STRATEGY, OPERATIONS STRATEGY AND LEAN MANUFACTURING

STRATEJİ, ÜRETİM STRATEJİSİ VE YALIN ÜRETİM

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Abstract

Nowadays, the main requirement in order to survive on international conditions of competition is to run ahead. To realize this, it’s required to keep up with the dynamic structure of the century, be open to the changes and innovations. The firms which don’t adapt to the new systems, techniques and technologies are convicted to stay behind in the competition. Because of these reasons, “Lean Manufacturing System” which was used first by Toyota Automobile Factory and later spread on other firms, was developed. The purpose is to deliver value which starts with raw material to final customers without interruption throughout value creating process (Emiroğlu, 2012, 985).

The purpose of this work is to introduce strategy, operations strategy and Lean Manufacturing System by defining of all. Methodologically, by defining these three words, by showing relationship between them and by comparing lean manufacturing system briefly has been embraced. As a result, the findings from the study show that organizational change from corporate level strategy to business level strategy and from operations strategy to lean manufacturing system should be necessary as a dynamic process. The study does contribute to the strategical change in Lean Manufacturing.

Key Words: Strategy, Business Strategy, Operations Strategy, Lean Strategy, Lean Manufacturing

Özet


Bu çalışmanın amacı; strateji, üretim stratejisi ve yalın üretime tanımlanarak sunumudur. Yöntem; bu üç sözçüğü tanımlayarak aralarındaki ilişkiyi göstermek ve kısaca Yalın Üretim ile karşılaştırmaktır. Sonuç olarak; çalışma bulgularından hareketle,
1. INTRODUCTION

One of the organizations’ key elements of success is the alignment of their strategies and their tactics (Laohirihongthong et al., 2010). In other words, for an organization’s success, the strategic guidelines (or business objectives) should guide program choices (production practices) and these should contribute towards the organization’s operational performance. These objectives are guided by two aspects in accordance with Womack (2006): what needs to be done to satisfy clients; and what needs to be done to survive and prosper as a business.

Many leading companies have implemented lean manufacturing programs, include waste identification and implementation of waste reducing techniques (WRT) to achieve desired business results. The lean companies, it’s confirmed that strength of management system correlates with WRT implementation which correlates with business result for lean manufacturing (Emiroglu, 2004 a, 2)

An organization’s operations function is concerned with getting things done; producing goods and / or services for customers. All business organizations are concerned with how they will survive and prosper in the future. A business strategy is often thought of as a plan or set of intentions that will set the long-term direction of the actions that are needed to ensure future organizational success. However, no matter how grand the plan, or how noble the intention, an organization’s strategy can only become a meaningful reality, in practice, if it is operationally enacted. An organization’s operations are strategically important precisely because most organizational activity comprises the day-to-day activities within the operations function. It is the myriad of daily actions of operations, when considered in their totality that constitute the organization’s long-term strategic direction. The relationship between an organization’s strategy and its operations is a key determinant of its ability to achieve long-term success or even survival. Organizational success is only likely to result if short-term operations activities are consistent with long-term strategic intentions and make a contribution to competitive advantage.

Operations strategy, based on competitive priorities, translates the clients’ needs to be met by the operations management function, in order to satisfy them (Slack and Lewis, 2003). And there are a series of decision areas to support the competitive priorities that include issues related to operations management. According to Godinho and Fernandes (2005) in the most recent literature on operations management, there are many programs that propose helping companies remain competitive, for example, lean manufacturing, responsive manufacturing, agile manufacturing, world class manufacturing, mass customization, among others.

2. LITERATURE REVIEW

2.1. The Nature of Strategy

Strategy is one of the most over-used words in the business dictionary. Yet, surprisingly, there is no agreement on what the term actually means. No-one challenges its military origin, used with regard to how a commander might deploy his resources (i.e. armed forces) throughout a campaign aimed at achieving a particular objective (e.g. [insert text here])
conquering territory or thwarting an invasion). The idea that a business organization could have a strategy seems to have first emerged in the 1960s, when the techniques of long-term business planning were first popularized. Since then many different interpretations of the concept and practice of strategic management have been developed. Indeed, entire books have been given over to contemplating the nature of strategy. For example, Henry Mintzberg et al. (2005) characterize ten ‘schools of thought’ in their consideration of what constitutes strategy. A widely accepted definition is offered by Johnson et al. (2005), who define strategy as ‘the direction and scope of an organization over the long-term, which achieves advantage in a changing environment through its configuration of resources with the aim of fulfilling stakeholder expectations’. In its determination of the long-term direction of an organization, strategy involves the interplay of three elements: the organization’s external environment, its resources and its objectives (in meeting the expectations of its stakeholders). Operations management is principally concerned with the organizational resources. However, the way that the operations function manages resources will impact both the way that the organization interacts with its external environment and its ability to meet the needs of its stakeholders. Thus, operations management is an integral part of an organization’s strategy.

Hayes et al. (1984), in a top down perspective, define strategy in three different levels: Corporate, business and functional. At the highest level, corporate strategy defines the markets in which the corporation wants to enter and how it acquires and allocates the resources fundamental to the activities. At the second level, the business strategy is associated with each unit, division or product line, specifying the business scope, positioning itself in the sector to achieve and maintain a certain competitive advantage. At the last level, the functional strategies define how each department / area will contribute towards business strategy.

**Corporate Level Strategy:** Corporate level strategy is the highest level of strategy. It sets the long-term direction and scope for the whole organization. If the organization comprises more than one business unit, corporate level strategy will be concerned with what those businesses should be, how resources (e.g. cash) will be allocated between them, and how relationships between the various business units and between the corporate centre and the business units should be managed. Organizations often express their strategy in the form of a corporate mission or vision statement.

**Business Level Strategy:** Business level strategy is primarily concerned with how a particular business unit should complete within its industry, and what its strategic aims and objectives should be. Depending upon the organization’s corporate strategy and the relationship between the corporate centre and its business units, a business unit’s strategy may be constrained by a lack of resources or strategic limitations placed upon it by the centre. In single business organizations, business level strategy is synonymous with corporate level strategy.

**Functional Level Strategy:** The bottom level of strategy is that of the individual function (operations, marketing, finance, etc.) These strategies are concerned with how each function contributes to the business strategy, what their strategic objectives should be and how they should manage their resources in pursuit of those objectives.

**2.2. Operations Strategy**

The foregoing discussion has highlighted the strategic importance of operations to organizational performance. An appropriate operations strategy is essential to an organization not only as this will determine the extent to which its business strategy can be implemented, but also as its operations can be a source of competitive advantage.
Slack et al. (2003: p.67) argue that an ‘operations strategy concerns the pattern of strategic decisions and actions which set the role, objectives and activities of operations’. Their use of the term ‘pattern’ implies a consistency in strategic decisions and actions over time. This concept is consisted with management guru Henry Mintzberg’s view of strategy as being a ‘pattern in a stream of actions’ (Mintzberg and Waters, 1985). Mintzberg sees strategy as being realized through a combination of deliberate and emergent actions. An organization can have an intended strategy, perhaps as a set of strategic plans. However, only some of this intended strategy may be realized through deliberate strategy. Some of the intentions may be unrealized. Strategies which take no regard of operational feasibility are likely to become unrealized, remaining merely as a set of intentions. Strategy may also emerge from actions taken within the organization, which over time form a consistent pattern. Actions of this kind will, almost inevitably, arise from within the operations of the organization. So, whether planned or otherwise, the organization’s operations are bound to have a major impact on the formation of organizational strategy.

Operations strategy, based on competitive priorities, translates the clients’ needs to be met by the operations management function, in order to satisfy them (Slack and Lewis, 2003). And there are a series of decision areas to support the competitive priorities that include issues related to operations management. According to Godinho and Fernandes (2005) in the most recent literature on operations management, there are many programs that propose helping companies remain competitive, for example, lean manufacturing, responsive manufacturing, agile manufacturing, world class manufacturing, mass customization, among others.

Literature on operations strategy underscores the importance of investing in Lean Manufacturing (LM) initiatives to improve a company’s operational performance (Pont et al., 2008). Cua et al. (2001), Rho et al. (2001), Shah and Ward (2003), Gebauer et al. (2009), Mackelprang and Nair (2010) and Rahman et al. (2010) identified the relations between competitive priorities and some LM principles and enablers, that is, the use of LM principles and enablers will eventually contribute towards improved organizational performance. However, thus far, little has been discussed in literature about the relations of the degree of implementation of LM principles and enablers needed to achieve different competitive priorities. Therefore, this study tries to answer the following question: is there a difference in the degree of implementation of LM principles and enablers for different competitive priorities of operations management? And, if this difference exists, how can it be justified in literature?

The operations management function and, consequently, operations strategy have great potential for creating a competitive advantage for companies. According to Hayes et al. (1984), operations strategy is a set of goals, policies and self-imposed restrictions that describe how the organization plans, directs and develops all the resources invested in the operations management function to better fulfill its mission. Leong et al. (1990) deal with the studies that involve operations strategy in terms of content or process. The content is the series of decisions made within the domain of operations strategy, while the process means the means through which the operations strategy is formulated.

The content of operations strategy is defined by the competitive priorities and decision areas (Voss, 1995). The competitive priorities represent the performance competences on which the operations management function will focus to meet the needs of the target clients. These decision areas are divided into structural and infrastructural. According to Hayes and Wheelwright (1984), the structural areas refer to long-term investments in physical installations and which are irreversible. The infrastructural decisions describe the systems, policies and practices that determine how structural aspects of organization are managed.
According to Voss (1995), the content of operations strategy also has a logical hierarchy of decisions. The definitions of competitive priorities act as guidelines for structural decisions and these guide the infrastructural decisions. Thus, there is an important dependency in terms of competitive priority format because they determine the best way to specify and mix structural and infrastructural production resources.

Many authors recognize four competitive priorities:

a) The quality offered in products and services,

b) Speed so the product processing time and delivery can be shorter than the competition,

c) Flexibility to adapt to changes in demand or production processes, and

d) Lower costs than the competitors (Ward et al., 1996; Devaraj et al., 2004; Wang and Cao, 2008).

Hill (1993) classifies the priorities into two criteria of performance:

a) Order winning criteria – which contribute directly and significantly towards the business and winning an order. This is what makes the client give preference to its product or service over the competition;

b) Order qualifying criteria – which may not be the main determining factors for competitive success, but they determine the minimum performance that criterion should have for the company to be considered by the client.

There are three perspectives for understanding competitive priorities found in literature: trade-offs, cumulative (or sand cone) and integrative, the latter being a perspective that tries to integrate characteristics from the first two.

According to the trade-offs perspective suggested by Skinner (1969), the keys to operations strategy success are in the identification of the priority choices, understanding that there is incompatibility between competitive priorities, implying the choice of one priority to the detriment of others. Thus, focusing resources on certain objectives reduces their availability to others, creating trade-offs whereby a factory cannot be excellent in all performance criteria.

However, Hayes et al. (1984) defend the idea that a company can reach superior performance in several competitive priorities, with some reinforcing the others, rather than functioning as trade-offs. Structural decisions relate to production capacity (how much to produce / how to meet the client’s order), technology employed (volume and variety / production system), size and location of the installation and degree of vertical integration (produce internally or outsource). Infrastructural decisions relate to human resources (skills), quality management, production planning and control (PPC) (programming resources) and organization (Leong et al. 1990). In order to achieve the competitive priorities, it is important to have a standard of actions within decision areas. The set of actions in each decision area reflects the production system used by the company, which is nothing more than a set of interrelated elements (human, physical and managerial procedures) projected to generate final products (Maccarthy and Fernandes, 2000). Thus, it is possible to observe a relationship between Production Planning and Control’s infrastructural decision area and the reach of a chosen competitive priority. In this context, this study addresses the Toyota Production System, also called Lean Manufacturing, one of the current production paradigms.

3. LEAN MANUFACTURING (LM)

The manufacturing industry has become extremely competitive in nature and each company’s survival depends on gaining an edge in their respective field. LM has emerged as the leading management philosophy in this struggle. The original model of lean, called the
Toyota Production System, is utilized by the phenomenally successful automotive manufacturer Toyota and many others have followed suite. Lean is a proven management strategy can be taught using both knowledge-based and competency based learning styles. Through the use of academic, simulation, and real life examples these concepts can be understood.

The principles and concepts of the LM such as the total elimination of waste and continuous improvement (Kaizen), are being used by more businesses to better compete in today’s global market. LM is a competitive philosophy adopted by many companies to produce cost effective products and services (Allada & Srinivasaraghavan, 2006). It is one of the fastest-growing movements in the quality field. “Success in modern manufacturing directly correlates to how a company handles global competition. Cost effective solutions and practices are much needed to stay competitive in the marketplace” (Allada & Srinivasaraghavan, 2006, p. 1159).

LM is a proven approach for success in manufacturing industry. However, several organisations failed in their attempt to implement LM system. LM is a concept that aims to make production a healthier, an efficient and effective manner by eliminating all the waste elements in the manufacturing process. Business apply LM techniques in order to reduce product cost, manufacture quality product and shorten production lead times so that deliver the product to the customer as soon as possible. The transition to LM requires radical change which involves a total reshaping of purpose, system and culture of the organisation (Emiroglu, 2013, 119).

LM has become a widely acceptable and adoptable best manufacturing practice across countries and industries. The ultimate goal of a lean organisation is to create a smooth, high quality organisation that is able to produce finished products at the rate of customer demands with no waste. However, in reality, many organisations are not able to transform themselves to LM organisations towards creating world-class companies. Transformation towards the LM is full with formidable challenges. It is reported that many of LM implementations, even those undertaken with the best intention, are often destined to a failure at some point of their implementations (Farris, at al. 2009, pp. 42-65; Liker, J. K. and Hoseus, M., 2008).

**Lean Manufacturing** (The Toyota Production System) can be define as a combination of multiple tools to help eliminate activities that do not add value to the product, service and / or process by increasing the value of each activity, aimed to eliminate or reduce waste and improve operations.

Alukal (2003) states, lean is a manufacturing philosophy that shortens the lead time between a customer order and the shipment of the products or parts through the elimination of all forms of waste. Lean helpful firms reduce costs, cycle times and unnecessary, nonvalue added activities, resulting in a more competitive, agile and market responsive company (p. 29).

The Toyota Production System (TPS) emerged in Japan immediately after World War II, when the country’s market began to demand production in small lots, with great variety and low cost. Eiji Toyoda and Taiichi Ohno of the Toyota Company decided that the mass production proposed by Henry Ford no longer applied to the Japanese scenario. As a result of these needs, the two began to create the TPS. The basis for TPS is the absolute elimination of waste, which may be classified as waste from overproduction, wait, transportation, excess processing, inventory, movement and manufacturing of defective parts and pieces. TPS became popular in the West after a benchmarking research with companies that were always seeking to “do more with fewer resources”. The research was conducted by the Massachusetts Institute of Technology (MIT) and in 1992 it resulted in the publication of the book “The Machine that
Changed the World”, by Womack et al. (2006), which began to call broadly the TPS as Lean Manufacturing (LM), the term used in this paper.

3.1. Lean Manufacturing Objectives

In today’s competitive environment, organizations are seeking to improve their position in the market. LM is an effective tool for elevating the competitiveness of organizations based on the fact that each can find its own way of improvement. Technology improvement is considered to be one of lean manufacturing’s dimensions. Technology is defined as the usage and knowledge of tools, techniques, crafts, systems, or methods of organization, with the aim of solving a problem or creating an artistic perspective.

- Specify the value for the customer,
- Identify all actions required to bring the product from being a concept to being launch, from an order to delivery, from raw material to the customer’s hand and even his life,
- Remove any action that does not add value and streaming align every action to add value as required by the customer,
- Analyze the results and start the evaluation process again.

Lean Manufacturing defines waste as “anything other than the absolute minimum of time and resources to add value to the product and get the highest quality”. LM focuses on reorganizing the following process: waste reduction, minimizing steps and thereby reducing costs. Several tools and techniques have been proposed in the context of lean manufacturing. Though LM is widely regarded as a business strategy, few researches have concentrated on the validation of its positive link with business performance (Vinodh Dino and Joy, 2012).

In today’s competitive world with its vast and rapid changes in scientific-technical areas and continuous challenges in economical-social systems, there are still many firms with a suitable position. These firms are flexible, pure, and customer oriented due to proper use of available facilities, suitable utilization of new sources for producing goods, and introduction of desirable services with suitable quality. Using philosophies like LM and employing tools such as technology, firms can establish an efficient and stable system to improve their weak points and protect their strong points (recoverable areas), enabling them to continuously identify their planning priorities and recover their recoverable areas by using corrective actions, resulting in gradually passing organizational transcendence levels and improving their efficiency.

One area of particular significance in formulating such a strategy is a company’s ability to implement an effective competitive strategy. The seemingly endless myriad of operating problems such as poor on-time delivery, too much tied up in working capital, slow response and high costs, among other problems, are often identified as the culprits that scuttle the best of strategic intents.

3.2. Lean Strategy

“Lean strategy” in manufacturing involves a series of activities to minimize waste and non value added (NVA) operations from production, customer relations, product design, supplier networks and factory management and improve the value added (VA) process. Applying lean strategies incorrectly, increases the inefficiencies of an organization’s resources and reduced employee confidence in lean strategies.

A Lean Strategy approach should start by doing 3 things:

1. Be clear what strategy is (and just as importantly, what it isn’t): The Lean Startup is variously described as an approach, framework and/or methodology for navigating the early days of a startup journey. The Built-Measure-Learn feedback loop, like Customer Development, is a process. These are all excellent resources to guide the development of a startup, but taken individually or together, they do not constitute a business strategy.
2. Focus on an overarching business strategy: For reasons totally understandable, The Lean Startup places sole strategic emphasis on the product: “the product is the end result of [the] strategy”. Product is of course central to the success of any lean startup but other factors must also be managed. The strategy must be directly aligned with the startup’s vision, its guiding policy and the lean methodologies and tools that the business is utilising. Product (and customers) will be a key strand but resources, finance, marketing and operations, amongst others, also require focus. The beauty of an overarching strategy is that it enables the management team to coordinate the strands of business activity in a coherent way, pivots and all.

3. Understand what is meant by lean strategy: The key factor that distinguishes lean and traditional strategy is time. The 3 to 4 year cycles of the corporate world are anathema to startups and new ventures. As a startup moves from its pre-revenue stage, through to early revenue and then to scale, a much shorter cycle is required. Strategic timescales will of course vary from business to business but they can be determined through a strategic planning process (implementation of the identified overarching strategy) that realistically identifies the time and resource requirements to execute lean startup processes. The challenge then is to shrink-wrap the strategic cycle. The detail of the strategy then defines how firms are going to get there and this can be articulated within a strategic plan. A solid overarching strategy and associated strategic plan will enable you to do this.

3.3. Relationships Between Operations Strategy and Lean Manufacturing

Lean operations is all about adding value and removing waste. Lean is a management strategy that seeks to improve operational performance in terms of customer satisfaction, cost, quality, and delivery by focusing on the customer and eliminating waste, variability and inflexibility. It is based on an operational strategy for manufacturing which originated in the Japanese automotive industry, and has now been successfully applied to a range of service businesses. To put LM systems into place, it is proposed a group of practices related to operations management (production planning and control, materials flow, maintenance system, quality system...), the relationships with clients and suppliers, product design or human resource management (participative management, worker involvement...) (Emiroglu, 2014b, 263). Operations management designs, schedules, and controls organizational processes to increase productivity by using methods such as Just-in-Time (JIT) / Lean Manufacturing, Total Quality Management (TQM) or Environmental Management Systems (EMS).

It’s point out that for production to support the competitive priorities imposed by consumers, the PPC system is vital. The PPC should contribute towards achieving competitive priorities as follows:

a) Cost: Developing and implementing managerial procedures that guarantees lower manufacturing costs for products;

b) Quality: Developing and implementing procedures that guarantee a fitting level of quality for components;

c) Delivery performance: developing and implementing procedures that guarantee compliance with established deadlines and short throughput times;

d) Flexibility: developing and implementing procedures that guarantee adaptation to new products, processes and methods.

The 5 principles of lean thinking that lean manufacturers employ are:

1. Specify Value.
2. Identify the Value Stream.
4. Let the customer Pull.
5. Seek Perfection (Continuous Improvement of Quality and Productivity).

Taichi Ohno, former Toyota Chief Engineer, identified 7 wastes of manufacturing:
1. Overproduction
2. Transportation
3. Unnecessary Inventory
4. Inappropriate Processing
5. Waiting
6. Excess Motion
7. Defects

These wastes should not be considered separate categories; instead, as operations strategy, we should use these wastes as a teaching/learning tool to help identify opportunities to improve our work environment and focus on adding value for the customer. Wastes are non-value-added activities for which the customer would not be willing to pay.

As observed, to provide support for achieving competitive priorities, it is essential to build a production system with procedures that reflect the chosen operations strategy (Säfsten and Winroth, 2002). Mackelprang and Nair (2010) underscore the importance of understanding which LM practices can be related to achieving competitive priorities. Their studies indicate that some LM practices are positively correlated with each competitive priority, thus supporting the claim that LM has a direct relationship with competitive priority. Shah and Ward (2003) and Pont et al. (2008) identified positive relationships between LM practices and achieving competitive priorities.

Cua et al. (2001) examined the relationship between achieving competitive priorities in three sets of LM practices: Total quality management (TQM), Just-in-time (JIT) and total production maintenance (TPM). Together, TQM, JIT and TPM practices comprise a consistent set for improving operational performance. However, the authors do not discuss the different impacts each one has on operational performance. Shah and Ward (2003) defend that the simultaneous use of groups of principles and enablers has a greater impact on operational performance than when separated.

In general, the most cited benefits related to LM practices are improvements in work productivity and quality, together with a reduction in client lead time, cycle time and production costs (Schonberger, 1992; White et al., 1999; Shah and Ward, 2003). Hallgren and Olhager (2009) sustain that LM principles and enablers support companies that seek a strong positive impact on cost reduction and subsequently on quality. Naylor et al. (1999) and Hallgren and Olhager (2009) consider cost reduction LM’s main metric. Also identified other impacts, besides costs: Customer service, as a result of a reduction in lead time, and the production of quality products. Once these requirements became the criteria that won over clients, countless organizations have been seeking to adopt this philosophy in their production environments.

As per the literature review presented, studies were sought in literature that analyzed the direct relation between LM principles and enablers and competitive priorities.

4. CONCLUSIONS

Although some semblance of lean has been around for nearly a century, lean manufacturing concepts are now beginning to be embraced worldwide. Lean Manufacturing is a popular and widely used production system since 1980s. It is generally known as “Toyota
Production System”, but it can also be called as “just in time” or “non-stock production”. The success of numerous companies thanks to LM encourages other companies to start LM.

Toyota’s success in the tough automotive market has proven the strategies of lean to be more than just another passing management fad. The true value of lean is being recognized and there is a genuine need for educational opportunities promoting this management philosophy in the field of manufacturing.

**BIBLIOGRAPHY**


