

# Developing Supply Chain Management and Lean Environment for Improving the Company Performance

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**Abstract-** The article discusses the ways to improve the efficiency of enterprises and organizations in a constantly changing and competitive environment. They analyzed the approaches to the definition of "lean production". They clarified the concept of "production systems" for regional economic entities. They analyzed the factors limiting the effective implementation of lean production tools in enterprises and organizations. Based on the analysis and comparison of approaches to the definition of "innovation environment" notion, the author suggests the approach of the "lean environment" development in the region.

**Keywords-** lean manufacturing, supply chain strategy, consumer value, loss, production system, lean environment.

## 1. Introduction

At present, enterprises and organizations are operated in the conditions of tough competition caused by the challenges of a dynamic and rapidly changing external environment. Constantly changing conditions set the task of competitiveness and survival provision for business entities. Any organization, whether production or service, is focused on survival, and ultimately the effectiveness of its development depends on the ability to respond to these changes systematically and continuously to enhance the value of its product. Being more efficient is the only way to stay competitive and make a profit in the market. In modern conditions, the task of activity efficiency increase is often solved by capital investments, the introduction of new technologies, and the acquisition of new equipment. Within the current economic and geopolitical situation in which our country is now, the solution of this problem is quite problematic, and often impossible. Besides, world practice shows that during some product production or service provision enterprises spend more time and resources to perform the actions that do not add value. So the research center "Lean Enterprise" of the Cardiff Business School, revealed the following during its research of enterprise and organization activities:

- 5% of activities carried out by enterprise and organization employees add value to a final product;
- 35% of activities do not add value, but are necessary because of the technology used and the peculiarities of production;
- 60% - losses [1]. Therefore, there is no doubt that the elimination of losses (the actions in the process that do not add any value to a client) represents a great potential in terms of economic entity efficiency improvement. The abovementioned facts make it necessary to search for internal reserves, reduce costs and eliminate losses during the production of goods and services [2]. International management practice shows that the provision of labor productivity growth conditions and the satisfaction of consumer needs is possible through the introduction of modern methods and approaches to the production system organization through the use of non-capital-intensive ways of labor productivity increase [3]. These approaches include the concept of "lean production", which contributes to efficient production system development for enterprises and organizations by cost reduction, the elimination of non-production losses, shortening the time taken for processes, the turnover of raw materials and unfinished production increase, the efficiency of equipment use increase, finished product quality improvement and the development of continuous improvement culture [4].

## 2. Study Methods and Materials

The work is based on the analysis of scientific publications from different countries. The materials of the study were the array of publications over several years devoted to the production system development based on the principles of lean manufacturing. A review of the study results was performed on the conditions of subject life, the possibilities for the application of lean manufacturing principles, tools and technologies. They applied the method of existing approach review to solve a scientific problem and the practical task of lean production introduction for enterprises and organizations. The principles of dialectical objectivity, positive and normative approaches,

abstract-logical and systemic approaches have been applied in the article as the methodology for scientific analysis. The method of analytical evaluation is used to identify the constraining factors during the implementation of tools for lean manufacturing. The method of comparison revealed the similarities and differences between lean production and innovation environment. Using the method of generalization, the model of "lean environment" development was synthesized. The factor analysis was used to identify the determinants of regional "lean environment" formation and development.

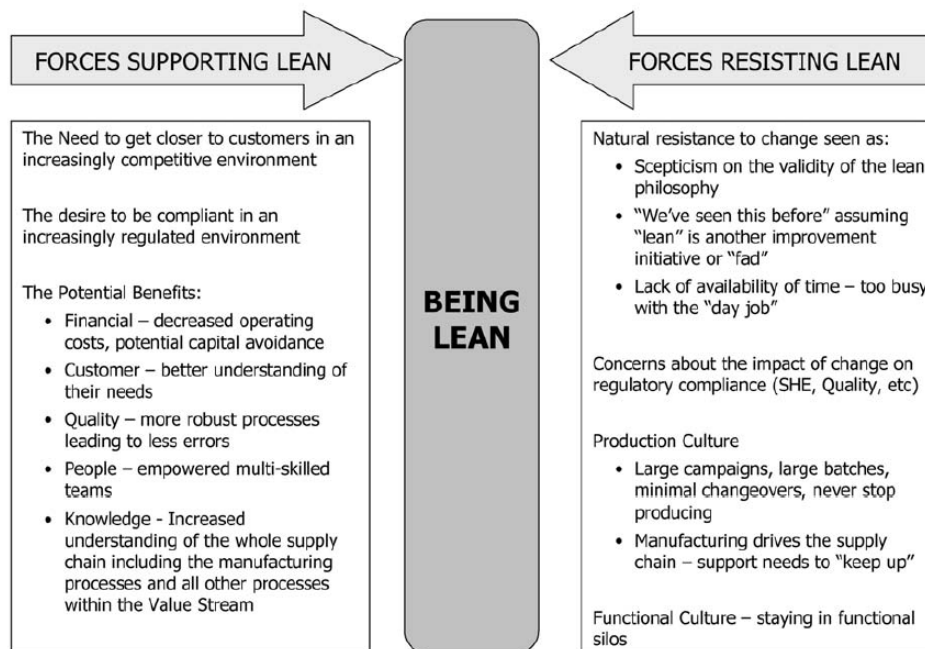
### 3. Study Results

Lean manufacturing is a set of methods that had been developed gradually over a long period in domestic and foreign practice and are based on various small and major breakthroughs that help to reduce costs, order making time, improve a product or a service quality and, thus, to improve the productivity of enterprises and organizations in general. Currently, there are several approaches to the definition of "lean production" concept in the scientific community. [5] in his studies considers lean production as a comprehensive set of methods that reduce and eliminate losses in combination through continuous improvement, the creation of a product or a service required by a client, which ultimately makes the company more competitive, flexible and responsive to external changes. [6] and [7] define lean production as a multidimensional practice that covers a wide range of management methods and includes the system exactly in time, the system of total quality management, the organization of the work in small groups, the cellular organization of production and supplier management in an integrated system. Anvari A. treats the concept of lean production in his works as a set of tools and methods to identify and eliminate losses. [8]. At that, Petersen J. emphasizes that lean production is "more than a set of tools, since this is a philosophical approach to continuous activity improvement" [9]. Womack J. and Jones D. define lean manufacturing as a set of principles to remove all types of losses within an organization. Besides, the authors formulated five basic principles of lean manufacturing: the definition of value from the consumer's point of view, the display of the value creation stream, the creation of a stream along the value creation chain, the creation of a pull system, and the pursuit of continuous perfection [10]. In the framework of the study, we consider it is important to clarify the concept of "production system" for enterprises and organizations. In our opinion, the most complete definition of enterprise and

organization production system is presented in the work by R.B. Chase, who understands the production system as the system that uses the operational resources of an enterprise to convert the input production factor into its chosen product or service [11]. The author considers there are five main elements for the operational resources of an enterprise: personnel; main capital; materials; accessories; planning and management processes and systems. It should be noted that any product or service produced by an enterprise must satisfy the consumer in three main parameters: quality, delivery time and reasonable price. One of the founders of "lean production" concept M.Imai noted the following: "quality, cost and supply is the ultimate goal of management" [12]. Based on the foregoing, we consider it is expedient to understand that the production system of enterprises and organizations is the totality of production, management and auxiliary process interaction aimed at a quality product or service creation that meets the needs of consumers by quality, cost and delivery time. The analysis of practical foreign and domestic experience has shown that it is not easy to achieve a developed production system based on the principles of lean manufacturing. There is a number of limitations that inhibit the effective implementation of lean manufacturing tools. [13] notes in his study that the success of production system development on the principles of lean production depends largely on various factors, but the key factor is the perception of employees and the involvement of management in the process of continuous activity. The introduction of lean manufacturing tools requires a deep understanding, knowledge and skills for its successful application in practice. Training, as a rule, provides employees with an excellent opportunity to master their hidden skills and allow them to learn about the latest trends and technologies. However, management often believes that training is an additional financial burden that can reduce their share of profits and is useless for their employees, and, thus, does not invest in the development of their employees, which is fundamentally wrong and reduces the efficiency of lean manufacturing tool introduction. [14] emphasizes that "the human element is an integral component of the lean manufacturing system. Poor thinking and misunderstanding of lean manufacturing concept severely limits its implementation and reduces the expected benefits for the organization. To implement a lean transition, motivation for cultural change is needed for employee perception improvement. The employees are involved in the process of continuous improvement through training,

they see benefits for their work and their professional competence improvement. [7] defines the specifics of enterprises as a deterrent, depending on its age and size. "The age of an enterprise implies either a tendency to resist change, or responsibility for novelty." The resistance to changes in his research is supported by organizational sociology, which

suggests that the age of an institution should influence the rate of innovation adoption. Shash also notes that "large manufacturers are more likely to introduce lean methods than small ones." Melton T. [1] highlighted the forces that contribute to a lean enterprise, and the forces that oppose the introduction of lean manufacturing tools (Fig. 1).



**Figure1.** The forces that promote and oppose the introduction of lean production at enterprises [1]

Melton T. [1] relates the following to the forces promoting the introduction of lean production: the ability of an enterprise to determine and know the needs of its customers; the reduction of enterprise operating costs and free cash flow increase; the development of sustainable processes that do not allow rejected products; team building; understanding of main and auxiliary flow processes and the problems existing in it. The author highlights the following factors that oppose the introduction of tools for lean manufacturing: a natural opposition to changes, consisting in skepticism about the need for innovations and their effectiveness, the lack of a temporary resource for the introduction of improvements; the established production culture, which contradicts the search for new ideas, the improvement and the change of established processes; unwillingness to open existing problems and break established functional connections. The analysis of research in the field of constraints during the implementation of lean production tools showed that most enterprises use only one or two tools. Thus, they do not get the expected effect and do not continue the further development of the production system. The successful implementation of lean production needs the systemic use of tools and

methods, taking into account the specifics of the enterprise production system [13]. In our opinion, it is still necessary to highlight such a limitation as the lack of methodological support for enterprises wishing to develop their production systems according to lean production principles. Methodological support should facilitate the systematic and phased implementation of lean production tools, the determination of a set of suitable tools, taking into account the specifics of the enterprise and the industry in which it operates. Thus, the development of enterprise and organization production systems based on the systematic introduction of lean production cannot be accomplished without a number of internal and external conditions, or an appropriate "lean environment". Such conditions, in our opinion, should be formed at the regional level, and not just in a single economic entity.

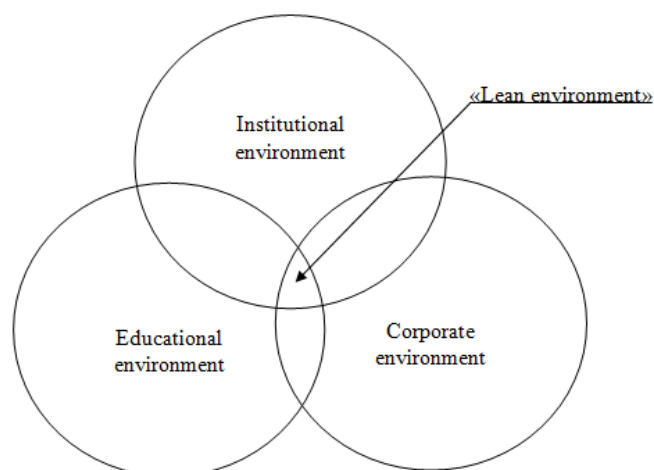
Nowadays, this concept is new in the scientific literature due to the fact that the scientific community did not consider the systematic introduction of "lean production" tools into the production systems of enterprises and organizations at the regional level. In a broad scientific sense, "environment" is interpreted as a complex of subject living conditions. In

management, the internal and external environment of enterprises is understood as the combination of factors affecting their functioning and development. In social sciences it is customary to distinguish material, social, spiritual environment [11]. During the analysis of scientific works of foreign and domestic authors in the field of regional economics, we came to the conclusion that "lean development" is close to the concept of "innovative development". First of all, they are identical in terms of the goals that these two concepts pursue, and in terms of their implementation characteristics within the practice of the regional socio-economic system operation [15]. For the implementation of "lean development", as well as for the innovative development of the region, it is necessary to involve such major institutions as economics, politics and education. In view of the mentioned above, in order to form the concept of a region "lean environment", we will proceed from the conceptual and methodological apparatus of the region innovative environment.

The concept of "innovation environment" was first mentioned in the 1980-ies by the sociologist M. Castells. In his writings, he considers the innovative environment as "a specific set of production and management relations based on social organization, which generally shares the culture of work and instrumental goals aimed at the generation of new knowledge, new processes and new products" [16]. The basic concept of the innovation environment is the definition introduced in 1991 by one of the participants of GREMIR R. Camagni, who considers "innovation environment" as "a set of complex network informal social relations in a limited geographic space, often defining the external image and specific internal representations and feelings of "belonging" that stimulate the innovativeness of a territory through synergy and collective learning processes" [17]. One should note a number of shortcomings in this definition, expressed in its narrow focus on the system of relations. The author focuses only on social relations, excluding economic

interrelations, which, in the opinion of most foreign and domestic authors, have a decisive influence on the regional innovation environment formation and development. Nowadays, the concept of "innovation environment" is actively studied in the scientific literature by domestic researchers from the perspective of various methodological approaches: system, resource, institutional, network and others. Thus, A. A. Nesterov notes that the territory innovative environment is a system that includes several subsystems, including research and educational one, the system of innovative enterprises and organizations, and institutional and political support [18]. T.E. Shishkova identifies the following elemental components of the regional innovation environment: administrative resource, intellectual resources of the region and human capital, regional innovation infrastructure, production and technological resource [19]. However, most authors agree that the most comprehensive understanding of the concept under study is provided by the use of the institutional approach. Institutional approach attaches to the innovation environment the value of a set of tools, mechanisms, methods, rules for the relationship of participants in innovation processes with the inclusion of various institutions responsible for their formation and implementation [15].

In our study, based on the approach analysis to the "investment environment" development concept, in order to determine the "lean environment" as the basis for an effective implementation of "lean production" tools in the production systems of territory economic entities, we propose to use the "triple helix" model by [20]. The triple helix is recognized as a universal collaboration model, since it forms the mechanism of complex non-linear system self-development with various levels, based on the resonant interconnection of three key subsystems. According to the proposed model, we consider it is appropriate to consider the "lean environment" as the combination of institutional, corporate and educational environments (Figure 2).



**Figure2.** "Lean environment" development model

The institutional environment of the region should be the driver for "lean production" tool introduction into the production systems of enterprises and organizations, through administrative mechanisms for targeted support of economic entities and popularization of best practices. Enterprise support should be developed in several areas: 1. the provision of expert and methodological support and coordination for production system development; 2. the implementation of specialized support measures and the removal of administrative barriers for businesses developing their production systems on the principles of "lean production"; 3. financial support. Information support and development popularization for production systems involves the distribution of the best practices, the placement of information in open access according to the methodology of lean production tool introduction, typical solution examples by industry on websites or specialized regional portals. The educational environment of the region should provide the development of expert competences in the field of "lean production"; the acquisition of skills to for "lean production" tool introduction at enterprises; to provide educational sites for the practice of production system skill development through "process factories" and on-site training; to increase the involvement of enterprise employees [21]. First of all, we consider the corporate environment in the study as the state of business entity internal environment, characterized by the willingness to form the culture of continuous improvement for production system activities and development on the principles of "lean production", in order to produce the products and services that meet the needs of consumers; secondly, as the form of interaction between enterprises and organizations for the exchange of experience and the replication

of best practices of production system development on the principles of "lean production". As the main factors of regional "lean environment" formation and development, we highlight the following in the framework of the study:

- the availability of human resources in the region, capable of expert and methodological support provision for the development of economic entity production systems on the principles of "lean production";
- susceptibility of the educational environment, expressed in the readiness to form high-quality educational sites for expert training in the field of "lean production" tool introduction methods into the production systems of enterprises and organizations;
- willingness to change and develop the corporate environment of the region, primarily from the top management of enterprises [22,23].

#### 4. Conclusion

Lean manufacturing is the set of methods, the introduction of which is not only aimed at loss reduction. In practice the introduction of lean manufacturing concept maximizes the product value by the reduction of losses. The principles of lean manufacturing determine the value of a product or service as it is perceived by the consumer. Evaluation for specific customers is the starting point for the production of products and services. Without a clear understanding of client needs, it is impossible to be competitive and to satisfy consumer preferences [1]. The introduction of lean manufacturing tools into production systems contributes to the aligning of value creation stream with consumer demand, improving it by continual improvement and elimination of

losses through added and non-adding value activity split for a final product or service with its subsequent elimination or minimization. At that, continuous improvement should be in the focus of lean thinking and the philosophy of an enterprise production system development.

## 5. Summary

The basis for “lean environment” formation and development will be the effective interaction of the presented elements of the model, aimed at production system development for business entities through support, the development of competencies and practical implementation of “lean manufacturing” tools. At that, the formation of “lean environment” in a particular region will have its specific features related to the level of business entity readiness to change and continuous improvement of activities, the availability of educational sites, the forms of interaction between the subjects of regional development management and production and business facilities.

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