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Issues of Forming Inventory Management System in Small Businesses

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ABSTRACT

An increase in the inventories efficient use gives a jump-start to the growth of small business economic efficiency. Application of the system approach to inventory management allows monitoring the whole process of material flow and minimize randomness of this process. The very system of inventory management should be understood as a system of material flow planning, control and regulation. Application of the system approach to inventory management allows carrying out goal and target decomposition at different levels of management. For the said purpose, the stages of forming inventory management system taking into account the whole cycle of enterprise material flow are represented in the article.

Keywords: Inventory, Functions of the Inventory Management, Production Scheduling, Supply Chain
JEL Classifications: G31, L2

1. INTRODUCTION

Ensuring a single, continuous process to provide all the systems of the production process with required inventories in optimal quantity and of specified quality is the most important guarantee of the efficient functioning of enterprises. Objects of work are kept in the form of inventories before each processing stages and after it. Inventories, their location and the dynamic dependence on the requirements of the subsequent stages of manufacturing determine largely the efficiency of enterprise internal and external material flows.

The importance of resource management including inventory in supply chain are considered in works of Barney, Dolgov, Ryzhikov. The inventory models and closed-loop supply chains can be classified under three categories: inventory control, production planning and supply chain management. The issue of the inventory control in these latter days are considered by Kot, Grondys, Szopa, Bauersoks, Lu, Song, Regan.

The inventory optimization in supply chain management is taken into consideration by Ab Talib, M.S., Hamid, A.B.A., Ceryno, P.S., Scavarda, Gunasekaran, A., Ngai, E.W.T. Logožar, K.

Russian researchers have been studying the issues of inventory management since the 60-s of the 20th century. Their researches can be divided into two groups. The representatives of the first group argued about fundamental inapplicability of this theory, since most models of inventory theory are of local nature and take into account only the costs of an enterprise under study. As for the second point of view, it represents Russian economists who are the followers of economic ideas and methods of the theory of inventories laid down in foreign economic literature. The works of Russian economists on the mathematical theory of inventories are being published since the late 60s (Ryzhikov, 2001; Dolgov, 2005). In the period of centrally planned economy the management of inventories and circulating capital invested in them were understood as a set of activities aimed at the determination of certain inventory levels, inventory depletion rate and inventory rationing, as well as a system of measures aimed at day-to-day supply management. Particular attention was paid to inventory rationing (Lukinskiy, 2008). However, these calculations were carried out using different methodical documents and methodological approaches recommended in them to determine standards and algorithms differed significantly from each other. As a result, enterprises had to carry out several independent calculations in parallel and they were not linked together.

Under current conditions, it is impossible to consider the enhancement of the efficiency of inventory management in isolation from other elements. Inventory management system (IMS) should include enterprise subsystems, which are related to the production inventories management directly or indirectly; these subsystems include procurement, transport facilities, storage facilities, information support, manufacturing, etc.

2. FORMING IMS IN SMALL BUSINESSES

Inventory management involves consideration of the relationship between strategic and operative objectives. It is necessary to start considering the issue of improving inventory management with the construction of the strategy of inventory management (in the broadest sense), which is in direct relationship with the strategic objectives of an enterprise.

The construction of an IMS on the basis of taking into account the strategic objectives will make it possible to create a common enterprise management policy and establish goals for different enterprise subsystems, including IMS (Bauersoks, 2006). Figure 1 shows the general procedure for the formation of efficient IMS taking into account the relationship of strategic and operating objectives.

Detailed goals and objectives of the IMS are represented in Figure 2. A large number of factors influence the strategic sourcing; they can include strategic importance of IMS element, cost advantage, the contribution of an element to product value, other competitive advantages.

The essence of management as a process requires exercising certain functions. The main functions include planning, organization, regulation and monitoring. Consequently, the management process can be represented as a process of targeted, systemic and continuous impact of managing subsystem on the managed subsystem by means of the common management functions, the relationship and interaction of which form a closed-loop repeated cycle of management (Figure 3).

The analysis of common management functions allows specifying the main characteristic functions typical for any management process: Planning, norm setting, accounting, analysis and regulation. Planning and regulation are the most important functions among common ones in terms of improving the efficiency. The functions of the inventory management block are represented in Figure 4. The decomposition and analysis of the material flow management functions can be carried out on the basis of the structure and processes of the object life cycle. Resources entry, storage and flow are managed processes. The structure of the management functions is shown in Figure 5.

Resource inflow management function is provided through the analysis of the resource inflow plan, the analysis of the resource inflow status, the selection of optimum alternatives of inflows, the assessment and selection of supply options. Resource inflow management function is aimed at the physical processes of resource inflows. Its management parameters are delivery plans, selection of suppliers, selection of the purchasing lead time and purchase quantity.

Figure 1: Goals and objectives of inventory management

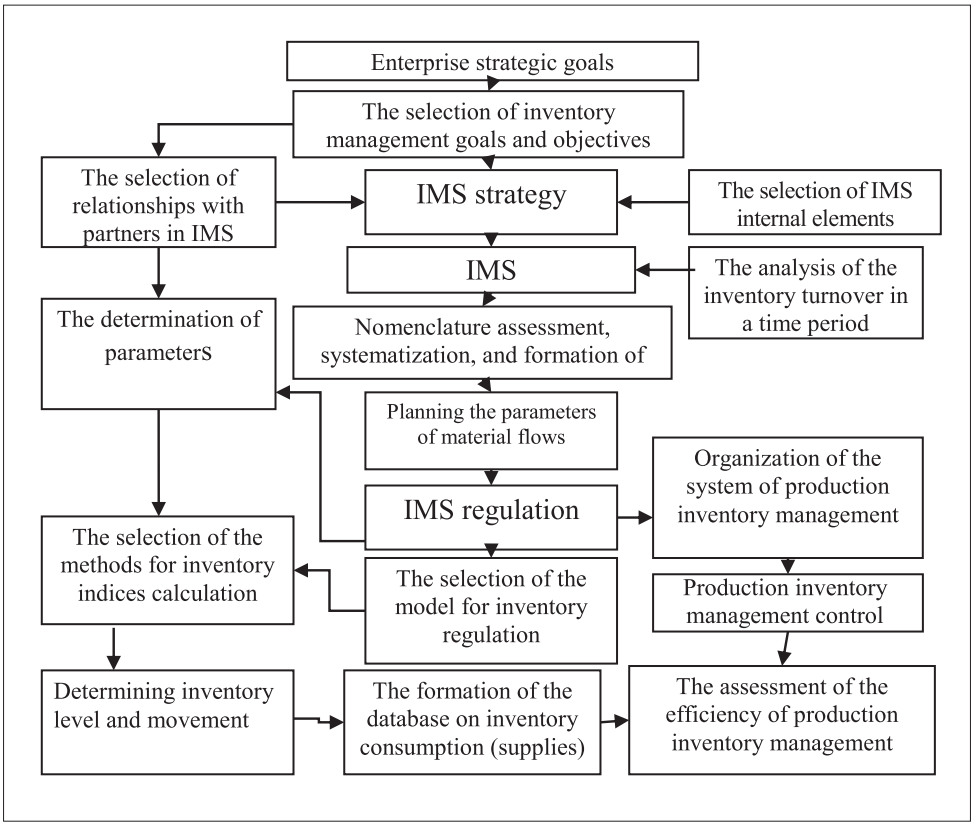


Figure 2: Detailed objectives of inventory management system

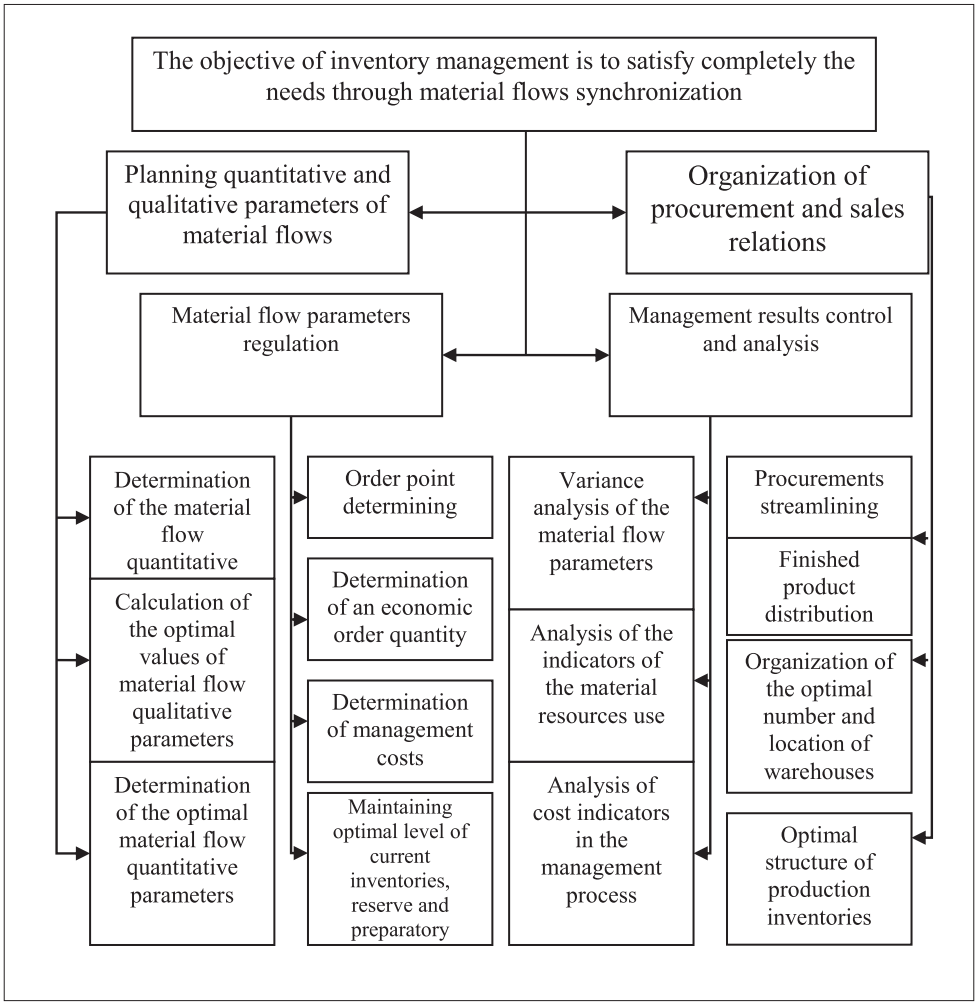


Figure 3: Model of the organization of material and information flows in the inventory management system

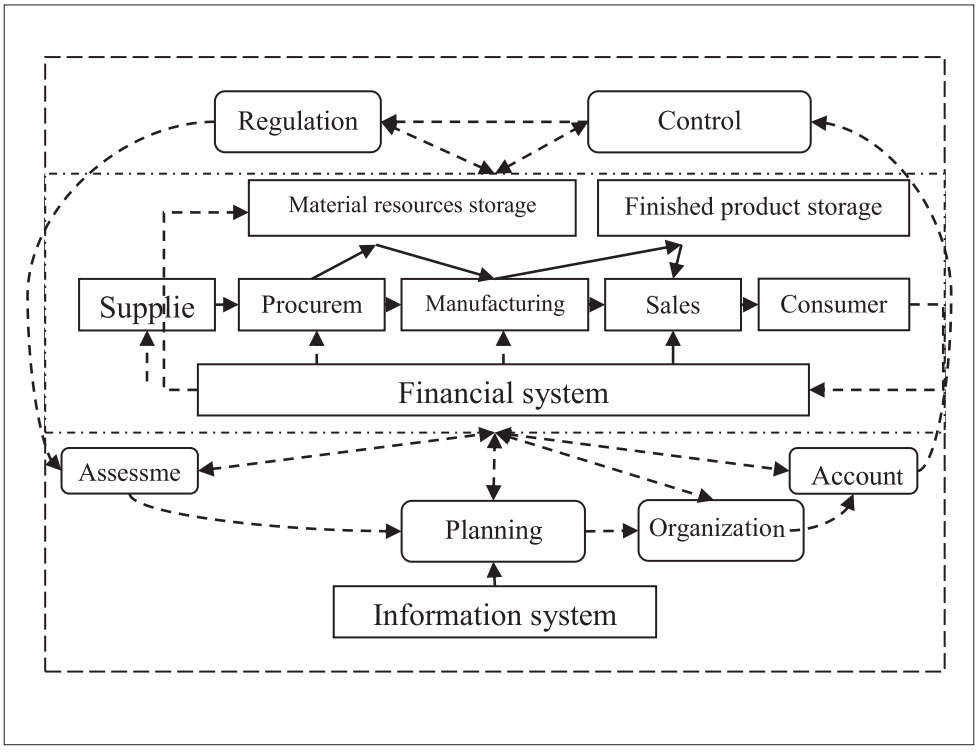


Figure 4: The functions of material flow management process

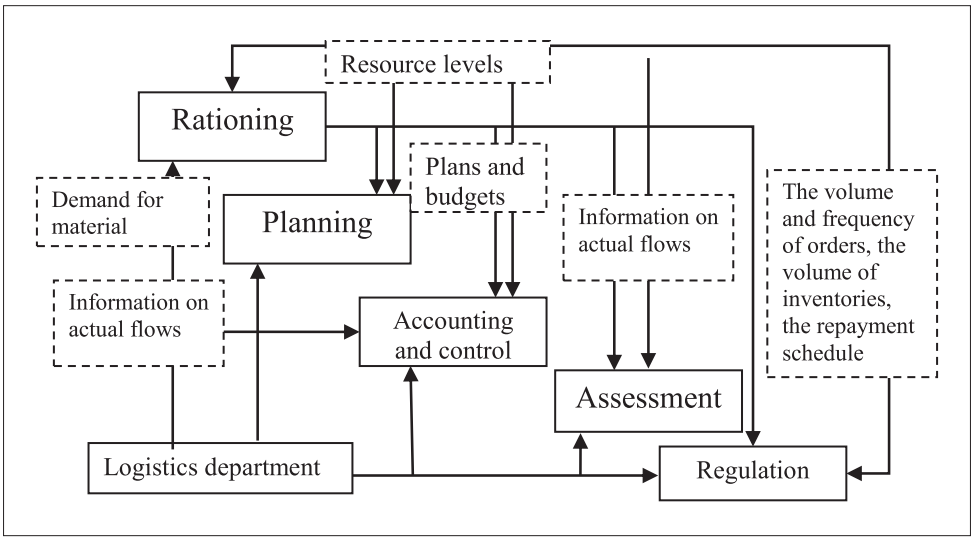
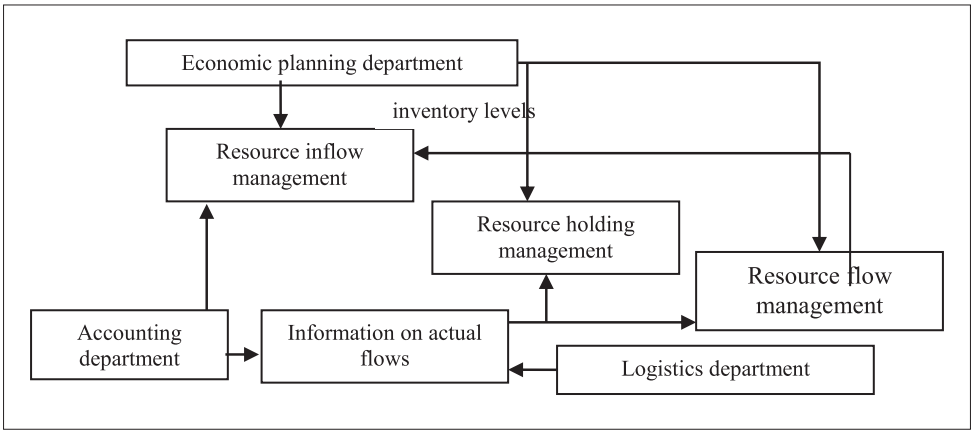


Figure 5: The structure of material flow management functions



Resource inflow management function provides inventory analysis, planning and adjustment of the resources delivery schedule. Based on the analysis, different options of delivery plans are created and selection of the most suitable resource supplies is carried out. Resource holding management allows minimizing costs during storage, as well as minimizing unnecessary resource inventories.

The selection of ways for optimizing management of holding material inventories includes stock sales, liquidation, inventory replacement, resource procurement. Planning as a function is an initial stage of management and is aimed at achieving the goals of an organization. Strategic, tactical and operative production plans are interdependent and form a single planning system. In an organization planning covers all areas of activities. Resource inflow management function is shown in Figure 6. Figure 7 represents resource holding management function.

Planning always starts with forecasting, that is why it can be considered as one of the phases or functions of the planning process. Planning is directly related to rationing, which should be considered as a process of the development of science-based calculated values. Calendaring and scheduling standards (production cycles, order quantity, work on process inventory, etc.), regulations (instructions, procedures) describing the rights and responsibilities of different levels of management are calculated and determined by means of this function. Figure 8 represents an algorithm of inventory planning.

Thus, swings in consumer demand have a direct impact on the value of the need for material resources and inventories; some industries (e.g., construction) and sectors of the economy are under the direct influence of seasonal factors, others experience seasonal influences due to intra- and inter-sectoral interrelations concerning markets and resources.

With the increasing intensity of demand increases the need for inventories. On the other hand, greater inventories allow getting greater sales intensity while the demand is growing. Since the demand for inventories is functionally dependent on the intensity of production and sales, it can be argued that there is a kind of functional dependence for the demand for inventory funding. Consequently, taking into account production and sales variability within the annual period, the demand for inventories funding will be also variable. In these circumstances, it is difficult to expect a spontaneously arising compliance of actual funding

Figure 6: Resource inflow management function

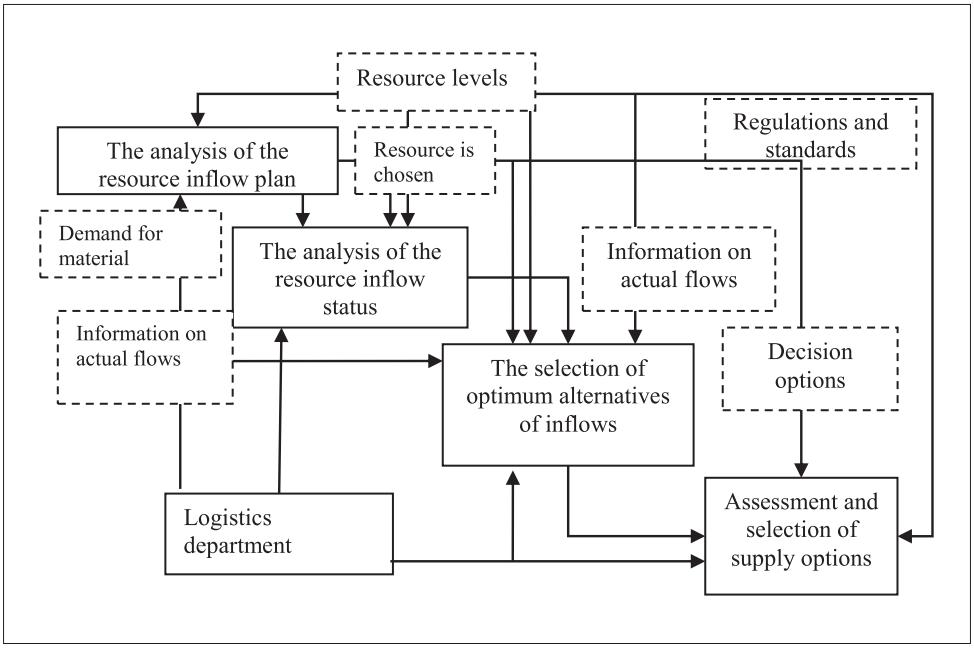
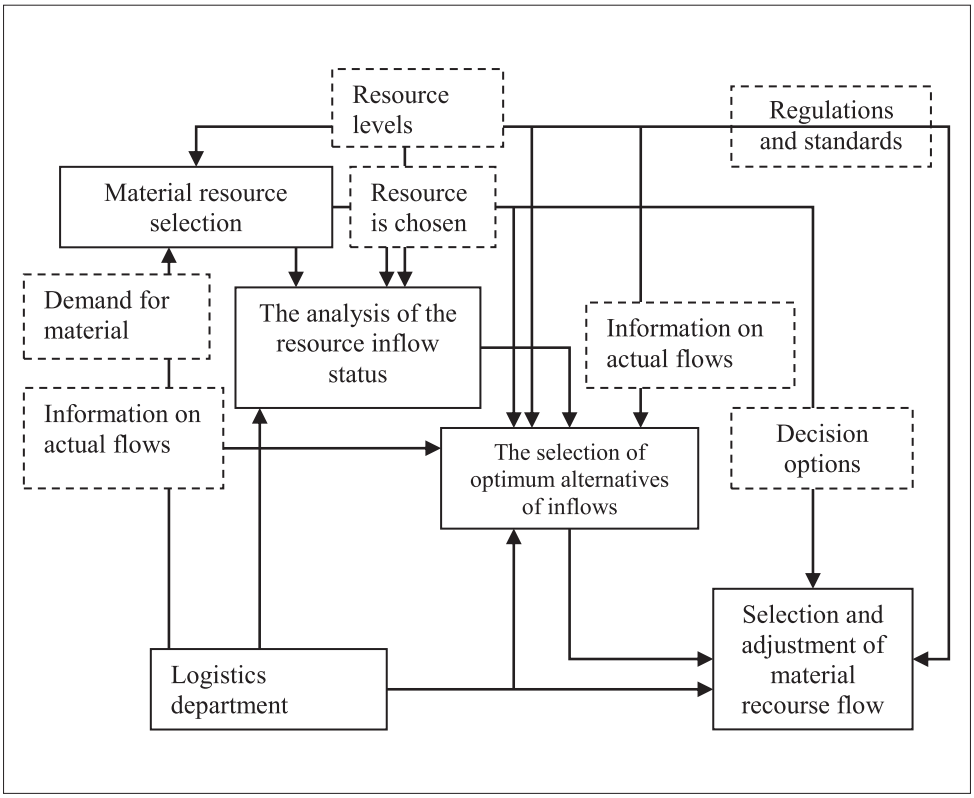


Figure 7: Resource holding management function

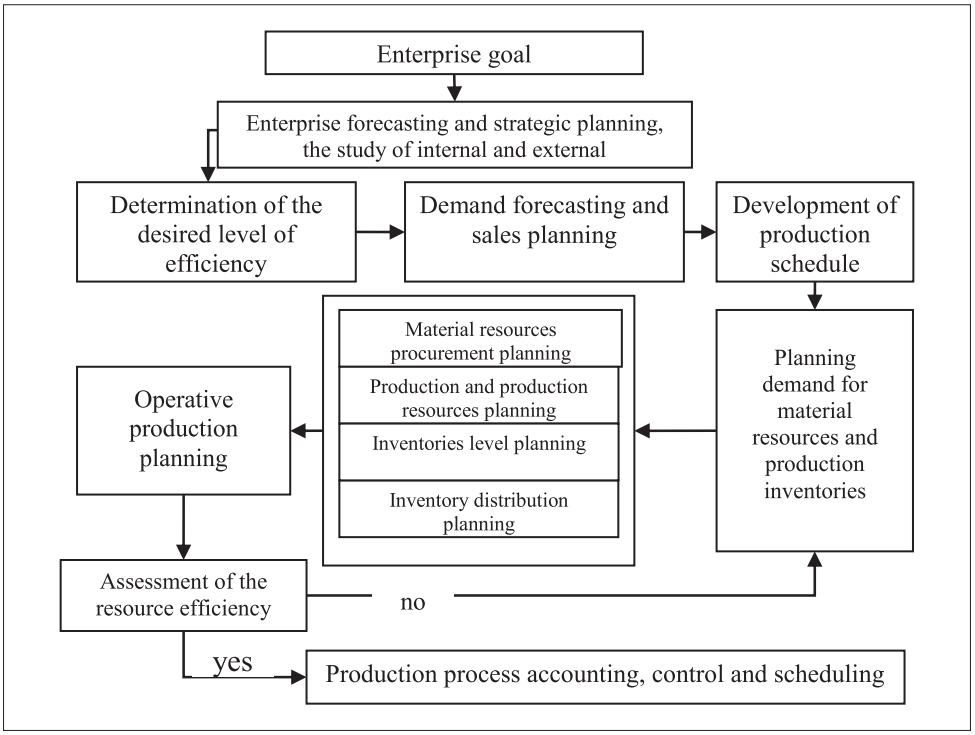


with funding needs. Therefore, to achieve a rational extent of such compliance it is necessary to carry out analysis, planning and development managerial decisions. The funding shortage can lead to a situation of insolvency, or to underutilization of production and marketing capabilities of an enterprise, but the excess funding reduces return profitability due to decreasing intensity of financial resources use.

3. SUMMARY

The integration of material, financial and information flows is required for effective inventory management. In this case, it is necessary to talk about the concept of "production IMS." Existing term "IMS" is too narrow, since, according to the generally accepted definition, this system comprises a policy in agreement

Figure 8: Inventory planning algorithm



to which the point of the order and its quantity are determined; according to this definition IMS is reduced to regulatory function. We believe this definition is more consistent with the definition of the concept of "inventory regulation system" or "control system." Since a practical implementation of the "IMS" shall cover not only the control function but all the functions related to the management of production inventories and material flows forming them.

Therefore, we can offer a definition of "production IMS," which covers all the aspects mentioned. Production IMS is a set of methods and techniques of effective management of material resources, which are in the status of production inventories from the point of supplier to the end-users, joining together all the functional services of an enterprise and related services of contractors for the realization of targets.

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