"Toyota" Production system as ability to rise effectiveness and competitiveness for business entity.

Kvetinskya V. Alessya

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Language advisor: N.A. Dmitrienko, candidate of pedagogical science, associate professor

Abstract: The article investigates Toyota's system of production. The main principles of Lean production are described, such as Kaidzen", "Just-in-Time", "5 S" system, "Muda", "Muri", "Mura" and possibilities to adopt this system in Russian factories.

Введение: В статье исследуется система производства которая используется в компании «Тойота». Описаны основные принципы «бережливого» производства, такие как «Кайдзен», «Точно в срок», «5С», «Муда», «Мури», «Мура» и описаны возможности применения данной системы производства на российских предприятиях.

Keywords: Lean production, "Kaidzen", "Just-in-Time", "5 S" system, "Muda", "Muri", "Mura" system.

Ключевые слова: «Бережливое» производство, системы: «Кайдзен», «Точно в срок», «5С», «Муда», «Мури», «Мура».

Nowadays all of the customers have demands which are growing day by day according to growth of technical progress . Actually it force business entity really often use innovation methods of production to modify services and goods as soon as possible. However implementation of innovation in process of production leads to increasing prices for modified products or services. How can we modify goods and decrease price at the same time? Taity Oho gave the answer for this question, the Head of mechanical production of the most known company in the world "Toyota". Taity Oho is the founder of "Toyota Product system" (TPS). "Toyota" Production system is unique approach to production. Exactly this system brought to birth Lean production which has become predominant tendency during last five years. Reason of such wide expansion of TPS system among manufactory are lots of advantages in realizing Lean production for all of business entity members. For example: for founder members and shareholders sizable beneficial effect is cost reduction, meaning that companies' profit can be increased. For employees main advantages are comfortable working conditions and possibilities to be self-realized. Customers can have high-quality product which can have unique characteristics with low price.

Talking about Lean production, we should mention that its main principals are:

- "Kaidzen"
- "Just-in-Time"
- "5 S" system
- "Muda", "Muri", "Mura" systems

The first principle of Lean production becomes "Just-in-Time" method. JIT is a production strategy that strives to improve a business return on investment by reducing in-process inventory and associated carrying costs. Thanks to this method there is not overproduction, obsolescence, moral depreciation, goods do not lie during long period of time useless. Main features of Lean production that it points at customers. Taiti Oho aimed to considering of all production process from the site of customers and tried identify which technology breakthrough would make additional points to goods. Only this values can be foundation of product's manufacturing. On the base of customer's values was created one more principle of TPS production – optimization of production. The main goal of this principle is to minimized labor costs and time in processes not giving values to good.

In this principle workers just control time between placing the order by customer and taking money for work which has been done. They cut down this time period and cancel losses which can not add values. Optimization in TPS system is exception from one of the “M” principles, going against Lean production: “Muda”, “Mura”, “Muri”.

Optimization excludes losses of “Muda”, but “Muri” is opposition to “Muda” - overpressure of staff, workers overwork and consequently overproduction. This scheme of work leads to short-life of equipment and to big quantity of waist. “Mura” is mix of previous two principles and leads to inequality of production process. It makes necessary to match evaluable sources to maximize production level, even if in reality its medium level is much lower. In such a way, exception from production three “M” is great step in Lean production.

One more important component of Lean production is system “5 S” presenting more rational method in organizing work place. Components of this system are:

- Sorting - finding of necessary things and their necessary quantity. All other unnecessary things and over pluses had to be deleted from work place.
- Straighten – rational placing of necessary staff to provide immediate access to it.
- Sweeping – systematically cleaning of work place up and checking of stuff for the purpose to except defects.
- Standardized - developing of systems which can provide systematic and qualitative making of the first “S”
- Sustaining – prompt actualization of established procedures with aim to improve process step by step without making break.

The last five “S” touch one more core principle of Lean production – “Kaidzen”. It is consisted in process of gradual, but the continuous improvements, allowing to eliminate any losses which increases expenses, without adding values. Continuous improvement forces people to study constantly and creates the atmosphere which not only favors to changes, but does them natural and necessary.

“Kaydzen” is the whole philosophy which is foundation of TPS system. By the way the main stages of economical production are: determination of value for the consumer; forming of a consecutive stream of creation of this value; providing of stream continuity; providing "pulling" from the customer; questing for excellence. Nowadays Russia still has not departed from crisis of 2009. For national economy consequences were quite dramatic. To return the status of rather great power, Russia needs to make huge jump forward. The role is "break" can perfectly play introduction of economical Lean production at the Russian factories. Many people consider that the Toyota (TPS) system can't be introduced in Russia, reasoning the opinion that Russia is absolutely other country with other people and another mentality. But it is far from true.

“Toyota”, by their example proves that it is possible. The majority of production is not issued at the territory of Japan. Mainly local population, which is continuously trained in all principles and features of this system works at the factories located in other countries. Kenya, Venezuela, Pakistan, the USA – the countries where the factories on the basis of TPS successfully functions. What stops the Russian companies from implementing it?

The main problem is the “superficial glance” on all system of Lean production. This system isn't attached to cars. TPS is only a set of the principles, following which it is possible to reduce considerably cost of production, and at the same time create goods the most suitable for the consumer. Having copied TPS "one to one", it is impossible to achieve positive results as each factories has own structure. Therefore, much more productively attentively study all system and to adapt it for the business, having created "A production system of own Company". One more considerable obstacle to implementation of Lean production is the fear of system’s complexity. Implementation of TPS is really quite labor-intensive process. Its main complexity is that all staff of the factory has to realize all system of works and what should we necessary do that it works better. However the effect at the correct implementation –repeatedly covers costs of implementation. As a big mistake of the Russian businessmen is expectation of fast results from TPS implementation. This system, as well as the majority of the programs which are carried out in digging of Toyota, is focused on long-term goals. Thus, we should not be afraid of TPS, and it is necessary to use a way checked by time which will lead from ruin to prosperity.

Currently in the Tomsk region already there are small successes of TPS implementation in two companies in some divisions : Tomsk Petrochemical Plant (trial introduction of a production system of "Sibur"); Siberian Chemical Plant (introduction of a production system of Rosatom – PSR). However results, even test activity, can impress us. So, the result of TPS implementation you can see in following tables:

Table 1. The results of introduction of the Toyota production system on a site of nonbasic production.

Sector of production of capacities	Basic indicators	July	At the end of year
Reduction of prime cost (thousand rubles)	4650	3500	2000
Reduction of floor spaces (sq. m)	1188	1070	948
Reduction of extent of total transportations (m)	466	450	366
Having submitted proposals on improvements (pieces)	0	64	100

Table 2. Results of implementation of the Toyota production system on a site of the main production.

Production site	At the end of year
Decrease in material inputs, %	- 5,3%
Decrease in expenses of energy resources (%)	- 14,8%
Reduction of time for readjustment of technical schemes (%)	- 33,1%

It is visible from tables that there is considerable improvement of indicators of the company that confirms great efficiency of TPS . Thus, Lean production is a reality which could allow to reach unknown heights.

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Kvetinskaya Alessya Vladimirovna - Institute of Social and Humanitarian Technologies of National Research Tomsk Polytechnic University

Email: ep.alessya.kvetinskaya@gmail.com