НАУКОВІ ПОВІДОМЛЕННЯ МОЛОДИХ ВЧЕНИХ

УДОСКОНАЛЕННЯ ЛОГІСТИЧНОГО ПРОЦЕСУ НА СКЛАДІ З ДОПОМОГОЮ «LEAN» ТЕХНОЛОГІЙ

IMPROVING THE LOGISTIC PROCESS IN THE WAREHOUSE WITH THE HELP OF LEAN-TECHNOLOGIES

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Анотація. У даній роботі досліджується система Lean Management як філософія, яка може бути використана в складській діяльності. Дослідження демонструє реалізацію трьох Lean інструментів, таких як 5S, Карта потоків і система Точно-вчасно.

Мета даного дослідження - вивчити, як Lean менеджмент може бути застосований в складуванні, досліджувати найбільш ефективні Lean інструменти, які можуть поліпшити складські операції і дати рекомендації щодо вибору логістичного інструменту, який може бути використаний у складській діяльності.

В результаті дослідження передбачається, що реалізація Lean системи дозволить компанії скоротити витрати, оптимізувати складські операції, і, як наслідок, підвищити конкурентоспроможність на ринку.

Ключові слова: Lean-менеджмент, логістика, складування, ABC-аналіз, 5S, карта потоків, точно-вчасно.

Анотация. В данной работе исследуется система бережливого производства как философия, которая может быть использована в складской деятельности. Исследование демонстрирует реализацию трех Lean инструментов, таких как 5S, Карта потоков и система Точно-вовремя.

Цель данного исследования - изучить, как Lean менеджмент может быть применен в складировании, исследовать наиболее эффективные Lean инструменты, которые могут улучшить складские операции и дать рекомендации относительно выбора логистического инструмента, который может быть использован в складской деятельности.

В результате исследования предполагается, что реализация Lean системы позволит компании сократить издержки, оптимизировать складские операции, свести к минимуму труд, и, как следствие, повысить конкурентоспособность на рынке.

Ключевые слова: Lean-менеджмент, логистика, складирование, ABC-анализ, 5S, карта потоков, точно-вовремя.

Abstract. The present paper investigates how the Lean philosophy can be used in Warehousing businesses. The research showcases the implementation of three Lean tools, such as 5S, Value stream mapping and Pull system in the warehouse. Documented studies to improve stock management in small-sized enterprises are not common in the literature.

The objective of this research is to examine how Lean thinking may be applied to the warehousing process, investigate the most effective Lean tools that can improve warehouse operations and give guidelines concerning the choice of tool that can be used to further leverage Lean Production in Warehousing. The empirical part of this paper is conducted as an ABC-analysis in manufacturing company. The primary source of information will be the review of the firm's databases.

The results of the study imply that implementation of Lean system will allow the company to reduce costs, optimize warehouse operations, minimize labor, and as a result, improve the competitiveness in the market.

Key of words: Lean-management, logistic, warehousing, ABC-analysis, 5S, Value Stream mapping, Just-in-Time.

Introduction. Currently, Lean Manufacturing is one of the new trends of management development. The push towards Lean Production originates from the Toyota Production System that started in the 1940s. In general terms, Lean is the set of "tools" that assist in the identification and steady elimination of waste in manufacturing (Jones, 2006). Lean in production is now a well-known subject with years of practical experience. However, after the success with Lean manufacturing, companies are now interested to see what benefits the lean concept can bring to warehousing. Lean warehousing is related to improving the warehousing operations by controlling and optimizing the flow of material, implementing suitable

order processing system, maintaining proper replenishment levels and maintaining efficient shipping standards. In the 21st century the warehouse is becoming a strategic tool to be used for a competitive advantage. Thus, optimizing the warehouse operations allows to be more flexible and efficient, especially in the rapidly growing world of e-commerce (Friedman, 2008).

Currently, there are a number of tools that can be used by companies to be Leaner, but not all the organizations know what tools to use, when to use them, or how to use them. Thus, it appears that the issue under consideration remains poorly understood. Therefore, this project is needed to investigate how to be lean in warehousing and how this can be supported by using 5S, Value stream mapping and Pull system.

Analysis of recent researches and publications. Toyota Production System which is often referred to as Lean Manufacturing focuses on reducing waste, synchronizing and managing work flows by integrating system of tools, practices, principles, and techniques (Fridman, 2008). Lean production is a management philosophy that combines a number of models. When Toyota Motor Manufacturing developed and shared its lean manufacturing strategy, many realized it had implication as an overall business system and not just a manufacturing system. The principles of lean are now being applied universally, including warehouses. According to Fridman (2008), the effective introduction of lean in the warehouse can help to improve the warehouse operations and, as a result, increase the competitive advantage of the company.

For a long time the topic of Lean Thinking has been dealt with by different scholars, however the research involved the examples of the implementation of Lean program only in large organizations (Mulcahy, 2007; Jones, 2006). In Rauch's (2013) opinion, implementing lean concepts is costly and time-consuming. However, the evidence suggests that Lean Manufacturing can benefit by improving competitiveness through faster innovation and production (Rauch, 2013). The author (ibid.) states that the informal nature of smaller businesses can make implementation of Lean Production programs easier in small firms than in large. This statement is an opinion, however in order to support the hypothesis the writer provides a number of telling examples in the paper. The researcher (ibid.) suggests that small firms have the advantage to be more flexible than large companies. Small business managers can bring change more quickly in small firms than it is generally possible in larger firms because they have less bureaucracy and have shorter communication lines.

Therefore, despite the fact that in the literature we can find many examples of the implementation of Lean program in large companies, the studies have generally concluded that this system can be used also in medium and small enterprises.

In spite of the increased popularity of this topic, the problem of implementation of the Lean program in the warehouse remains poorly understood. Therefore, in this research the emphasis will be on the Lean tools that can increase the efficiency of warehouse operations.

The fact is that most Lean concepts can work well in the warehouse, especially 5S, value stream mapping and kanban/pull system (Shook, 2009). Numerous research generally concluded that a good way to attain better flow is to start with VSM (Shook, 2009; Rauch, 2013). The value stream map can give employees an overall view of all warehouse activities, which allows them to suggest improvements in other areas. Shook (2009: 33) argues that "it is a good way for everyone to understand and agree on how the facility works and to come up with ideas for improvement".

Such Lean tools, as 5S and Pull system can also be helpful in the warehouse environment. Especially when it is necessary to identify the wastes in areas such as errors, inventory inaccuracy, damage, safety, and lost time. 5S system, for example, has had significant implications in the production sphere (Dulhai, 2008). Pull systems using kanbans are "natural" in a warehouse for everything from packing materials to forms, as well as product assembly and kitting (ibid.).

Implementation of these three tools can improve the performance of the company as a whole, optimize and standardize the work of the staff. However, in order to achieve these results the warehouse strategy must be integrated into the entire supply chain (Mulcahy, 2007). More than that, it is exceedingly important to engage all team members in the warehouse in problem solving (ibid.). Eventually, this is the essence of the lean culture.

Evidence suggests that lean warehousing produces tangible and measurable results (Mulcahy, 2007). These include labor productivity, space utilization and inventory reduction. The company can have accurate baselines from which to measure improvement. Therefore, waste reduction and cost reduction will be visible and tangible.

Previously unsettled problem constituent. So, for a long time the topic of Lean production has been dealt with by the different scholars, but the research involved the examples of the implementation of Lean program only in large organizations (Rauch, 2013). However, currently among the entrepreneurs of small and medium businesses there is a growing interest in this topic. Therefore, the present paper will be of interest for executives of Small-Sized enterprises, because at the end of the research the implementation program of Lean Warehousing and a number of guidelines will be developed and any company can use the results of the present study in order to successfully implement the Lean-concept and improve warehouse operations.

Based on the foregoing, the purpose of this research is to gain information about the warehousing processes as a whole, examine how Lean Thinking may be applied to these processes, and investigate the key Lean tools, such as 5S, Value stream mapping and Pull system that can improve the warehouse operations. Within the framework of the study a number of tasks are going to be addressed. One of the

tasks of this research is to study and analyze the logistic process in the warehouse. Secondly, it is exceedingly important to evaluate the impact of implementing Lean technologies on the warehouse operations and to develop guidelines for an effective implementation of Lean strategies.

The key problem of the research is to investigate ways of merging Lean thinking and warehouse practice and determine which tools can be used to support Lean Warehousing? Within this problem the following questions will be addressed:

1) How does the Lean philosophy can be used in the Warehousing?
2) How do the Lean strategies influence the warehouse operations?
3) Which tools can improve the stock management?

The first and second questions help to analyze the impacts of Lean System before and after the implementation in the warehouses. The third one allows to evaluate and choose the best practice of the Lean Production used in the stock management.

Speaking about the pace of lean warehouse introduction Mulcahy (2007: 47) states that "creating a lean warehouse is not something you accomplish overnight". The results achieved through the lean efforts can be seen after a certain period of time. Improved customer fill rates, decreased inventory levels, reduced inventory carrying costs, improved inventory accuracy, increased asset and team member utilization are all benefits of lean warehousing.

There is a lack of empirical data on the topic of the study, therefore the empirical base of the project proposal will consist of the analysis of data and firm's financial performance, collecting of information about Lean warehousing and conducting a number of interviews with the company representatives.

Methodology. The research methodology used in this study will be built upon an ABC-analysis. The ABC analysis provides a mechanism for identifying items that will have a significant impact on overall inventory cost, while also providing a mechanism for identifying different categories of stock that will require different management and controls.

For more effective storing the ABC-analysis tool can be used in many ways to formulate each warehouse individual strategies for storing. ABC classes are based on Pareto's principle "the vital few and the trivial many". A stands for 80% of the value that's interesting (volume, frequency, cost and etc), B stands for 15 % and C for 5%.

These percentages are not final but are just an initiative for a classification. The boundaries for determine ABC classes are based on how the output of percentages look and policy makings.

The analysis can be used to indentify:

- products that generate the most profit;
- the products that are the most fast moving through the warehouse;
- the products that occur most in orders;
- the products that are depreciated the most;
- the products that have the highest demand.

By using the ABC-tool to answer questions like the ones above one can get a good picture of where to, put their efforts and, which products that are stored in the rong place and which might not need to be stored at all (phase out). It can also be of help when phasing items into the warehouse to know where to place the item.

How to perform an ABC classification on one parameter:

1. Sort the items in smallest to largest of the interesting parameter. For example volume, frequency or gross profit.

2. Calculate how much percentage each item has of the total value for the interesting parameter.

3. Calculate the accumulated percentages after each item of the total value for the interesting parameter. Starting with the items with the highest value.

4. Classify the items into classes based on the Paretos principle. Sometimes other natural groupings may come visible. Then it could be motivated to use these as criterions for the classes' boundaries.

5. Add one column for how much percentage of the total amount of items each item represent and one column for how much accumulated percentage of the total amount of articles. Starting from the item with highest value of the studied parameter.

6. To do the classification a chart could be drawn to help visualize the groupings of the items.

Example of an ABC classification: the primary source of information was reviewed of the firm's databases. Then if we do the steps one to four we get the table 1 below.

This table helps to determine the three groups of recourses, using the criterion of the profit. When performing an ABC classification on which items that has the highest demand one can visualize it through a graph like the one below.

Looking at the table and the graph, one could show the conclusion that the items №00890-47049 would be categorized as A items, the items №00742-01399 as B items and the remaining items as C items. Then the classes would be:

- A class would be 40% of all items and have 88% of total demand;
- B class would be 15% of all items and have 10% of total demand;
- C class would be 45% of all items and have 2% of total demand.

If the natural boundaries in the demand aren't visible it can create multiple interpretations of which items belongs to which class.

In general terms, the ABC-analysis can be used as a Lean tool. It can be successfully implemented in the warehouse activities and allow:

- to control inventories;
- to buy the right resources in the right quantity;
- to decrease costs;
- to optimize the storage operations;
- to establish mutually beneficial relationships with suppliers.

Accordingly, all these points can improve the logistic process in the warehouse. The picture demonstrates the most effective using of resources, that can decrease costs of the company.

According to the picture, the company needs to focus on A and B resources, that will provide to make profit from costly inventories and reduce the total inventory in the warehouse. It creates the conditions for implementing the Lean-program.

Conclusion and further researches direction. The final part of the study reports on the results which will be obtained. The article examines in detail the problems concerning the warehouse operations. More than that, it contains the analysis of the impact of Lean tools on the warehouse operations. According to the methodology, it is important to say that the ABC-analysis can be applied in different areas of the company. Using a similar analysis, can be made a rational distribution of the assorted genres in stock from the point of view of technical and transport based on economic criteria. This method is most effective for companies with large amounts of materials.

It is assumed that the implementation of Lean system will allow the company to reduce costs, standardize and optimize warehouse operations, minimize labor, and as a result, improve the competitiveness in the market. The results of the study also imply that the implementation program of Lean Warehousing and a number of guidelines will be developed and the results of the present paper can be used to further investigations of Lean-programs. In the future, it is important to explore the features of the introduction and realization of Lean-system in more depth. In order to successfully implement the new systems in the domestic business.

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УДОСКОНАЛЕННЯ ЕКОЛОГІЧНОГО ОПОДАТКУВАННЯ З МЕТОЮ СТИМУЛЮВАННЯ ПРИРОДООХОРОННОЇ ДІЯЛЬНОСТІ В УКРАЇНІ

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Анотація. В статті розглянуто роль екологічних податків як одного з дієвих інструментів механізму стимулювання природоохоронної діяльності, проаналізовано існуючі пільги в оподаткуванні природоохоронної діяльності в Україні, виявлено розбіжності екологічного законодавства з відповідними статтями податкового законодавства, запропоновано зміни до податкового законодавства.
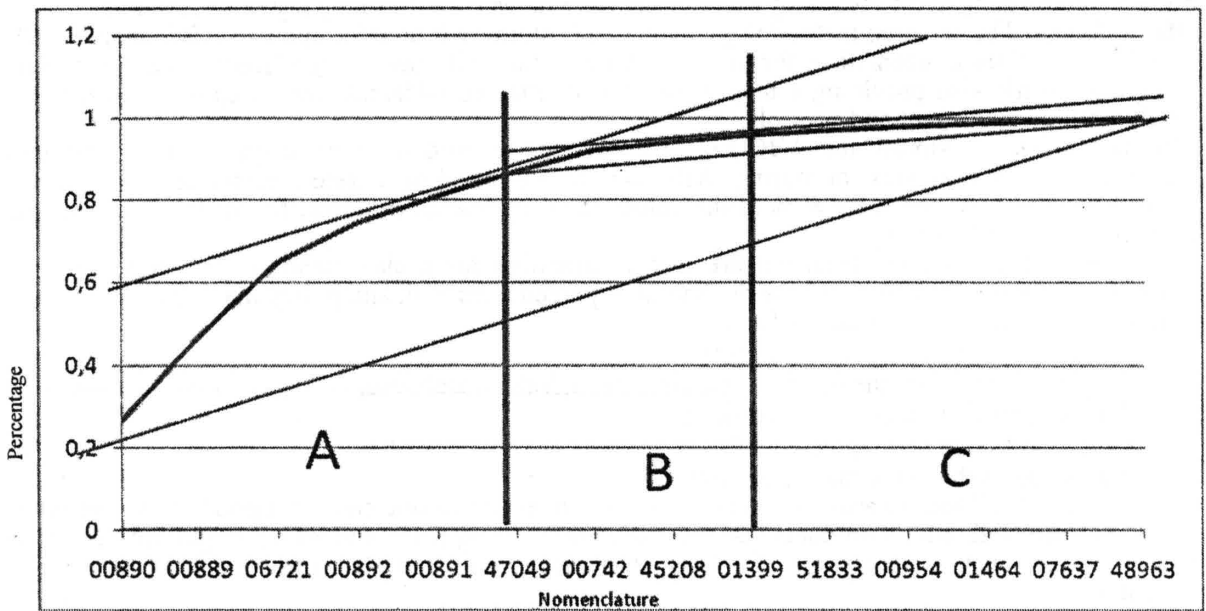
Ключові слова: природоохоронна діяльність, економічні інструменти, оподаткування, екологічний податок, пільги.

Аннотация. В статье рассмотрена роль экологических налогов как одного из действенных инструментов механизма стимулирования природоохранной деятельности, проанализированы существующие льготы в налогообложении природоохранной деятельности в Украине, обнаружены расхождения экологического законодательства с соответствующими статьями налогового законодательства, предложены изменения к налоговому законодательству.
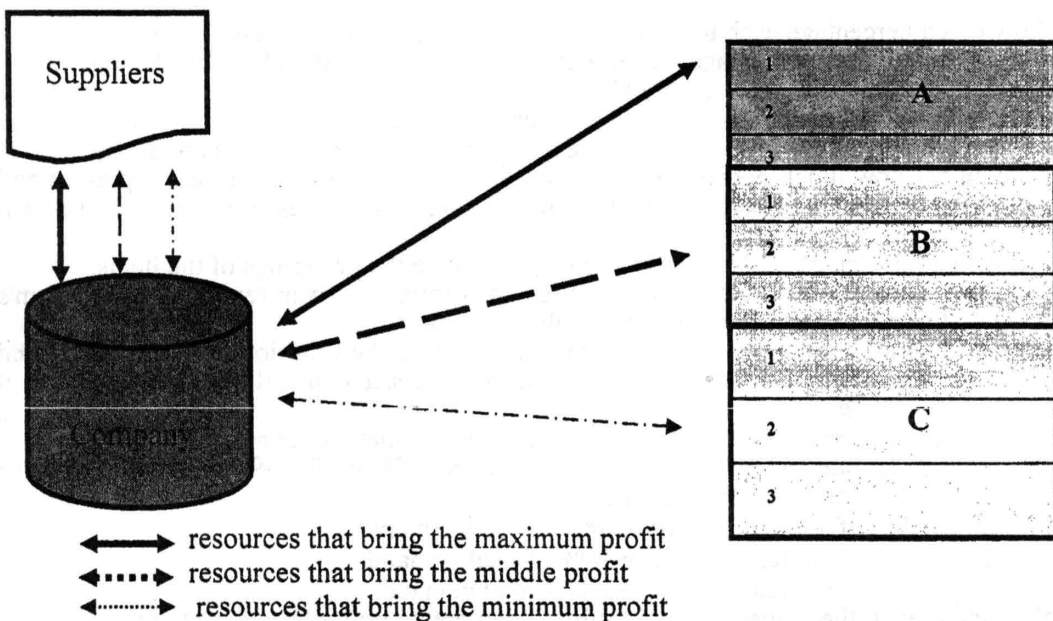
Ключевые слова: природоохранная деятельность, экономические инструменты, налогообложение, экологический налог, льготы.

Table 1 – The ABC-analysis of production company

Category	Cod	Sept. Profit	Oct. Profit	Novem Profit	Sum	Cumulative amount	Share	Graph ABC
Nomenclature	00890	39294,85	44899,38	49285,53	133479,75	133479,75	0,268872	A
Nomenclature	00889	27575,39	34164,20	39607,13	101346,72	234826,47	0,4730175	A
Nomenclature	06721	25565,72	27694,20	35097,60	88357,52	323183,99	0,6509986	A
Nomenclature	00892	13962,90	15267,00	17024,70	46254,60	369438,59	0,7441705	A
Nomenclature	00891	5960,99	12410,08	14372,84	32743,91	402182,50	0,8101275	A
Nomenclature	47049	5064,69	10544,08	14832,30	30441,08	432623,57	0,8714458	B
Nomenclature	00742	9559,72	6671,55	8655,24	24886,51	457510,08	0,9215754	B
Nomenclature	45208	1739,01	2572,50	6184,29	10495,80	468005,88	0,9427174	B
Nomenclature	01399	1766,94	2560,74	3989,58	8317,26	476323,14	0,9594711	C
Nomenclature	51833	908,67	2040,09	2873,77	5822,52	482145,66	0,9711995	C
Nomenclature	00954	1010,24	1390,40	1960,64	4361,28	486506,94	0,9799846	C
Nomenclature	01464	715,61	1235,47	2101,90	4052,97	490559,91	0,9881486	C
Nomenclature	07637	621,15	811,73	1574,05	3006,92	493566,83	0,9942055	C
Nomenclature	48963	595,06	966,16	1315,43	2876,64	496443,47	1	C

Graph 1 – The graphical presentation of ABC-analysis

resources that bring the maximum profit
resources that bring the middle profit
resources that bring the minimum profit

Picture 1- Improving the warehouse activity through the ABC-analysis