# THE PROBLEMS OF MODERN LOGISTICS

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**Abstract**

The authors analyze the internal information flow in an enterprise. The authors define the concept of logistics in modern and classic approaches. They will also discuss main subjects which, in their opinion, influence logistics most, like planning, purchasing, and information infrastructure. Also they try to define what is an issue of integrated structure in enterprise and how it is related to modern logistics. Last speculations regard e-business as a new phenomenon which determines new approaches to business thinking. The authors will state there their research results and practical examples in Paper Machinery Producers with a commentary and proposed solution.

## 1 Introduction

Since the human society established the activity of merchandise trade, logistics has accompanied it in the mankind existence. Its activity influences the development course of the economic activity. Therefore we may say that the economic activity of a society is conducted and developed in a logistics system. Consequently, it has naturally become an important part and key basis that people pay more and more attention to and make serious studies of. Only serious studies into logistics, its operation system, and all of its various aspects can accurately help companies realize their own position in the enterprise competition.

After Poland joined the European Union, the competition situation becomes stricter. With the global integration and development of the new economy, the environment of existence and development of enterprises has become more complex. In order to establish its superiority any enterprise must continuously adopt new ideas and technology in the field of logistics. Modern logistics as an advanced organizational form and management technology is a high level form when compared to traditional logistics.

The target of the work was to try to analyze information connections and relations in a particular segment of the logistics process according to the rules of modern logistics.

## 2 Logistics – overview of the subject

Since the seventies of the previous century, the term logistics has started to appear in general business discussions. This tendency is generally noticed in countries with a high market economy, where companies and firms start to think in a long term scope. Beginnings of logistics are strictly connected with military actions. Probably this terminology was first used by a Byzantine emperor Leontos whose idea was to pay the soldiery on time, to keep the army equipped; all needs of the army were supposed to be satisfied in a proper time and every expedition was to be well prepared, which meant time and space had to be calculated, force of

enemy had to be estimated and according to these factors the army weas to be be lead [1]. Both in national and foreign literature no common definition of logistics exists. Different authors focus on different aspects of logistics; one puts stress on economy, another on economics. F.J. Beier and K. Rutkowski state: "logistics generally stands for the idea of management of displacement and storage so that it helps with transporting a product from the place of origin to the place of final consumption with information which ensures the satisfaction of clients and the lowest cost"[2]. According to the presenting authors´ opinion, this definition is not complete. To better understand the matter, the basic conception of logistics has to be shown.

- Logistics is a physical process, flow of goods – materials, products – in a company as well as between companies, and information flow which reflects the physical process and is used to control this process.
- Logistics is a conception, philosophy of management physical processes based on integrated approach to those processes.
- Logistics is a domain of economics which studies the flow of physical materials and information in economy and also in economy's components.

This argumentation proves that logistics can be understood from the point of view of either activity in economy or concept of economics.

Logistics as a philosophy can be used in every day life. This is a normal aspiration to make life easier and increase self-satisfaction. Implementing this system or this way of thinking to a company is not so simple. In modern economy, the flow of physical goods has become more complicated. Managing this process requires specific information and ability to transform this information properly. The modern idea of logistics processes is an integration of an information stream with a stream of goods, the ability to flow, and costs which have to be borne. This idea contains also client services, which consist of the level of service, quality, effectiveness and client satisfaction. The flow of goods cannot be constant; such a situation can be induced by e.g. technical or organizational factors. A complete synchronization where breaks do not exist is a perfect state, but it is also hardly possible. Tthat is why stocks have to be created. They appear in different stages in a company structure and meet variety of functions, but the main idea of stocks is to ensure a balance between the market demand and production.

Logistics processes cannot work and exist without infrastructure, buildings, cars, machines, etc. Holding the infrastructure consists of requirements for money, which means produce costs. Nowadays technology is so advanced that many complex operations which used to be done by humans and thus cost a lot can be done by machines. Ther process where humans were replaced by acomputer or a machine is treated as optimal, and it requires no modification. Robotization, automation and usage of computers in production steering lead to a situation where costs of producing are reduced to minimum. From the technical and organizational points of view, processes in logistics are far behind production, hence they cause bigger expenses. That is why, paradoxically, the main purpose of modern logistics, apart from improving the management of flow processes and subordination of logistic actions to the client demands, is to reduce costs of flow in every manner of this word. Figure 1 shows basic elements of logistics [3], and the direction of arrows defines priorities. To fulfil superior purposes of logistics every component has to be taken into consideration.

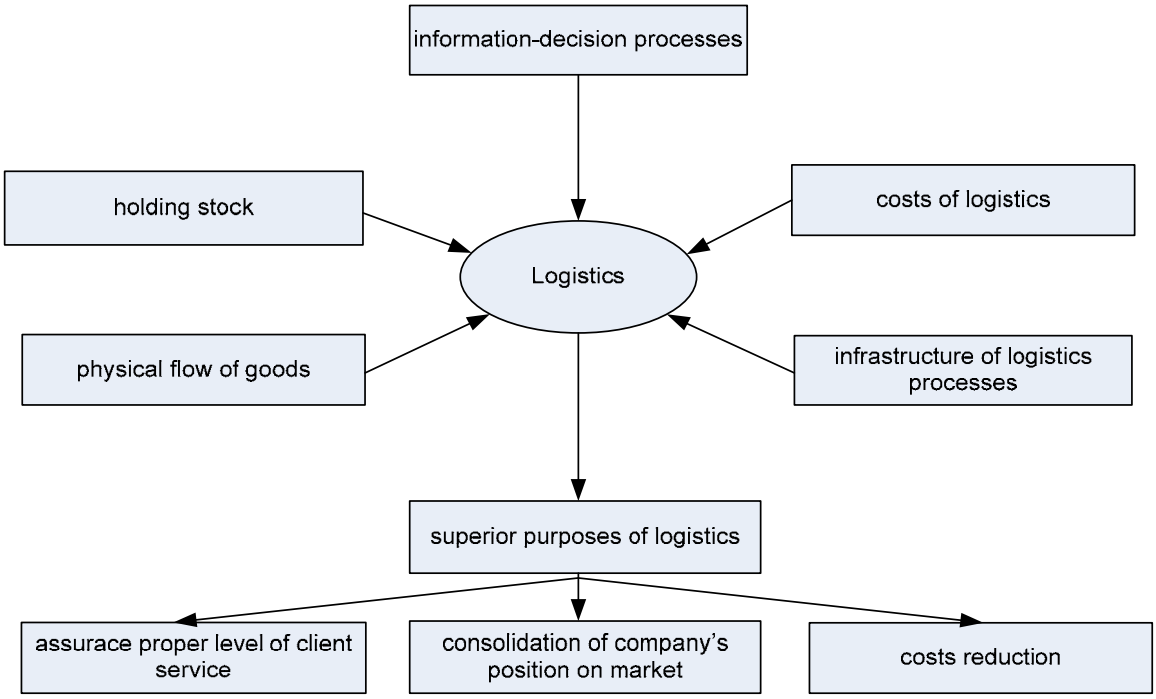


*Figure 1 Graph of logistics basic components [3].*

All the rules and laws mentioned in this chapter are prepared for companies of different specialization, size and value but in last few years another aspect has been taken into consideration. Our modern life has become computerized. People started to understand what a useful tool a computer was, but a machine which could count correctly was too little to attract their attention fully. It was the invention of the Internet and its popularization that became the crucial period in modern economy. Internet has been gradually gaining more and more followers till the present time when it has become the most popular medium. This was the time when the previous knowledge about economy had to be complementd because the Internet became a new market, with different behaviour, with much simplified relations between the client and seller. "A feature which specifies this "cybermarket" is that the seller does not necessarily have to possess the goods he sold. He or she can even not be a classic mediator and the whole transaction from the products´ owner point of view can be actually limited to supervising changes in a store and controlling ther cash income on a bank account. In other words, frequently the firm where a client makes a transaction poses only some information about the product, like its general description, and specifications about the place and time of delivery"[4]. Virtual transactions have crucial arguments like, for example, comfort, time saving or insight to all products offered by the company. Due to this, "cybermarkets" will survive as one of the biggest sales markets in the world despite the fact that any personal contact is missing in this form of purchasing.

## 3 Logistics –a modern approach

After a general overview of logistics, the authors would like to focus on a more complex approach to this field, which is presented by the modern logistics. Deliberation of modern logistics can be done according to different factors, connections between logistics and other activities in a company's structure, like marketing, finances, and management. Before further explanations of the more detailed relations among the modern logistics laws, the authors will offer a short section on the background of this idea [5]:

- Logistics is a conception of planning, steering, organizing and controlling a physical flow of goods and its informational conditions regarding to the system oriented approach;
- The flow of goods and information forms a system which can spread on different teams, modules, departments, etc.;
- The idea of logistics is embedded in interdependent, fixed connections of functional, structural, and institutional aspects of the physical flow of goods;
- Integration of logistics components (transport, storage, supplies, packing, client service, etc.) corresponds with the creation of integrated organizational systems as well as information and coordination systems, which ensure and stimulate achieving the company's goals;
- Logistics is an effect oriented approach in the system aspect, which is based on a complex analysis and formation of costs structure where the main attention is put on the proper level and quality of service;
- Logistics is a tool for discovery of new potential and ability to create profits, which ensure long term effectiveness and company's success;
- Conception of logistics is embedded in market realities, its requirements and possibilities to develop;
- Logistics is a strategic tool of marketing, which supports the components of the company's market strategy and determines its effectiveness;
- Integrated logistic structures are dynamic and they increase the ability to accommodate the company to the changing market situation and also to economic, organizational, and technical changes which result from that;
- An active and integrated aspect of logistics appears on its coordination function through the basic processes in a firm's hierarchy to firm's economics;
- Logistics is oriented on a synergic approach, which means that the sum of work done by systems components separately is less than work of this system as one.

Nowadays companies more often concentrate on managing different processes in the scale of the whole organization and connections between organizations rather than particular functions. Such an integrated process is a logistics chain where accomplishing the goals is done by harmonization and synchronization of particular actions. The authors have implemented the new structure of logistics in Paper Machinery Producer (PMPoland).This company is improving its structure to achieve the best communication, flow of information, and to introduce a new style in management – this is team- and process-oriented management. A few assumptions exert the biggest impact on the new structure formation [6]:

- Concentration on product – maximal focus of funds, knowledge, and personnel on a particular product which gives the biggest chances for the company to find its market niche and loyal clients;
- Process management –possibility to change the vertical structures into a structure with a complete client service done by teams, starting from marketing actions and ending on after-sale service;
- Communication – horizontal, flat structure of management, which supports optimization of information and knowledge flow channels;
- Management by objectives – increase of powers and responsibility of individual employees and their duties which are oriented to team goals achievement by shortening the decision making process;

- Management by values – elimination of all bureaucratic barriers created by commodious procedure and instruction system to independence and creativity of teams limited only by Ethical Codex, Vision and Mission, and Strategic Goals of the firm.

As was mentioned above, modern logistics requires a more detailed approach to relations between logistics and other subsystems in the firm's and markets structures, like: logistics and distribution, logistics and structure, logistics and management, logistics and marketing, or logistics and work effectiveness. As a conclusion the authors present the figure 2 which explains relations between logistics and work effectiveness.

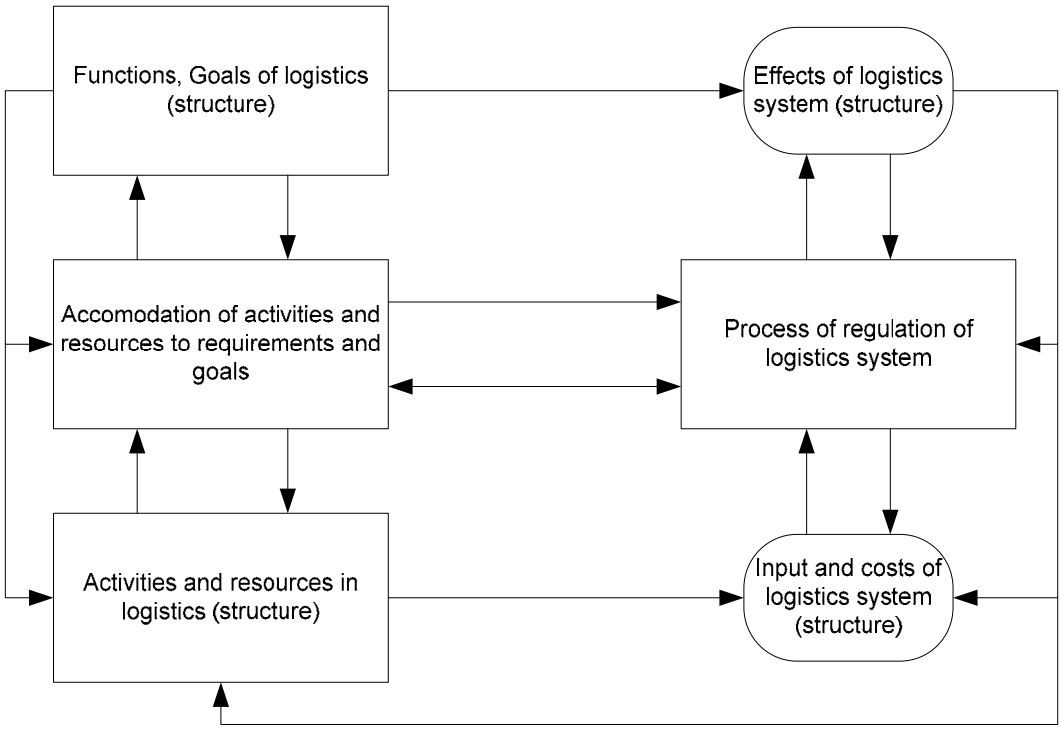


*Figure 2 General relations between goals-activities resources-costs and effects of logistics [3], [5].*

## 4 Planning

The subject of planning is strictly connected with prognostication. As they have common features and both are related to the future authors distinguishing the main difference between them, prognostication itself does not influence future actions, while planning does. Actually the main task of planning is to formulate, according to the plan, some part of the future. Usually both processes appear together, and then prognostication is treated as the first phase of the whole process of planning. Prognostication has a great impact on many fields in the organization and can be divided according to the considered time period into [7]:

- long-term prognostication – usually for a period of 2 – 5 years. It is used for making strategic decisions like planning firm's assets (e.g. building new storage) and its finance, elaborating marketing actions (e.g. introducing new product to the market), evaluating the level of firm's costs and income,
- middle-term prognostication – usually for a period of 3 months – 2 years. It is used to plan tactic actions (e.g. to determine the production capacity, human resources, or budget planning)
- short-term prognostication – relates only to the period with changes in the amount. It is a base for operational planning, which defines production scheduling, management of

stores, purchase planning, human resources planning, management of logistic actions, and control of costs and client service.

To make a right choice and select an appropriate prognostication method, many aspects have to be taken into consideration, but mainly it is the demand which helps to precise that. There are two types of demand: dependent demand, and independent demand. The first group describes a demand (internal) for materials or subassembly, which results from the demand (external) for the whole product, whereas the second group is not related to any internal demand, and it results from the external (market) demand. For example, the dependent demand is the demand for a gearbox, which is installed to a car in a car manufacture; while the independent demand, deals with the same gearbox, but it is produced for sale as a spare part.

Needs and requirements result from the demand prognostication, but materials requirements are evaluated in calculations. Material Requirements Planning (MRP) system is used for solving those calculations. The traditional supply systems were formulated to supplement stores immediately after materials were out of the storehouse. Meanwhile in the assembly production (especially in the individual production, like paper machinery production) we often experience situations when after a large amount of materials has been out of storehouse for some time, your next order will not take place soon. Immediate supplement stores do not have much sense (unless it is done for realization of another contract).

Material requirements planning considers different sources of information and different relations between information what is presented on figure 3 (the described modules are numbered on the figure). The MRP consists of a feedback system which is started by a middle-term production planning (module 1). First of all production size, employee amount, and stocks are defined. Ther basic time unit on this stage is one month. Products are divided into groups according to the machines used for their production. This stage of planning is extremely important because it enables a proper production power planning and simplifies later aggregation or allocation of a product by affinity to the group with other similar products. Next is module 2 (demand supply) where synchronization of information about the demand and conditions of supplies is done. Data come from five different places, one is short- term prognostication, others are: planning and scheduling of production (module 3), and orders and realization contracts (module 4). The central part of the discussed structure is the complex production scheduling (module 5) where a combination of marketing and production issues takes place; another issue done here is also the definition of the short-term production operations. In this module the plans from the module 1 are separated; then allocation of particular positions (parts) to time and place of production is done.

The base for the main production schedule should be attempted to job realization as it is specified in the contract. Hence in a complex production planning, the time horizon of schedules becomes an essential factor. Of course, the most desired situation would be when the complex production plan would ensure the minimal costs of its realization, but this fact is not reliable. There are always some disturbances in the flow of goods, corrections in the received orders, breakdowns of machines, or other unpredictable events. That is why to ensure stability of plans together with consideration of new circumstances and information, the conception of time barriers has to be introduced. This conception describes eventual changes in plans (according to particular time periods), for example, a change in the plan which relates to the next two days requires the acceptation by the firm's president, changes which relate to the next 3-7 days require acceptance of the director´s deputy.

Module 6 (complete product scheduling) is obligatory when those products are not considered in module 5. The task of module 7 is material requirements planning; transformation of complex production planning into a detailed production plan takes place here. After an evaluation of the real complex production plan (module 5), the creation of an operational plan becomes possible (module 9). This will enable to start our own production or order the required materials. The described system will not work effectively without a working module 11 (production steering and feedbacks). Here the responsibility for operational activities is

defined. Also a proper and punctual updating of stocks should be done here and an immediate reaction for any changes in the plan (feedback) should be reported as well.

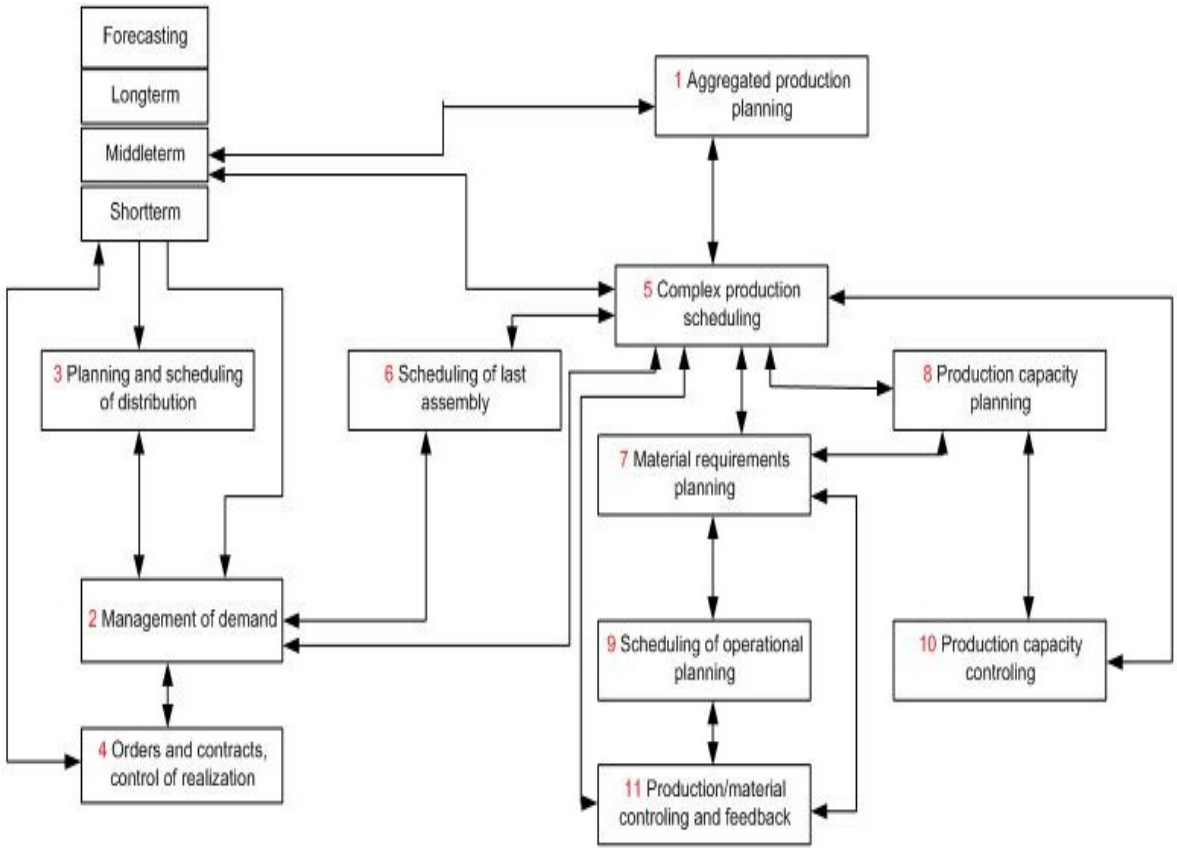


*Figure 3 Feedback in material requirements planning [3], [8] on the example of PMPoland.*

Shopping has to be treated equally with other processes in a company and that is why the idea of logistics should be introduced here also. This approach was naturally an effect of ending the economical boom for the long-term planning, which took place at the end of the eighties in North America and West Europe. Nowadays spectacular evolutions of small firms to potentate are hardly possible. Market is often saturated, and finding a niche or inventing a new product takes place really rarely; the necessity of lowering the costs forced companies to look after savings by commission of some work to firms from outside (outsourcing), moving production to Far East, or reducing particular firm's focus only on fundamental references.

On the table 1 past and modern approaches to shopping are given.

*Table 1 Past and modern approaches to shopping [5], [8].*

| Previous | Modern |
|---|---|
| All parts of production inside the firm | Concentration on fundamental references |
| Large system know-how | Complex shopping |
| Purchase of single components | Purchase of whole components |
| Expansion of the firm | Entire treatment of costs |
| Search for the cheapest suppliers, frequent change | Multipurpose delivery<br>Long term relationships with the best suppliers |
| All possible delivery partners | |
| Win-lose approach to suppliers | Win-win approach to suppliers |
| Isolation of delivery | Alliance strategy |

In logistic aspect of purchasing, the main features which determine the production process are completeness, quality, and punctuality of supplies. Purchasing consists of many functions which integrate real and information processes. The issues of this processes can be specified by answering questions connected with the company's activity:

- the company´s own production or purchase (make or buy) – such a decision has to be preceded by a complete analysis of all factors, which sometimes may be in conflict, as representingh different departments. The company´s own production gives arguments, like a high added value, unique technology, and strategic character of the producing technique. On the other hand, purchasing goods or services from outside may result in a decreased production capacity, a possibility of profitable cooperation, and an access to modern technology. Regardless of result consideration, this matter should be done in the early stage of product development,
- how much to buy and when to buy – these are complex issues and making decision here is a whole independent subject
- where to buy – the complex analysis of potential suppliers is required here.

Table 2. shows evolution in the approach to shopping; can be treated both, as a global tendency or modification in firm's strategy.

*Table 2 Evolution of shopping – functions and meaning.*

| Evolution stage | Activities | Reaction in company |
|---|---|---|
| Stage 1-rise | shopping function is not | little or none |
| Stage 2-realization | getting savings | administrative efficency, small savings due to consolidation-2% - 5% |
| Stage 3-development | controlling and development in price fixing and negotiations | costs reduction- 5% to 10% |
| Stage 4-maturity | introducing 80/20 rule, hiring shopping specilist, costs reduction, beginings of supplier managment | costs reduction from 10% to 20%, costs of shopping from 1% to 10% |
| Stage 5-advanced | strong, centralized control, managment in supply chain | costs reduction for 25%, consideration of all costs due to purchased goods, advanced shopping, increase of costs of supply chain managment |

## 5 Conclusion

The subject of information flow is very complex. This process takes place in every field of production organization and every other kind of activity. The goals of this work were to: first, choose a sufficient part of the logistic process, and second, analyze the internal information flow in this process according to modern logistics rules. The authors explained in the work all necessary methods and tools which were used to the problem specification.

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## PROBLEMY NOWOCZESNEJ LOGISTYKI

W pracy poddano analizie wewnętrzny przepływ informacji w firmie. Analizę przeprowadzono na przykładzie średniej wielkości przedsiębiorstwa produkcyjnego. Zdefiniowano pojęcie klasycznej i nowoczesnej logistyki. Omówiono również kwestie, które wpływają na nowoczesną logistykę czyli planowanie, zakupy i infrastrukturę informatyczną. Zdefiniowano istotę struktury zintegrowanej jako czynnika łączącego się z przedstawionym pojęciem logistyki.

## PROBLEMATIKA MODERNÍ LOGISTIKY

V této práci je předložena analýza toku informací ve firmě. Analýza byla provedena na příkladu středně velkého výrobního podniku. Autoři definují klasickou a moderní definici logistiky. Dále jsou zde diskutovány problémy plánování, nákupu infrastruktury informatiky v moderní logistice. Jsou zde také definovány integrační struktury jako faktory pojící s moderní logistikou.

## DIE PROBLEME DER MODERNE LOGISTIK

Der Beitrag beschäftigt sich mit der Analyse des Informationsflusses in einem Betrieb. Die Analyse wurde am Beispiel eines mittelgroßen Betriebs durchgeführt. Es wird hier eine klassische und moderne Definition der Logistik gegeben. Es werden die Hauptprobleme wie Planung, Einkauf und Informatikinfrastruktur in der modernen Logistik diskutiert. Es werden auch Integrationsstrukturen als die Verbindungsfaktoren mit der modernen Logistik definiert.