

# PRINCIPLES OF CREATING A COST-CUTTING STRATEGY AT AN ENTERPRISE BY MEANS OF THE LEAN PRODUCTION CONCEPT

*Ivan Jáč, Josef Sedlář, Andrey Alexandrovich Zaytsev, Alexander Vladimirovich Zaytsev*

## Introduction

In conditions of globalization it is also important to take into consideration to which extent the subsidiaries and the transnational corporation in general are capable of increasing the value under existing parameters (organizational structure, production capacity, quality of the manufactured product), i.e. what internal and external factors mainly influence the forming of the market value of the whole holding structure.

The paper looks into the interconnection between organizational innovations, created within the cost management sphere, and the general competitive strategy on the example of Hartmann – Rico, a.s. (Brno, the Czech Republic), a subsidiary of the transnational concern Paul Hartmann AG (Heidenheim, Germany). This provides an opportunity to demonstrate the practical value of cost management during implementation of certain approaches of the Lean Production Concept /LPC/, i.e. the concept well-known in the world economy as the Toyota Production System – the TPS. [15], [18]

## 1. The Structure of Forming the Cost-Cutting Strategy during Transition of an Enterprise to Innovative Managerial Techniques

The cost-cutting strategy at an enterprise by means of the LPC, based on the method of functional decomposition, is formed by the structure demonstrated on Figure 1. The philosophy of the suggested method lies in extracting a few basic elements from the chosen functional strategies on the basis of decomposing the general competitive strategy of the enterprise. Using these basic elements, it

is possible to devise a strategy that focuses activities of a certain group of employees on achieving specific goals within realizing the formed strategy. An important task is to choose and create a mechanism for realizing the focus strategy. In the structure under review (Fig. 1) the LPC serves as a core for the mechanism of realizing the cost-cutting strategy. [1], [19]

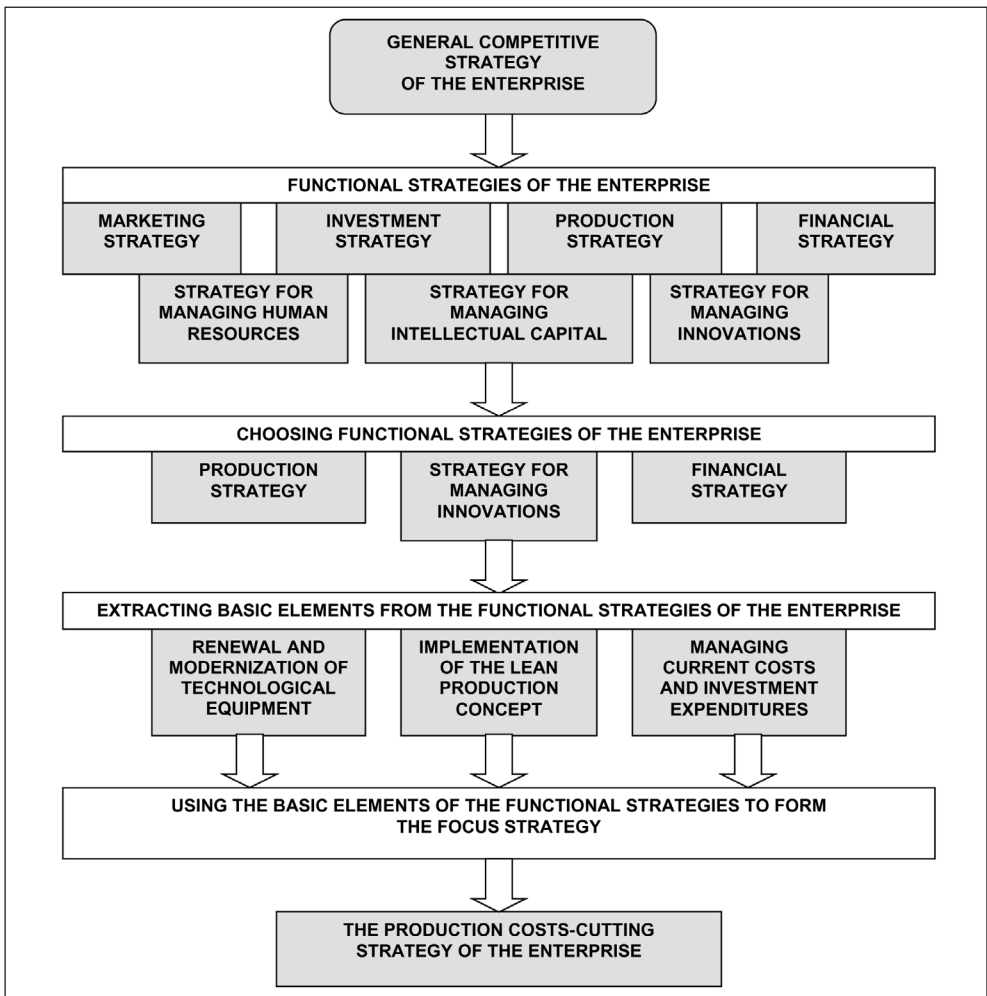
The practical importance of the LPC pointed out Jáč and Sedlář in [5], in which „the following economic benefits are expected:

- Lead Time reduction by 50 %.
- Increase in work productivity by 30 %.
- Optimisation of TPM (Total Productive Maintenance) and SMED (Single Minute Exchange of the Die) with the objective of reduction of the change-over time by 100 %.
- Simplification in process management, especially shop floor management.
- Synchronisation of the sub/processes and decrease in administrativ burden (including the need of „fire fighting“).
- Improvement of working systems, including ergonomic workplace“.

Using the principle of management by target costs and determination of the executives to eliminate wasting will enable the enterprise to take a lead in cutting costs of goods on the competitive market. The production system, based on the LPC, focuses on total waste elimination.

Having defined the Implementation of the LPC as its basic element of its functional strategy, each company must start to deal with the problem of identification wasting in its production. Typically most of the wasting lies outside the attention zone of the personnel, because the wasting has become an essential part of the routine [20]. These “invisible” losses

**Fig. 1:** The Structure of Forming the Cost-Cutting Strategy at the Enterprise by Means of the Lean Production Concept



Source: own

become the factor limiting growth of the market value of the company and reducing effectiveness of realization of its competitive strategy.

The two types of activities can be found in every process, as shown in Fig.2

- Waste – the needless movement that must be eliminated immediately.
- Value Adding Work – two types are non-value-added and value-added work.

The main principles of the LPC are [19]:

- maximizing the value of the product for the customer in each and every production process. It means that “producing unneeded goods or providing wrong services in a right way means wasting”;
- defining and recognizing the stream of adding value to the product by all participants of the process (from a manufacturer of raw materials to a consumer) on the basis of

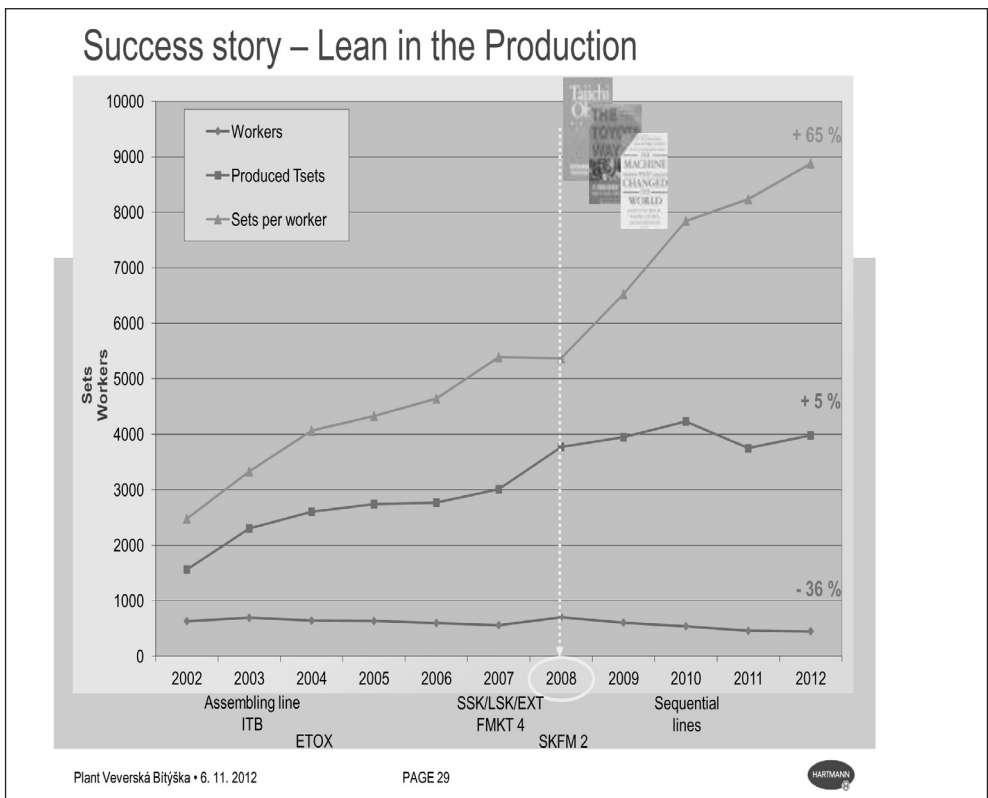
Fig. 2: “Value Adding Is As Big As a Stone in the Plum”, Taiichi Ohno



Source: own

- analyzing existing processes and detecting sources of wasting by means of “photographs” of the real situation at the enterprise;
  - creating the flow (a continuous movement of the product) along technological processes (shifting from the batch work to a continuous flow), i.e. a consecutive advance of the product without stops and inventories, as illustrated in Chapter 2. Operations that add value are identified and those that do not contribute to the value creation are eliminated;
  - “pulling” the product by the client, meaning an ability of the manufacturer to design and produce goods that the consumer really needs in the “customer tact time”;
  - improving production organization for all parties interested, suggesting more precise definition of the value, increasing the speed of the flow (decreasing technological and production cycles).
- Enterprise Hartmann – Rico, a.s. (Brno, the Czech Republic), as a part of the German

Fig. 3: Dynamics of Performance Indicators of Hartmann – Rico, a.s. (Brno, the Czech Republic). From 2008 – Implementation of the Lean Production Concept



Source: own

transnational concern Paul Hartmann AG, has been successfully realizing the cost-cutting program by implementing the LPC since 2008. Designed on the basis of this concept, the production costs-cutting strategy at this enterprise is a practical example of forming and realizing the focus strategy by means of the above-mentioned approach. Subsidiary Hartmann – Rico, a.s., the leading manufacturer and distributor of medical and hygienic products in the Czech Republic, continuously improves the LPC. The policy of sustainable improvement enabled the enterprise to achieve significant growth of annual product output per employee from 2008 through 2012, which is illustrated in Fig. 3.

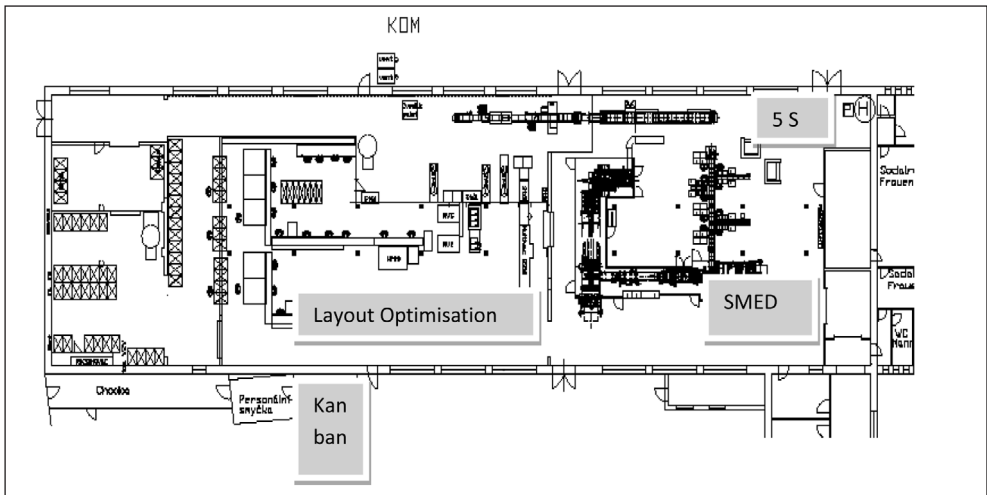
The trend line “Set per worker” shows the two different strategies of the company. The growth of productivity between 2002 and 2007 was facilitated mainly by modernization of technological processes connected with high-cost investments bringing only moderate growth of the observed indicator. Since 2008 the company has started implementing the

LPC, often connected with a low-cost smart investments and turning out into the high growth of performance.

## 2. Mechanism for Creating the Value for the Customer and Managing Continuous Flow along the Process Steps

Familiarizing itself with application of the lean production concept within its own production, the management of the company selects a method that would be the most appropriate, taking into consideration the nature of the company. Typically the set of lean techniques such as 5S, Kanban, 5Why or SMED (Single Minute Exchange of the Die) are of the first choice. As illustrated in Fig. 4, these cost-cutting initiatives are carried out locally in single shop cells in order to improve partial malfunctions in the process. Such malfunctions may be a bottleneck in the production, overproduction, high scrap volume, waiting, rework, backorder situation, etc.

**Fig. 4: Local Application of Lean Techniques within the Company**



Source: own

This rather intuitive problem-solving approach serves to satisfy the immediate and urgent cost-cutting needs and the most apparent wasting is eliminated first. However, these initiatives are mostly isolated victories

over muda which fail to improve the whole and do not last long.

Looking for robust and sustainable solutions, the management must instead turn to integration approaches analyzing the whole

process chain. Taking a value stream perspective means working on the big picture, not just individual processes; and improving the whole, not just optimizing the parts.

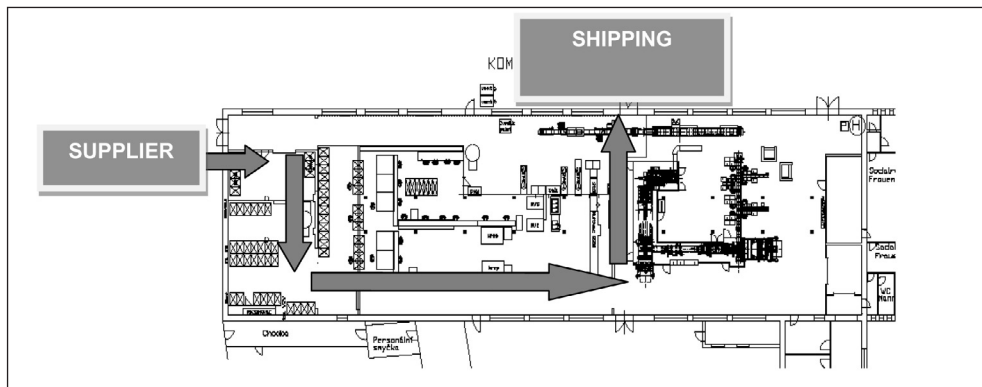
Value Stream Mapping /VSM/ is a strategic change management tool putting lean manufacturing techniques together with process engineering [13].

Value stream mapping is a pencil and paper tool that helps you to see and understand your door-to-door flow of material and

information as a product makes its way through the value stream. In this the VSM helps you to see more than waste; it helps you to see the sources of waste in your value stream. Such an approach reports to yield even double-digit increases of the indicators in view, as illustrated in Fig. 3.

A practical example of mapping the value stream within a shop floor is given in Fig. 5 putting the stress on the door-to-door view of the process chain.

**Fig. 5:** Value-Creating Elements of the Functional Strategy of an Enterprise are Connected along the Process Chain



Source: own

A practical example of the VSM carried out at Hartmann-Rico, a.s. is drawn in Fig. 6.

The first thing when starting to draw a Current State Map is to pick up the product family; so the map does not comprise everything that goes through the shop floor. The product or product family should be "typical" one (the runner) and it should be produced on the day, the VSM plans to be carried out. VSM

means walking and drawing in pencil all the process steps (material and information) for one product family from door to door yourself.

In this case the Current State Map for the Drape No. 463945 was chosen. The customer tact time, cycle time, change over time, idle time and number of employees is scrutinized at each process step, as shown in Tab. 1. By means of simple icons the flow of the material

**Tab. 1:** Example of the Door-to-Door Data Gathering as a Source for Process Description Entering the Current State VSM

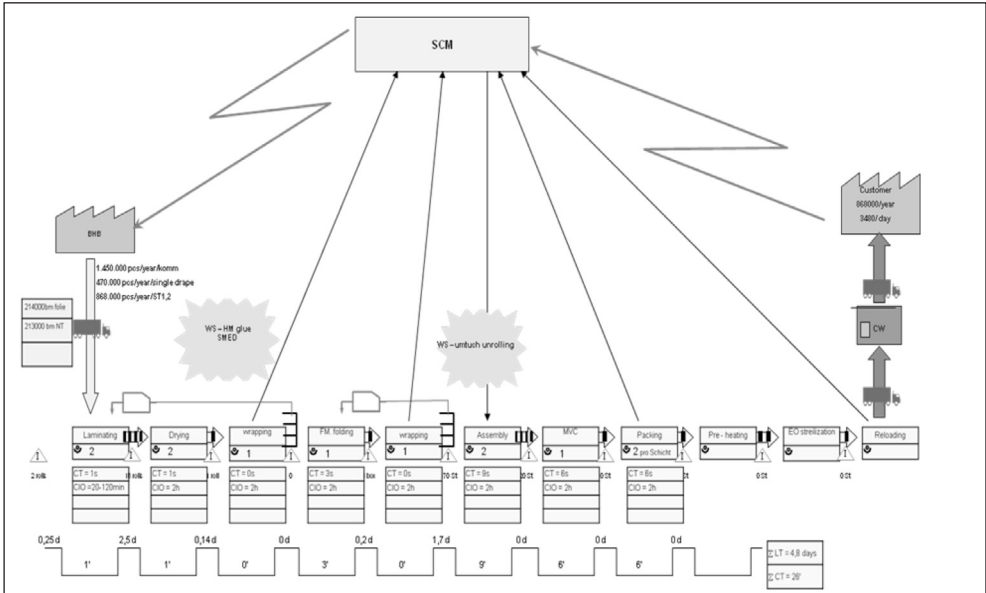
Process Step	Number of Operators	Cycle Time (CT)	Change-over Time (CIO)	Inventory / / WIP (pcs/day)	Lead Time (LT)
Laminating	2	1 sec.	20 - 120 min.	2 reels	0.25 days
Drying	2	1 sec.	120 min.	18 reels	2.5 days
FM Folding	1	3 sec.	120 min.	1 reel	0 days

Source: own

and information in the process chain is illustrated. This approach puts forward the total “speed” of the product (lead time) within the process rather than the individual efficiency of the particular machine.

As a result of this value stream mapping, it has been identified that the drape No. 463945 was actively processed only 26 seconds; out of total 4.8 days spent in the whole process stream.

**Fig. 6: Current State Map for the Drape No. 463945 at Hartmann-Rico, a.s.**



Note: Not intended to be read; to be viewed as the flow of material and information.

Source: own

But the current state without the future state is not much use.

The Future-State Map is most important. Future-state ideas will come up as the current-state is drawn. Each particular process step is reconsidered with respect to wasting. Process steps which do not add value the customer's needs are modified or eliminated. It shows the ideal process with no constraints in the business, as shown in Fig. 7. It typically comprises period of 5–10 years ahead. Within this all bottlenecks, issues and “root causes” must be eliminated. These items are marked on the Future-State Map with the kaizen lightning burst icons. Thus a new “road map” of the process is drawn pointing out future activities of the enterprise to be implemented.

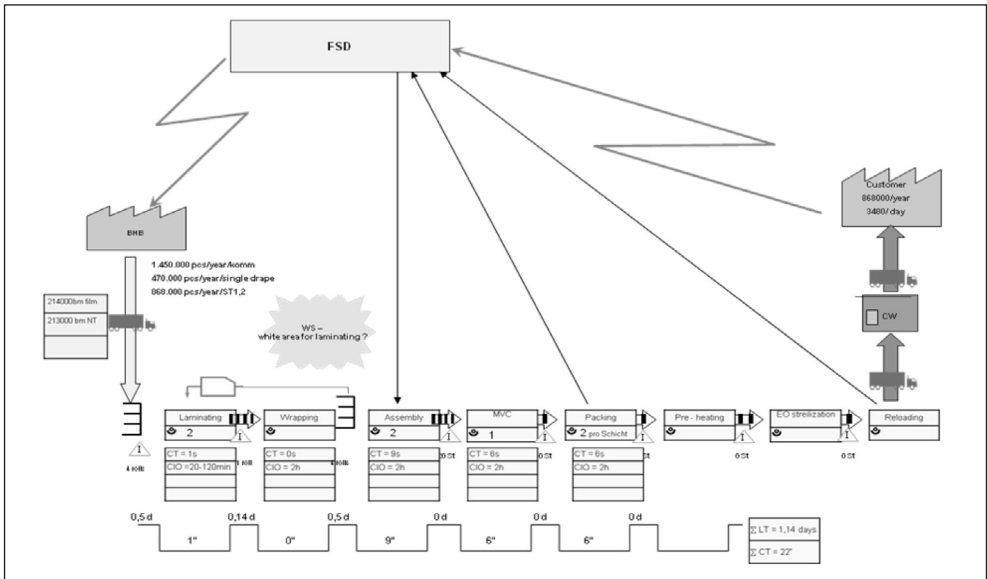
The prime objective of the VSM is to shorten the lead time and to enhance the flow

along the process chain by reducing wasting. The result between the Current and Future process chain is given in Tab. 2.

The Future State map in Fig. 7 resulted in total CT = 22 seconds and the total LT = 1.14 days spent by the drape in the plant, which implies the dramatic reduction of the Lead time. The total LT was cut by 3.7 days, even when the CT could not be substantially shortened compared to the initial value.

Although the LPC presented in this paper by means of the Value Stream Mapping leads mostly to the substantial reduction of Lead Time by eliminating or combining single process steps (or combining machines), the application risk regarding OEE (Overall Equipment Efficiency) is to be also considered. For example, even with a 95% OEE for each of machines the OEE of 7 linked machines is

**Fig. 7: Future State Map as a Road Map of Future Activities**



Note: Not intended to be read; to be viewed as the flow of material and information.

Source: own

**Tab. 2: The Imperative of VSM: Enhance Flow by Eliminating – Combining – Cutting of Waste**

Process Step		Laminating	Drying	Wrapping	FM Folding	Wrapping	Assembly	MVC	Packaging	Total Cycle Time (CT)	Total Lead Time (LT)
Current Map	CT in sec.	1	1	0	3	0	9	6	6	26	4.8 days
Future Map	CT in - sec.	1	eliminated	0	eliminated	eliminated	9	6	6	22	1.14 days

Source: own

0.95 x 7 = 70 %. And 7 machines with 85% OEE each, have a line OEE of 0.85 x 7 = 32 %. As Taichi Ohno [16] says: „If you do it only half way, it can actually make things worse. If you are going to do TPS (LEAN) you must do it all the way.”

Nevertheless, the positive aspects of the LPC discussed in the paper such as the shorter LT of the final product that implies also shorter LT for all existing components in use, reduction of the stock of the Work in Process (WIP), the increase of flexibility of the company and finally less need of the working capital, prevail and are

generally accepted as a contribution to the innovative management system. [21], [24]

### Conclusion. Practical Significance of the Approach to Formation and Realization of the Cost-Cutting Strategy at the Enterprise by the Lean Production Concept.

In order to increase production efficiency the management of enterprise Hartmann – Rico, a.s. has formed changes to the competitive

strategy on the basis of the structure we have suggested in Figure 1. During formation of the changes to the competitive structure diagnostics of all functional strategies was carried out, efficiency in use of tangible, financial, intellectual and other types of resources was analyzed. This provided an opportunity to determine the market capacity, evaluate strengths and weaknesses, and also potential threats and future advantages of the enterprise in the competition.

On the basis of the functional decomposition method and the results of the diagnostics a cost-cutting strategy has been formed at the enterprise via implementation of the LPC. This strategy encompasses elements of the organizational structure of the enterprise, entwining all parts of the management system, business processes and specific technological operations. The aim of realizing the strategy is eliminating negative influence of wasting and increasing the value of innovative products.

Considering a specific practical example, it is possible to formulate a local objective of realizing the LPC for a single stage of the technological process. For instance, at Hartmann – Rico, a.s. this objective included:

- analysis of processes on the laminating line, drying unit, folding line, assembly line, packaging line and sterilization unit;
- identification of “root causes” on the basis of value stream mapping, i.e. processes or production stages where wasting occurs;
- analysis of root causes (reasons) for wasting;
- analysis of processes of transporting raw materials and finished goods;
- analysis of information flow throughout the process (supplier to customer).

Within realization of the cost-cutting strategy at the enterprise a set of recommendations was formulated, advising the use of equipment with flexible readjustment. This equipment was also recommended for use on various stages of the production process. For example, installation of hot melt lamination system and integrating folding unit for the table cover drape prior to set assembly reduced the wasting of 3.7 days within the overall lead time.

Implementation of the organizational innovations that we have formulated lead to the improvements in the material and information flows within the Lean Production Concept at the enterprise. Particularly, these suggestions were

connected with developing measures for reducing time wasting at the packing lines, rational use of production personnel of the enterprise and organizing more ergonomic production layouts for the service staff to decrease time wasting during maintenance.

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**prof. Ing. Ivan Jáč, CSc.**

Technical University of Liberec

Faculty of Economics

Department of Business Administration

ivan.jac@tul.cz

**Ing. Josef Sedlář**

Hartmann-Rico, a.s., Veverská Bítýška

Plant Manager

josef.sedlar@hartmann.info

**Andrey Aleksandrovich Zaytsev, BBA**

Russian Academy of National Economy and

Public Administration

Institute of Business Studies

MBA student

zayand12@yandex.ru

**Dr. Ing. Alexander Vladimirovich Zaytsev, Ph.D.**

Moscow State Textile University „A.N. Kosygin“

Head of Analytical Laboratory

az-inform@mail.ru

Doručeno redakci: 4. 3. 2013

Recenzováno: 2. 4. 2013, 10. 4. 2013

Schváleno k publikování: 4. 7. 2013

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*The article analyzes the interconnection between innovations and the general competitive strategy of a transnational concern. Looking for robust and sustainable solutions, the management turns to integration approaches analyzing the whole process chain. Basic elements from the functional strategy of an enterprise are selected in order to enhance the value creating processes.*

*A structure for forming the cost-cutting strategy by means of the Lean Production is suggested. The necessity for using Value Stream Mapping as a strategy execution tool is demonstrated.*

*Within the Value Stream Design each particular process step is reconsidered with respect to wasting in order to shorten the lead time and to enhance the flow along the process chain.*

*Process steps which do not add value the customer's needs are modified or eliminated. A new "road map" of the process is drawn pointing out future activities of the enterprise to be implemented.*

*Practical significance of the devised approach to forming and realizing the cost-cutting strategy is indicated.*

*During realization of the cost-cutting strategy at the enterprise a set of recommendations was formulated, advising the use of equipment with flexible readjustment. This equipment was also recommended for use on various stages of the production process. For example, installation of multipurpose hotmelt lamination device and integrating folding unit for the table cover drape prior to set assembly reduced the wasting by 3.7 days within the overall process time.*

*Implementation of the organizational innovations that we have formulated lead to the improvements in the material and information flows within the Lean Production Concept at the enterprise. Particularly, these suggestions were connected with developing measures for reducing time wasting at the packing lines, rational use of production personnel of the enterprise, organizing more ergonomic production layouts for the service staff to decrease time wasting during maintenance.*

**Key Words:** *competitive strategy, cost-cutting strategy, cost management, innovative managerial techniques, lean production, value stream mapping.*

**JEL Classification:** *O32, L23, D24.*