual question and puts the tasks of optimization and improvement of distribution activity and decrease the level of costs. «Zeus Ceramica» is the corporation which develops, increases the number of consumers every year, comes to the new markets and improves the quality of production and service.

Getting acquainted and analysed its work we proposed the mechanism of distribution activity modernization. One of the main propositions is an implementation of optimization tasks with the help of MS Excel. Thanks to the tasks of minimal cost methods we can calculate optimal and economically profitable plan easily and fast, the quantity of production supplying to the consumer in conditions of having some storages. But unlike the minimal way task in the graph, we cannot calculate the shortest way without turning back twice to the same point. Minimal way tasks in the graph based upon finding optimal supplying ways with the aim to save costs and time.

The alternative proposition to minimize transport costs is the definition of optimal location of additional storage of distributional centre in Kyiv which can be possible to move production to the West and Central regions of Ukraine from.

The improvement of distribution activity organization will let to plan rationally supplying of ready production on the corporation's storages in the future, to deliver production to the consumers as fast as possible with minimal transport costs and to improve the distribution activity organization.

The list of used literature.

1. Avramenko V. I., Karimov I. K.: Probability Theory and mathematical Statistics. Educational manual.Dneprodzerzhynsk: DDTU, 2013. 245 c.

2. Bolt G.J. Practical guide to sales management: textbook. Moscow: MT–Press, 2001. 268 c.

3. Bruch O. O. Theoretical problems of distribution of agricultural products. *Bulletin of Kharkiv National Technical University of Agriculture P.Vasilenko. Economical sciences.* Kharkiv: KNTUAC, 2011. №. 112. C. 140-145.

4. Vardanyan L. E. Businessman's book : directory. Moscow: High school, 1993. 350 c.

5. Vlasova V. M. Fundamentals of entrepreneurship: Educational manual. Moscow: Finance and Statistics, 1996. 496 c.

6. Vovk V. M., Zomchak L. M. Optimization methods and models: educational manual. Lviv: LNU named after Ivan Franko, 2014. 360 c.

7. Garkavenko S. S. Marketing: textbook. Kyiv: Lubra, 2007. 720 c.

8. Zavadskyi J.S. Management: textbook. Kyiv: Ukrainian Financial Institute of management and business, 1999. 541 c.

9. Kardash V.Y. Marketing Commodity Policy: educational-methodical manual. Kyiv: KNEU, 2001. 240 c.

10. Classification and Procedure for calculating the main indicators of assessing the financial condition of the enterprise. URL: http://www.studfiles.ru/preview/5084680/page:6. (date of appeal: 17.03.2019).

11. Kus A. Fundamentals of Marketing:educational manual. Kyiv: Nichlava, 1999. 224 c.

12. Leonenkov A. Solution in optimization problems in the environment MS EXCEL. St.Petersburg: «BHV-Petersburg», 2005.

13. Lukyanets T. I. Marketing communication policy: educational manual. Kyiv: KNEU, 2005. 380 c.

14. Nesterenko S.S. Kutlina I.Y. The essence of sales in the enterprise marketing system. *International Scientific and Practical Conference «WORLD SCIENCE»*. Kyiv, 2016. №1(5).

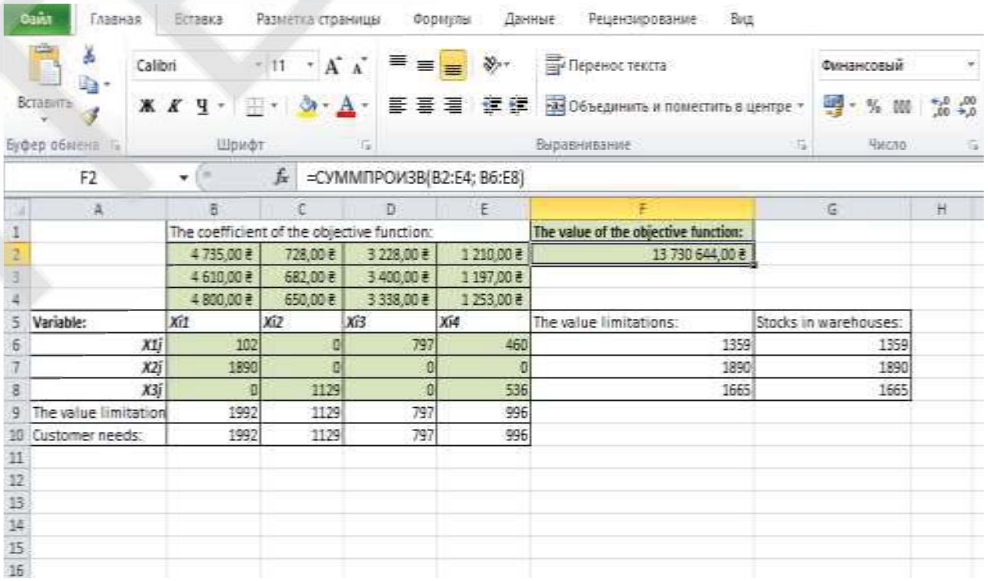
15. Job description of the Head of Sales. URL: https://www.borovik.com/index_instruction.php?Gins=73&lang_i=1. (date of appeal 17.12.2019).

16. Starostina A. O. Industrial marketing: theory, world experience, Ukrainian practice: textbook. Kyiv: Znannya, 2005. 764 c.

17. Terenteva N. V. Management of distribution activities in the enterprise management system. *Effective economics*. 2016. URL: http://www.economy.nayka.com.ua/ (date of appeal: 17.03.2019).

18. Khlusov V.P. Introduction to marketing: textbook. Moscow: Prior, 1997. 160 c.

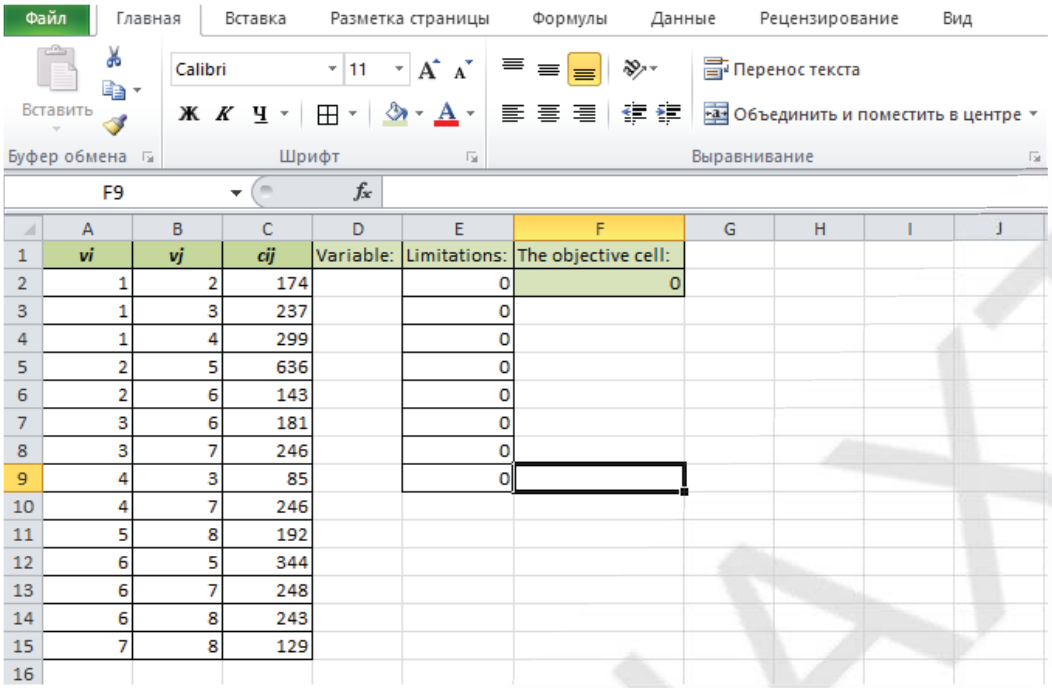
APPENDIX A



	A	B	C	D	E	F	G	H
1		The coefficient of the objective function:				The value of the objective function:		
2		4 735,00 ₴	728,00 ₴	3 228,00 ₴	1 210,00 ₴	13 730 644,00 ₴		
3		4 610,00 ₴	682,00 ₴	3 400,00 ₴	1 197,00 ₴			
4		4 800,00 ₴	650,00 ₴	3 338,00 ₴	1 253,00 ₴			
5	Variable:	Xi1	Xi2	Xi3	Xi4	The value limitations:	Stocks in warehouses:	
6	X1j	102	0	797	460	1359	1359	
7	X2j	1890	0	0	0	1890	1890	
8	X3j	0	1129	0	536	1665	1665	
9	The value limitation	1992	1129	797	996			
10	Customer needs:	1992	1129	797	996			
11								
12								
13								
14								
15								
16								

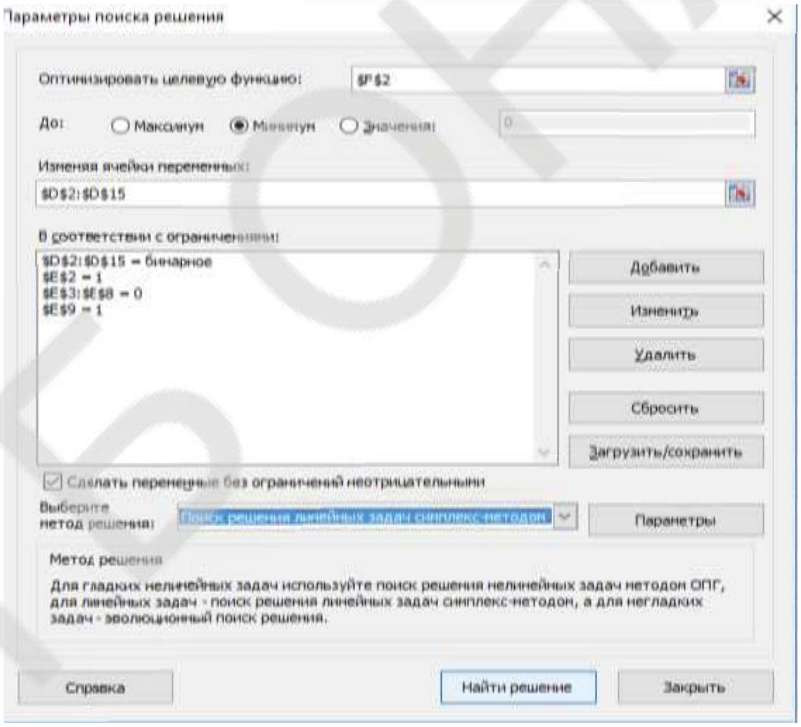
Picture A.1 – Quantitative solution after fulfilment of calculations by MS Excel

APPENDIX B



	A	B	C	D	E	F	G	H	I	J
1	*vi*	*vj*	*cij*	Variable:	Limitations:	The objective cell:				
2	1	2	174		0	0				
3	1	3	237		0					
4	1	4	299		0					
5	2	5	636		0					
6	2	6	143		0					
7	3	6	181		0					
8	3	7	246		0					
9	4	3	85		0					
10	4	7	246							
11	5	8	192							
12	6	5	344							
13	6	7	248							
14	6	8	243							
15	7	8	129							
16										

Picture B.1 – Original data for fulfilment the task of minimal way in the graph



Picture B.2 – An example of use superstructure «The search of solution» for the task of minimal way in the graph