

COSTS OF PRODUCTION LOGISTICS - RELATION: DECISION - RISK - COST

KULIŃSKA Ewa

Opole University of Technology, Opole, Poland, EU, e.kulinska@po.opole.pl

Abstract

The article describes cost problem of managing the production process. It demonstrates that decision problems implied creation of risk factors and are also the source of costs for the enterprise. In article described cost problems of managing production process, decision making problems as implication of risk factors and source of costs. On the basis of own research, the Author made an analysis of risk factors in strategic areas of the sphere of production in manufacturing enterprise. The main goal of this article is to show that decision-making processes are an important source of formation of risk factors and what this entails a significant impact on its costs.

Keywords: Manufacturing, logistics process, logistics costs, risks, decision-making process

1. INTRODUCTION

One of the essential sources of formation of the risk factors in logistic processes is a decision making process. Decision making entails activities aiming to solve a given decision problem. As a rule, we have at our disposal a set of decision variant, from which the best one is being chosen on the basis of defined criterion [2, 9]. Due to the fact, that the structure of logistic production process is complex, the number of variants applicable to each decision is also plentiful. The fact stating that taking supposedly good decision in one area of relevance of logistic process might not be suitable for the other, is not significant. Fraught with to high risk, the decision may influence beneficially on one area of logistic production process, but immerse another. The effects are visible in costs.

Problem of logistics costs analysis is one of the most challenging and complex decision process that logistics managers have to face with. According to the research, there are difficulties of formal and organization related nature, at the level of unambiguous and moderately precise identification of category of costs relating only to logistic processes. Classification systems of logistics costs are very developed and stay in tight correlations and mutual dependence, what hinders their exact estimation in accordance with disjoint analytical criteria. What is more, character of costs present in logistic processes creates many conflicts between each groups [4, 5, 6, 8, 9, 10, 11, and 13].

Phase and functional division allows for more precise analysis of logistics costs. In the article there was demonstrated analysis of logistics costs, resulting from relation decision - risk - cost, in the sphere of production. Production logistics is about planning, organizing and controlling the flow of raw materials, materials and cooperative elements during production process. Likewise in other spheres of logistics in enterprise, also in production logistics there are present physical processes of flows and information streams [1, 3, 7, 9, 10, 12, and 13].

The presented material is an attempt to answer the research problem: that decision-making processes are an important source of formation of risk factors and what this entails a significant impact on its costs. Intermediate targets research are structuring and cost sources of the production process, analysis of the relationship between decision problems and risk factors of the production process. To verify that the given problems were used theoretical research tools (analysis, synthesis, generalization, comparison) and practical (method of ordering).

2. COST PROBLEMS OF MANAGING PRODUCTION PROCESS

Physical flows in the sphere of production include: internal transport of raw materials, materials, semi-finished goods, spare parts, and also production underway and finished goods, technological handling operations associated with production, creation and maintenance of various technological stocks and stocks of production underway (see Fig. 1).

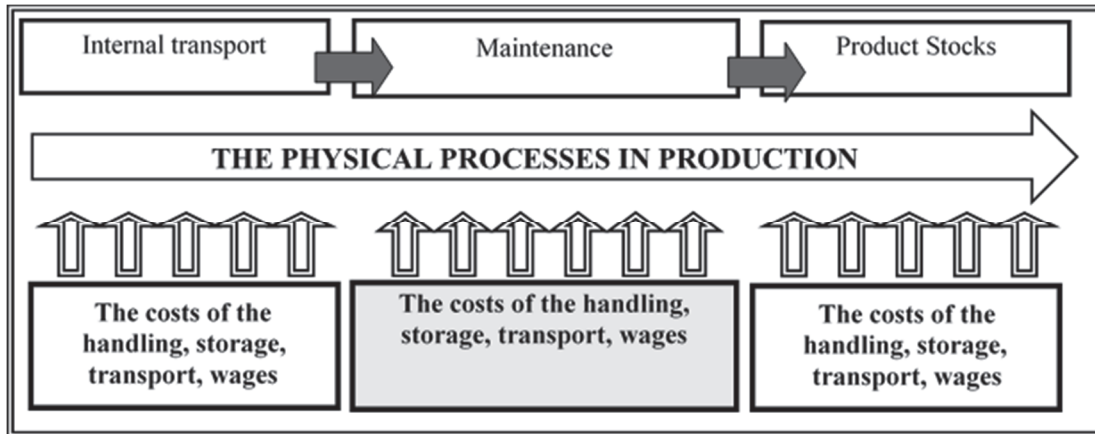


Fig. 1 Cost of production sphere related to the structure of physical processes [9]

Material processes include primarily internal transport of raw materials, materials, semi-finished goods and technological handling operations associated with production, along with creation and maintenance of stocks of production underway. Managing logistics production process consists of planning, organizing and governing, as well as controlling of physical flows on each level.

The fundamental criterion for functioning of production logistics is to ensure the continuity of the enterprise and adequate intensity of production in terms of material flows in accordance with the requirements of a particular technology. Operational criterion of production logistics is minimizing the stocks of production underway, which realization indicates minimizing costs of frozen assets and reduction of the costs of maintaining these stocks. In case of typical manufacturing enterprise the scope for use of logistics approach in managing production process is determined by specificity and technology of performed production (see Fig. 2).

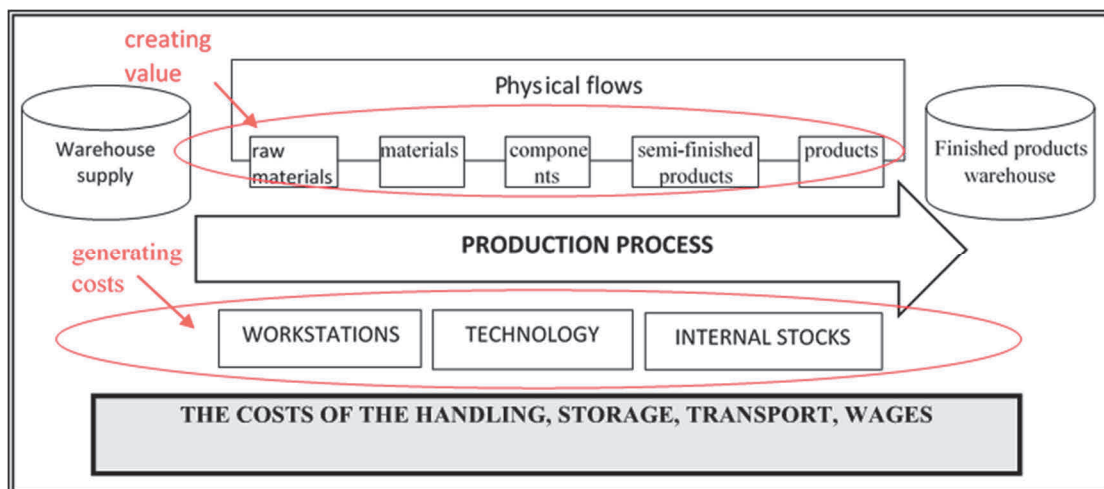


Fig. 2 Cost of production sphere related to the structure of physical processes [9]

Fluency and continuity of production process is ensured by stocks of production underway, which generally can be divided in two categories:

- internal stocks used for levelling out current disproportions in supply of particular production posts; that includes current stocks and reserve stocks,
- internal stocks include two categories of supplies: cyclical (technological) stocks and out cyclical stocks.

As a main sources of costs in logistics production process one can point: long time of flows and low rhythmicity of supplies, insufficient overtaking of supply processes, low level of THS processes (transport, handling, storage).

Cyclical stocks fall into operational stock created and accumulated on given post and interoperation stocks including rotary stocks, transport stocks and emergency stocks. Governing the level of stocks of production underway is strictly related to the type of enterprise and character of performed final production.

A significant impact on the level of incurred costs and generated income has the level of quality of products and services. It constitutes market position of the enterprise. The condition for implementing his task is to ensure the highest quality of all processes and ventures realized in enterprise. Traditionally quality use to be understood as an expression of reliability and craftsmanship of manufacturer. Today it is an important instrument in manager's hands, strengthening competitive ability of the enterprise. The quality shapes both professionalism in technical sense, and professionalism in managing whole manufacturing process and therefore nowadays it is accepted that quality is being shaped during each phase and level of manufacturing process.

3. DECISION MAKING PROBLEMS AS IMPLICATION OF RISK FACTORS AND SOURCE OF COSTS

To a great extend about effectiveness in functioning of production logistics decides technical and organizational structure of production process and chosen technology of manufacturing process. The technical structure of production is determined by organization of production process, namely the way of dividing the labor force and rules of combining positions and production cells into organizational units (slots). Organizational and functional system of the enterprise determines structure of production process, and hence the structure of flow of physical process. Production logistics is decisive in shaping and developing all logistic processes. It results from three basic premises: firstly, manufacturing activity stimulates and satisfies market needs; secondly, in production stage competitive value of the good is created; thirdly manufacturing enterprises were the precursors of integrated logistic approach.

The main requirement which production logistics must meet is elasticity understood in categories of modern technology. From the point of view of efficiency of logistic processes exceedingly important is the time and space architecture of technological processes, topography of production posts and corollary of each action and technological operation.

In stage of designing functional and organizational structure there should be taken into account, to the fullest possible extend requirements and conditions of logistic technologies, that guarantee highest efficiency of physical flows. Those requirements include Inter alia determination of quantity and technical parameters of each logistic Channel, its capacity and synchronization with technological channels in a whole production process. In that regard it is about fulfilling two cardinal rules of efficiency of flows relating respectively to:

- one-way of all physical flows,
- minimizing the number of logistic channels.

First of preceding rules allows for eliminating so-called relapses and useless cycles, which unnecessarily may emerge in logistic channels. Apart from superfluous costs such situation absorbs time and occupancy of the transmission channels, and therefore might introduce destruction in a whole logistic net. Further consequence is reduction of congestion and stoppages in physical flows, and hence minimization of the level of stocks of production underway. Second condition provides for necessity of reducing number of logistic channels to

necessary minimum, ensuring however full cover of needs of production system and suitable fluency and rhythmicity of all physical flows.

Fulfillment of the foregoing requirements implies the necessity of complex synchronization of all nodes and channels both in technological (production) net and securing those processes logistic net. Fluent and rhythmical course of physical flows of Raw material, materials, semi-finished goods, spare parts, and also packaging or energy requires adequate time and space configuration; both technological net as well as tightened it logistic net. It is about optimal, from the logistics needs point of view, localization of each posts, cells, nests, and also whole departments and manufacturing plants in global architecture of the enterprise.

In case of manufacturing enterprise the scope of use of logistic approach for managing the production process is determined by specificity, technology of performed production. Particular logistic solutions are determined by applied technologies and organization of production process. The foundation of effective logistic system of specific, mass production processes is than appropriate logistic infrastructure, strictly tightened interrelated with structure and organization of production system. The scope of specialized logistic infrastructure entails:

- universal means of internal transport,
- specialized systems of manufacturing and work packages,
- specialized storage sites and warehouses for production underway,
- integrated computer systems,
- governing technological and logistic processes.

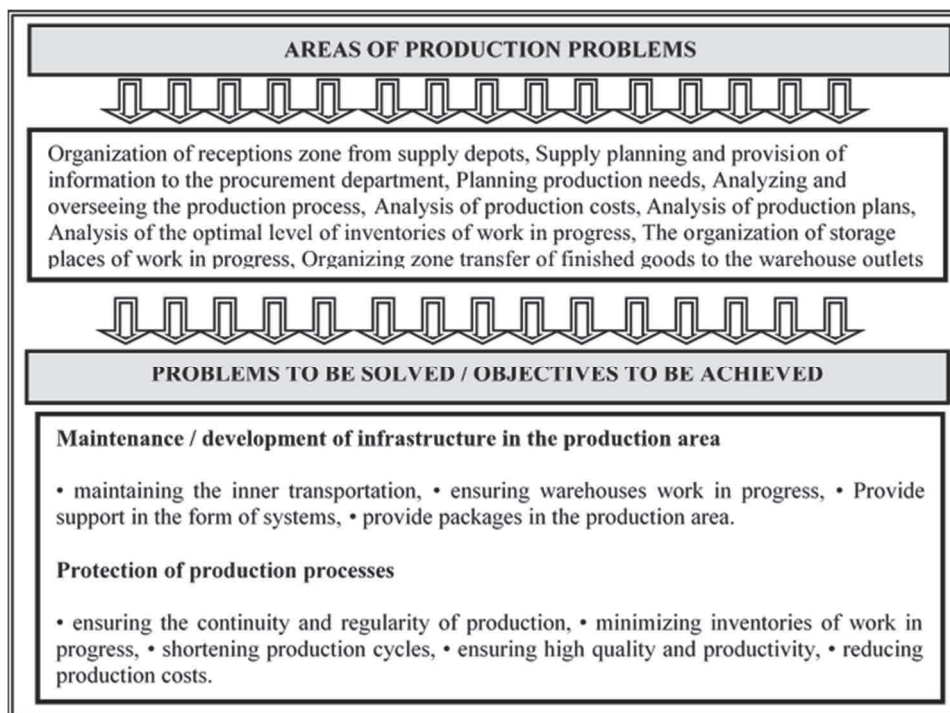


Fig. 3 Problems spheres of decision-making supplies [9]

Only on the basis of adequate infrastructure of logistics production processes and Jasing on integrated IT system it is possible to successfully realism main goals of logistic management in the production phase (see Fig. 3):

- ensuring continuity and rhythmicity of logistic processes,
- maintaining high quality of produced goods,
- minimizing stocks of production underway,
- increasing the timeliness and shortening production cycles.

Due to high level of automation and robotics of modern, industrial production system, implementation of rational logistic. Technologies must take place on the basis of integrated IT applications, that combine functions of managing IT processes and governing physical processes. The use of advanced IT Technologies must be preceded by the stage of modelling adequate physical processes and organization systems, which eventually will be implemented as integrated IT systems.

4. ANALYSIS OF RISK FACTORS IN STRATEGIC AREAS OF THE SPHERE OF PRODUCTION

One of the most frequently mentioned, in literature, risk factors of the sphere of production are: to low or to high level of interpretational stocks, errors in governing stocks of production underway, high dynamic of creation, rotation rate, high cyclicity of consumption, the exhaustion of stocks of materials on one or more workstations, too long interoperable logistics procedures related to the handling of materials, errors in the division of labor, errors in combining jobs, errors in connecting production cells in the unit (slot), no one-way physical flows of materials too many channels logistics.

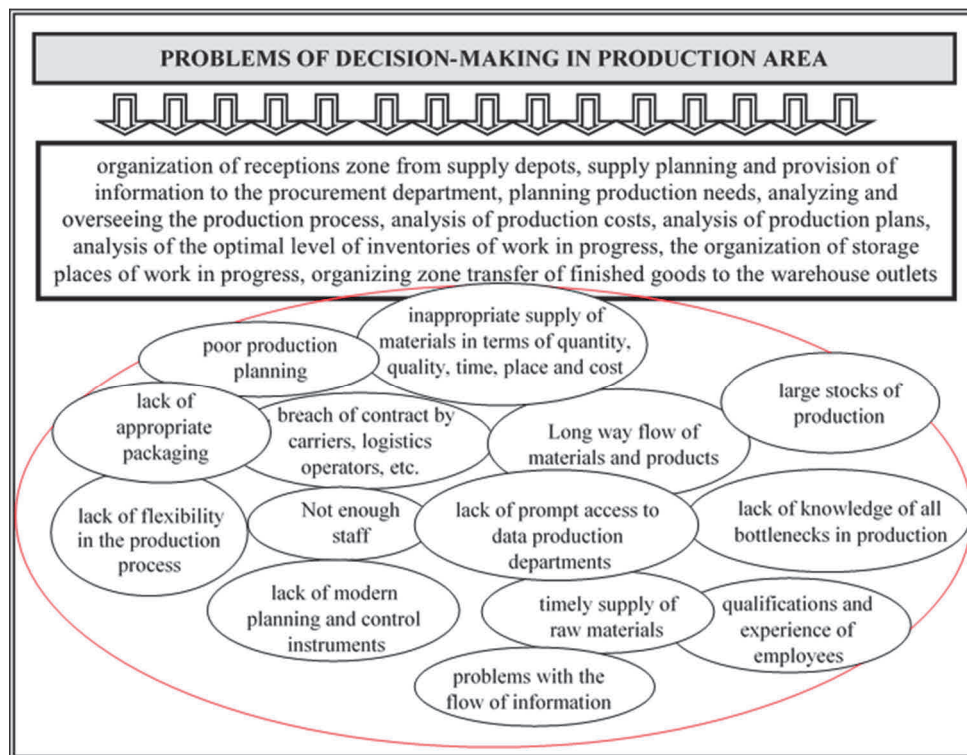


Fig. 4 Selected risk factors sphere of supply caused by the decision-making processes [9]

Risk management in logistic production process should include internal transport of raw materials, materials, semi-finished goods, spare parts, and also production underway and finished goods, technological handling operations associated with production, creation and maintenance of various technological stocks and stocks of production underway. It ought to be focused on the identification of potential events which might have negative influence on its aims, associated risk calculation, and further defining and implementing solutions that shall reduce risk and keep it under controlled limits.

Recognition of the risk factors can be done on different levels of detail. More natural to distinguish are those factors, that May occur on each sphere of functioning of material management of the enterprise (see Fig. 4).

Specification shown on **Fig. 4** of selected risk factors sphere of production caused by the decision-making process is not only possible and not exhaustive catalog of risk factors which may occur in this area. Rather, it is a starting point for discussion in this regard.

5. CONCLUSION

The importance of presented research area is manifested primarily in building the foundation of theoretical calculations and the classification of the real costs arising from the implementation of logistics processes.

Logistics processes determine spatio-temporal economic activity, and the costs of their implementation have a significant impact on the financial result of the company. The implementation of logistics processes is an integral part of business operations and is an important factor in shaping the economy and the capability of conducting active, competitive strategy. New possibilities in this regard provides the parameterization of risk costs of logistics processes.

In traditional recording and reporting systems, the cost of logistics processes, although they are important determinants of the profitability of the company, are kept very general and rather vague. Difficulties of strict accounting of logistics costs stem from their very complex nature and large scatter in different registration systems company. Keeping a strict account of logistics costs is difficult because of the very complex range of factors and conditions of objective and subjective, procedural and random, as well as the historical and economic character, as it is confirmed by the authors of many publications in the field of logistics together with ongoing researches.

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