MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL AVIATION UNIVERSITY
Faculty of Transport, Management and Logistics
Logistics Department

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BACHELOR THESIS

(EXPLANATORY NOTES)

OF GRADUATE OF ACADEMIC DEGREE

«BACHELOR»

THEME: **«Management of transcontinental delivery of perishable products»**

Speciality 073 «Management»

Educational and Professional Program «Logistics»

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Kyiv 2020

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
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ВИПУСКНИКА ОСВІТНЬОГО СТУПЕНЯ

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Київ 2020

NATIONAL AVIATION UNIVERSITY
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Academic degree Bachelor

Speciality 073 «Management»

Educational and Professional Program «Logistics»

APPROVED
Head of the Department

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«25» May 2020

TASK

FOR COMPLETION THE BACHELOR THESIS OF STUDENT

Daria O. Kompaniets
(surname and name)

1. Theme of the bachelor thesis: «Management of transcontinental delivery of perishable products» was approved by the Rector Directive №553/ст. of May 04, 2020.
2. Term performance of thesis: from May 25, 2020 to June 21, 2020.
3. Date of submission work to graduation department: June 05, 2020.
4. Initial data required for writing the thesis: general and statistical information about perishable products supply, information of the company «Imperial Holding», production and financial indicators of the company «Imperial Holding», literary sources on perishable products transportation, Internet source.
5. Content of the explanatory notes: introduction, the essence of the perishable products concept; the specifics of perishable product transportation; organization of perishable products supply chain; analysis the activity of the company «Imperial Holding»; identification of organizational process of bananas supply by "Imperial Holding"; analysis of delivery scheme of bananas of the "Imperial Holding"; development of proposals about improvement the supply chain of perishable products.
6. List of obligatory graphic matters: tables, charts, graphs, diagrams illustrating the current state of problems and methods of their solution.

7. Calendar schedule:

№	Assignment	Deadline for completion	Mark on completion
1	2	3	4
1.	Study and analysis of scientific articles, literary sources, normative legal documents, preparation of the first version of the introduction and the theoretical chapter	25.05.20-27.05.20	Done
2.	Collection of statistical data, timing, detection of weaknesses, preparation of the first version of the analytical chapter	28.05.20-29.05.20	Done
3.	Development of project proposals and their organizational and economic substantiation, preparation of the first version of the project chapter and conclusions	30.05.20-01.06.20	Done
4.	Editing the first versions and preparing the final version of the master thesis, checking by standards inspector	02.06.20-03.06.20	Done
5.	Approval for a work with supervisor, getting of the report of the supervisor, getting internal and external reviews, transcript of academic record	04.06.20	Done
6.	Submission work to Logistics Department	05.06.20	Done

Student_____
(signature)

Supervisor of the bachelor thesis _____
(signature)

8. Consultants of difference chapters of work:

Chapter	Consultant (position, surname and name)	Date, signature	
		The task was given	The task was accepted
Chapter 1	Senior Lecturer, Molchanova K.M.	25.05.20	25.05.20
Chapter 2	Senior Lecturer, Molchanova K.M.	28.05.20	28.05.20
Chapter 3	Senior Lecturer, Molchanova K.M.	30.05.20	30.05.20

9. Given date of the task May 25, 2020.

Supervisor of the master thesis: _____ Molchanova K.M.
(signature of supervisor) (surname and name)

Task accepted for completion: _____ Kompaniiets D.O.
(signature of graduate) (surname and name)

ABSTRACT

The explanatory notes to the bachelor thesis «Management of transcontinental delivery of perishable products» comprises of 73 pages, 13 figures, 11 tables, 50 references.

KEY WORDS: PERISHABLE PRODUCTS, CLASSIFICATION OF PERISHABLE PRODUCTS, TRANSPORTATION OF PERISHABLE PRODUCTS, SEA TRANSPORTATION, TRANSCONTINENTAL TRANSPORTATION, IMPROVING OF SUPPLY CHAIN, BLOCKCHAIN SYSTEM.

The aim of the study is to study the theoretical foundations and problems of managing transcontinental supply chains from Latin America, analyze related problems and find solutions to problems, improve the logistics supply chain.

The subject of the study is the improvement of the supply chain of perishable products of the company-exporter “Imperial Holding”.

The object of the study is the processes in the supply chains of perishable products of the importing company “Imperial Holding”

Methods of research are scientific inquiry, empirical, analysis and synthesis, modeling, expert assessments, extrapolation of time series.

Materials of the thesis are recommended for use during scientific research, in the educational process and in the practical work of specialists of logistics departments.

CONTENTS

NOTATION

ATP – Admission to Transportation of Perishable Goods;

CSC – Supply Chain Council;

CEO – Chief Executive Officer ;

CIF – Cost, Insurance and Freight;

CFR – Cost and Freight;

FAS – Free Alongside Ship;

FOB – Free on Board;

RFID – Radio Frequency Identification.

INTRODUCTION

Perishable cargo - a special cargo that requires a special temperature, air and temporary conditions, as well as humidity conditions during transportation and storage in order to maintain its condition or suitability for a specific purpose. Transportation of perishable goods a priori assumes that the goods will arrive at the destination in the same quality as they were when loading in the refrigerator. As a result of this, all products, even at the loading stage, are carefully checked. Vegetables, greens, berries and fruits should not have moisture and traces of mold. There should be no mucus on meat carcasses. Particular attention during loading should be given to processed products. They must be calibrated and, if necessary, sealed. Perishable goods must be carefully checked. If such a check is not carried out, then there is a possibility that during transportation the products will corrode corny. Perishable goods are transported by rail, water (river and sea), by road, and to a lesser extent by air.

The aim of the thesis is to analyze the transcontinental supply chain of perishable products and develop proposals that lead to an increase in the number of related transportation problems.

In accordance with the purpose of the thesis, the following tasks were identified and formed:

– Find out what perishable products are, their classification;

– Study of the features of the transportation of perishable products, especially by sea;

– Study of the features of the supply chain;

– The study of various modes of transport for such transportation;

– To characterize the importing company "Imperial Holding";

– To conduct diagnostics of the financial and production companies of Imperial Holding;

– Analyze the logistics system of the enterprise;

– Identify the problems the company is facing;

– Development of solutions to problems;

– Calculate possible improvement in the supply chain;

– Determine the consequences of introducing a blockchain system in the organization of logistics processes in the company "Imperial Holding".

The advantages and disadvantages of a particular type of transport are described. Based on the fundamental documents, the conditions for the transportation of perishable goods are given. In the third part of the thesis “development of proposals for improving the transcontinental supply chain of perishable products”, the main problems of the development of perishable goods transport are identified and possible solutions are presented.

The subject of the study is the improvement of the supply chain of perishable products of the company-exporter “Imperial Holding”.

The object of the study is the processes in the supply chains of perishable products of the importing company “Imperial Holding”

The information sources during thesis research were:

–regulations and legal documents;

–scientific and methodological development whose connect with social and environmental responsibility;

–statistics and financial report of “Continental Logistics” company, internal documents that describe company’s activity;

–Internet sources.

During carrying out calculations and edition of thesis was used Microsoft Office software applications: Word, Excel and Visio.

CHAPTER 1
PERISHABLE PRODUCTS AND FEATURES OF TRANSPORTATION OF PERISHABLE PRODUCTS

1.1 The concept of perishable products

Perishable product is the product that has short life time or one that easily deteriorates. These items include fresh foods, dairy products, and pharmaceuticals. This short lifetime complicates the inventory management as they must be processed and move through the supply chain for sale to customers before they perish and lose either part of their value or their entire value. [1]

For the seller, perishable product categories are a big problem. It is important to order such a volume of products that it can be sold with the least loss. The other side of the issue is that perishable products on store shelves are most often subject to inspections by Supervisory authorities. And the presence of the notorious delay can be the basis for a prescription and penalties.

Thus, if we turn to the legal interpretation or definition of the concept of "perishable products", then the legislator refers them to a product category that requires special conditions for transportation and storage, as well as sales strictly within the established time frame.

Certain aspects of turnover of perishable goods are regulated by the following regulations:

- resolution of the Chief state sanitary doctor;
- sanitary and epidemiological rules and regulations;
- state standard that defines the list of such products.

Perishable cargo includes:

- vegetables and mushrooms fresh and canned (except dried and dried): eggplants, fresh peppers, cucumbers, tomatoes, cabbage, potatoes, onions, beets,

rutabaga, radishes, fresh mushrooms, vegetables and mushrooms salted and pickled all sorts of jam and puree of vegetables, herbs of all kinds;

– fresh and canned fruits and berries (except dried and dried); watermelons, bananas, melons, fresh fruits and berries, citrus fruits, subtropical crops, pickled fruits and berries, jam, puree and dough fruit and berry, various jams and confections, fruit and berry jam;

– meat and meat products (including broken poultry and game), smoked meat and sausage and fat animals: animal meat in any form, fat and fat, broken poultry, endocrine raw materials, offal;

– milk and dairy products: fresh milk, cream, sour cream, cottage cheese, various types of cheese, cheese, butter and ghee;

– egg and egg mélange;

– fish, fish products and crayfish: live fish eggs and fry, all kinds of fish: live, chilled, frozen, smoked, salted and pickled, all kinds of caviar and crayfish;

– margarine, Margolin, compound-fat and also fat artificial from vegetable oils;

– alcoholic beverages: beer, honey wine, fruit and berry wines, grape wines, tinctures, liquors and champagne;

– non-alcoholic beverages, mineral waters, natural and artificial, and all kinds of non-alcoholic beverages;

– pressed baking yeast;

– canned food in a sealed package;

– plants live: trees and bushes live, vegetable seedlings, seedlings of all sorts and other planting material, evergreen plants, flowers live and cut;

1.2 Features of transportation of perishable products

Perishable goods, as can be clearly seen from their name, differ in that they have a limited shelf life, and therefore their transportation requires special conditions — maintaining a certain temperature and meeting delivery deadlines. If these conditions are not met, the cargo will deteriorate and completely lose its commercial qualities: all that can be done with it is to throw it away. This means that it will not be implemented and the client will suffer losses, losing both the product and the money spent on it.

The difficulty of transporting perishable goods is that no matter how carefully all the necessary conditions are met and no matter how clearly the transportation plan is thought out, there is always a risk of not delivering the goods in their quality form. The same delay in the way may well occur for reasons beyond the control of the carrier and increase the delivery time so that it exceeds the maximum allowed time allotted for transportation.

In fact, there are many risk factors associated with the transport of perishable goods: road conditions, road surface quality, weather (namely, external temperature), dust and gas content of the air, exposure to microorganisms, humidity levels, etc. To minimize them, the more necessary it is to strictly observe the necessary temperature regime of transportation, as well as the rules of cargo packaging, loading and placement.

For each group of products, and sometimes for each individual product, there are strictly defined state, regional or technological documents requirements for transportation.

Refrigerators and heated vehicles are most commonly used for transporting perishable foodstuffs.

Reefers are insulated vehicles that have an individual or shared cooling system for several units, which allows you to lower the temperature inside the empty body at an average outside temperature of +30 °C and then maintain it at a constant level.

Refrigerators of classes A, B and C have refrigeration units that provide any set virtually constant temperature within the following limits:

– class A refrigerators: +12 ° C: 0 °C

– class B refrigerators: +12 ° C: -10 °C

– class C refrigerators: +12 ° C: -20 °C

Refrigeration units of class D, E, F refrigerators provide constant temperature readings:

– class D refrigerators: +2 °C

– class E refrigerators: -10 °C

– class F refrigerators: -20 °C

Heating vehicles are insulated vehicles that have a heating system that allows you to raise the temperature inside the empty body and then maintain it without additional heat for at least twelve hours at a virtually constant level of not less than +12 ° C at an average outdoor temperature for class A -10 °C, class B -20 °C.

A certificate is issued for each vehicle that is allowed to transport perishable foodstuffs in international traffic. The certificate form must be printed in the language of the issuing country, as well as in English or French; the headings must be numbered. The certificate or its corresponding photocopy must be present on the vehicle during transportation and must be presented at the first request of the inspectors.

To maintain the high quality of transportation of perishable food products strict compliance with a number of requirements is required:

– careful selection of high-quality products intended for transportation;

– proper placement of products in the vehicle body, which ensures proper air circulation and efficient use of cold;

– strict compliance with temperature requirements for products intended for transportation in the cargo area of the vehicle before loading and during transportation;

– monitoring the state of the temperature regime in the cargo area during transportation;

– delivery of products to their destinations on time.

Transportation of Perishable Goods by Ground

– By Truck. Trucks transporting perishable goods have different cold systems, which may or may not be mechanized (ice or dry ice is often used).

– By Rail. Train cars should have an isolating lining, as well as a special system for refrigeration, loading, and unloading. Dry ice is often used to keep goods cold.

Transportation of Perishable Goods by Air.

This is the best option for transporting perishable goods. Each airport has a special area for handling perishable goods where temperature can be controlled using refrigerated chambers and freezers. These areas have customs inspection points that are guarded at all times by highly-qualified, specialized personnel, which ensure that the goods are kept at the optimal temperature at all times.

The products most commonly transported by air are:

– Fresh products (fruit, vegetables, meats, dairy, etc.)

– Frozen products (fruit, concentrates, fruit pulps, etc.)

Transportation of Perishable Goods by Ocean.

Goods are transported in refrigerated ships that are fully equipped with systems to circulate air properly. You can also ship in refrigerated containers (commonly known as reefers). Usually, logistics operators are in charge of consolidation or deconsolidation.

Before transporting perishable goods, a “temperature requirement sheet” is provided to indicate the temperature at which the product must be kept in the refrigerated container.

The products most commonly transported by ocean are:

– Fresh products (fruit, vegetables, meats, etc.)

– Frozen products (fruit, concentrates, fruit pulps, meats, etc.) [2]

In General, you can transport perishable goods by any type of transport — by road, sea, rail, or air. However, if air transport is quite expensive and is used when the shortest possible delivery time is extremely important (for example, when transporting biological tissues and organs). Sea transport is somewhat slow and

preferable for transporting cargo with a fairly long storage period. Railway, although relatively cheap and has a good possibility (for freight trains there are no "traffic jams" and they can maintain the same speed almost throughout the entire section of the track), implies large volumes of cargo and, as a rule, does not provide direct delivery of goods — to the customer's door.

The truck also carries cargo "from door to door" and does not require additional overload, which can affect the quality and safety of the goods. In addition, cars are used in almost every" chain " of delivery — from the port, airport, railway station to the destination, etc. And they also deliver goods from warehouses to retail outlets and therefore are the most popular and widespread method of delivery of "perishable".

However, before starting to transport this type of cargo, cars and rolling stock must pass a special admission procedure: pass tests for compliance with sanitary, thermal, etc. standards and receive a special certificate of ATP. The certificate has the following abbreviation for the name of the document regulating the transport of perishable goods — the Agreement on the international transport of perishable foodstuffs and on the special vehicles intended for these transportations.

Transportation of perishable cargo begins with the correct choice of vehicle (depending on the type of cargo, temperature conditions required for its transportation, weight, size...), packaging and labeling that meets all requirements, and preparation of accompanying documents.

Among the mandatory documents accompanying the perishable cargo include:

– commodity-transport or bill of lading;

– waybill;

– a quality certificate containing the main characteristics of the product and confirming its compliance with norms and standards;

– veterinary certificate-for animal products;

– sanitary and hygienic certificate confirming the hygienic safety of the product;

– quarantine (or phytosanitary) certificate for products of plant origin, indicating the absence of diseases;

– the usual documents for the car — technical passport, certificate of inspection, insurance policy;

– ATP certificate (admission to transportation of perishable goods);

– list of control checks of the temperature of cargo and air in the car body.

In addition, the driver must have a certificate of medical examination.

In order for perishable goods to withstand transportation and maintain their quality, they must be packed in accordance with the established requirements.

For example, frozen meat blocks should be wrapped in parchment (cellophane) or similar material and placed in containers or boxes made of corrugated material. Smoked meat products-in special boxes that provide free air circulation. Corned beef - in strong, leak-free aspic barrels filled to the top with brine. Frozen fish - in boxes lined with paper or other insulating material. On the bottom of the container for chilled fish (as well as on each row of fish) pour a layer of clean crushed ice. Bars of yeast are wrapped in paper and put in clean and odorless boxes. And the eggs of birds are packed in a container with corrugated gaskets.

Each type of cargo has its own special packing order, which must be strictly observed. In addition, the temperature of loading and transportation of the goods is of great importance (it is specifically indicated by the shipper in the 5th column of the bill of lading) and the marking of the container.

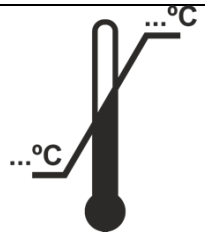
For perishable goods, there are several designations that warn about the conditions under which it should be transported and how to handle it during loading and unloading operations (Table 1.1).

Loading perishable cargo also involves its own nuances.

First and foremost, it is necessary to clearly monitor the temperature at which the cargo was provided for shipment. For this purpose, a special list of control checks is provided: the shipper enters the values of the cargo temperature and the temperature in the vehicle measured before loading, and the consignee — the temperature in the body of the arriving car and the temperature of the arrived cargo. Vehicles intended for the carriage of perishable goods, available now with the standard devices. This device automatically records the temperature values along the

way, and it is easy to determine how the temperature regime changed and whether the temperature exceeded the set values.

Table 1.1 – Special marking of perishable goods

	The "Perishable cargo" sign: indicates that the cargo cannot be under the influence of high or low temperature and for its protection and safety requires a special temperature regime-cooling, ventilation, etc.
	The "Protect from dampness" sign: requires protection from moisture and is usually used for marking bulk cargo (sugar, salt, etc.).
	The "Protect from sunlight" sign: indicates that the transported cargo is subject to damage at high temperatures, direct sunlight, etc.
	The "Temperature limit" sign: it must indicate the temperature range at which the product can be stored, transported, and reloaded.
	The "Sealed packaging" sign: prohibits opening the packaging during storage, loading/unloading, and transportation.

Secondly, the shipper must provide the carrier with the necessary accompanying documents, and in the transport/consignment note in a separate column indicate the temperature regime, the maximum duration of transport and other special conditions under which the cargo must be transported and compliance with which will ensure its safety.

Third, the shipper passes the cargo to the carrier in a clean, dry, strong container that meets sanitary and hygienic standards, has not been subjected to corrosion and other damage. If possible, the container must be sealed; if not, the vehicle must be sealed.

In addition, you need to consider some loading rules:

– frozen loads are stacked tightly on top of each other with maximum use of usable space;

– fresh and chilled loads must be stowed so as not to interfere with natural air circulation: a gap of at least 30 cm is left between the ceiling and the top row of the load;

– there should be no gap at all between the last row of cargo and the rear wall of the car body;

– if the dimensions of the boxes do not allow you to "fit" them evenly along the length and width of the body (there is a space between them and the walls of the car), you must create special conditions (use, for example, additional material) to prevent the boxes with cargo from moving quietly and hitting each other during transportation;

– when using special hooks (for meat carcasses) for transportation, you cannot load them more than the maximum weight for which they are designed;

– fruits and vegetables should be sorted by maturity and variety and Packed tightly in a box at the level with its edges — so that the fruits do not beat.

1.3 Supply chains for perishable products

The supply chain is a technique that allows you to optimize all horizontal or vertical communications in the management of an enterprise. The peculiarity of this approach is that it covers the entire production chain, from our suppliers to our end customers, with the constant flow of information between all participants in the

process. Thus, all participants in the process hear the same guiding voice, receive the same information, no matter what level of planning or execution we talk about, from strategic planning to site management.

The advantages that the supply Chain gives to a modern enterprise is the stabilization of the production process, which is carried out with minimal costs and ensures that all customer requests are met in the shortest possible time. This ensures a reasonable, regulated reduction in the volume of inventory and work in progress, which, of course, has a positive impact on the company's economy.

The supply chain refers to a chain of entities and activities whose task is to provide products and services to the customer. The entire supply chain can be represented by five main processes: purchasing, production, distribution, and customer contact, all of which are covered by planning.

In a broader sense, the term "Supply Chain" also refers to a development concept aimed at optimizing this chain.

What characterizes it:

– a transversal approach that focuses on processes rather than professional skills.

– a general view based on software integration and data exchange.

– practical approach: we use the best solution for each individual case.

The supplier chain covers all the activities involved in creating value. The peculiarity of this approach is to go beyond the company, from its suppliers and to the end user.

In practice, the process proceeds as follows:

– splitting, analyzing, and linking existing processes.

– fix processes with low performance and create missing processes.

– adapt these processes to be able to provide comprehensive and integrated guidance.

To do this, you need to prepare a complete display of all business processes and decompose each process into sub-processes, procedures, work instructions, and manuals. The advantage of this display is that you get a general and detailed view of

the company's supply chain: we know who does what, how they do it, who is their supplier and who is the customer. This ensures that nothing is forgotten, everything is under control, and all the goals facing each of the links in the chain, each direction (production, procurement, human resources, technology, finance, etc.) are the same.

One of the keys to the success of an effective supply Chain is the exchange of information in real time and the creation of a collective solution by all participants in the process, without exception. This helps to minimize response time and make corrective action plans for risks (supply disruptions, poor quality, changes in commercial demand, and so on) more effective.

For an enterprise, the two main aspects of a successful supply chain are:

– reduce the need for working capital by reducing inventory (be cost-effective and be able to invest in research and production upgrades).

– improving the quality of customer service through managed planning and production.

According to the supply chain Council (CSC – Supply Chain Council), the results usually show a 50% reduction in inventory along with a significant improvement in service levels.

A global supply chain is a dynamic worldwide network when a company purchases or uses goods or services from overseas. It involves people, information, processes and resources involved in the production, handling and distribution of materials and finished products or providing a service to the customer.

Global supply chains are networks that can span across multiple continents and countries for the purpose of sourcing and supplying goods and services. Global supply chains involve the flow of information, processes and resources across the globe.

Low-cost country sourcing is linked to global supply chains and refers to the procurement of products and services from countries with lower labor rates and reduced production costs than that of the home country. [3]

1.4 Chapter 1 summary

According to paragraphs 1.1-1.3, the following conclusions can be drawn:

– transportation of perishable goods is a responsible process that requires consideration of multiple factors to ensure its safety. Transportation always involves a number of risks, since the cargo throughout its entire length needs to create special conditions around itself that meet the standards of its storage. For example, ensuring the appropriate temperature regime, monitoring the humidity level;

– perishable or urgent cargo is a material object whose properties can be lost, damaged or devalued due to the impact of various conditions. Among these conditions: obsolescence of the item itself due to prolonged transportation; drop, increase or jump in temperature; change in humidity. Getting physical defects due to impacts, squeezing, etc. belongs to the group of General risks and is not exclusively related to this type of cargo, since such violations of integrity are not due to the "urgency" of the cargo, but appeared due to fragility;

– the peculiarity of transportation of perishable goods is that no matter how quickly it is performed, it is almost always required to comply with the minimum measures to ensure the safety of transported products.

CHAPTER 2
ANALYSIS OF THE "IMPERIAL" COMPANY ACTIVITY AND THE PERISHABLE PRODUCTS DELIVERY PROCESS

2.1 General characteristics of the company "Imperial"

The Imperial Holding was founded in 1993 and is the leader in importing bananas from Latin American countries to Ukraine. It is an international group of companies that has representative offices in 15 regions of Ukraine, in Ecuador, Colombia, Costa Rica and Mexico. It is this importer that sets a high standard of quality that the Ukrainian consumer is already so used to. GC "Imperial" has an extensive network of logistics centers, the largest of which are located in Kiev and Odessa.

Here is the most modern fleet of trucks and refrigerators. Employees of the company represent Ukraine at the largest international exhibitions. To improve the level of qualification, the staff regularly receives training, including abroad. All this guarantees a high level of service provided by GC Imperial. [4]

Bananas, which we see on Ukrainian counters, have come a long way. They crossed the ocean, breaking out of the hot embrace of Ecuador's plantations. The main condition for growing bananas is the humid tropics. Ecuador does not have any problems with this: the country is located on the equator, and therefore the humidity and temperature in some areas are at the same level almost all year round. Ecuador is the largest supplier of bananas to all countries of the world. They live in families and bear fruit after nine months. In principle, bananas are not whimsical. In the Ecuadorian tropics, harvest is harvested up to six times a year. But if it suddenly becomes cold at least to +16 degrees, the fruits freeze and quickly die. If this happens, then the fruits are trying to heat up. Bananas are torn off immature, green. [4]

Over a 27-year period of successful operation, “Imperial” has achieved:

– sales of more than 1 billion boxes of banana;

– own production facilities in Ecuador;

– teams of more than 550 highly qualified specialists;

– built a logistics center in Odessa, Ukraine;

– modern fleet of trucks;

– the level of world brands.

“Imperial” has offices in Ecuador, Colombia and Costa Rica. Weekly deliveries amount to 150 000 boxes to Ukraine and Russia. The company's own quality Department controls all stages of delivery, starting with the cut of fruit on plantations and ending with delivery to the customer's warehouse.

Since “Imperial” receives cargo from distant countries, it has developed network logistics centers. The biggest are in Kyiv and Odessa.

The company owns its own fleet of vehicles (see Figures 2.1–2.2) :

Figure 2.1 – Delivery truck

– container ships - 52 units;

– refrigerator cars 20t – 70 units;

– refrigerator cars 10t – 50 units;

– modern warehouse equipment.

DAF vehicles meet the standard EURO6:

– DAF FA LF 250.16 EURO 6, 2015

– DAF XF 105 460 EURO 6, 2015

Figure 2.2 –Container truck of “Imperial Holding”

The “Imperial” group of companies started with the sale of small and medium-sized wholesale food products by regions, simultaneously developing the distribution Department, that is, a small transport Department that was engaged in delivery around the city and to the nearest regions. From 1993 to 2004, small wholesale companies moved to medium and large ones. We started selling products to the nearest regions: Zaporozhye, Kherson, Poltava, Kharkiv, Odessa, Crimea, etc. since 2004, Imperial has become an importer and started opening branches in Ukraine,

which by 2012 were already in each region. First of all, frozen products were imported: meat products from Latin America, fish from Scandinavia. Since 2006, we have been importing bananas. In parallel, since 2005, a transport company has been developing, which included both multi-ton and low-tonnage vehicles and passenger vehicles. To date, the number of units of trucks and cars has reached 250 units.

Since 2006, the volume of imports has been estimated in thousands of tons in ship lots. The products came in both refrigerated vessels and containers, which made it possible to make a small variety of batches and also have a wider range. At the moment, the company is in the top 3 importers of banana, citrus and exotic fruits in Ukraine.

Partners of “Imperial Holding”: “Mediterranean Shipping Company”, “DAF”, “Carrier”, “EHO”, “CMA CGM”, “Maersk”, “Hapag Lloyd”.

Banks of Imperial Holding: “TAC”, “Rayffayzen bank Aval”, “Oshchadbank”, “Union Bank of Switzerland”, “Deutsche Bank”.

Customers of “Imperial Holding”: “Furshet”, “Ashan”, “Brusnychka”, “NOVUS”, “Kopiyka”, “Silpo”, “Billa”, “EkoMarket”, “Velyka Kyshenya”, “ATB”, “METRO”, “Produkty Blyzenko”, “Salyut”, “Nash Kray”, “Tam Tam”, “Meha Market”, “Rukavychka”, “Rost,Digma”, “Varus”, “Karavan”.

2.2 Analysis of production and financial indicators

“Imperial” experts identify optimal warehouse locations that take into account itinerary, cargo type. It also provides specialized equipment to ensure maximum safety while handling and storing cargo.

The company offers all necessary warehousing services, including cargo prepacking, packing, repacking, labeling, tagging (with stickers we can print), and cargo palletizing.

The strategic locations of “Imperial`s” warehouses allow to deliver goods quickly at the appointed time and place. Warehouses in the Odessa and Kyiv are perfect for the consolidation of cargo, including excise taxed goods, and are used for the transshipment of packaged goods.

One of the important criterions of company’s logistics quality is the geographical coverage. The company has offices in all regions of Ukraine, in Ecuador, Colombia, Costa Rica and Mexico.

Head offices in Kiev and Odessa. In Odessa, the largest and only terminal for storing and ripening bananas in Ukraine has been built, and the main fleet is based.

At the moment, the “Imperial” group of companies has a holding structure, that is, the company is self-sufficient and self-sufficient from the moment of purchasing goods on plantations to the moment of its implementation. The company has representative offices in the countries where imports come from, has its own Foreign Trade Department, Forwarding Department, Transport Department, Financial Department, that is, the entire complete structure. The company is built in such a way that third-party companies, except for large shipping lines, are attracted to carry out their activities. Whatever the company's Department or type of activity is needed, the company provides itself with all related services, which is quite rare, especially for the Ukrainian market. This factor is one of the greatest advantages of “Imperial Holding” in comparison with its nearest competitors.

The system is a set of elements that are in relations and connections with each other, forming a certain integrity, unity.

The logistics system is an ordered structure in which the planning and implementation of the movement and development of the total resource potential, organized as a logistics flow, from the alienation of resources from the environment up to the sale of final products.

The logistics system can allow relative isolation from the external environment in the information aspect (trade secrets, etc.)

The level of coverage of logistics systems can vary from regional to interregional, from an individual firm to the national economy. The organizational

structure of logistics systems is determined by the type of industry and the accepted management concept, the size of enterprises and the scale of their activities.

Based on the logistics concept itself, in any company, the logistics structure, regardless of its size, should be responsible for planning, managing, and controlling the flow of goods and materials both inside and outside the company. By organizing supply and sales as a single complex of material support for production, the logistics structure of the company should strive to reduce the cost of manufacturing products, increase the firm's adaptability to market demands and customer guarantees.

The macro-logistic system includes industrial enterprises and organizations, supply and sales structures and transport organizations of different departments, in different regions. As such, we can consider transnational corporations, transcontinental firms, regional industrial associations, territorial production complexes.

The construction of macro-logistical systems and management contribute to the following tasks:

– building a shared vision of product distribution;

– choosing the type of transport, determining the nature of interaction of vehicles, organizing the technology of the transport process;

– determination of rational directions of movement of material flows;

– selection of delivery points and partners-suppliers of raw materials, semi-finished products, energy carriers;

– defining the boundaries of the service area that ensures delivery on the “just-in-time" principle”;

– design and organization of a network of warehouse systems: Central, regional, transshipment, taking into account the optimization of material flows. [5]

“Imperial” has the macro-logistical system; it means that company has a large material management system covering enterprises and industry organizations, intermediary, trade and transport organizations of various departments located in different regions of the country or in different countries. The macro system is a certain infrastructure of the region, country or group of countries.

The micro-logistics system is determined by the sequence of the movement of the cargo from the point of origin to the destination point. The fruits of the bananas, that the company transports, grow on plantations in Latin American countries. In a green kind, the fruit is cut off and goes to the consolidation warehouses where it processed by chemistry, packed in boxes and folded into a container.

Then the container goes to the port, where they are reloaded on ships and sail to Europe via the Atlantic Ocean. In Europe, the container is reloaded to another vessel. There can be several such trans-shipments in the way of bananas. When the ship sails to the port in the Odessa Sea Trading Port, the cargo is cleared.

The next stage is the unloading to the production, where the product is processed by gas, so that the green banana is ready for consumption. The ripe product moves to the Imperial branches or directly to small stores.

In the process of organizing a logistics system, the important point for the logistician is to correctly establish its boundaries. At the same time, you should distinguish the boundaries of the logistics system – physical and market.

The physical border of a logistics system is actually determined by the territory where all its subsystems are located.

The size of the physical border of the logistics system depends mainly on the type, assortment and volume of material flow passing through the latter, not excluding the process of transformation of raw materials within the system itself.

The market boundary of the logistics system is determined by the coverage of the territory where the material flow "leaves" for consumption by the established consumer market. In other words, the market boundary is defined by the geography where the logistics system can have advantages over a competitor in promoting its product. [6]

The boundaries of the “Imperial Holding” are combo. To a greater extent, they are physical, but they are constantly expanding in the form of branches and cover the countries where goods are transported and from which fruits are exported. In turn, the market boundary is characterized by seasonality and the sales system. Bananas are

actively bought in the autumn-winter period, because the supplies are large. In the spring and summer season, the banana is practically not imported.

The logistics system, like every material system, exists in a specific environment, which is everything that is outside of the system in question. The environment includes objects external to it that participate in the formation of its integrative properties indirectly, through individual components of their systems or the system as a whole (see Fig. 2.3).

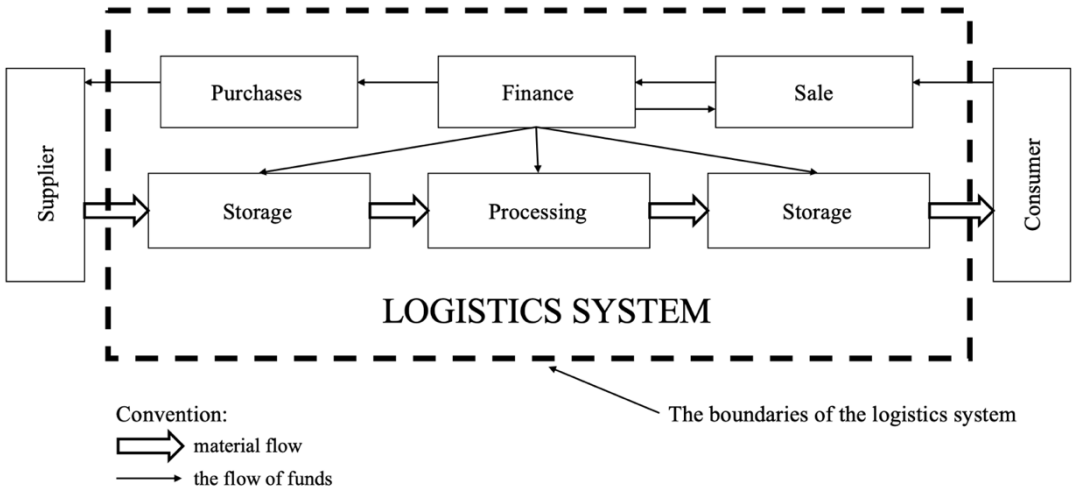


Figure 2.3 – Logistics system of “Imperial Holding” [7]

The external environment of “Imperial” characterized by some points:

– attachment to a remote territory. Since the beginning of the logistics chain is on the other continent (Latin American countries), there is a dependence on the time of the year, weather conditions during transportation by the ocean;

– seasonality. Due to seasonality, there are also unstable supplies, i.e. a sufficient number of containers are not collected on the vessel. On this ship can come not once a week, but twice a week;

– suppliers;

– customers;

– creditors;

– competitors. Imperial has been on the market for more than 10 years and is a leader in the import and sale of high-quality bananas. Competitors are divided into 3 groups: these are large importers similar to “Imperial Holding”: “Tropic”, “UFK”, “Fruit World” (Stamburg); independent networks of importers (for example, “Fozzy” group); small importers that create competition in the market segment.

The internal environment of the enterprise is people, means of production, information and money (see Fig. 2.3). The result of interaction of components of the internal environment is the finished product (work, services).

The basis of the company is made up of people who are characterized by a certain professional composition, qualifications, and interests. These are managers, specialists, and workers. The results of the company's work depend on their efforts and skills. Of course, people can't work for nothing. They need the means of production: fixed assets, with which products are made, and working capital, from which these products are created. For payments for the supply of necessary materials, equipment, energy resources, for payment of wages to employees and other payments, the company needs money that accumulates on its current account in the Bank and partially in the company's cash register.

Information: commercial, technical and operational information is important for the company's operation. With the help of information, all the components of an existing enterprise are linked into a single synchronously functioning complex aimed at producing a given type of product, the appropriate quantity and quality.

The internal environment of the organization is the processes, as a result of which the organization turns available resources into products offered to the market. The internal environment is divided into 2 parts: the resource part, the operating part. The resource part of the organization is the set of resources that the organization offers to carry out activities. The operating part of the organization is a set of processes related to the transformation of the initial resources into a finished product. [8]

The internal system of “Imperial Holding” consists of many departments (see Fig. 2.4) and each of them is equally important for the fruitful and high-quality work

of the company. Warehouse complex with all necessary equipment and staff; transport department with a huge number of cars and trucks, also with staff; department of logistics, as a coordinator of work with top-level logisticians; managerial (top managers); analog-planning department; Foreign Economic Activity, through which all materials of bananas adjacent to the unit are inspected, expenses, ensuring fulfillment of obligations to foreign partners, managing the export potential of the enterprise and creating competitive products.

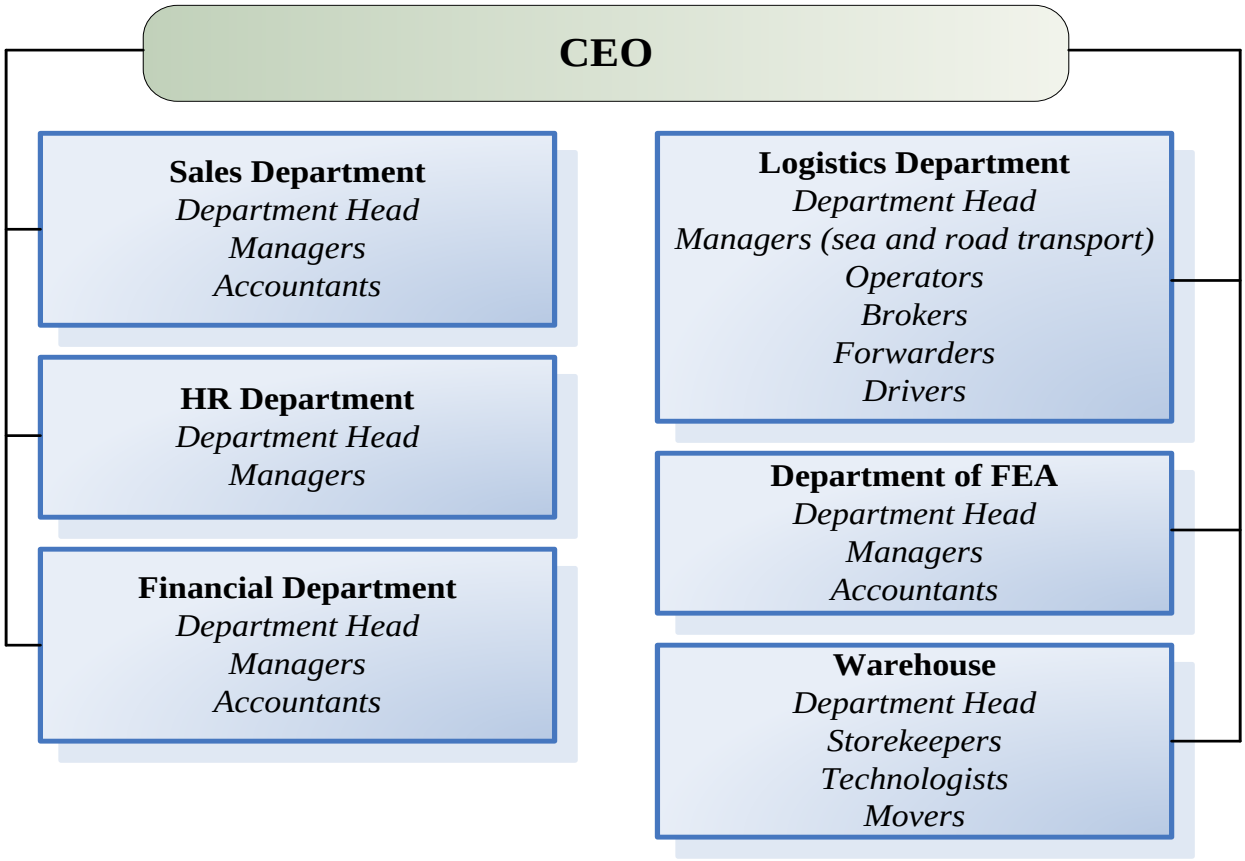


Figure 2.4 – Organizational structure of "Imperial Holding"

In the Table 2.1 is presented statistical data about purchase and sale of bananas in Ukraine.

Table 2.1 shows statistics on banana purchase and consumption over three years. As mentioned above, the banana business has a seasonality of consumption. When in Ukraine the summer season the market is filled with seasonal products that displace the banana until late autumn.

Table 2.1 – Statistics of bananas purchase and sale by season in Ukraine

№	Month	2017			2018			2019		
		Purchase		Sale	Purchase		Sale	Purchase		Sale
		Cont	Boxes	Boxes	Cont	Boxes	Boxes	Cont	Boxes	Boxes
1	January	277	339474	264641	281	323889	200825	282	314969	224950
2	February	144	173055	275156	324	379380	180499	232	260698	194575
3	March	206	223667	257666	250	296125	277708	178	204404	199137
4	April	126	133514	254304	97	114270	311069	95	107517	205246
5	May	345	389751	223429	248	281069	316101	125	138835	196073
6	June	164	193311	159653	131	160042	188078	90	99822	111780
7	July	129	154743	173448	96	106112	149606	106	119676	104859
8	August	249	296981	215003	361	424135	126740	177	194395	111275
9	September	236	275551	219677	231	258872	187334	167	181008	139779
10	October	333	392083	334199	225	247471	299951	293	322470	214101
11	November	198	229944	253705	155	173310	220524	225	248546	211441
12	December	119	140417	302183	88	102056	205300	169	190693	282140

For bananas turnover month are divided on the following seasons:

- January, February, March, November, December – high season;
- April, May, October – middle season;
- June, July, August, September – low season.

Based on the Table 2.1 can be seen the trend of bananas purchase and sales (see Fig. 2.5).

According to Fig. 2.5, the purchase significantly exceeds the consumption. In the 2017 excess was 9 427 boxes, in 2018 it was 202 996 boxes, and in 2019 was 187 677 boxes. Average cost per box in 2017 was 5,93, in 2018 was 6,48, in 2019 was 6,55 (see Table 2.2). So, in 2017 Imperial Holding lost due to incorrect calculation of demand approximately 55 902$, in 2018 the losses were approximately 1 315 414$, in 2019 – 1 229 284$.

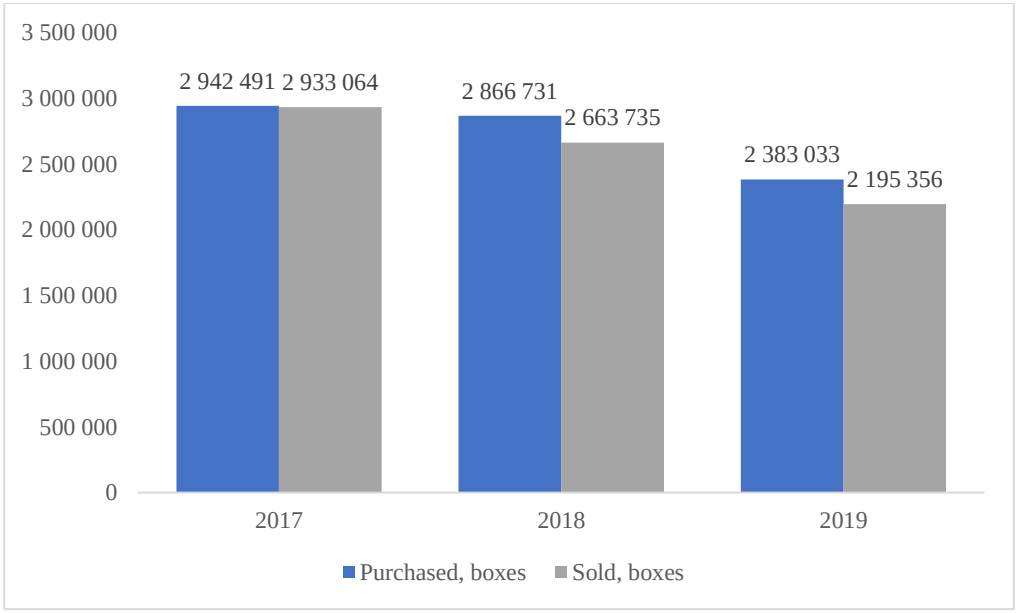


Figure 2.5 – Ratio of purchase and sale of bananas in Ukraine

The reason for this difference between purchasing and consumption is an incorrect analysis of demand during seasonal and non-seasonal periods (see Fig. 2.6).

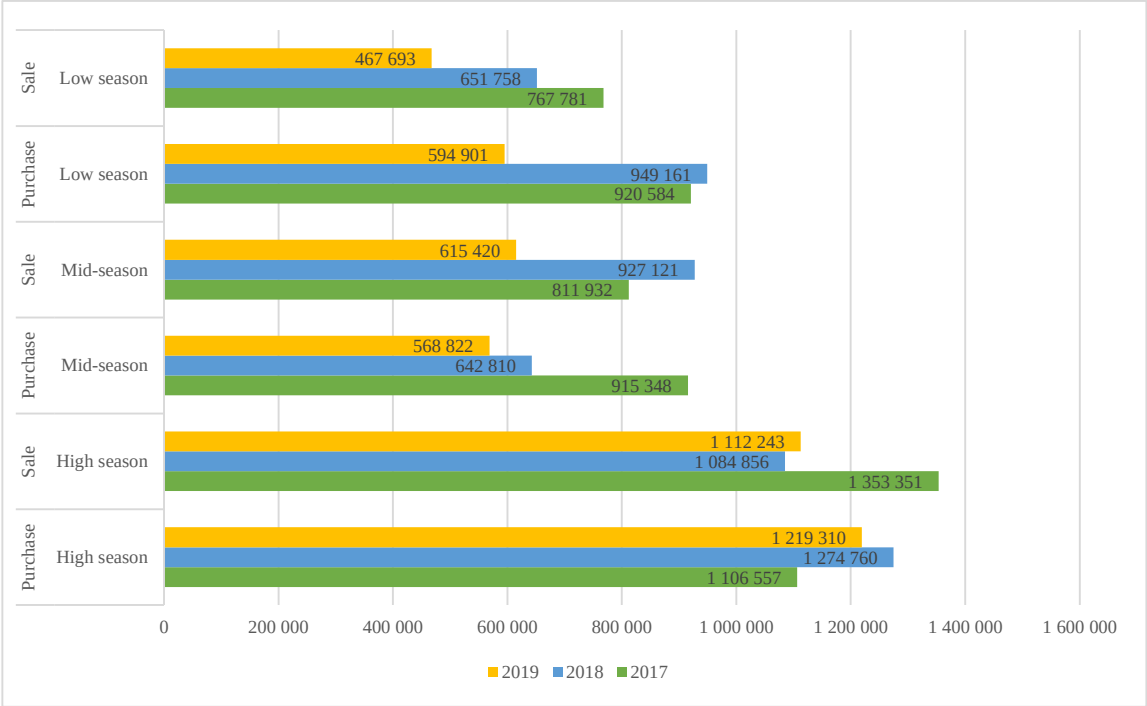


Figure 2.6 – The ratio of purchases and sales by seasons

The Figure 2.6 shows in more details the different between purchasing and sales indicators are during different seasons. After these calculations, we can highlight the first problem of “Imperial Holding”.

The Table 2.2 shows how the price changes depending on the season. In high season, the price in Latin America is high due to high demand and, accordingly, in low season, the price is low to attract exporting companies to buy more.

Table 2.2 – Statistics of the price of bananas in Latin America

Average for a month	2017			2018			2019		
	Ecuador	Costa Rica	Colombia	Ecuador	Costa Rica	Colombia	Ecuador	Costa Rica	Colombia
January	6,29			9,98	8,49	10,10	7,74	7,28	6,80
February	7,95			13,36	7,16	8,80	9,09	8,70	7,25
March	9,93			6,86	8,05	9,30	7,39	7,63	7,25
April	10,67			4,10	6,34	7,48	6,13	6,60	6,78
May	7,80			4,06	6,10	5,52	6,52	6,47	6,86
June	5,57			5,85	6,50	6,50	5,37	6,45	6,95
July	2,53	2,50	3,50	4,28	5,69	6,50	4,30	5,60	6,03
August	3,18	2,50	3,33	4,94	5,43	4,92	6,18	5,66	5,96
September	4,74	3,06	3,50	5,67	4,70	4,69	7,47	6,31	6,18
October	8,20	6,38	6,32	6,27	5,10	4,53	7,69	6,48	5,95
November	10,20	8,80	7,90	6,36	5,73	5,78	7,78	7,25	7,15
December	8,73	8,25	7,87	6,06	6,13	6,08	7,24	7,54	7,18
Average for a year	7,15	5,25	5,40	6,48	6,28	6,68	6,91	6,83	6,69
Average for Latin America	5,93			6,48			6,81		

The Table 2.3 shows that “Imperial” in Russia buys bananas much less than “Imperial” in Ukraine due to the fact that sales in Ukraine are larger. Despite the fact that the territory of Russia is much larger than its market, the Ukrainian company has performed much better, working with a large number of stores, markets and regions.

Table 2.3 – Statistics of bananas purchases to Russia

Recipient country	Russia					
Data	PURCHASE					
Year	2017		2018		2019	
Quantity	Container	Boxes	Container	Boxes	Container	Boxes
I half year (weeks 01 - 26)	582	703 834	435	518 382	415	486 979
II half year (weeks 27 - 52)	517	618 874	354	423 964	524	596 849
In a year	1 099	1 322 708	789	942 346	939	1 083 828

Comparing the purchase of Russia and Ukraine is obtained on the Figure 2.7.

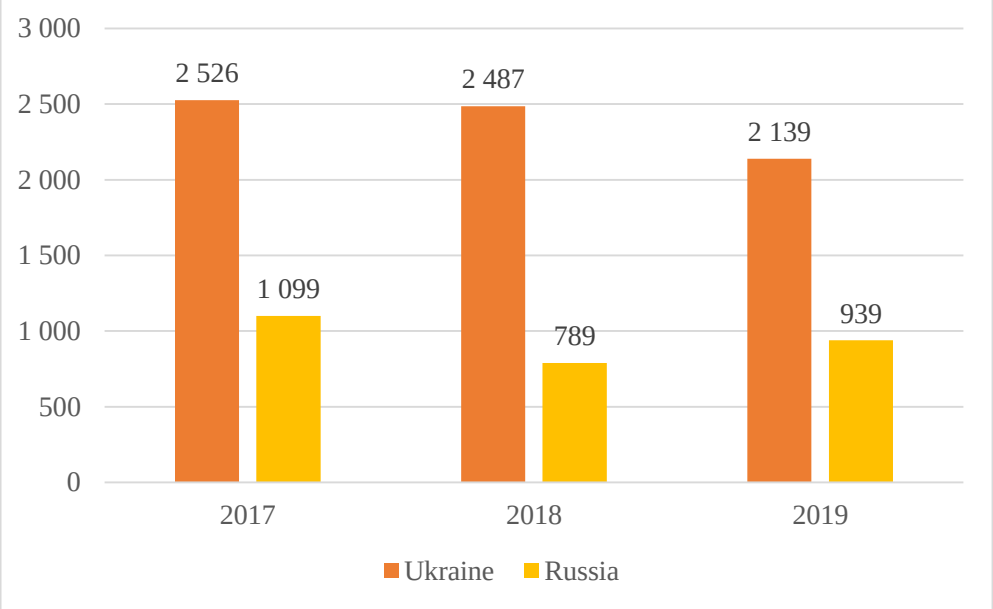


Figure 2.7 – Comparison of Russian “Imperial” and Ukrainian “Imperial” purchases

The graph shows a slight drop in supply over the past three years. This is due to some problems of the marketing department, but in future years it is planned to increase the supply.

2.3 Analysis of the processes of organization of transcontinental transportation by sea

Despite rapid technological progress, cargo transportation by sea successfully stands up to competition with such modern means of transportation as pipelines or aircraft. It would seem that the construction of oil pipelines should reduce the relevance of water transport, but sea transportation of oil still occupies an important place in the international economy. The following statistics confirm the relevance of various types of vessels:

– sea transportation of various goods and raw materials in the total world cargo turnover takes more than 60%;

– more than half of the world's countries have access to the sea with equipped ports (120 countries);

– the average distance of sea transportation is much higher than that of other types of transport. Today, it is about 3.5 thousand km.;

– about 80% of international foreign trade relations are served by cargo transportation by sea.

Main advantages of cargo transportation by sea vessels:

– compared to air, pipeline, railway and automobile transport, sea transport by ship is characterized by lower cost;

– the latest technologies, modern ship design, as well as developments in the field of production of devices for loading/unloading cargo in the port ensure a reduction in the final price of sea transportation. The share of the cost of loading goods on a ship and unloading it in the port in the total volume of the transportation price decreased from 11 to 2%;

– construction of large-size vessels increases their load capacity, which reduces the cost of transportation by sea;

– no other type of transport can compare with a sea vessel in terms of cargo capacity and cargo capacity for transportation;

– in cases where the size of a ship does not allow it to approach a certain port, innovative technical solutions make it possible to quickly unload the ship on the roadstead or in the open sea;

– uniform standards that have been developed for the design and construction of a marine vessel allow for faster unloading/loading in the port;

– cargo containers on Board a ship ensure the safety of cargo during transportation;

– according to statistics, sea transportation has the lowest percentage of cargo loss or damage as a result of accidents or natural disasters (from 1 to 1.5%);

– unified legal norms. The Maritime transport of goods is regulated by the Athens and Brussels conventions;

– cargo transportation by sea is the most efficient way to move goods between different continents.

Sea cargo transportation has its disadvantages, which are expressed in the following:

– sea transportation is characterized by the lowest speed of transportation. At the same time, the duration of movement of goods by a sea vessel is more influenced not by the speed of the vessel itself, but by the time required for loading operations at the seaport. Multimodal transport technologies contribute to the acceleration of sea transport;

– difficult in the technological plan, the process of loading/unloading;

– high degree of dependence on weather and climate conditions. Sea transport can be severely slowed down or even suspended due to natural factors;

– since ancient times, there has been a threat to sea transport by pirates;

– sea transportation requires high investment. The construction of a modern vessel is quite an expensive process;

– fastening and packing of cargo for sea transportation must be carried out according to strict rules;

– low frequency of shipments;

Container ships are designed to transport products in standard-sized containers. A distinctive feature of container ships is a large open deck area above the holds. The structure of holds is a vertically located room with special installed guides (cell guides) for securing and placing containers.

The leading position in terms of the number of sea transportations is occupied by the Atlantic Ocean (1/2 of transportations). The most important ports of America and Europe are located along the entire ocean coast (2/3 of all ports). Thus, several directions were created in the Atlantic Ocean:

– the North Atlantic (the largest in the world), connecting Europe with North America;

– the South Atlantic, connecting Europe with South America;

– the Western Atlantic, connecting Europe with Africa.

A bill of lading is a type of document that has a title value or, in other words, confirms the right of ownership of the goods. This is a full-fledged document for accompanying and transferring goods during transportation on a ship. There are several types of bill of lading: on board, received for shipment, port, through, etc. The essence of all types of documents remains unchanged, and their difference is only in the details of the features of receiving / transferring goods.

For example, the “on-board” document is issued after loading on the ship. Banking organizations consider the on-Board bill of lading as the most risk-free documentation. So, there is a clear understanding of what time and on board of which vessel the products are loaded.

The unified rules of documentary letters of credit describe in detail the requirements for the registration and verification of bills of lading by banks. Banks should pay special attention to the following points when issuing letters of credit:

– compliance of the addressee's name and delivery terms with the data contained in the letter of credit terms;

– correspondence of the addressee of the cargo transfer notification to the letter of credit data;

– type of bill of lading and its compliance with letter of credit conditions;

– compliance of ports (shipment/ delivery) with the data in the letter of credit;

– compliance with the name of the cargo, its weight and other characteristics specified in other accompanying documents;

– compliance of the freight payment information with the data specified in the terms of delivery of the cargo in the letter of credit and commercial invoice;

– compliance of the date of loading the goods on the ship with the requirements of the letter of credit for the period of its validity.

Seaway Bill is one of the types of bill of lading used in the carriage of goods by various modes of transport. Sea waybills are named as follows:

– Ocean Waybills;

– Data Freight Receipts;

– Liner Waybills.

Sea waybills are used in international trade along with bills of lading when this way of arranging the carriage of goods satisfies both sides of the trade transaction. Here it should be recalled once again that the sea waybill does not apply to securities that provide its holder with the right to cargo, but serve as a document confirming the existence of a contract for the carriage of goods, by virtue of which the carrier undertakes to deliver the goods to the recipient specified in this document.

The use of sea waybills is quite widespread. It is generally accepted that they, in principle, satisfy both the carrier, the consignee, and the bank. A significant advantage of this accompanying document is that when it is applied, the legal and financial problems associated with the discrepancy in the time of arrival of the vessel with the cargo and shipping documents that were sent by mail from the port of shipment of goods disappear.

So, for transcontinental shipping by sea and smooth customs clearance in Ukraine, the following documents are needed:

– bill of lading;

– sea waybill (if the goods are of own company);

– phytosanitary certificate;

– certificate of origin;

– invoice (in the original and translation into the recipient's language);

– certificate of quality (in the original and translation into the recipient's language).

Incoterms rules made it possible to unify the interpretation of concepts used in drawing up international contracts of sale with the transportation of goods outside customs borders. The Incoterms 2010 rules include 11 trade terms, but four terms are directly related to sea transportation:

– FAS - Free Alongside Ship. This term means that the seller is deemed to have fulfilled his delivery obligation when the goods are placed alongside the ship at the agreed port of shipment. From this moment, the buyer must bear all the costs and risks of loss or damage to the goods;

– FOB - Free on Board. This term means that the seller delivers the goods on board the vessel nominated by the buyer at the indicated place of shipment. From this moment, the buyer bears all risks of loss or damage to the goods;

– CFR - Cost and Freight. Under the basic condition of CFR, sea transportation is carried out with the seller placing the cargo on the ship at the port of shipment. The seller must pay all costs and freight, as well as perform customs formalities. However, the risk of accidental loss or damage to the goods, as well as subsequent unforeseen expenses, are transferred to the buyer;

– CIF - Cost, Insurance and Freight. Under the basic CIF condition, sea transportation is carried out when the seller delivers from the moment the goods are placed on the ship at the port of shipment. The seller is obliged, as in the previous case, to pay costs and freight, as well as perform customs formalities. Risks are also transferred to the buyer, but, unlike the previous term, the seller is obliged to provide marine insurance of the goods against risk due to accidental loss or damage during transportation.

These terms, referring exclusively to the carriage of goods by sea or transportation by inland waterways, as well as other Incoterms terms, are intended to clearly and clearly distribute the responsibilities of the parties to the trade contract. In this case, directly related to the transportation of goods, their insurance, ensuring their

proper preservation, and performing customs formalities. The correct application of these terms by the parties to the transaction allows us to assess its expenditure parameters and the limits of responsibility of each participant at an early stage, helping to avoid any controversial situations or conflicts in the future. [12]

“Imperial Holding” transports under the terms of FOB and CIF.

In 2019, “Imperial Holding” transported 209 containers by the “Maersk” line, 1082 containers by the “MSC” line and 850 containers by the “CMA CGM” line. This difference is associated with the benefit of the company's freight, transit time (see Table 2.4) and statistics of the delays.

Table 2.4 – Line statistics according to country

№	Country	Port Of Loading	Port of Unloading	Line	Transit time (days)	"Free days"			Freight, $	Total LILO, $	Total FILO, $
						Monitoring	Demurrage	Demurrage, $	Cont	Cont	Cont
1	Ecuador	Guayaquil	Odessa	CMA CGM	28-30	5	10	127	3 300	4261	3872
2	Ecuador	Guayaquil	Chernomorsk	MSC	29-30	5	10	250	3 411	4273	4023
3	Ecuador	Guayaquil	Yuzhny	Maersk	27-28	5	5	120	3 590	4408	4140
4	Costa Rica	Moin	Odessa	CMA CGM	28-30	5	10	127	3 700	4 323	4 272
5	Costa Rica	Moin	Chernomorsk	MSC	29-30	5	10	250	3 411	4 137	4 023
6	Costa Rica	Moin	Yuzhny	Maersk	27	5	5	120	4 010	4 761	4 560
7	Colombia	Turbo	Odessa	CMA CGM	27	5	10	127	3 700	4272	4272
8	Colombia	Turbo	Chernomorsk	MSC	25	5	10	250	3 811	4423	4423
9	Colombia	Turbo	Yuzhny	Maersk	26	5	5	120	4 200	4750	4750
10	Mexico	Veracruz	Odessa	CMA CGM	39	5	10	125	4 000		4550
11	Mexico	Veracruz	Chernomorsk	MSC	37	5	7	250	3 851		4463
12	Mexico	Veracruz	Yuzhny	Maersk	38	5	5	120	4 400		4400

The Table 2.4 shows the cost and all the necessary information for the lines. Judging from this table, we can conclude that for imports from each country, you can choose only one line that is the most profitable in terms of transit time and freight cost, but Imperial holding distributes the goods along different lines. This is due to

the fact that the lines often run with delays and so that the whole batch is not late, but only some part of it.

There are such problems in the logistics of “Imperial Holding”:

– seasonal delays in the ship schedule (weather, low loading). In the low season, not many bananas are purchased, that is why the ship does not sail until an acceptable loading of the vessel is reached;

– large seasonal load on storage warehouses (the receipt of goods is more than necessarily (see Fig. 2.5)). During the high season and sometimes during the low season, a lot of goods arrive that have no place to put and bananas have to be stored in refrigerated trucks, which makes the trucks stand idle with green bananas;

– lack of transport in Ukraine (hype) in high season. In high season the transport fleet of “Imperial Holding” cannot cope with a high load. For example, there are 1 000 trucks; only 1 500 are required in the season, and 300 in off-season. As mentioned above, in the season the turnover of transport should increase, and in off-season this transport, which is temporarily unoccupied, it needs to find some work.

– unequal annual workload for personnel who manage warehouse and logistics processes.

2.4 Chapter 2 summary

In this chapter, I analysed the logistics system: competitive advantages, defined the system boundaries, and the environment of the system. I collected statistics on the purchase and sale of bananas by seasons, by price, statistics on the purchase of bananas in Russia, compared the purchase of Ukraine and Russia, collected statistics on Maritime transport companies and analysed transcontinental delivery. According to the collected statistics and analyses I made the following conclusions: the purchase of bananas does not correspond to the sales, the purchase is incorrectly distributed by

season, the most profitable lines for transportation by freight and transit time are “MSC” and “CMA CGM”. I also highlighted the following issues:

– seasonal delays in the ship schedule (weather, low loading);

– large seasonal load on storage warehouses (the receipt of goods is more than necessarily);

– lack of transport in Ukraine (hype) in high season;

– unequal annual workload for personnel who manage warehouse and logistics processes.

CHAPTER 3
DEVELOPMENT OF PROPOSALS FOR IMPROVING THE TRANSCONTINENTAL SUPPLY CHAIN OF PERISHABLE PRODUCTS

3.1 Analysis of the scheme of perishable products delivery from Latin America

Bananas go a long and hard way to reach the final consumer (see Figure 3.1). It begins in remote Latin America, which has a tropical climate all year round. This climate is ideal for growing high-quality bananas.

To grow high-quality bananas, the palm tree must be healthy. A healthy banana tree should have an average of 6-7 leaves without any damage. These trees can produce fruit every 3 months. After the banana tree grows a banana 3-4 times it is cut down and planted a new one that grows for 9 months.

After the green bananas are cut, they move on special mechanisms through the entire plantation to the place of processing. There, bananas are distributed to the first and second grades, washed, the crown is treated with special chemicals so that it does not spoil (the freshness and "health" of the banana depends on the state of the crown),the banana itself is treated with special non-harmful chemicals and Packed in boxes with a special packing. The boxes are loaded into a truck and sent to the consolidation center. At the consolidation center, boxes are loaded into containers and sent to the port.

At the port, the containers are loaded onto the ship. There, containers can be tested for anti-narcotics. In Latin America, such a check is a normal phenomenon and every 5th container is checked. After checking for an anti-drug, the seal is changed, which should be reported to the line. The line must indicate the new seal in the bill of lading and provide it to the importing company. Otherwise, when the ship arrives at the port of destination and the bill of lading with the actual container and seal

numbers begins to be checked, problems may arise. For the importing company, it is simple and easy to connect after the end of the "free days" in the port, numerous inspections of containers, and bananas, that were counted on in planning of sales, will not be delivered on time.

During the transportation of containers with bananas to Ukraine, the fruit passes through 1-2 transshipment points where the containers are reloaded to another ship and the integrity and safety of the cargo is checked.

Upon arrival at the port, the product passes customs clearance, and is sent to the warehouse or directly to small stores and markets. In the warehouse, bananas are unloaded from containers and pass gassing (forced maturation with a special gas). On average, gassing lasts 2-3 days, depending on what maturity of bananas is required. Then already ripe bananas are distributed to branches of Ukraine.

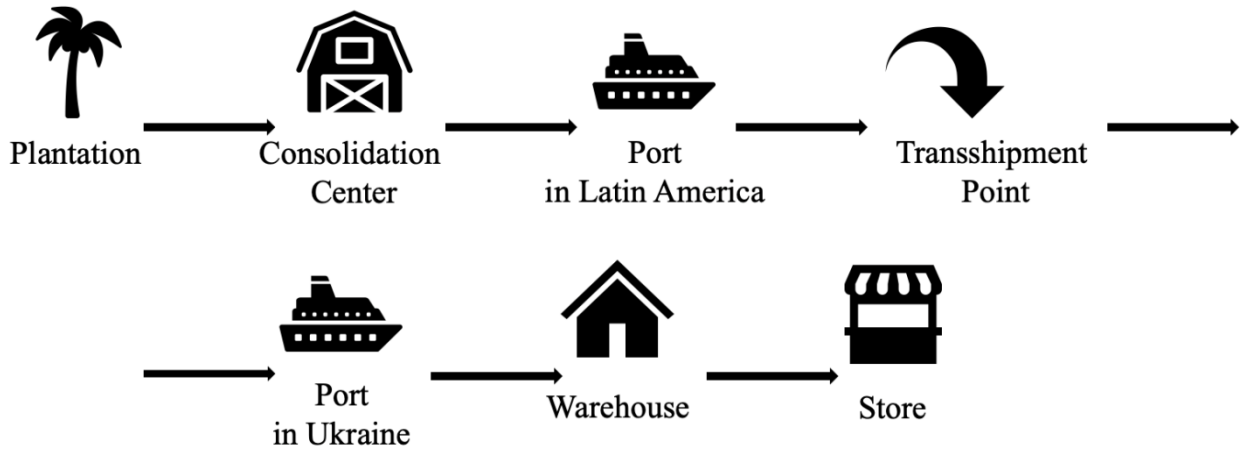


Figure 3.1 – The supply chain of bananas from Ecuador

As noted in Chapter 2, “Imperial Holding's” supply chain has problems.

The main problems are high workload in warehouses and uneven, excessive purchase of bananas. These problems are closely related. When the implementation corresponds to the sales, the bananas do not stand still: they arrive, go through aeration and go to branches and shops. Each warehouse, of course, has a limited capacity. Although the warehouses of the Imperial Holding are large and roomy, even

they do not withstand the load during low sales. In such cases, the cargo is stored in refrigerated trucks, which is a salvation but for a short while.

Accordingly, while green bananas are stored in trucks, trucks cannot fulfill their initial functions in the company - to transport/deliver bananas after aeration. Storage of bananas in trucks within the temperature range will only prolong their life for a short time. Like all perishable foods, especially fruits, bananas begin to rot. As a result, there is a loss due to unsold bananas and losses from hiring third-party transport companies.

The solutions to these very related problems are quite trivial and do not require any costs. Firstly, this is a thorough analysis of the good annual consumption indicators at different times of the year. Bananas consumption is almost the same from year to year. Of course, you need to strive up and increase sales statistics, but they should not be radical. The involvement of new stores, the conclusion of contracts on mandatory minimum deliveries with large chains of stores and hypermarkets in the country are reasonable and logical reasons for increasing purchases.

Secondly, there should be a clear interaction between the commercial and logistics departments. In “Imperial Holding”, communication and cooperation is important between all departments, but in order to conduct business correctly and with minimal losses, the interaction between the logistics department and the commercial department is especially important. To reduce the amount of unsold goods, the sales department can force discounts and promotions than encourage stores and markets to buy more than they planned.

One of the ways to solve the problem with high seasonal load is the temporary operation of auxiliary storage warehouses.

The next problem of the company is the uneven annual load on the personnel who manage the warehouse and logistics processes. Almost all the problems of Imperial Holding are related to seasonality, the personnel problem is no exception. Since the consumption of bananas is uneven during the year, unloading at warehouses, transport and personnel is also uneven. In winter, during the highest

season, the volume of work increases by 75-100% of the usual average volume. In urgent mode, new staff is hired to distribute the workload of staff in warehouses and the logistics department.

In the summer, when sales are at a loss and a minimum amount of goods is purchased, the company is having difficult times. Cash expenditures in the low season significantly increase revenues. A company cannot have a large number of personnel at a low load on them. Together with purchases and sales, the load on all departments and all employees is drastically reduced. For example, there are duties that an employee performs during the high season for 5-6 days. During low season, the same duties take an employee 2-3 days. Therefore, the responsibilities of the laid-off people are distributed and fill the working hours of the main base of employees.

Most often, it is precisely those employees who were hired in the high season as an auxiliary resource that fall under the reduction, which, of course, is irrational and unfair to the employees.

A solution to this problem can be a more thorough and high-quality approach of the personnel department to the selection of personnel. Since the business is specific and unstable, employees must comply with this. The goal should be to hire universal employees who could fulfill their main duties in the high season, and in the low season their versatility would allow them to be connected to various management tasks of the company.

Such a solution to the problem may prevent a sharp reduction in a large part of the staff, which may affect the company's reputation. Also, the stable composition of the company is undoubtedly good for the company and for the staff itself, because the favorable environment in the company directly affects the work.

Whenever one company uses the services of other companies, it can lead to problems that will be difficult or even impossible to solve. The only third-party services that “Imperial Holding” uses are the services of shipping companies (lines). Not every company has the opportunity to have their own sea transport, because these are very high costs. Therefore, maritime companies are the most common option in transcontinental transportation around the world, because it is not fast, but the

cheapest and most reliable transportation option. There are a lot of sea transport companies now and this makes it possible to choose the best one for prices and transit time. But if transit time and freight rates can be calculated, it is impossible to find out how often the company will encounter problems due to (or with) lines.

Therefore, the Imperial Holding in the course of its activities faces such problems due to work with the lines:

– long transit from the countries of Latin America. Some lines offer very long transit from Latin America to Ukraine. Transit times of more than 33 days jeopardize the quality of the delivered products. When transporting bananas, all conditions are created so that the condition of green bananas is preserved (temperature, special sachets that absorb banana gas so that they do not self-ripen, etc.), but even the most high-quality and carefully selected conditions will not extend the shelf life for a very long time.

– seasonal delays in ship schedules (weather, low load). Since the beginning of May, the demand for bananas in Latin America has been falling significantly. In this regard, ships are loaded slowly because shipping lines are not profitable to carry half-empty ships to such distant distances. This contributes to the fact that the ship leaves the country of origin later than planned. For example, in the 20th week, 10 containers should be sent to Ukraine by the “MSC” line and 10 containers by the “CMA” line. The “MSC” was waiting for an acceptable loading of the vessel due to which it sailed later than the schedule. At the last transshipment point, the line decided that it would be more rational and more profitable for them to deliver 10 containers for 20th week with 21st week containers that will arrive at this transshipment point in a few days. As a result, Imperial Holding at 24th week (taking an average transit time of 4 weeks) will not receive 10 containers with the product and, as a result, underselling. In the 25th week, in addition to the planned containers, Imperial will receive 10 more that were planned for sale in the 24th week and, as a result, an excess of goods. In the low load season, such an unstable and unprofitable schedule for the company is common.

– failures in the schedule of a specific shipping line (both external causes and their internal ones). Delays of vessels can also occur for any internal or external

reasons (weather, force majeure). If you do not distribute the load across different countries and lines, then the problem with delays can lead to big problems for the company as a whole.

Each problem described above has its own solution. The solution for a long transit time may be to find the optimal shipping line with a service that involves the shortest route, with a minimum number of transshipment ports. Such a route can reduce transit time from 28-32 days to 22-24 days, which will well affect the quality of the bananas. It often happens that with a transit time of 30 days or more, the banana starts to ripen. Self-maturing in such cases is up to 10% of the load.

For the problem of delaying ships, the solution may be to create a sufficient amount of stocks in the high season, but in this case, the quality of the reserve products and the shelf life of the goods should not be affected (officially, for bananas it is 90 days). If the vessel is delayed during the low season, there should be reserve options of sale of products with the preservation of economic feasibility.

The solution to the problem with shipping line failures could be as follows. The supply chain from Latin America should be designed in such a way that the weekly supply was from at least 2-3 different countries and was transported by 2-3 different shipping lines. This way of solving such a problem is some kind of insurance so that the Imperial does not leave its customers without bananas.

For example, the “Russian Imperial” purchases only Ecuadorian bananas. When the COVID-19 pandemic penetrated Ecuador and the number infections increased sharply, many government agencies creeped in that issued documents for importing goods into Russia (phytosanitary certificate and certificate of origin Form A). In the port region of Guayas, restrictions were introduced on the entry of transport, which made it very difficult to transfer goods to the port. Also, all documents that were published even before the closure of state institutions could not be transferred to the recipient company in Russia due to the unstable operation of air communications of postal services.

For a company in Russia, the absence of documents was a huge problem, because for the customs clearance of products, the originals of some documents are a

prerequisite. Before solving this problem, the company managed to get into large amounts of demurrage, detention and a lack of bananas for sale. This is a good example of what problems can be if you do not distribute supplies from different countries.

Also, in the "Imperial" there is a problem with transport. Despite the fact that the fleet of Imperial Holding is quite extensive and numerous, it may be lacking in the high season. In the low season, the opposite is true: most of the transport can be not used. For example, there are 1,000 trucks; only 1,500 are required in the season, and 300 in off-season.

The solution to such a problem could be to work out a regular customer base of carriers, conclude annual contracts, bonuses and preferences for them in the low season. Thus, the company will provide a safety net for itself during a shortage of its own transport.

When the transport is not involved, it can be rented out or/and provide its services to other companies. Such methods will provide additional income.

3.2 Improving the supply chain of perishable products

Ships with containers most often arrive at the port of Chernomorsk. This port has one problem - the long time it takes to unload containers from the ship. Unloading can take about 4 days, on weekends it is not performed at all. For example, Maersk specifically builds such a system so that ships always arrive only on Saturdays. It turns out that before the ship of Maersk is unloaded, it will have to wait a weekend and stand in line.

Therefore, I decided to calculate how much it would be profitable for Imperial Holding to receive ships from the port of Odessa in which the unloading of containers is much faster than in the port of Odessa (see Fig. 3.2– 3.5).

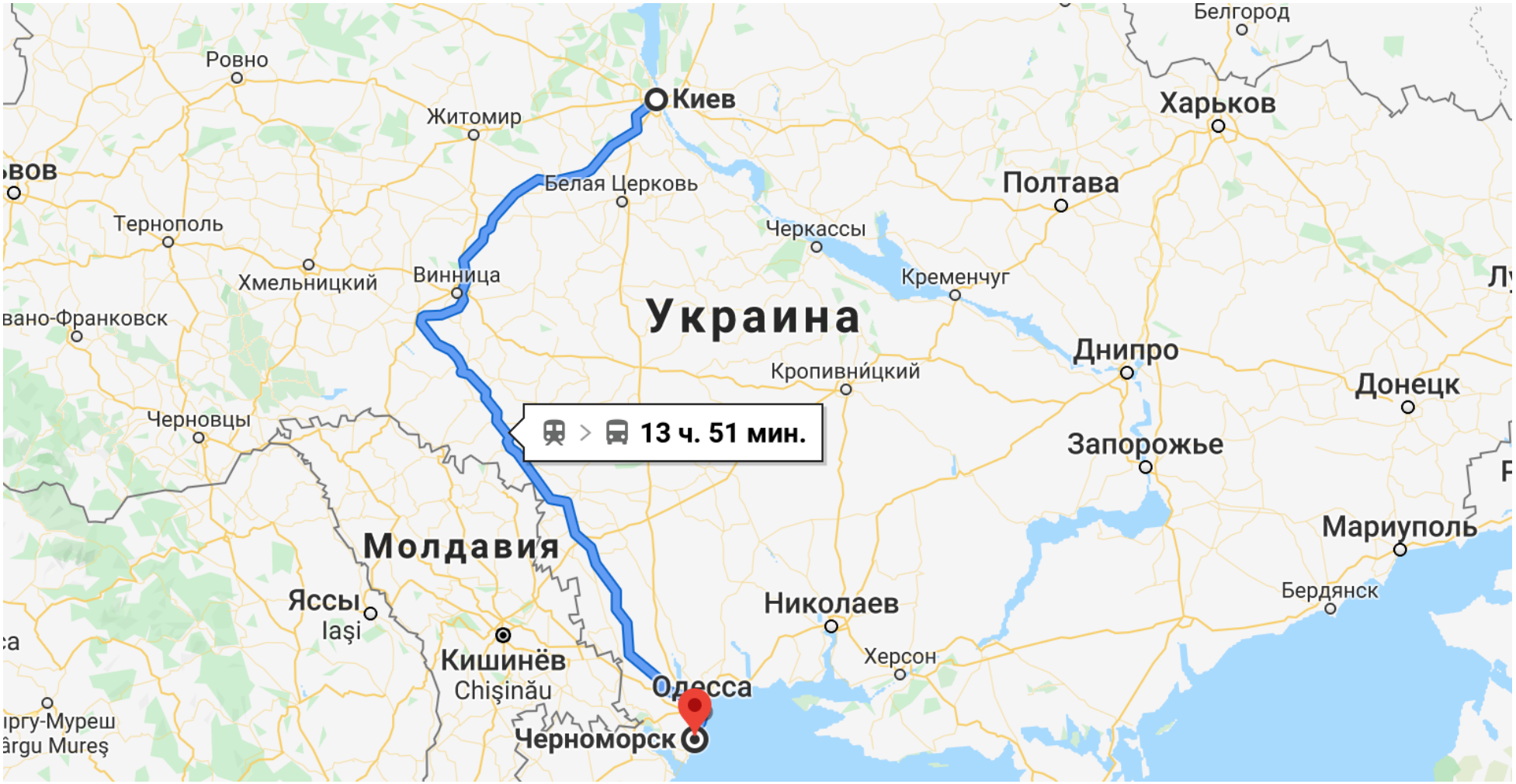


Figure 3.2 – Cargo route by rail from Chernomorsk to Kiev

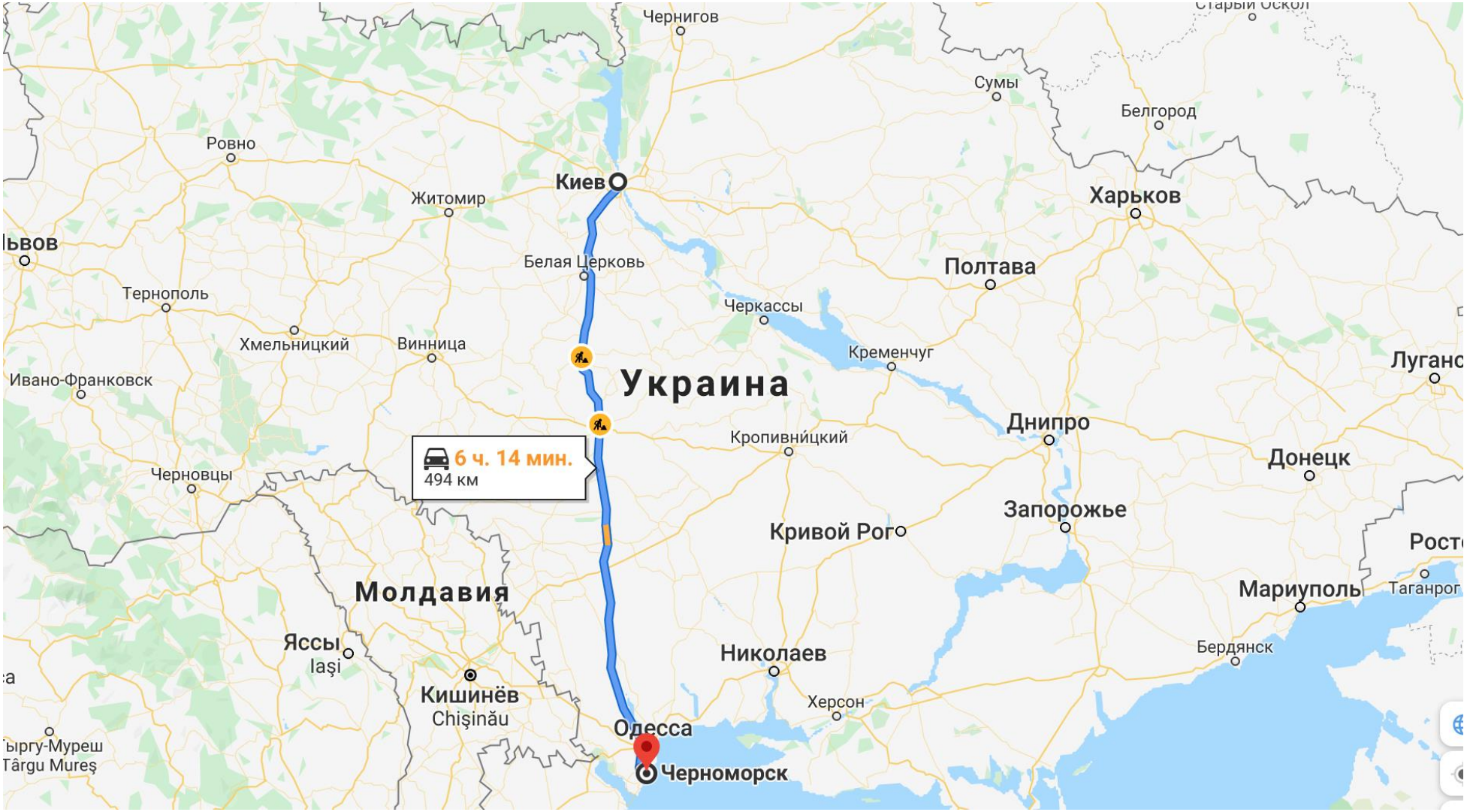


Figure 3.3 – Route of cargo by road from Chernomorsk to Kiev

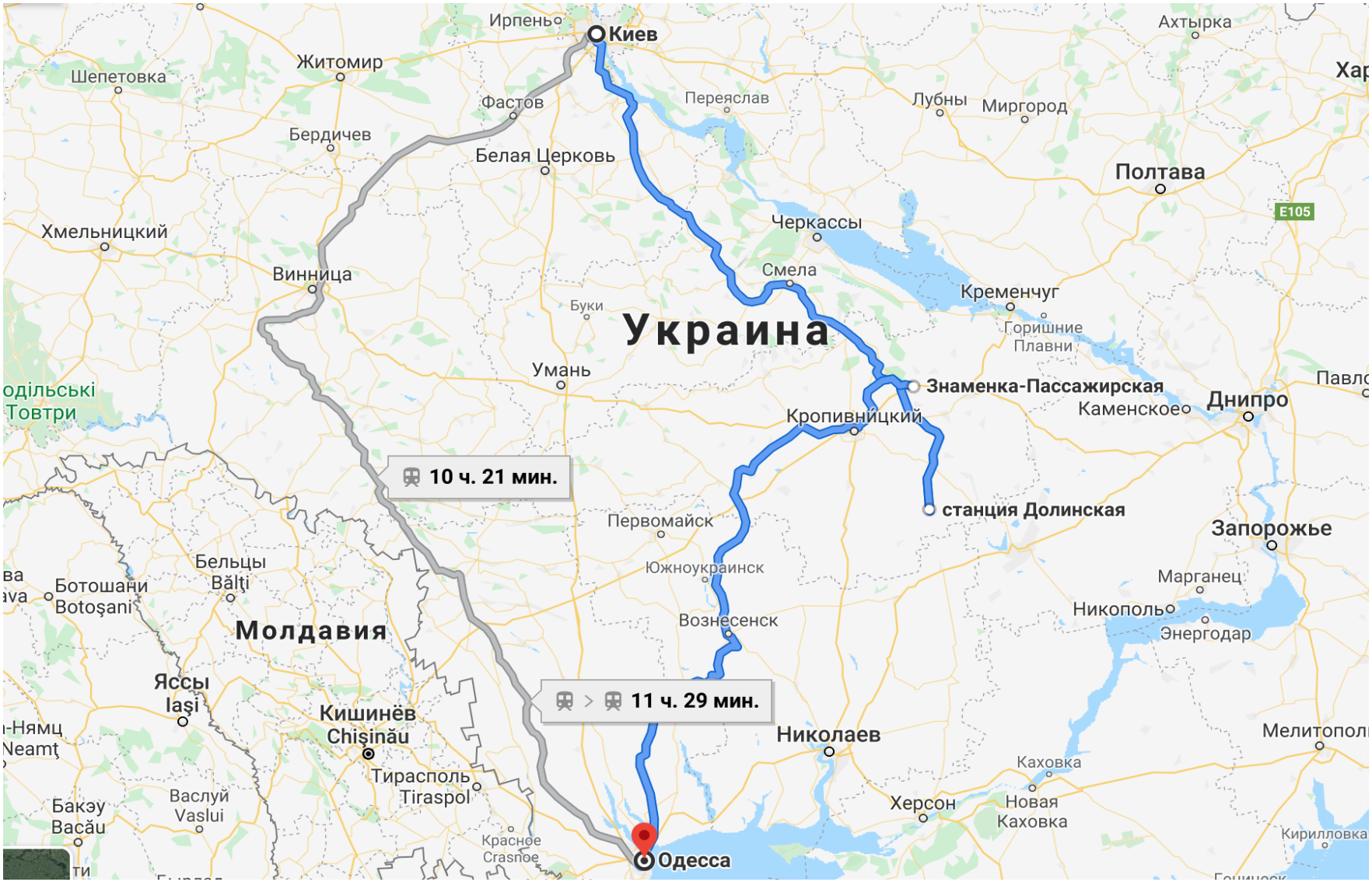


Figure 3.4 – Cargo route by rail from Odessa to Kiev

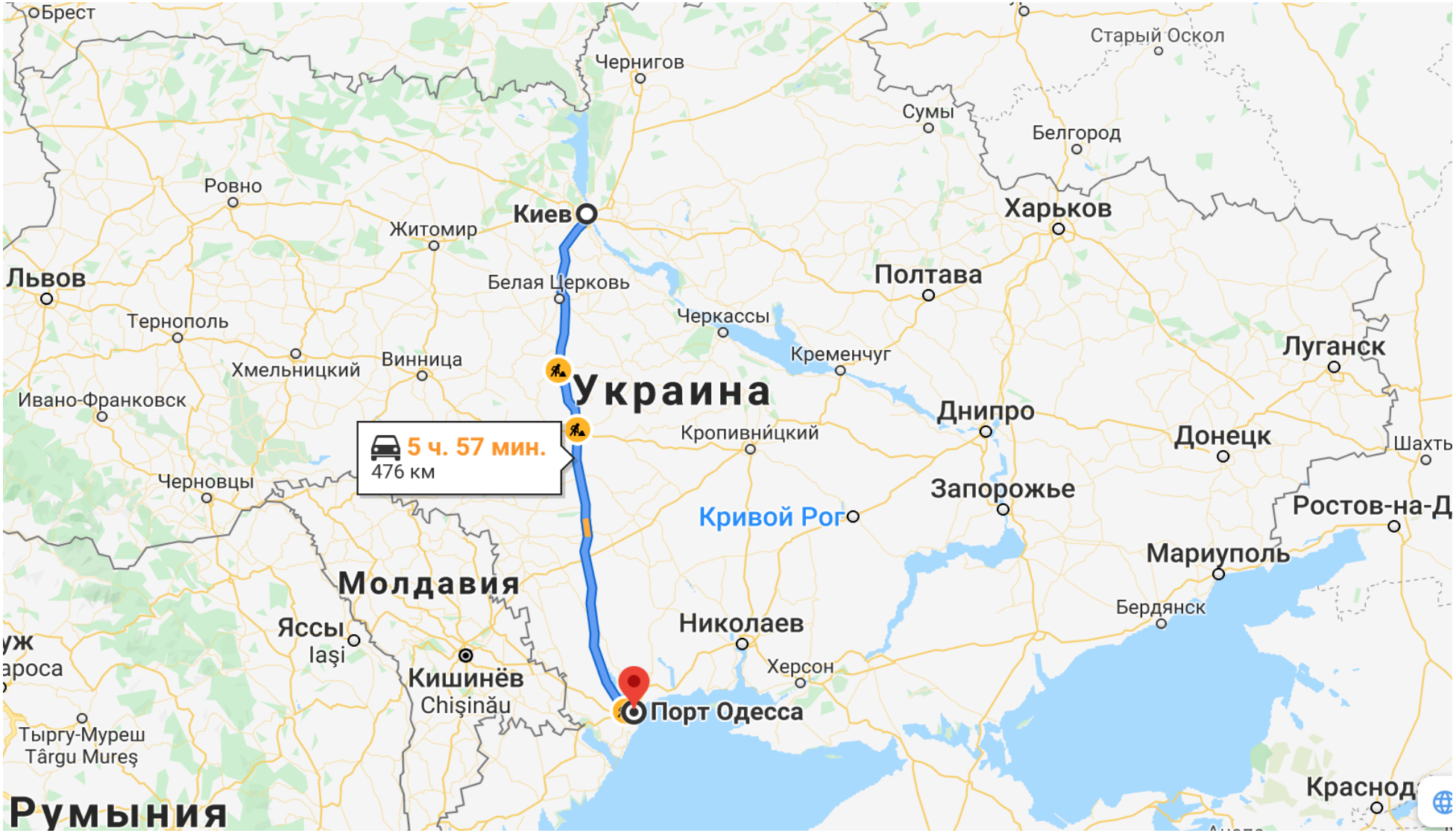


Figure 3.5 – Route of cargo by road from Odessa to Kiev

According to the figures, it can be seen that in addition to a long unloading, Chernomorsk is inferior to Odessa also by the time of transportation.

A 40-foot container with bananas must be transported from Guayas (Ecuador) to distribution center in Kyiv. There are shipping routes at Table 3.1. There are types of operations and their time and cost parameters at Table 3.2 and Fig. 3.6.

It must be justified:

– the choice of the optimal route by the parameters: "time", "cost" and "present value";

– the choice of the optimal route under uncertainty (using decision criteria).

The average bank interest rate on short-term foreign currency loans is 19 % per year. Purchase cost of freight is $17 750.

Table 3.1 – Short description of shipping routes

Route	Direction	Mode of transport
1	Guayas (Ecuador) – Kyiv via port in Odessa	Sea + Road
2	Guayas (Ecuador) – Kyiv via port in Odessa	Sea + Rail + Road

Table 3.2 – Operations of delivery routes on direction Guayas – Kyiv

№ operation		Type of operation	Cost, usd	Av. Time T i , day
1	2	3	4	5
1	2	Port loading in Guayas (Ecuador)	260	3
2	3	Paperwork for cargo	-	1,5
3	4	Transportation by ship from Ecuador to Europe	16300	24

The end of the table 3.2

1	2	3	4	5
4	5	Transshipment in Europe	1150	3,5
5	6	Transportation by ship from Europe to Odessa (Ukraine)	300	4
6	7	Unloading in the port of Odessa	270	2,5
7	8	Customs clearance in Odessa	2100	1
8	9	Confirming paper work and loading on truck	200	1,5
8	10	Confirming paper work and loading on rail platform	100	3
9	11	Road transportation from Odessa to warehouse in Kyiv	310	1
10	12	Rail transportation from Odesa to Kyiv	175	2
12	13	Loading from wagons to a truck	100	2
13	14	Road transportation to warehouse from the railway station	50	0,5
11	15	Unloading from trucks at the warehouse	75	0,5
14	15			

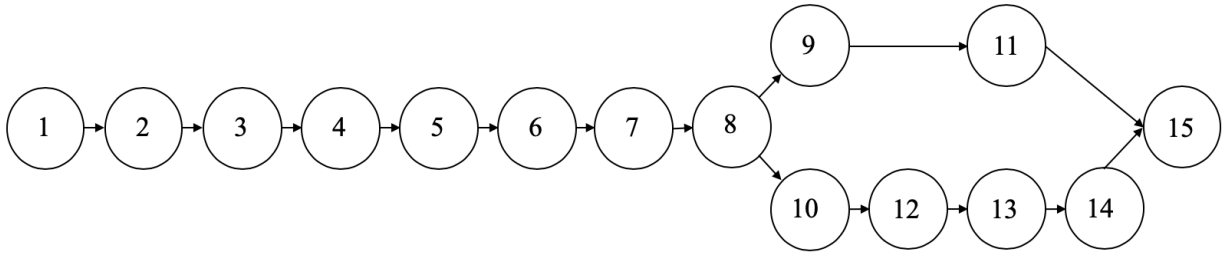


Figure 3.6 – Network graph of alternative shipping routes of direction Guayas – Kyiv

Into account was taken quantity of shipping routes determines quantity of parameters (here is two).

Type of operation which is comprised in network graph and time value and cost value are presented in Table 3.2.

Parameters of time and cost for each route of delivery is calculated as sum of all value on this route.

Parameter of present value is calculated by formula 3.1:

$$C' = (C_{cargo} + C_T)(1+\Delta)^n, \quad (3.1)$$

where C' – present value (estimation of cargo cost and delivery of cargo taking into account time factor);

C_{cargo} – purchase cost of freight;

C_T – transportation cost;

$(1 + \Delta)^n$ – interest rate multiplier with rate Δ on п period, n = $T/365$.

The values of the parameters for each delivery route are given in Table. 3.

Therefore, the analysis of the calculation results shows that when transporting 40-foot containers, the most attractive shipping route will be:

– by the parameters "time" and "total cost": road transportation;

– by the parameter "cost": rail and road transportation;

Probabilistic interpretation of the international supply chain (functional cycle) makes it possible to determine its total duration T_0 with a given credible probability. The time distribution function obeys the normal law:

$$T_0 = \overline{T_0} + x_p \cdot \sigma_T \quad (3.2)$$

where x_p – an indicator of the normal distribution that corresponds to the probability P.

Table 3.3 – Calculation results for different shipping routes

Route	Scheme of shipping road	Total average time, day		Total transport cost, usd (C_T)	Present value, usd (C')
1	1-2-3-4-5-6-7-8-9-11-15	42,5	1,39	20965	29057,40
2	1-2-3-4-5-6-7-8-10- 12-13-14-15	47,5	1,44	20880	30072,55

To further analyze the determination of the optimal route, taking into account the cost and time characteristics, it is necessary to bring the time, the cost of transportation and the reduced cost to a relative form, that is, to a dimensionless value - a relative value. As for these characteristics attractive value is the minimum select in each column of the Table 3.3 the minimum value from shipping routes after which we divide each value by the corresponding minimum value. The results of this transformation are summarized in Table 3.4.

Table 3.4 – The relative values of the parameters of direction Guayas – Kyiv

Route	Scheme of shipping road	T	C	C'
1	1-2-3-4-5-6-7-8-9-11-15	0,472	0,501	0,491
2	1-2-3-4-5-6-7-8-10- 12-13-14-15	0,528	0,499	0,509

Laplace criteria: equal probabilities $q_i = {}^{1}/_{3}$ are assigned to the result of each strategy S_i ($i = \overline{1,n}$), from which the highest is chosen. All nature states are accepted as probable. The probability q_i is determined by the formula $q_1 = {}^{1}/_{n}$, i.e. will be equal to:

Value (M_j) by formula is calculated for all delivery routes.

$$M_j(R) = \frac{1}{n}\sum_{i=1}^{n} V_{ij} \quad (3.3)$$

Example, for first delivery M_1 is 1/3 × (0,472 + 0,502 + 0,491) = 0,488. Minimum value of M_i is the chosen.

Wald's criteria: also known as pessimist model: select the maximum of the minimum, in other words the lesser of evils the agent determines the maximum results for the competitor and choses the strategy that will lead his competitor to the lowest result. This will make the agent better-off.

$$W = \min_j \max_i \{V_{ij}\} \quad (3.4)$$

So find maximum value in each row and from all maximum values choose minimum value.

Savage criteria based on risk matrix which elements are calculated by formula:

$$R_{ij} = V_{ij} - \min_j \{V_{ij}\}, \quad (3.5)$$

where r_{ij} – the difference between best value in column i and value V_{ij} on same *i.* It is recommended to choose strategy which risk value is minimum value in worst result:

$$W = \min_j \max_i \{r_{ij}\} \quad (3.6)$$

For example, for first route:

r_{11} = 0,472 – 0,472 = 0

r_{12} = 0,501 – 0,472 = 0,029

r_{13} = 0,491 – 0,472 = 0,019

Maximum value is 0,029.

Hurwicz criterion or optimist-pessimist index: an optimum constant (α) is defined and assigned to the best result, and another is assigned to the worst (1-α). The

average weighted value is then calculated and the highest value is chosen. The results will depend on the value of the constant (α) defined.

$$W = \min_j \left(\alpha \min_i V_{ij} + (1 - \alpha) \max_i V_{ij} \right) \quad (3.7)$$

This criterion determines the balance between radical optimism and radical pessimism by an optimum constant (α).

Take α is 0,8.

For first route: 0,8×0,472+0,2×0,501=0,678.

Results of calculation is presented in Table 3.5.

Table 5 – Criterion of decision making for routes

Route	Scheme of shipping road	T	C	C'	Laplace	Wald	Risk matrix			Hurwicz	Savage
1	1-2-3-4-5-6-7-8-9-11-15	0,472	0,501	0,491	0,488	0,472	0,000	0,029	0,019	0,678	0,029
2	1-2-3-4-5-6-7-8-10- 12-13-14-15	0,528	0,499	0,509	0,512	0,499	0,056	0,027	0,036	0,716	0,056
		minimum			**0,488**	**0,472**				**0,716**	**0,029**

Thus, according to the obtained result, it is necessary to choose the road transportation of delivery on the first route.

3.3 Implementation of the blockchain system in the marine logistics of perishable goods

At present, the potential of blockchain technology, which lies in its reliability, transparency and efficiency, is increasingly being revealed, and therefore today

blockchain continues to replenish the list of conquered industries. The potential of sharing this technology, its architecture protected from unauthorized access and complete transparency make it an ideal tool for revolutionizing ways.

Blockchain is a mathematical algorithm that allows you to safely and privately exchange data through peer-to-peer networks. The main idea of blockchain technology is a chain of blocks with information about each transaction, which is stored in each unit of a computer network. The blockchain provides effective and reliable data protection, transparent and tamper-proof information exchange. The information entered into the system cannot be changed, and its storage is carried out without a centralized management. A clear diagram of the functioning of blockchain technology is presented in many studies.

Blockchain, in fact, is the most important and productive method of exchanging information between several parties. It creates an immutable digital register of operations that is maintained over a distributed network of computers.

Blockchain has the potential to solve all of the above issues. Being a transparent public register, it is able to provide customers and auditors with simple and effective tools for tracking the entire route. One of the important aspects of the blockchain is that it can provide its advantages only if all members of the logistics chain have access to the network.

Here are seven key processes that will benefit most from implementing blockchain technology in supply chains and logistics.

– Inventory and tracking of goods.

International logistics, which accounts for 90% of world trade, is discrete (separate, intermittent) and uses all types of transport: rail, road, air and sea. Moreover, each participant in the supply chain uses its own local accounting system, for example, CRM, BPM, EDM, ERP or another. Communication between these systems is usually carried out on an analog (i.e. traditional) method associated with paper documents: couriers, mail, facsimiles, face-to-face meetings.

This approach creates a lot of problems: a significant portion of goods, containers and vehicles are lost or not used due to the fact that they are “out of sight”

of accounting systems. When Walmart introduced blockchain into its logistics, they monitored the traceability of mangoes from the shelf in the store to the farm on which this fruit grew. It took 6 days 18 hours and 26 minutes (with blockchain - 2 seconds). Correcting inaccuracies in accounting requires a lot of time and money.

It is impossible to solve these problems with the traditional approach, since complex interactions and paperwork are necessary to confirm the truth of information in accounting systems and at the legal level.

How will it be with the blockchain: the technology can be used to create a unified system of digital document management in the cloud, which will allow participants in the supply chain in real time to track the location of vehicles, goods and their products, even at micro levels.

– Authentication and quality.

According to the Organization for Economic Co-operation and Development, in 2018 the global market for counterfeit products reached $ 450 billion, which is more than the GDP of countries such as Austria or Israel. Other studies show an annual loss of 1.6 billion tons of food (worth about $ 1.2 trillion), 40% of which is spoilage during transportation. At the same time, according to CDC estimates, a significant part of this spoilage falls on the consumer's table, which in the USA alone leads to 130 thousand hospitalizations and 3 thousand deaths.

How will it be with the blockchain: as for the problem with counterfeit products, the blockchain technology allows you to track the origin of goods from the counter in the store to the specific manufacturer: factory, farm, enterprise, person. And this data has a large degree of truth, since each consignment of goods (or each individual product, if it is something large and / or expensive) is equipped with an RFID tag that constantly monitors the location of the product and the interaction between participants in the supply chain.

In addition, RFID sensors can also measure speed, temperature, humidity, and other empirical indicators. Thus, it is possible to detect a violation of transportation conditions and identify spoilage of food products, as well as to track the process or the participant who is responsible for this. In addition, if a product is infected, for

example, with the E.coli bacterium, then a blockchain-based system can identify the source of infection in a matter of seconds and track all infected batches of goods.

– Improving freight and delivery.

A typical delivery scenario involves about 30 parties: shippers and consignees, 3PL, carriers, government services, banks, insurers and others. Moreover, during the delivery of only one consignment of goods, they exchange more than 200 paper messages: delivery confirmation, invoices, bills of lading. The cost of servicing this paper work is $ 300, or 10-15% of the cost of transportation.

As will be the case with the blockchain: according to IBM, the implementation of the blockchain can save the logistics industry $ 38 billion a year. This will be possible thanks to smart contracts that automate most of the workflow and business processes. In addition, the distribution registry will reduce errors, shorten delivery times, and detect fraud.

– Billing and Payment.

As noted above, the shipment of goods from one country to another creates a supply chain in which about 30 organizations participate, interacting with each other more than 200 times. A significant part of these interactions is billing and payment. In the traditional approach, these financial transactions are complex, require a lot of time and bureaucratic efforts, which creates the conditions for manipulation, fraud and generates a lot of mistakes.

As will be the case with the blockchain: the technology allows you to automate the billing and payment process by linking these calculations to a specific action, for example, making an entry about the completion of the shipment of goods or the passage of a vessel, container and / or cargo through the border of a country or port. IoT sensors are responsible for tracking actions, and smart contracts are responsible for process automation.

Thus, the blockchain solution: will ensure accuracy and compliance with the timing of financial settlements; reduce the need for paper circulation and intermediaries, which are necessary to guarantee honesty and compliance with transactions, which will greatly reduce costs; help prevent fraud or quickly identify it;

reduce the generation of errors (for example, the wrong company name or account number) to a very low level; will speed up all processes.

Financial settlements between participants in the logistics processes can be carried out in fiat and / or cryptocurrency money. The latter option is more effective, since it allows you to reduce costs in the case of trans-currency and international payments.

– Freight Market Launch.

In the current state, the freight market is inefficient and incomprehensible. There are no clear standards and rules that would address the issues of liability of the parties for compliance with transactions and explicit or implicit fraud. In addition, this market is opaque, which often leads to unpredictable changes in freight costs, despite the absence of significant changes in supply and demand, as, for example, in early 2019, when the market fell into a state of shock due to the rapid drop in bulk carrier rates tonnage.

As will be the case with the blockchain: blockchain technology and smart contracts can be used to create a fair-trading platform where companies can hire carriers in the shortest possible time on understandable and transparent conditions. At the same time, since all the terms of the contracts will be pre-registered in smart contracts, the level of responsibility of companies will increase, so it will occur immediately automatically, and not after long negotiations and / or a decision of an arbitration court.

– Transparency enhancement.

A big problem in the supply chain is the low level of reliability of the information being verified, which is a direct result of the lack of transparency in the industry. For example, due to the lack of transparency in the formation of the cost of transportation (purchase, transportation, storage), many companies overpay for the delivery of their goods to the consumer, and due to the lack of the shipper's ability to control the delivery process, “gray” schemes and smuggling flourish in the market and counterfeit.

As will be the case with the blockchain: since all data is stored on the blockchain, each participant in the supply chain can at any time check the information for each vessel, container and / or cargo, which reduces the likelihood of discrepancies in the documentation of different parties.

What will increase transparency in logistics: it will allow parties to see evidence of past counterparty results, including delays in delivery, payment, and the like; reduce the likelihood of discrepancies in documentation, for example, when the carrier and the consignee misinterpret the delivery time; It will provide an opportunity to control the delivery process at the micro level, which will reduce the level of fraud, inaccuracies and will counteract smuggling and gray schemes.

– Dispute Resolution.

Every day, due to disputes over payments in the logistics industry, operations totaling more than $ 140 billion are “frozen”. For example, this happens when the shipper informs the transport company that she sent the wrong invoice or when the parties forgot to indicate who pays certain fees. Such discrepancies bind cash flows, increase the costs of companies and reduce their liquidity. To solve them, they usually involve independent auditors who find out all the circumstances and give their recommendations, which usually drags on the process to 42 days.

As will be the case with the blockchain: if all the conditions and actions are recorded on the blockchain, then this eliminates most of the problems in the event of a dispute. Participants in the conflict can verify the necessary data on the blockchain and, in accordance with the contract (or the User Agreement), decide who is right and what to do. [13]

Instant quote calculation, online freight booking, electronic bills of lading and marine certificates, digital monitoring of ship traffic in ports and terminals are just a small part of the technological solutions that are already transforming the shipping industry. Last year, giants Maersk, Hapag-Lloyd, MSC and ONE created the Digital Container Shipping Association to develop common IT standards for the maritime industry. Perhaps this means that soon the industry expects the creation of a single digital space covering the entire maritime logistics market. [14]

3.4 Chapter 3 summary

According to all the information and analyzes that were carried out in this Chapter, we can draw the following conclusions:

– Imperial Holding's delivery system is not ideal, but due to how long the company has been on the market, all the problems that it has are related to the seasonality of the market for the products offered. All problems are solvable and long-term;

– all the calculations that have been carried out prove that transportation of bananas is cheaper and shorter from the port of Odessa by road and will be a more profitable solution for the company;

– the implementation of the blockchain system will be a profitable solution for the simplification and transparency of shipping, which are key for the company. The effective use of such tools is possible only on the basis of an integrated logistics system. A single information space will help create a "single point" at which it is possible to receive any information about the progress of the process of delivery of goods to consumers.

CONCLUSIONS AND RECOMMENDATIONS

Perishable goods - this is a set of goods, the transportation of which has special requirements in relation to temperature, humidity, and a number of other requirements of a sanitary-hygienic nature. The entire set of requirements is aimed at ensuring that the goods during transportation do not change their properties and are suitable for their intended use.

Each perishable cargo has its own characteristics, and therefore the requirements for the transportation of various types of cargo, the required temperature regime, humidity regime of air and ventilation, as well as the duration of transportation can vary significantly.

Today, there are mainly rail-water, road-water and rail-road transportation of perishable goods.

transportation of perishable goods is a responsible process that requires consideration of multiple factors to ensure its safety. Transportation always involves a number of risks, since the cargo throughout its entire length needs to create special conditions around itself that meet the standards of its storage. For example, ensuring the appropriate temperature regime, monitoring the humidity level.

Perishable or urgent cargo is a material object whose properties can be lost, damaged or devalued due to the impact of various conditions. Among these conditions: obsolescence of the item itself due to prolonged transportation; drop, increase or jump in temperature; change in humidity. Getting physical defects due to impacts, squeezing, etc. belongs to the group of General risks and is not exclusively related to this type of cargo, since such violations of integrity are not due to the "urgency" of the cargo, but appeared due to fragility.

The peculiarity of transportation of perishable goods is that no matter how quickly it is performed, it is almost always required to comply with the minimum measures to ensure the safety of transported products.

I analysed the logistics system: competitive advantages, defined the system boundaries, and the environment of the system. I collected statistics on the purchase and sale of bananas by seasons, by price, statistics on the purchase of bananas in Russia, compared the purchase of Ukraine and Russia, collected statistics on Maritime transport companies and analysed transcontinental delivery. According to the collected statistics and analyses I made the following conclusions: the purchase of bananas does not correspond to the sales, the purchase is incorrectly distributed by season, the most profitable lines for transportation by freight and transit time are “MSC” and “CMA CGM”. I also highlighted the following issues:

– seasonal delays in the ship schedule (weather, low loading);

– large seasonal load on storage warehouses (the receipt of goods is more than necessarily);

– lack of transport in Ukraine (hype) in high season;

– unequal annual workload for personnel who manage warehouse and logistics processes.

Imperial Holding’s delivery system is not ideal, but due to how long the company has been on the market, all the problems that it has are related to the seasonality of the market for the products offered. All problems are solvable and long-term;

All the calculations that have been carried out prove that transportation of bananas is cheaper and shorter from the port of Odessa by road and will be a more profitable solution for the company.

The implementation of the blockchain system will be a profitable solution for the simplification and transparency of shipping, which are key for the company. The effective use of such tools is possible only on the basis of an integrated logistics system. A single information space will help create a “single point” at which it is possible to receive any information about the progress of the process of delivery of goods to consumers.

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