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Applying Lean Principles for Lean Product Development: A Study with Reference to the Telecommunication Sector

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ABSTRACT

The Lean appears to have numerous definitions while exploring the topic. The principles of Lean are just a compilation of methods and tools which are implemented in an organization to improve the efficiency and effectiveness of the organization. It is also true that, the Lean principles mostly have undesirable outcomes. Sometimes, the organizations do not achieve the expected success which forces them to desert the Lean principles while at times they find it difficult to sustain the improvements, again making them forcefully conclude the Lean product development. These limitations or failures can be overcome by recognizing Lean principles not only as a set of tools but also as a value. This paper aims exclusively on effectively applying the Lean principles in the telecommunication sector to improve the product development activities. For the study, the secondary data was collected from various articles, journals, books and publications which are the works of various researchers and authors. The study also carried out a case study of 2 giant companies in the telecommunication sector, the Cisco and the Alcatel-Lucent. From the study it was observed that companies employing Lean have effectively improved their processes and services. Various impacts of the Lean principles were also encountered and the study also suggests certain strategies to overcome the impacts or limitations of the Lean principle implementation.

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INTRODUCTION

The capability to bring high quality innovative products effectively to the market has rapidly become a feature of the booming consumer driven enterprises. Morgan (2014) states that, this is true with every enterprise or a sector where drastically increased quality of products and radically shortened development time of the products remain the factors which crucially differentiates the enterprise among the best performing companies and in the entire industry. Introducing new products in the market has always been at the heart of most of the companies. Hence to achieve speed to market the effectiveness needs to be maximized in the designing and manufacturing stages of the product. Hence to maximize the effectiveness, most of the enterprises have started adopting Lean. The basic idea behind is to minimize waste while maximizing the value of the customer. The Lean principles are widely used in the automobile sector. Now various other enterprises have started adopting the Lean principles to improve their activities of developing the products. In this

study we will investigate how Lean principles can be effectively applied in the telecommunication sector to improve the product development activities.

Problem statement:

Developing the Lean product has emerged as the most prominent principles for generating innovative goods in most effective manner with specific reference to automobile sector. Therefore most of the organizations are attempting to implement the applications of Lean principles in order to sustain in the competitive market. Innovative products mostly demand in the market as well as attract the customers so organizations recognizing the impact of applying Lean principles and adopting it. This research aims at application of Lean principles in the development of products in the telecommunication sector with special reference to the telecommunication sector.

i. To investigate about how the Lean principles can be effectively applied in the telecommunication sector to improve the product development activities.

- ii. To study how the Lean principles have been promising for developing innovative products in the most efficient and effective manner for so long in the automobile sector.
- iii. To analyze how the Lean principles are being applied in the two giant telecommunication industries, the Alcatel Lucent and Cisco.
- iv. To investigate the impacts of applying Lean principles on the efficiency of the target organizations.
- v. To identify the strategies for the effective implementation of Lean product development in the organizations belonging to the telecommunication sector that are not used to the same in their day to day operations.

Literature review:

Introduction:

While the environment for developing a product is clearly unique, similar work is performed throughout the project in order to acquire the benefits of the same optimization methods and tools applied to manufacturing. According to Clark & Fujimoto (1991) especially this becomes true when the capability of manufacturing becomes a competitive advantage in the development process and for all the tasks further downstream in the process of development. As long as, the understanding of the product is solid and there are allowances offered, managing, standardizing and continuously improving the development process of the product are possible for the certainly unique characteristics of the environment of product development. According to the research by Adler (1999), on the development process of a product, it is stated that, achieving the improvement goals like in the traditional manufacturing process eliminating rework, relieving process bottlenecks, managing capacity and reducing variation can reduce up to 30 to 50 percent of time required for development. Additionally, applying the principles of Lean is critical during the process of development of a product.

Lean Principles in the Product Development:

Lean can simply be meant as a tool to create or generate more value for the customers by using fewer resources. The value of the customer is understood in a Lean organization and in order to continuously increase the value, it focuses on the key resources (Dantar, 2010). The ultimate goal of Lean is to offer perfect value to the customer by creating a process of perfect value which has zero wastage. In order to accomplish this, the focus of the management is changed by the Lean, to optimize the flow of services and products from optimizing the separate assets, technologies and vertical departments. And it is accomplished through the entire value streams which horizontally flow across assets, departments and technologies to

the customers. Dantar (2010) also states that the Processes which require less space, less time, less human effort and less capital to manufacture products and offer services at much fewer defects and much less costs, compared to the systems of traditional business is created by eliminating the waste throughout the value streams rather than at the isolated points. According to Teresko (2007), with Lean, the organizations are able to react to the changing desires of the customers with high quality, very fast, low cost and high variety throughput times. At the same time, using Lean, the information management has become more accurate and much simpler.

Concepts of Lean product development:

To meet the challenges of development of a product like the requirement of more innovative solutions, many redevelopment cycles, high production costs, lengthy development cycle times, high cost of development and high production costs, the Lean approach called the LPD or the Lean product development is used (Masaaki, 2008). Certain concepts associated with the development of Lean product are, creating the knowledge which can be reused; concurrent engineering which is set based, responsible and integrated experts team which is created by the organization developing the Lean product; pull and cadence where the notion planned by the managers and workers are rejected by the managers of the organization and only the work and plans of the engineers are accepted; visual management which is a main enabler in managing the development of Lean product; ESD-Entrepreneurial System Designer who is the person made responsible by the organization of Lean development for aesthetic design and engineering and for the success of business and market of the product (Lars, n.d).

Principles of Lean product development:

13 principles for development of Lean products are offered by Morgan and Liker (2006). These 13 principles are denoted to be followed by the pioneer in Lean product development, Toyota. According to Festival (2011) the maximum adoption of the principles of Lean in the development of software, over the past decade has been drawn from the various manufacturing domains, especially from the Toyota Production System. The aspect drawn from the Toyota Production System in applying Lean principles is the desire to manage or eliminate variability. In the telecommunications and networking domain, variability is expected and is not to be eliminated but is to be designed. Even though robust methods of managing flow are being developed by the telecommunications industry, the issue of variability still persists. Hence the Lean principles are adopted by the telecommunication sector. The principles of Lean are as follows.

1. In order to separate the value added from the waste, customer defined value is established.
2. To explore the alternate solutions thoroughly, the process of product development is front loaded especially when the space for design is largest.
3. A level process flow of product development process is created.
4. In order to obtain predictable outcomes, create flexibility and reduce variation rigorous standardization is utilized.
5. To integrate the development process from beginning to the end, a chief engineer system is developed.
6. Organize cross functional integration and functional expertise to balance.
7. Towering competence is developed in all engineers.
8. The suppliers are fully integrated into the development system of the product.
9. Continuous learning and improvements are built in.
10. To support relentless improvement and to support excellence a culture is built.
11. Technologies are adapted to fit personal process and people.
12. Simple visual communication is employed to align the organization.
13. For organizational learning and standardization powerful tools are used.

Research Methodology:

This chapter offers a description of research approach, research design, sampling design and data types included in organizing the study. This study would adapt an interpretivism research. According to Chalmers (2004) Interpretivism is also known as hermeneutics approach. Interpretivism is the study and theory of understanding statements common to the interpretation of the text. It is also explained as the art of understanding discourses such as language, texts, translation and explaining such courses meaning. This study adopts interpretive research since the researcher has gathered descriptive data for studying the proposed problem in the study. The research approach adapted in this study is qualitative research. According to Maxcy (2003) qualitative research is the process of inquiry of understanding concerned on unique traditions of methodology of inquiry that implements a human or social issue. The researcher develops a holistic and critical picture, reports brief informant's views, analyzes words and conducts natural setting study. This research is said to have adapted a qualitative approach since it collects data in textual form rather than numerical form. This study adopts case study research design. Connaway and Powell (2010) have described that the case study research design can be quantitative but because of the wide nature of case study itself it is always used as a qualitative research method.

This research is said to have adapted a case study research since it investigates in detail the Lean principles that can be applied effectively in telecommunication sector to improve the product development activities. The convenience sampling technique is adapted in this study. Fink (2003) has described that convenience sampling is a non-probability sampling technique. Convenience sampling is a sampling technique in which the participants are obtained wherever they can be found and typically wherever is convenience for the researcher. As the name implies the sample is identified primarily by convenience. Convenience samples are the least expensive and least time consuming of sampling techniques and are generally considered to be a convenience sample which is any process that quickly and easily selects sample elements. The greatest problem with the convenience sampling is the inability to know if the sample is representative of the target population. Since the convenience sampling technique follows no pre-designate method the sampling error cannot be calculated. Consequently specific precision and confidence level estimates cannot be made. Even with the drawbacks of convenience sampling it is frequently used particularly for exploratory research. The researcher chooses the samples according to his/her convenience. According to Rubin and Rubin (2005) secondary research will be conducted by assessing information that has already been archived in some form. In this study secondary data is collected by the researcher from books, journals, articles and few internet resources and databases that speak about Lean principles in telecommunication sector.

Discussion: Case Studies:

To demonstrate the need or the benefits of introducing the Lean principles to assist in complex production environments, the study discusses 2 case studies. The case study investigates on using and applying the Lean principles in the two giant telecommunication industries, the Alcatel Lucent and Cisco to enhance the activities of product development.

Case Study 1: Cisco

The first case study involves an American Multinational Company, Cisco, which designs, produces and sells the equipment of networking. The growth of Cisco has reflected in higher processing of sales orders, manufacturing and delivering of product units, dispatching of service calls. Tracking of spare parts and producing invoices. Maintaining higher levels of operational efficiency and customer satisfaction with increase in the volume of service is a key challenge. Initially, the business processes and data varied according to the usage of systems by the organization, partners and as per its local business

requirements. But these traditional processes did not bring in or increased the number of orders, authorized more suppliers and partners or added more products (Cisco on Cisco, n.d).

According to Agarwal (n.d), Cisco ranked 8th in the Supply Chain Top 25 list for its largest partners AMR Research after the introduction of Lean Principles. The Lean Principles became a global initiative to enhance the sales and growth profitably for the organization and its distributors. At Cisco, the Lean principles were applied into the channel of manufacturing and it was also extended into the supply chain to its distribution partners. It provided a single face to the distributors of the organization within the chain of supply. The significant financial metrics included freed up working capital, reduction of operating cost, reinvestments of savings and enhancement of the sales generation. The significant operational metrics included fill rates, lead time, stock rotation percents, rejection of details rebate claims and inventory weeks of supply. The principles of Lean enable the organization to look at the opportunities in a diverse way whether it demands or forecasts configuration or fulfillment. The Lean principles are mostly looked at as a source to improve the profitability of the company, to amplify the returns obtained on the capital and to use the returns by investing in the partnership. All the worldwide distributors or the suppliers of the Cisco are provided with 'one face' on using the Lean principles which also improves the experience of the customers on the products of Cisco. In terms of the partnership, the Lean principles brings in close partnership enabling to solve the issues of supply chain by involving reinvestments and profitable growth on a mutual basis.

At Cisco, the Lean start-ups are followed on the basis of 3 trends,

1. Using the open and free source software,
2. Agile software development methods are applied and
3. As exemplified by the process of customer development, ferocious and customer based rapid iteration are followed.

The Lean principles are applied on the entrepreneurial process. The principles of Lean Cisco follows at start up are, entrepreneurs are all around; validated learning; build measure learn; entrepreneurship is management and innovation accounting. The company also follows the basic and fundamental principle of Lean, which is eliminating waste. The first basic step in implementing principles of Lean is the knowledge about waste. The wastes in Lean product development are delays, extra features, extra relearning/ processes, handoffs, defects, task switching, partially done work and unused employee creativity. Thus, by following Lean principles, it is considered that overburden and unevenness are the causes for wastes and the

principles of Lean are applied to eliminate them (Reinertsen G D, 2009).

Case Study 2: Alcatel-Lucent

The second case study involves the study on Alcatel- Lucent, a global giant in the telecommunication sector. The study focuses on its fabrication facility of the base station which constitutes of 3 major processes; wiring, assembly and testing. The Lean principles based workstation was decided to be implemented to manage the complex processes. To handle the limited product groups, dedicated cells were designed with the intention of improving the quality of wiring and reducing the testing time. As a result, a direct impact on the station's workload by the scheduling pattern was evident. Hence, analytical scheduling tool to plan the errors was required. Before reshaping the layout on the basis of cell, few Lean practices and tools which decrease waste and improve cycle time across all processes were implemented this allowed the company to produce in an immediate mode. Later on, the Lean principles were applied over the complete line of production. Standardized workload duration was distributed across the lines of assembly, but because of the reconfiguration, multiple durations were spent on the items at every new cell. Therefore, multiple cells can be fed by one assembly line. The results obtained from the application of Lean principles were smooth production, a leveled and reasonable rate of production and localized smoothing at every cell. Thus significant improvements in the work process inventory, head count, manufacturing interval, quality of performance being delivered and first test yields. These improvements have made the company extend the concept of Lean principles to other areas of the factory (Gerathy, 2013).

Conclusion:

This study attempt to gain a better insight of the influence and successfulness of Lean implementation in product development activities based on the case study. Understanding and gathering more information on these topics guided researchers to investigate further effectiveness of Lean implementation. Instead of the implementation limitations, there are still companies manage to get the benefits of it. Thus, Lean is a value that can reshape and redefine to suits particular interest and it will evolve and improve. On top of that, it provides a lead way for any industry player wishing to deploy Lean in their day to day product development activities as future route as well as to serve as the reference guide for adoption and diffusion research topic for researchers in other universities.

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