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LEAN THINKING AND ITS ROLE IN THE DEVELOPMENT OF VALUE – ORIENTED PRODUCT

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Bilimsel Etik Bildrimi

Yüksek Lisans tezi olarak hazırladığım (Lean Thinking And Its Role In The Development Of Value – Oriented Product) adlı çalışmanın öneri aşamasından sonuçlanmasına kadar geçen süreçte bilimsel etiğe ve akademik kurallara özenle uyduğumu, tez içindeki tüm bilgileri bilimsel ahlak ve genelek çerçevesinde elde ettiğimi, tez yazım kurallarına uygun olarak hazırladığım bu çalışmamda doğrudan veya dolayı olarak yaptığı her alıntıya kaynak gösterdiğimi ve yararlandığım eserlerin kaynakçada gösterilenlerden oluştuğunu beyan ederim.

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ÖNSÖZ

Bingöl Üniversitesi’nde bana ders veren anlatan tüm hocalarıma ve akademik çalışmalarda öğrencilere bilgi öğretmek için çaba harcayan akademisyenlere teşekkür ederim.

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ÖZET

Araştırma, sanayi şirketleri için üretim sisteminde yedi atığın ortadan kaldırılmasında yalın düşüncenin rolünü ve bu şirketlerin benimsediği değer odaklı ürüne olan etkisini araştırmaya çalışmaktadır. Araştırma, problemi araştırma örneklemindeki fabrika yöneticileri ve üretim müdürleri ile görüşme anketi ile yapılan araştırmacı- araştırma yoluyla yürütülmüş, araştırma verileri bu amaçla düzenlenen bir anket yoluyla toplanmıştır. Araştırma, Duhok Şehrindeki (16) sanayi şirketinde yürütülmüş ve anket formunun Bu çalışma için toplan (132) formu anket dağıtıldı (120) tamamlanmış anket alındı ve cevaplama oranı (%91) idi. Buna ek olarak, bu çalışmaya müdahale edilmek üzere on iki yönetici ve üretim müdürü seçilmiştir. yapılan şirketlerin fabrikalarında üretim fonksiyonlarında görev Alan bireylere dağıtılmış ve formlar bu yolla doldurulmuştur. Elde edilen veriler araştırma hipotezlerine göre (SPSS V.20) analiz edilmiş, sonuçlar istatistiksel ölçümlerden bazıları kullanılarak elde edilmiştir.

Araştırma, değer odaklı ürün değişkeninde zayıf düşünce değişkeni üzerinde belirgin bir etki olduğunu ve yanıt veren şirketlerde, üretim atığı, bekleme süreleri, atık, ulaşım atıkları, işleme atığı, envanter atıkları, hareket atıkları, kusurlu atıklar olduğunu belirlenmiştir. Ayrıca, katılımcı şirketlerin, imalat operasyonlarını gerçekleştirirken değer odaklı ürün seviyelerini iyileştirmek için üretim süreçlerinde zayıf düşünmeye güvenmeleri sonucuna varılmıştır. Sonuçlar, ulaştırma atığı ve hareketli atığın, diğer türdeki atıklardan geldiğini gösterdi; çünkü katma değerli ürün üzerinde herhangi bir etkisi yoktur; bu da, yanıt veren kuruluşların diğer türler gibi üst düzeylerden zarar görmediği şeklinde atfedilebilir.

Anahtar Kelimeler: Yalın Düşünme, Değer Odaklı Ürün, Gerçek Değer, Algılanan Değer,Fonlısiypnel İşlevsel Faydalar, Duygusal Faydalar, Kendini ifade Eden Fayda.

ABSTRACT

The research attempts to investigate the role of lean thinking in eliminating the seven wastes in production system for industrial companies and its effect on value-oriented product adopting by those companies. The research problem was conducted through exploratory study by interview questionnaire with factory managers and production managers in the research sample, and then the research data was collected through a questionnaire issued for this purpose. The research was conducted at (16) industrial companies at Duhok City, for this study a total of (132) questionnaires were distribution, (120) completed questionnaires were received, and then the response rate was (91%). In addition, twelve managers and production managers have been selected to be interviewed in this study. The collected data were analyzed by (SPSS V.20) according to the research hypotheses, the results were obtained by using some of statistical measurements.

The research concluded that there is a significant effect for lean thinking variable on value – oriented product variable, and the respondent companies suffer from varying levels of over production waste, waiting times waste, transportation waste, over processing waste, inventory waste, motion waste, defects waste. Also, it concluded that the respondent companies rely on lean thinking in their production processes in order to improve the value – oriented product levels when they performing their manufacturing operations. The results indicated that the transportation waste and motion waste has inferred from the other types of wastes because they have no effect on the value – oriented product which can be attributed that the respondent organizations did not suffering from them at high levels like other types.

Key Words: Lean Thinking, Value-Oriented Product, Real Value, Perceived Value, Functional Benefits, Emotional Benefits, Self-Expressive Benefits.

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INTRODUCTION

Lean thinking is a philosophy focused on elimination of all the waste types while increasing a product value. Simply, lean means adding more value for both products and customers with fewer resources. This strategy changes the focus of management and directs it to the elimination of waste along entire value streams, instead of at individual points. In order to achieve this, we need to introduce processes that reduce costs, services, human efforts, space, capital and time with much fewer defects if compared with traditional production systems.

A lean organization comprehends value – oriented product and focuses its key processes to continuously increase it. This strategy takes into consideration the respect for the workers, the quality of the products and the stability of the process.

CHAPTER ONE: LITERATURE REVIEW

1. LEAN THINKING

1.1. INTRODUCTION

Currently organizations starve to get good results with as few resources as possible in such ways that help them continue exist in complex and competitive globalized markets. These organizations have to find ways and means to meet all these threats and demands by using different available strategies. One of these is the well-known strategy “Lean Thinking”, a popular Japanese method that was mainly developed in Toyota as the Production System. Many companies have tried to implement it as a whole system or have adopted a portion of the strategy, in order to improve their internal processes. Today organizations face challenges in the form of intense international competition, rapid technology evolution, maturing customer expectations and quality demands (King, cited in Aziz, 2011: 1).

One of the first and important ways that can help organization in such cases to exist is to adopt "effective and efficient management" and the "project management" has approved to be very successful (Whittington, cited in Aziz, 2011: 1).

The exercises that are often attempted in form of projects belong to different ventures, such as services, development, administration, management, product improvement, and etc. However, (Atkinson and Winch cited in Aziz, 2011: 1) refers that "several of these projects are censured to be delayed and overrun cost, which is often considered as normal. This latent acceptance that projects may not deliver on time or within distributed budget has great impacts on the overall business of associations ". They also postulate that "delay in projects" sensibly means delay in product introduction, certainly missing market opportunity and forefront of "innovation ", which badly impact the status and strength of the company in market. Moreover, it verifiably means that projects often show unsatisfactory performance with respect to productivity and quality (Atkinson and Winch cited in Aziz, 2011: 1).

Also, an organization success is a fundamental means for society to improve their living ways. And that success mostly comes from technological change by using new

techniques or ways of producing goods and services in order to improve the production in the organization (better ways of using available resources given available technology). These years, manufacturing functions have been transferred rapidly and globally from mature countries to emerging countries. Our study is about the lean thinking philosophy and the critical elements for successful transfer of lean thinking among manufacturing organizations.

The lean philosophy in shortly is about eliminating all waste and synchronizing necessities in order to, on the short and long term, meet the requirements of the customers and markets. The paradigm of manufacturing is experiencing a major advancement all through the world. The use of computers and the Internet has changed the way that we build and manufacture products. According to later patterns in manufacturing, products are subjected to a shorter product life, frequent design changes, small lot sizes, and small in-process inventory restrictions (Santos, et al., 2006: 9).

Improving production with Lean Thinking is a departure from a production book called (The Machine That Changed the World) which was written to be a text book for courses on management such as "Production Control, Operations Management, Manufacturing Systems, or Production Management," because it includes inclusive details about these topics with special emphasis on lean engineering principles. This book is full of practical production cases of how lean thinking can be connected viably to production system.

The Lean Thinking book first is distributed in the fall of 1996, just in time -we thought- for the subsidence of 1997 and the financial meltdown of 1998. This book aimed to pass through the financial games that took place in the 1990s in order to come with new genuine and life-long value that can be utilized in any business. Toward this end, it demonstrated how a range of organizations in North America, Europe, and Japan took advantage of the recession of 1991 to rethink their strategies and embark on a new path. Given that the book was published years before our thoughts were most required, it's amazing how many peruses took the advice in Lean Thinking seriously during the best of times. More than 300,000 copies have been sold in English, and it's been translated into German, French, Italian, Portuguese, Polish, Turkish, Korean, Japanese, and Chinese. In revising the book, we have

corrected a few minor errors and omissions in the original text. However, we have been careful not to change the pagination. We know that many organizations use Lean Thinking as content to direct their change process, appropriating copies widely and often counting their merchants and suppliers. Thus, we wanted to ensure that there will be no difficulty in interchanging the two editions (Womack and Jones, 2003: 15).

1.2. ORIGIN

Lean philosophy can be connected to all angles of the supply chain and ought to be if the most extreme benefits within the organization are to be reasonably realized. According to (Melon, 2004: 662) thinks that there are two serious problems facing the application of lean to "business processes" namely the identified absence of "tangible benefits" and the second problem is the understanding that a lot of those business processes are already competent. However, both postulations can be challenged.

Lean thinking is one side of Lean philosophy and got its name from a 1990's best seller called "The Machine That Changed the World". This book gives accounts to the history of cars' industry from the beginning moving to mass production and lean production. It also talks about Henry Ford's business experience in automobile and how he succeeded to standardize parts and assembly techniques in such a way that cars could be made cheaply for masses by low skilled workers and specialized machines. It gives details on how mass production given cheaper cars than the make production, but come about a blast of indirect labor: production planning, designing, and administration.

At that point the book clarifies how a little organization set its sights set on manufacturing autos for Japan, yet it couldn't manage the cost of the gigantic investment in single reason machines that appeared to be required (Pop Pen Dick, 2003: 1). The ideas behind lean production start from Toyota Production System (TPS) initially develop by Tahiti Ohio, an engineer at Toyota Motor Corporation. In the late 1940's and mid 1950's Toyota's business fell significantly, by then Toyota chose to study auto industry in different nations. (Womack, cited in Aziz, 2004), mentioned that everything started when Fiji Toyoda and Tahiti Ohio went to U.S in

1950’s in order to study world’s largest and most efficient manufacturing plant, Ford’s mass production factory in Detroit. Toyota’s plans to study what Ford has made in the automobile industry in order to make use of his ideas in improving their own business to become more competitive failed. During their stay in the U.S., Ohio realized that Toyota did not have enough resources to produce mass production as big as that of Ford. Instead; they have to create a productive system that produces littler volumes. Moreover, what entranced Ohio in U.S. was how nourishment stores were fabricated.

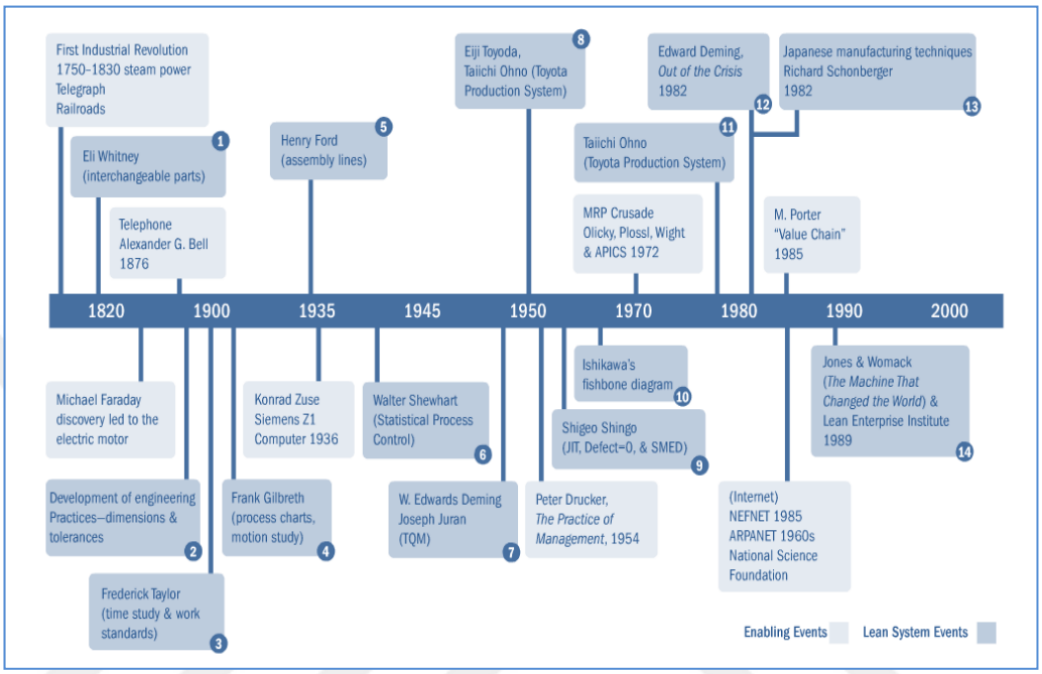
The customer expects that the store has what he/she needs, and when the customer takes it; the stock was renewed using kabana in stores. Ohio took this idea back to Toyota and later developed the Just in Time philosophy based on this idea (Womack, cited in Aziz: 44). When Ohio went back to Japan he tried to apply and execute new ways to improve Toyota's production processes. In spite of the fact that his pans were useful but they were not completely practiced until Kiichiro Toyoda resigned and Ohio began to experiment new ideas (Womack, cited in Aziz, 2004: 44).

With the passage of time Toyota radically succeeded in increasing production quantities, but was also met with serious crisis as Toyota’s new model was refused in American market due to the following reasons: It did not have the required safety standards; its engine power was not efficient enough and great numbers of cars. This crisis has made has made Toyota to think again of their market status and to develop ways to improve their cars' quality in order to survive in the automobile market. Accordingly, Toyota’s management finally agreed to adopt Ohio's, Total Quality Control (TQC) system (Womack cited in Koskela, 2004: 25).

AS admitted later by two of its authors (Womack and Jones cited in Koskela, 2004) the book -the machine that changed the world- did not concisely summarize the principles of lean production. In their newer book (1996) (Womack and Jones) endeavor to improve the theoretical side of the discussion of lean production, they say of the previous book, the thought process required to tie all the method together into a complete system was cleared out generally implicit. Further we figured it out that we required to compactly summarize the principle of lean thinking to provide a "sort of north star" which is a sort of reliable guidelines for managers to exceed with

the day-to-day chaos of mass production without such a guide, managers are drowning in techniques without understanding the whole, and the Figure (1) demonstrate the time line history of Lean Philosophy (Behm, et al., 2010: 33).

Figure 1: Lean History Timeline



Source: Behm**,** J, Deseck**,** M., and Gramza, M, Hermansen**,** S, (2010), Lean Thinking for Business And finance, International Conference on Industrial Engineering and Operation Management Kuala Lamprey, Malaysia, January 22 - 24 - 2014, p.33.

1.3. Lean Thinking (Principles and Concepts)

1.3.1. PRINCIPLES

One of these research objectives is to clarify the basic principles and concepts of lean thinking, in order to provide basis for the lean transformation process within the organizations. The references related to the lean principles and main concepts are various books, articles, research summaries and other public material. Several different sets of lean principles are available, each of them presenting principles from different viewpoints and using slightly diverse wording. However, the main vision of the lean thinking seems to remain the same: "more and more with less and less – less human effort, less equipment, less time, and less space – whilst coming closer and closer to providing customers with exactly what they want" (Womack and Jones,

cited in VTT,2010: 6). In the following sections, the best-known sets of lean thinking principles and key concepts are summarized.

1.3.2. LEAN PRINCIPLES AT PRODUCTS LEVEL

Middleton and Sutton during 2002 – 2007 have studied the challenges at products level and how the challenges are being met by the lean thinking principles. They began with the five principles of Womack and Jones Table (1) and applied them in manufacturing software products. They claimed that the software industry is the most suited of all the industries to transform to the lean manufacturing. (Middleton and Sutton cited in VTT, 2010: 6), they concluded with the following seven principles of lean thinking at products level.

Table 1: Lean principles at products level

1	Eliminate waste.
2	Build quality in.
3	Create knowledge.
4	Defer commitment.
5	Fast delivery.
6	Respect people.
7	Optimize the whole.

Source: (pop pen deck and pop pen deck cited in VTT, 2010: 6)

Waste in lean production is the time and costs spent on manufacturing a product without adding value from the customer's opinion. Value added activities are considered something useful because they encourage customers to be interested in buying products. On the other hand, customers think differently of non-value-added-activities and consider them as worthless activities. Consequently, they do not tend to purchase them. Moving WIP between department that are organized functionally and building a defective product are examples of no value – added activities (Georgescu, 2011: 5). Managers have to measure the waste made in no value –added activities and take it seriously because it will have negative effect on the profit made by the organization. Manufacturers can try find out this waste in two areas namely:" documented and undocumented non-value-added steps and events" (Georgescu, 2011: 5).

1.3.3. LEAN PRINCIPLES AT THE ENTERPRISE LEVEL

In their book "Lean Thinking", (Womack and Jones cited in VTT, 2010: 6) widened the scope of lean thinking from lean manufacturing to lean enterprise. They presented the following stripped-down lean thinking principles, as in Table (2).

The lean advancement initiative (LAI) at the Massachusetts Institute of Technology (MIT) has developed the lean enterprise model (LEM), which is a systematic framework that includes lean enterprise principles, measurement, all- encompassing practices and empowering practices to help corporations recognize and survey the leanness of their own organization and processes (Nightingale, cited in VTT,2010). According to the MIT authors, the approach provides an equal balance of people-oriented and process-oriented practices that help chart a path to becoming a lean enterprise. MIT's lean enterprise models based on the following 7 principles of lean enterprise thinking (Nightingale, cited in VTT, 2010), as shown in Table (2).

Table 2: MIT's lean enterprise thinking principles

1	Adopt a comprehensive approach to enterprise change.
2	Identify relevant stakeholders and decide their value recommendation.
3	Concentrate on big business adequacy before effectiveness.
4	Address inside and outside big business buries conditions.
5	Ensure stability and flow both within and across the enterprise.
6	Develop administration to support and drive endeavor practices.
7	Underline authoritative learning.

Source: (Nightingale, cited in VTT, 2010: 6).

Organizations and different associations utilize Lean standards, practices, and apparatuses to make exact client esteem - merchandise and ventures - with higher quality and less imperfections with less human exertion, less space, less capital, and less time than the conventional arrangement of large scale manufacturing.

Utilizing Lean standards, manufacturers have made noteworthy changes to their operations, from enhanced efficiency, expanded asset usage, to a more exact comprehension of item expenses and costs. One territory where producers might not have thought to apply Lean management is the workforce. In any case, as work

weights increment and margins fix, clever producers are turning their thoughtfulness regarding the workforce, and finding that Lean can help them increment workforce adaptability and dexterity, and enhance their primary concern.

An adaptable, spurred workforce is the focal segment or element of an effective Lean program. Applying Lean standards to the workforce can assume a basic part in guaranteeing that work is adjusted to request, which thus can bring about lower costs and shorter lead products. There are three essential area of change that manufacturers ought to concentrate on to accomplish Lean change in the workforce as given by (Georgescu, 2011: 4) which are:

- Identifying non-value-added labor.
- Measuring and managing variability.
- Motivating the work force.

1.3. 4. KEY PRINCIPLES OF LEAN THINKING

To put this philosophy into practice a major attempt is needed to be made by the organization and its individuals to adjust to better approaches for performing, thinking and enhancing strategies. In this procedure, there is a great deal of learning growing out and changes incited, and if it is not overseen as it should be, it can affect the development of Lean methodology and delay the positive results (Diaz,2013: 6). In order to implement Lean Thinking we must take in consideration the key principles shown in Table (3) as following:

Table 3: Lean thinking principles

1-	Identify the value.
2-	Map the value stream.
3-	Create the flow.
4-	Establish the pull.
5-	Seek perfection.

Source: (Womack and Jones cited in VTT, 2010: 6)

First: Identify the Value

The primary key principle of LT is to characterize an incentive from the customer point of view. The standard manners organizations to assess and reexamine on who are their real customers, and what those customers see as esteem. The principle focuses on characterizing value from the way a customer sees it as they eventually choose the value of an item or service. Referring to Mililani this way of thinking contrasts from the common practices utilized by most organizations where they generally tend to indicate value from a departmental point of view such as research and 'development engineering also finance'.

Defining value is the method for recognizing the shape, highlight, or capacity that a customer will buy in the situation where they can't play out the required undertaking on claim or without contributing extensive cost or time. (Womack and Jones cited in Tanagarajoo and Smith, 2015: 6) stated that organizations need to define value precisely "in terms of specific products with specific capabilities offered at specific prices through a dialogue with specific customers". This urge organization to understand and define the aspects of a goods or services are valuable or not from a customer perspective, and fulfill their demand by delivering what they want purchase. According to (Howell and Ballard, 2001) the defined value would set up the destinations for each of the activities encompass from planning until conveying a product to the customer.

However, Mililani stated that the process of understanding and accepting the value for customer point of view mostly would demand an organization for a comprehensive reorganize of currently practiced business processes and organization culture. For example, organizations may need to restructure the product line by reorganizing managers and employees into units that base on the product. The critical starting point for lean thinking is value. Value can only be defined or characterized by the final customer. And it can only significant when expressed in terms of a specific product (a good or a service, and often both at once) which meets the customer's needs at a specific price and at a specific time (Womack and Jones, 2003: 19).

Slack investigated about two value perspectives that assist in relating Lean Thinking Principles. He thinks it is necessary to understand Stakeholders and Employee Value and their attributes in addition to Customer Value. For defining the right value of the goods or services it is necessary to identify real needs, wants as well as wishes of customers. Identifying real customers is not always as easy as it seems. It is a challenge for companies to find their customers and their needs, either external customers who explicitly pay for a good or service or internal customers who receive outputs of a task or activity (Slack cited in Motavallion and Settyvari, 2013: 12).

Second: Map the Value Stream

The second principle of LT is 'recognize the value stream'. Value stream as defined by (Tanagarajoo and Smith, 2015: 2) is a perception that separates itself from the customary supply or the value chain concept. The previous is an engaged view on the value including process, alluding just to the particular practices that required in increasing the value of the making of a particular product or service in an organization, though the last incorporates the entire practices/ activities that are required in the organization (Tanagarajoo and Smith, 2015: 2).

The value stream is the arrangement of all the particular activities required to bring particular product (regardless of whether a product, or a service, or, progressively, a blend of the two) through the three basic management undertakings of any business: the problem-solving task running from concept through detailed point by point plan and designing "to production launch, the data management task running from order- catching through itemized scheduling to delivery, and the physical transformation task proceeding from raw materials to a finished product in the hands of the customer. Identifying the entirety value stream for each product (or in some cases for each product family) is the next step in lean thinking, a step which organizations have rarely attempted but which almost always exposes enormous, indeed staggering, amounts of muda (waste) "(Womack and Jones, 2003: 19).

In particular, value stream analysis will quite often demonstrate that three kinds of activities are happening along the value stream (Womack and Jones, 2003: 19):

A- Many steps will be found to unambiguously make value: welding the pipes of a bike frame together or flying a traveler from Dayton to Des Moines.

B- Many different steps will be found to make no value, however, to be unavoidable with current innovations and production resources: checking welds to guarantee quality and the additional progression of flying expansive planes through the Detroit center enrooted from Dayton to Des Moines (we'll term these Type One muda). Many extra steps will be found to make no value and to be quickly avoidable (Type Two muda).

(Slack cited in Motavallion and Settyvari, 2013: 12) later added a fourth type of tasks which not only do not create any value to the customer, but they reduce customer value. This can happen in the process where the customer value is not correctly understood and the efforts for adding value will actually have the opposite effect.

Third: Create the Flow

The next principle in lean thinking, after specifying the value and identifying the value stream, is making value flow. Flow is defined "As the lining up of all necessary sequences of activities required to achieve a steady continuous job flow, without interruption, wasted steps, batches or queues" (Slack cited in Motavallion and Settyvari,2013: 13).

When value has been accurately determined, the value stream for a particular product completely mapped by the lean project or venture, and clearly inefficient steps disposed of, it is the ideal opportunity for the following step in lean considering-a really amazing one: Make the rest of the value making steps flow. However, organizations be warned that this step requires a complete rearrangement of their mental tasks (Womack and Jones, 2003: 50).

Ford lessened the amount of effort required to assemble a Model T Ford by 90 percent amid the fall of 1913 by changing to ceaseless flow in last assembly. Along these lines, he arranged every one of the machines expected to create the parts for the Model T in the right grouping and attempted to accomplish flow the distance from crude materials to shipment of the completed auto, accomplishing a comparable

profitability leap. In any case, he just found the special case. His method just worked when creation volumes were sufficiently high to legitimize rapid sequential construction systems, when each product utilized the very same parts, and when a similar model was delivered for a long time (nineteen on account of the Model T). In the mid-1920s, when Ford towered over whatever remains of the mechanical world, his company was assembling more than two million Model Ts at many get together plants far and wide, every one of them precisely similar (Womack and Jones, 2003:50).

The most essential problem is that flow thinking is counter intuitive; it appears glaringly evident to the vast majority that work ought to be sorted out by offices or departments in batches. At that point, once offices and particular equipment for making batches at high speeds are set up, both the job ambitions of employees inside offices and the calculations of the corporate account (who needs to keep costly resources completely used) work effectively against changing over to flow. The reengineering development has perceived that departmentalized believing is problematic and has attempted to move the concentration from hierarchical classes (divisions) to esteem making "forms" - credit checking or guarantees modifying or the treatment of records receivable.

The issue is that the engineers haven't gone sufficiently far theoretically they are as yet managing separated and totaled procedures (for instance, arrange taking for an entire scope of products) as opposed to the whole flow of significant worth making exercises for particular products. Moreover, they regularly stop at the limits of the organization paying their expenses, while real leaps forward originate from taking the entire value flow into consideration. Besides, regard departments and employees as the opponents, utilizing outside SWAT groups to impact both aside. The recurrent outcome is a crumple of spirits and self-esteem among the employees who survive being reengineered and a relapse of the organization to the mean when the reengineers are gone (Womack and Jones, 2003: 50).

The lean alternative is to redefine the work of functions, departments, and organizations so they can make a positive contribution to value creation, speak to the real needs of employees at each point along the flow so it is really to their greatest advantage to make value flow. This requires not simply the creation of a lean

undertaking for each product but too the reevaluating of conventional corporations, functions, and careers, and the development of a lean strategy (Womack and Jones, 2003: 50).

Fourth: Establish the Pull

The primary obvious impact of changing over from departments and batches to product groups and flow is that the time required to go from concept to launch, sale to delivery, and crude material to the customer goes down significantly. At the point when flow is presented, products obliging years to configuration are done in months, orders taking days to process are finished in hours, and the weeks or months of throughput time for customary physical generation are decreased to minutes or days. In fact, in the event that you cannot rapidly bring throughput times around half in product advancement, 75 percent all together preparing, and 90 percent in physical production, you are accomplishing something incorrectly. (Womack and Jones, 2003: 67).

Fifth: Seek Perfection

As organizations start to precisely identify value, recognize the whole value flow, make the value making steps for particular products flow persistently, and let customers pull value from the venture, something extremely unusual starts to take place. It first lights on those included that there is no limit to the way toward decreasing effort, time, space, cost, and mistakes while offering a product which is mostly about what the customer really needs. All of a sudden flawlessness, the fifth and last principle of lean thinking, does not appear like an insane thought (Womack and Jones, 2003: 67).

Why should this be? because the four beginning principles cooperate with each other in a prudent circle. Getting value to flow faster always exposes hidden muda in the value stream. What is more, the harder you pull, the more the obstacles to flow are made known so they can be eliminated. Committed product groups in direct discourse with customers continuously find ways to determine value as better. In addition, although the disposal of muda sometimes requires new process technologies and new product concepts, the technologies and concepts are normally surprisingly straightforward and ready for execution immediately.

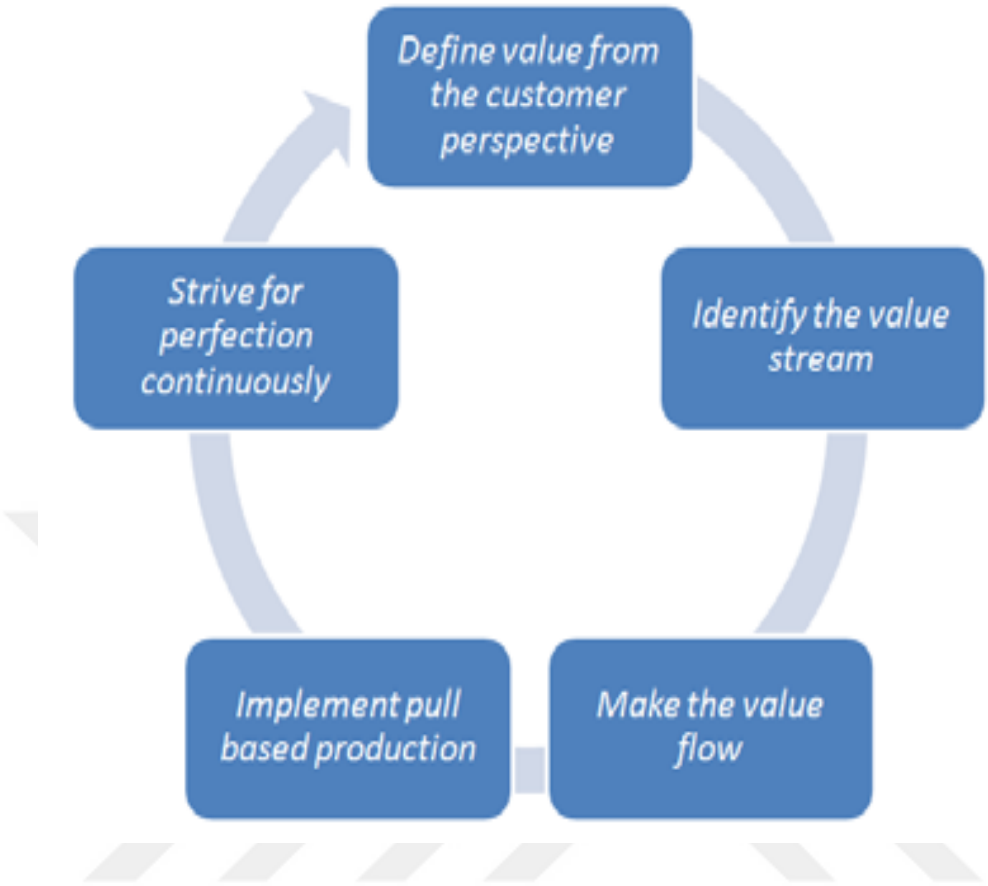
Transparency could be the most significant urge to excellence, the fact that in a lean framework everybody — subcontractors, first-level providers, "system integrators (often called assemblers), distributors, customers, employees - can see everything, and so it's easy to discover better ways to create value. What's more, there is nearly instant and highly positive feedback for employees making improvements, a key feature of lean work and a powerful spur to continuing efforts to improve" (Womack and Jones, 2003: 67).

According to (Tanagarajoo and Smith, 2015: 2) view, they argue, that to implement the keys principles of lean thinking they must be executed sequentially, as shown in the Figure (2) which summarize the circulation of lean thinking principles from their view, because identify and Specify value usually only a small part of the total time and effort in the organization adds value for the end customer.

All the non-value activities or waste or waste can be targeted for removal once we can obviously identify value for a particular product or service from the end customer's point of view. Also, identify and outline the value stream speak to the entire set of exercises across all parts of the corporation included in delivering the product or service together. This speaks to the end-to-end procedure that delivers the value to the customer. When you realize what, your customer needs the following step is to distinguish how you are delivering (or not) that to them.

Generate flow by dispensing with waste –Typically when you first guide the value flow, you may find that only some activities add value, this can bring more up in a service condition. Wiping out this waste guarantees that your product or service "streams" to the customer with no interference, reroute or holding up. Respond to Customer Pull– This is about how much you are aware of the customer's request and need from your organization and after that you make your procedure to react to this. That implies you create just what the customer needs when the client needs it. Seek after flawlessness - making flow and draw begins with fundamentally rearranging singular process steps, however the additions turn out to be really noteworthy as the whole steps connect together. As this happens an ever-increasing number of layers of waste get to be distinctly obvious and the procedure proceeds towards the hypothetical end purpose of flawlessness, where each advantage and each activity includes a value for the end client (Shnang, et al., 2014: 534).

Figure 2: Five key principles of lean thinking



Source: Thangarajoo**,** Y., and Smith**,** A, (2015), Lean Thinking: an over View, university Of Melbourne, Victoria, 3010, Australia, p.2.

1.4. CONCEPTS

The key terminologies of lean thinking were introduced below, and this set of concepts as a whole is too wide to focus on in this thesis, defining these concepts is necessary in order to understand the ideology and fundamentals behind the Lean Thinking approach and its linkage to Value – Oriented Product. The concepts excluding flow, Just-In-Time, pull, value, and waste are Japanese words due to the Japanese origin of Lean thinking (Liker and Houses, cited in Ikonen, 2011: 13). The following terminology is used in Lean thinking: -

Andon: The Japanese term Andon refers to a system that notifies management, maintenance, and other appropriate workers of a quality or process problem. An electric signboard equipped with signal lights is an example of this kind of system. And on closely relates to the Judoka (see below) quality control method and provides

workers with the possibility to stop production in case of abnormality and immediately call for assistance. In Toyota, the first step in Judoka is identifying problems and each team member must be able and willing to call attention to the problem. The Andon system makes this calling easy for the members (Liker and Hoses, cited in Ikonen, 2011: 13).

Flow: The English term flow in the context refers to the entire value stream, not to productivity of individual steps in the stream. In a pipeline process, for instance, we have to focus the time for ideas to go from beginning to end so that the flow provides the greatest value. The term closely relates to Just-In-Time (see below) (Shallowly, et al., cited in Ikonen, 2011: 14).

Gemba: By its meaning, it is defined by (Liker and Houses, cited in Ikonen, 2011:14) as "place, applied in manufacturing it is understood as the place where activity really happens", i.e., where the manufacturing work, for example, is done. The term closely relates to Gandhi Gen but us (see below) (Liker and Houses, cited in Ikonen, 2011: 14).

Genchi Genbutsu: The Japanese term Genchi Genbutsu is one of the key principles of the TPS and means "going to see". In order to understand the full impact of the situation one has to physically go to the place where work is done (Gemba). According to Lean thinking, problems are visible, which makes it sensible to consider Genchi Genbutsu as a key approach in problem solving. It allows management and other observers to see the performance in the manufacturing place where real value is created. Genchi Genbutsu facilitates seeing, for example, whether people are following a repeatable standard process or the material is flowing smoothly through the plant. The concept becomes second nature to Toyota engineers (Liker and Hoses, cited in Ikonen, 2011: 14).

Hansei: Hansei is a fundamental part of Japanese culture and means self-reflection. The aim is to acknowledge one's own mistakes and to commit to making improvements. The Toyota culture requires executing Hansei-kan (a reflection meeting) despite the success level of the project or process executed. The idea is to

review what went wrong and what can be improved. In TPS, only "no problem" is a problem during a Hansei-kai and the focus is on all the deficiencies of both the team and technical processes (Liker and Houses, cited in Ikonen, 2011: 14).

Heijunka: Heijunka refers to production smoothing and it aims at reducing Mud (see Section "Muda" in this chapter). The TPS develops the production efficiency by following the Heijunka principle. The general value of utilizing Heijunka is to produce intermediate products at a constant rate and to allow further processing to be carried out at a predictable, constant rate. Toyota applies the principle to its hiring policy as well (Liker and Hoses, cited in Ikonen, 2011: 15).

Hoshin-kanri: While Hushin means shining metal, compass, or pointing the direction and Kanri means management or control, Hoshin-kanri translates into "directions and means management" and refers to policy deployment. Regarding TPS, it is a system that sets objectives for improvement. It teaches people to learn how to solve problems and continually improve their work. Hoshin-kanri begins at the very top of Toyota and comes to agreements at each level down to the team member. Every employee has a Hoshin, defined as particular measurable objectives that are reviewed throughout the year. Hoshin both develops people through the job and increases performance as an organization through teamwork. It interconnects the leadership's vision, values, and philosophies to the daily activity on the Gemba. As a process, Hoshin (1) sets mid-to-long-term management plans and annual Hoshin, (2) prioritizes activities and resources, (3) involves all members in targets or means to achieve them, and (4) maintains the cycle of plan-do-check act and follow-ups during implementation. By putting all these to gather, Hoshin-kanri is a mechanism for converting team members' energy into exception all levels of performance that guides the whole organization in one direction, with the members taking the initiative (Liker and Hoseus, cited in Ikonen, 2011: 15).

Jidoka: Jidoka is considered the other pillar upon which the TPS has been built and is considered to lead to continuous improvement. The TPS understands Jidoka as automation with a human touch, often called "intelligent automation". The fundamental idea is that people should not serve machines but vice versa. Jidoka

implements rather supervisory functions than production functions. Stop-the-line is an example in case of abnormality Jidoka prevents overproduction and producing defective products. By evaluating gather process and understanding the reasons behind a problem it can better be ensured that the problem never occurs again (Liker an Hoseus, cited in Ikonen, 2011: 15).

Jishuken: By meaning voluntary self-study, Jishuken in the TPS refers to Toyota Kaizen events that are performed with the primary purpose of developing the skills of problem solving and leadership of the managers. Joshua en expects managers to learn and find ways to improve processes. In the sense of self-study, managers may interview team members, identify waste, and make improvements based on their findings. The Jishuken events, are however, driven and led by trained facilitators where experts in Lean (Liker and Hoseus, cited in Ikonen, 2011: 16).

Just-In-Time (JIT): The idea of pull-driven JIT is that a production unit does not "push "anything to the customer or unit next to it. This customer or unit rather "pulls" the product needed. Such a policy prevents overproduction: if the customer or unit "pulls" means "only those products really needed, the producing unit only wastes its time and resources" (Shingo, cited in Ikonen 2011: 16) if it produces unnecessary products. Furthermore, when products are ready just in time, inventories become useless since the customer pulls the product to himself before the non-value adding inventorying operation (Shingo, cited in Ikonen 2011: 16); (Womack and Jones cited in Ikonen, 2011: 16) defines the term Just-In-Time as follows: A system for producing and delivering the right products at the right time in the right amounts. "Pulls" just those products truly required, the delivering unit just squanders its time and assets.

Kaizen: Kaizen refers to change for the better, either a philosophy or practices that focus upon continuous improvement of processes, which aims at eliminating waste and overly hard work (Muri). In addition, the workplace gets humanized and people learn how to perform. Usually Kaizen concerns all personnel from the chief executive officer to assembly line employees. In the TPS, it is commonly a local improvement with a local area or work group related to their own environment and

productivity improvements. The line personnel are expected to stop the line when abnormality is revealed. Then, tracing the reason for this abnormality leads to improvement suggestion that eventually may initiate a Kaizen. The essence of Kaizen is the notion that line workers, engineers, and managers collaborate continually to identify incremental changes and systematize production tasks in order to establish a smoother flow (Liker and Hoseus, cited in Ikonen, 2011: 16).

Kaikaku: Kaikaku means radical improvement within a limited time, in contrast to Kaizen. The aim is to eliminate Mud. In TPS, such a radical improvement may occur due to introducing new production techniques or equipment, strategies, or knowledge. Typically, it is initiated by management but can also be launched by external factors, such as market conditions (Womack and Jones, cited in Ikonen, 2011: 17).

Kanban: The Japanese word Kanban refers to a signboard. When the term is used in manufacturing, it means a scheduling system that hints what, when, and how much to produce. Toyota, for example, has successfully applied Kanban in practice as one part of TPS resulting in a way for promoting improvements (Hiranabe, cited in Ikonen, 2011: 16). Kanban is basically a flow control mechanism "for pull-driven Just-In-Time" production in which the upstream processing activities are triggered by the downstream process demand signals. In general, Kanban has three rules: (1) visualize the workflow, (2) limit work in progress (WIP) at each workflow state, and (3) measure the cycle-time, i.e., average time to complete one item" (Kniberg, 2009 : 17). Kanban does not intervene in management despite its importance, i.e., how to do things. Instead, it is inclusive of management. In other words, management is involved and it is committed to abide by the methods the teams have selected to do their work. In addition, management is part of discussions about how the work is being tracked and performed. Kanban combines defining and managing a workflow: this workflow based on queues and control loops is managed by limiting WIPs (Shalloway, et al., cited in Ikonen, 2011: 17).

Muda: Muda for waste means activity that is wasteful and does not add value or is unproductive (Ohio and Shingo, cited in Ikonen, 2011: 18). (Womack and Jones

cited in Ikonen, 2011: 17) divide wasteful activity that has occurred along the value stream into two types: steps that create no value but are unavoidable (type one Muda) and steps that create no value and are immediately avoidable (type two Muda).

Mura: Mura refers to inconsistency in physical matter or the human spiritual condition, and to unevenness. Uneven workloads are an example of Mura (Ohio and Shingo, cited in Ikonen, 2011: 18). The third type of waste is called Mura. Mura exists when the work flow is out balance and work load is inconsistent. Muda and Muri will be a result of Mura. (Liker, cited in Motavllian and Settyari, 2013: 18).

Muri: Muri means unreasonableness, overburden, or absurdity (Ohio cited in Ikonen, 2011: 18). According to (Liker cited in Motavllian and Settyari, 2013: 18), Muri is pushing a machine or person beyond natural limits. Overburdening people result in safety and quality problems. Overburdening equipment causes breakdowns and defects.

Pull: In the pull method, the next process withdraws the quantities it requires from the preceding process (Ohio, cited in Ikonen 2011: 18). See Section "Just-In-Time (JIT)"in this chapter.

Yokoten: Yokoten is to spread across or propagate. In nature, Yokoten is multiplying of grafts and saplings of a large tree into many new trees. While each new tree will grow differently in its separate, unique way, it will thrive with properly prepared weather and soil conditions as will its peers. Correspondingly in the TPS, Yokoten is not cloning nor copying but improving what has been seen. Toyota's Kaizen process includes Yokoten (Liker and Hoseus, cited in Ikonen, 2011: 18).

1.5. LEAN THINKING GOALS

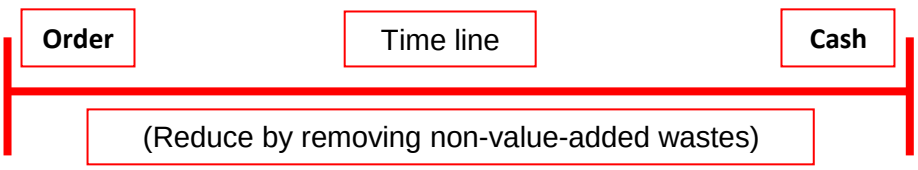
Lean Thinking goals are always an interesting topic. The name Lean Thinking came about because, in the end, the prepare can run utilizing less manpower, take less time, devour less space, and use less equipment and material investment. So often when evaluating the success of a Lean Thinking initiative, these terms are used

and calculations of space utilization, and even distance traveled, are used. In long terms, these are not extremely significant measures since they commonly are not a good subset of the plant objectives, nor do they promptly convert into key business parameters, such as " profits or return on investment" (Wilson, 2010: 147).

Sustainable shortest lead time, best quality what's more, value (to individuals and society), most customer delight, lowest cost, high morale, safety Broadly, the global or system goals of lean thinking is to quickly delivering things of value (to the client and society), in shorter and shorter cycle times of all processes, while still accomplishing maximum quality and high levels of confidence, spirit and self-esteem - flow of value to the customer without delay. The main goal of lean thinking that Toyota strives is to reduce cycle times, but not through cutting corners, continuous improvement, that requires a company culture of meaningful regard for people in which people feel they have the personal safety to challenge and change the status quo (Larman and Vodde, 2009: 9).

We see echoes of this goal in the words of the creator of the Toyota Production System (TPS), Taiichi Ohno: All we are doing is taking a gander at the course of events objective, from the minute the customer gives us a request to the point where we gather the money. What's more, we are decreasing the course of events by diminishing the non-value adding wastes Figure (3). So, a focus of lean is on the baton, not the runners-removing the bottlenecks to faster through put of value to customers rather than locally optimizing by trying to maxi utilization of workers or machines. (Larman and vodde, 2009: 9).

Figure 3: Time line of Toyota Production System



Source: Taichi Ohno**,** (1988), Toyota Production System: Beyond Large-Scale Production, Productivity Press, N, Y, USA, p.4.

(Wilson, 2012: 147) postulates that "most plants already have good measures of manpower utilization. For the other Lean measures, the ones that commonly get

woven into the general plant goals are inventory management measured as inventory turns, and the lead time, measured as manufacturing lead time.

If Generally Equipment Viability doesn't already a line targets this is clearly to be included. In total, there ought to be five to seven objectives that are the measurements to measure how the line will supply the product, with better quality, with shorter lead times, and do so less expensively (Wilson, 2010: 147). We don't support particular objectives here past the objectives of the venture that are incorporated into the plan. This is for two extremely stable reasons:

At some points these objectives will conflict with the plant objectives. It is best to just mesh them into the plant objectives. On the off chance that the plant objectives do not echo the need to be Lean, change the plant objectives.

We need to try as we can to mesh the Lean activity into the typical workings of the plant and not make it a New Thing We Do. Or maybe, it ought not to be another thing, but rather another method for doing the things we have to do. We need to start quickly meshing Lean exercises into the way of life; i.e. culture, which will begin the required social change to manage the increases. There is no better point to start than right here.

(Kumar, 2014: 231) argues that the key goal of Lean Thinking is to eliminate waste and improve effectiveness in a manufacturing situation or a methodical way to deal with distinguishing and taking our waste through continuous improvement, following the product at the pull of the customer in pursuit of perfection. Also, he indicates the following objectives when it is used in product manufacturing:

1. Reducing defects and unnecessary physical wastage including excess use of raw material inputs.
2. Reduce production cycle time by reducing holding up times between process stages.
3. Minimize inventory levels at all stages of production especially works-in advance between production stages.
4. Enhance work efficiency by lessening the sit time of laborers.
5. Effective utilization of hardware and space by eliminating bottlenecks and limiting machine downtime.

6. Adaptability underway with least changeover expenses and changeover time.
7. Increasing yield by achieving the above-mentioned goals.

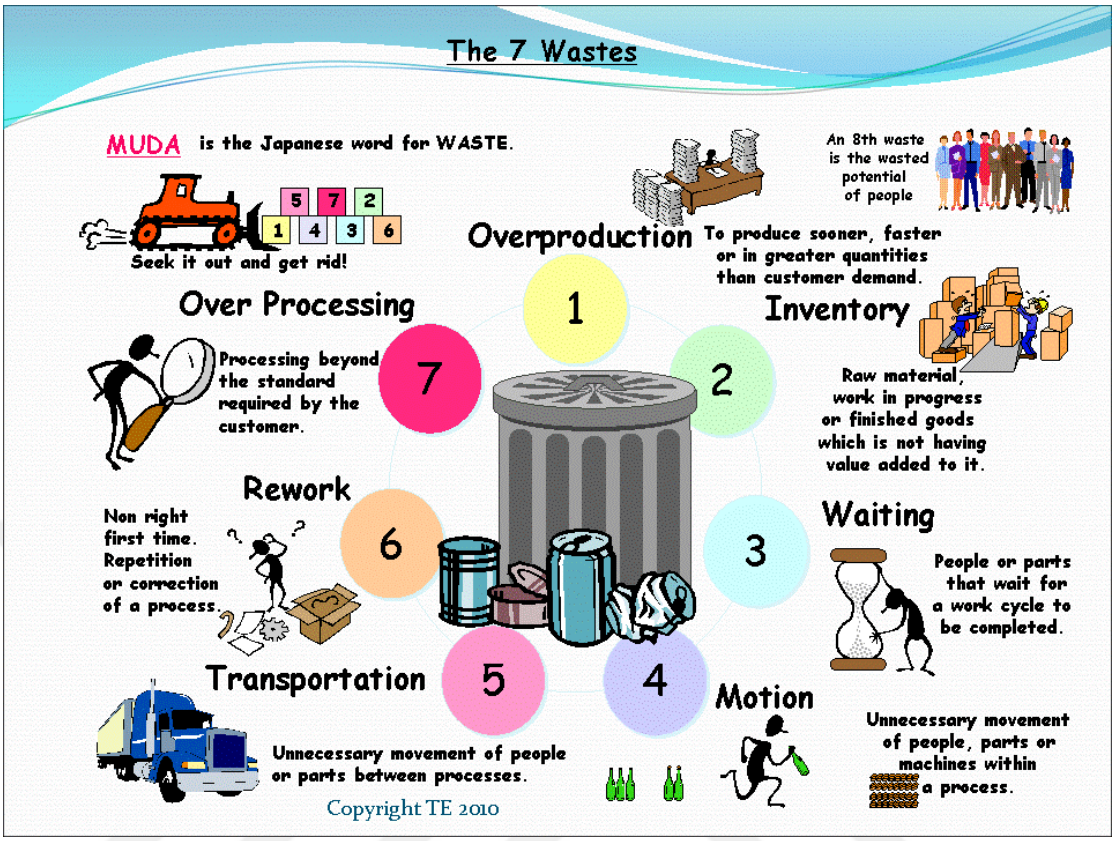
1.6. THE SEVEN WASTES

Lean thinking is a method to learn how to think in terms of the seven wastes. When you find, yourself doing something extra, think over processing. when you are carrying a part, think transportation. "When you walk around a pile, think inventory. When you call things what they are, you will keep the problems front and center, and will be more likely to do something about them" *(*lean manufacturingtools.org, 2010, Accessed on 3 November 2016).

Also, keep in mind that in a Lean culture, it is everyone's job to go after the seven wastes. It isn't enough to just recognize the problems. You must continually eliminate them. If it happens that you are not acquainted with change procedures, approach your manager for help, however remember that the easiest approach to portray waste is as 'Something that includes no Value' the customers would not be happy to pay for any action that does not add value to what they actually want and nor should we be.

May be one ask a question about why to remove wastes? The answer is relating to organizations desire to achieve profit, their profits represent selling price less their costs, no matter how they think about the selling price it is very much dictated by the market not by themselves. If organization charge too much then customers will go elsewhere, even if organizations charge too little they may lose clients as they will see there might be a major issue with what they are offering. Therefore, the only way organizations have to improve their profits are to reduce their costs; this means removing all elements of waste from the processes. In addition to improving the profits organizations will find that waste has a major impact on customer's satisfaction with their goods and services. Customers want on time delivery, perfect quality and at the right price. Something that organizations cannot achieve if they allow the seven waste Figure (4) to persist within the processes (lean manufacturingtools.org, 2010, Accessed On 3 November 2016).

Figure 4: The 7 Wastes



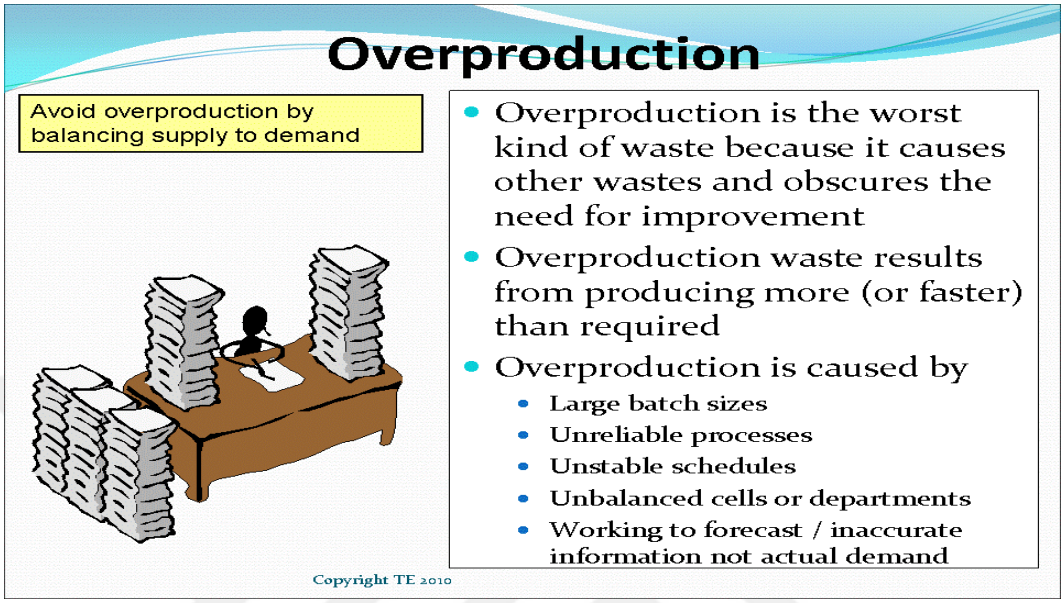
Source: (http://lean manufacturingtools.org, 2010, Accessed On 3 November 2016).

The Non-Added Value Activities in Lean Thinking -especially in manufacturing organizations- have a clear concept of the Toyota Production System the term "Waste" and its nature must be understood. In lean terminology, Waste is anything over than the minimum amount of equipment, materials, parts and working time which is absolutely essential to add value to the product. According to (Diaz, 2013:8) "waste elimination is one of the bases of lean philosophy, this is because the activities that add value to the product just represent 5% of efforts; the other 95% is waste". (Diaz, 2013: 8) categorizes this waste in the following seven types:

First: Over Production: producing items early or in greater quantities than needed by the customer. This situation produces other wastes, for example, overstaffing, capacity, and transportation costs because of inventory. In brief any situation lead to producing more products than the ultimate customer requires it mean over production. (Georgescu, 2011: 7) stated that over production is making something before it is truly needed. This is viewed as an especially genuine type of waste since it prompts to overabundance inventory (e.g. safety stock) that normally veils

numerous other hidden issues and wasteful aspects. And Figure (5) illustrate a brief view about this type of waste and its causes.

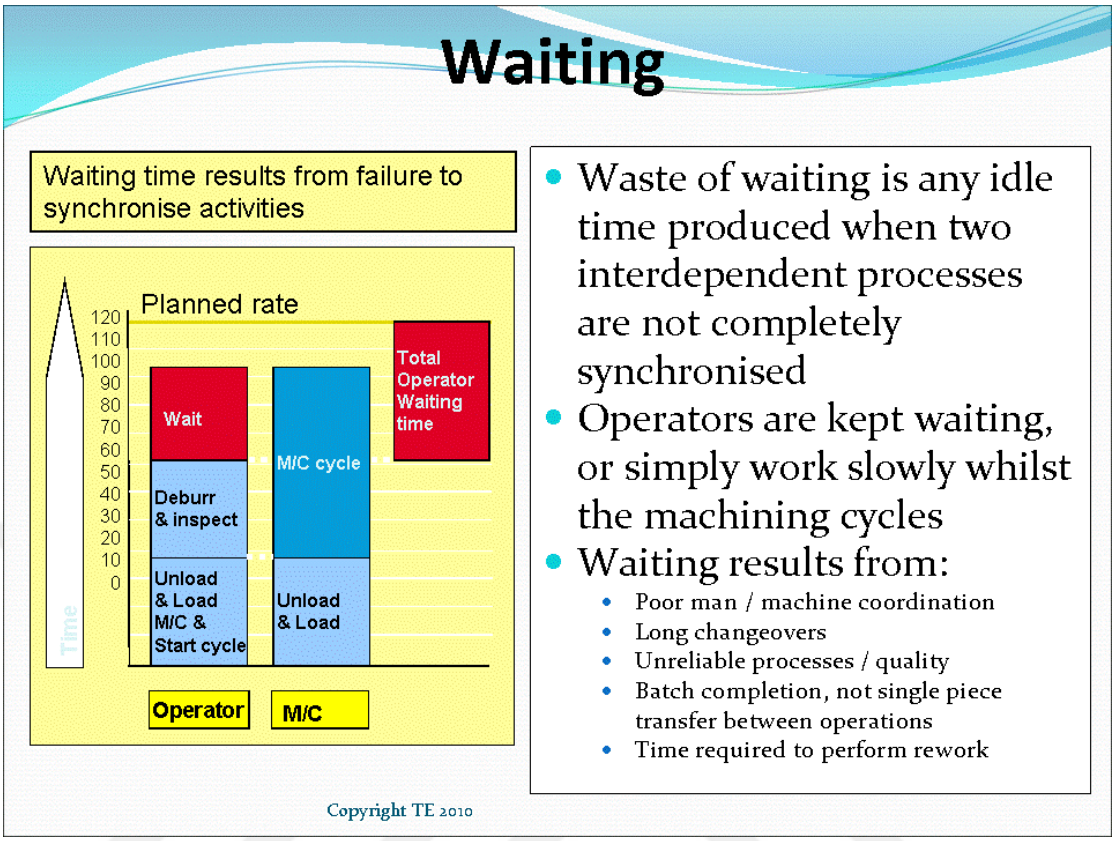
Figure 5: The Over - Production Waste



Source: (http://lean manufacturing tools.org, 2010, Accessed On 3 November 2016).

Second: Waiting: It is the idle time created when materials, parts, information, people or equipment is not ready when it is required. Or the time spent waiting for products required to complete a task (i.e. information, material, supplies, instruction etc.). Time, when work-in-process, is waiting for the next step in production. It can be genuinely helpful to take a gander at the time interim from "delivery and ask" - how much from that time is really spent on genuine value added manufacturing. Figure (6) depict this sort of waste and what are the elements that outcome it.

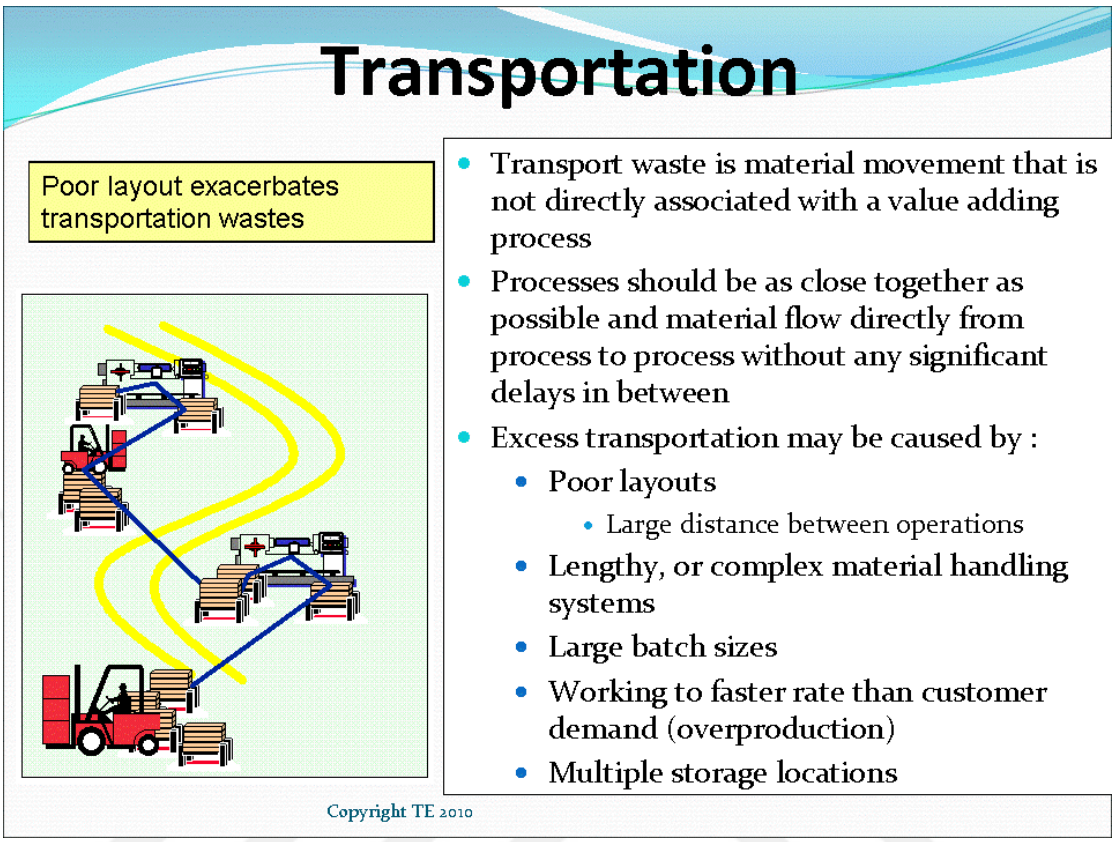
Figure 6: The Waiting Waste



Source: (http://lean manufacturingtools.org, 2010, Accessed On 3 November 2016).

Third: Transporting: moving materials, parts, vehicles to and from storage or between processes. Or unnecessary transportation of material by conveyor, forklift, or foot travel. Transport which is the transfer of goods from one place to another is a waste because it does not any value to the product; this value is technically called zero value. Why would your customer (or you for that matter) want to pay for an operation that adds no value? Transport increases the value of the product; you as a business are paying individuals to move material starting with one area then onto the next, a procedure those exclusive costs you cash and makes nothing for you. The misuse of Transport can be a high cost to your business, you require individuals to work it and hardware, for example, trucks or fork trucks to attempt this costly development of materials. Figure (7) illustrates a brief view about this type of waste and its causes.

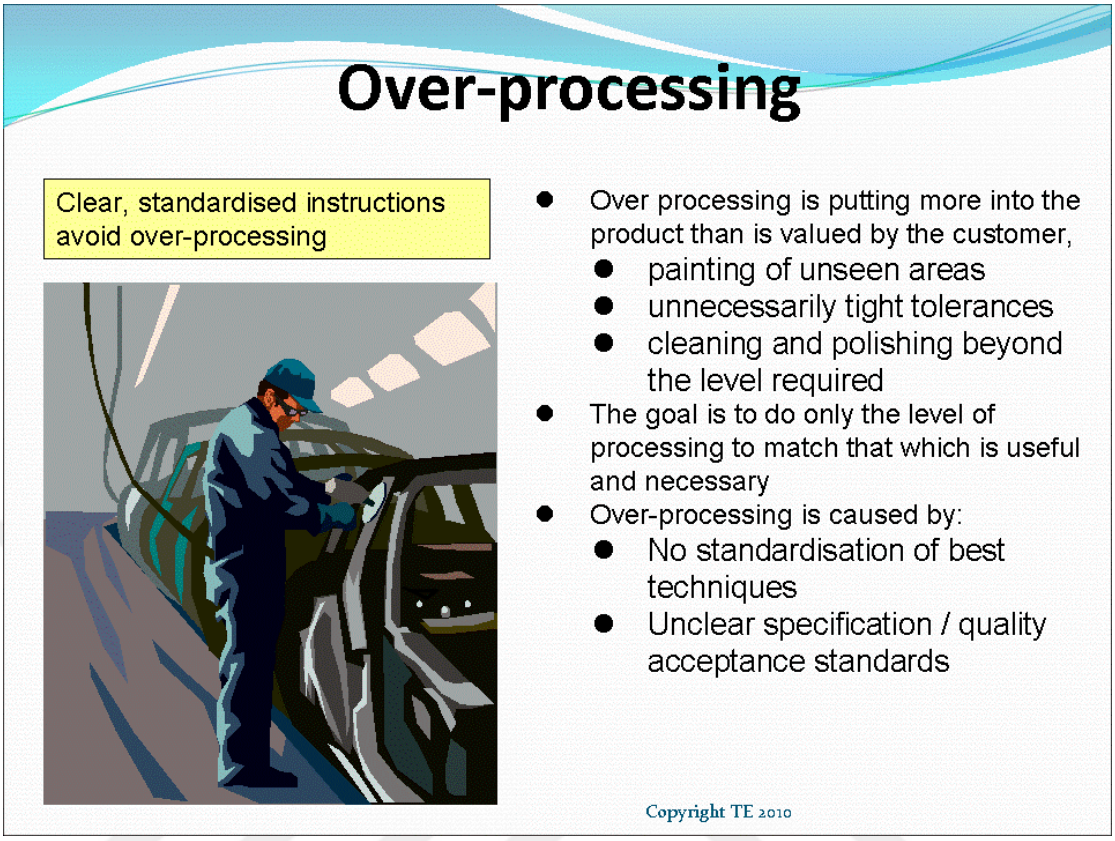
Figure 7: The Transportation Waste



Source: (http://lean manufacturing tools.org, 2010, Accessed On 3 November 2016).

Fourth: Over processing: this is about all non-value added process steps or actions taken that are not important to the customer, and any efforts and time spent on processing material which doesn't add value. The waste of Over preparing is the place we utilize wrong strategies, oversize gear, attempting to resilience's that are too tight, perform processes that are not required by the customer and so forth. These things cost us time and cash. One of the biggest examples of over-processing in most companies is that of the "mega machine" that can do an operation speedier than whatever other, however every procedure flow must be directed through it bringing about planning complexities, postponements et cetera. In lean; little is excellent, utilize little fitting machines where they are required in the flow, not break the flow to course through a very costly giant that the accountants demand is kept occupied (lean manufacturing tools.org, 2010, Accessed On 3 November 2016). Figure (8) give us a brief view about this type of waste and its causes.

Figure 8: The Over - Processing Waste

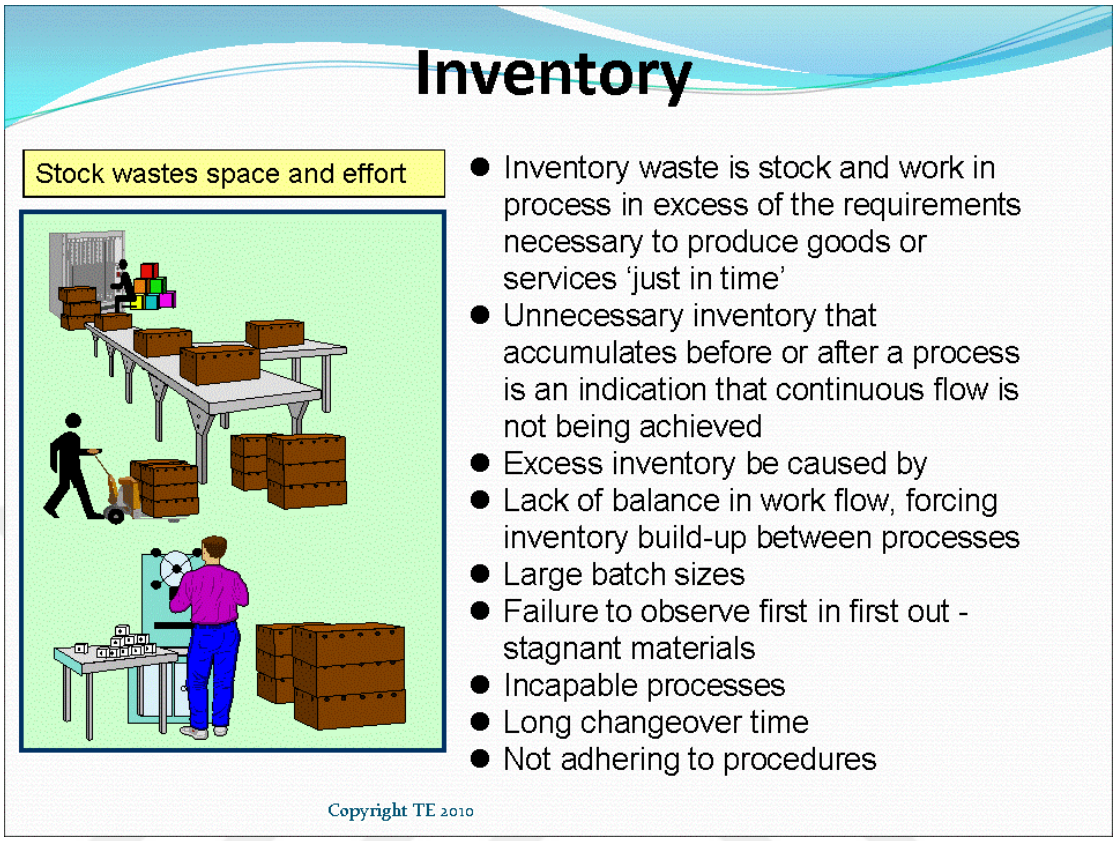


Source: (http://lean manufacturingtools.org, 2010, Accessed On 3 November 2016).

Fifth: Inventory: It is any material, supplies, parts or products in excess of Just-in-time requirements. Inventories hide a lot of problems like material that is waiting for processing or not required per customer demand.

Inventory costs represent organizations money, every piece of product tied up in raw material, work in progress or finished products has a cost and until it is actually sold that cost is theirs. As well as the immaculate cost of the stock/inventory there are other different costs which are seen as wastes; Stock must be stored, it needs space, it needs bundling and it must be transported around. It has the chance of being damaged during transport and becoming obsolete. The waste of Inventory hides many of the other wastes in organization systems (lean manufacturing tools.org, 2010, Accessed On 3 November 2016). Figure (9) demonstrate this type of waste and its causes.

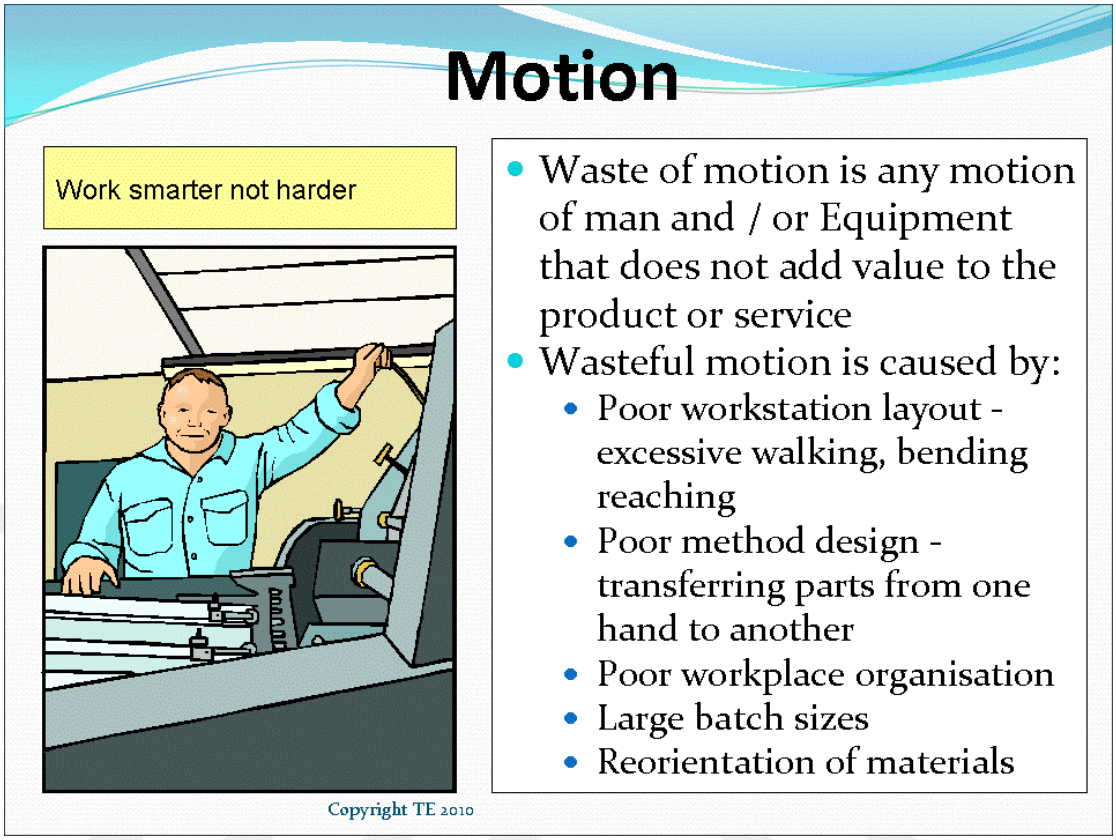
Figure 9: The Inventory Waste



Source: (http://lean manufacturing tools.org, 2010, Accessed On 3 November 2016).

Sixth: Moving (Or Motion): unnecessary movement or motion of people that do not add value to the product or service. Unnecessary motions are those developments of man or machine which are not as little or as easy to accomplish as possible, by this it mean bending down to retrieve heavy objects at floor level when they could be nourished at waist level to decrease stress and time to recover. Too much travel between works stations, too much machine movements from start point to work are all cases of the misuse of movement which considered wastes. All of these wasteful motions cost the organizations time (money) and cause stress on their employees and machines, after all even robots wear out (lean manufacturing tools.org,2010, Accessed On 3 November 2016). Figure (10) describe a brief view about this type of waste and its causes.

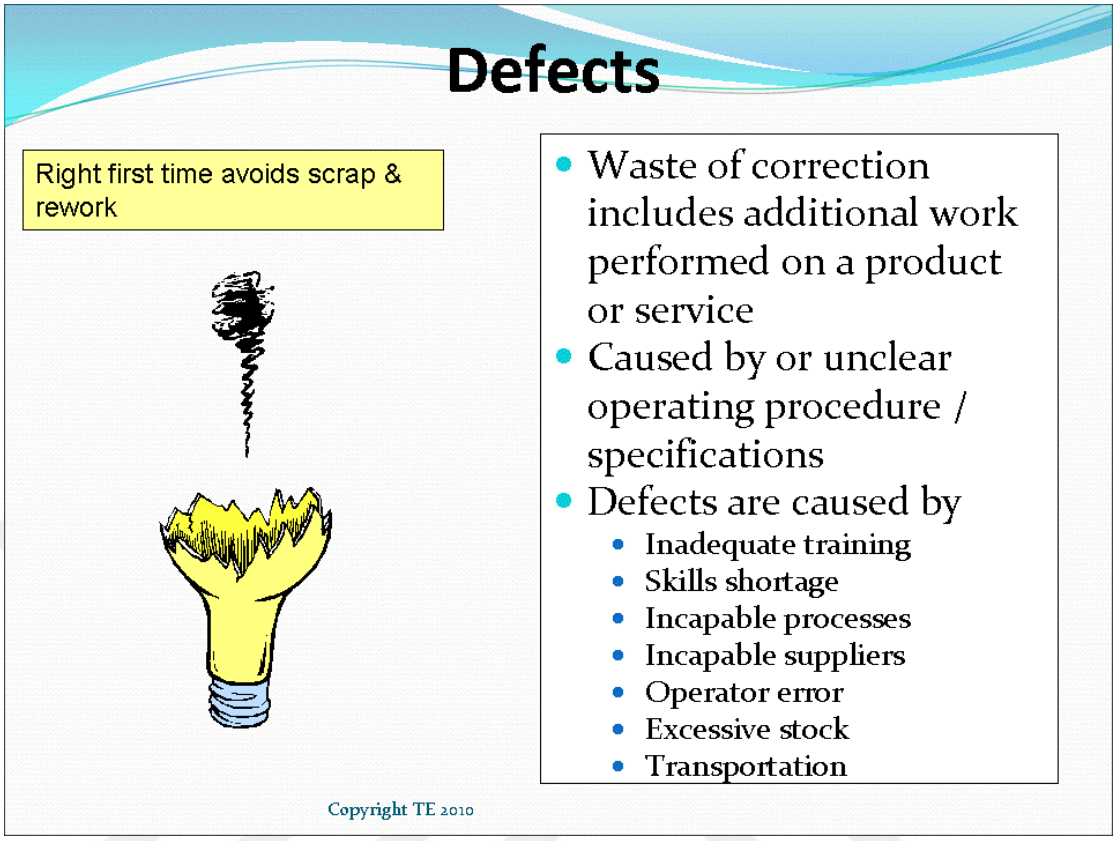
Figure 10: The Moving (Motion) Waste



Source: (http://lean manufacturing tools.org, 2010, Accessed On 3 November 2016).

Seventh: Making defective parts and products: any defects, errors, rework or repair. Or any time spent on reworking or repairing defective products. The most obvious of the seven wastes, although not always the easiest to detect before they reach organization customers. Quality errors that cause defects invariably cost the organizations far more than they expect. Each damaged thing requires improve, repair or substitution, it wastes assets and materials, it requires official procedures, it can cause loss of customers. It is better to avoid and disallow 'The Waste of defects' wherever possible than merely detecting them, the execution of pokayoke systems and computerization can keep defects from happening (lean manufacturing tools.org, 2010, Accessed On 3 November 2016). Figure (11) describes a brief view about this type of waste and its causes.

Figure 11: The Defects Waste



Source: (http://lean manufacturingtools.org, 2010, Accessed On 3 November 2016).

1.7. Lean Thinking Culture

Culture can be defined as "the combined actions, thoughts, beliefs, artifacts, and language of any group of people" (Wilson, 2010: 179). It could be the culture of life of the Catholic Church, the culture of life of the South, the culture of life of Toyota, the culture of life of the New York Yankees, the culture of life of your plant, or any gathering of individuals. The general population inside these gatherings thinks, talk, and carry on inside unsurprising examples of conduct. These considerations, dialect, and practices then recognize them to be an individual from the culture of life. Often, "these cultures have specific artifacts that help identify them as part of a culture. These artifacts may include such things as symbolic necklaces, or uniforms. However, simply put, a culture is "how we do things around here" (Wilson, 2010 :179).

The common belief is that to be 'fully' lean requires changing the culture of the whole organization. Indeed, whilst there is some technical skill in implementing

Lean tools, the overarching success factors of lean practices are behavioral and cultural. What is meant by this is that improvement requires change, and change rests on behavioral factors even more than technical ones. Without a person's willingness to fully embrace a change of working practice, that process will not improve, regardless of the technological or analytical breakthrough that has been made using lean tools. It is at this stage that change management, and all the associated principles of educating, training, and empowering employees, becomes important (Lee, et al., 2013: 79).

In industry, the measure of lean culture change has evolved into a type of 'forward-thinking mentality', characterized by:

1. An openness to change and willingness to look beyond the status quo.
2. Passionate leaders who can motivate the entire workforce into embracing Lean.
3. Clear and transparent standard procedures that all employees support.
4. A belief that measuring and monitoring is as important as the work procedure 1itself.

As (Behm, 2010: 2) refer, if any organization wish to adopt the lean culture it must do it through the five principles of lean thinking as a whole and not adopt it with one or two principles only, it must change their beliefs, actions, thoughts, artifacts according to identify value principle, map the value principle, create flow principle, establish pull principle, and seek perfection principle, as indicating in Figure (12).

Figure 12: Lean Thinking Culture

Source: Behm**,** J, Deseck**,** M., and Gramza, M, Hermansen**,** S, (2010), Lean Thinking for Business And finance, International Conference on Industrial Engineering and Operation Management Kuala Lamprey, Malaysia, January 22 - 24 - 2014, p.4.

Whilst the automotive industry embraced the pure Japanese Lean terminology of 'Lean Philosophy' and 'Culture Transformation', the food industry has discarded the elements that are less relevant and is establishing its own language of continuous improvement. However, as the real-world examples below show, attaining this level of transformation is not easy, and this is a goal that few in the food supply chain have yet reached (Lee, et al., 2013: 79).

At the pinnacle of the Lean Pyramid sit organizations which have adopted a fully Lean Culture from top to bottom. The philosophy of Lean is second nature, with all functions continually examined and optimized for the value they add. Once properly identified anywhere in the supply chain, waste is minimized or eliminated using a variety of established or bespoke Lean tools. Attaining this level takes time and requires the culture of Lean thinking and continuous improvement to be embedded

throughout the organization, as well as similar transformations in first and even second tier suppliers. The top level does not mark the end of the Lean journey efforts to improve resource efficiency are continuous. At level 2 of the Pyramid, the requirement was for a change in the mind-set of individuals involved in Lean. At this level, the demand is that the collective culture must change, that a company culture must develop (Lee, et al., 2013: 79).

1. 8. LEAN THINKING IN PRACTICE

Numerous of publications strongly proposed that the organizations should implement comprehensive of lean thinking practices (Karlsson and Kuala Ahlstrom cited in Rose, et al., 2011: 837).

In their study (Rose, et al., 2011: 874) claimed that the small organization could success in Lean Manufacturing as the large organization. There are more than hundred lean thinking practices available and being practiced by manufacturing and services organizations. Researchers had suggested that the organization should implement all or most of the lean thinking practices in order to achieve its objectives in growth, survive and value creation. However, we try at the following items to explain a number of Lean Thinking Practices. (Rose, et al., 2011: 874).

1.8.1. LEAN THINKING AND PRODUCT DEVELOPMENT

Implementing lean thinking in product improvement concentrates on making re-useable learning – that adds to the profitability of future operational value cycles and that can in a perfect world be utilized for some activities (Gustarsson, 2011: 26). Lean thinking strategies concentrate on expanding customer value and on the general population who increase the value of the product. A Lean-based organization urges its workers to perform constant change. This is done by cross-utilitarian and parallel work and a high level of standardization keeping in mind the end goal to enhance and to share learning over the corporation.

Lean thinking in product improvement is accomplished by a watchful planning of a production line keeping in mind the end goal to upgrade the generation stream to address client issues in merchandise and service. Every assembly station is organized to limit pointless movement and material transportation. Every assembly station is given certain assignments to be done at a particular time keeping in mind the end

goal to accomplish adjusted flow all through the production line. A balanced flow means that the results are delivered on time without waiting or over-production (Gustarsson, 2011; 26). An essential beginning stage for lean item/product improvement is to view item advancement as a procedure or process, and like some other procedure there are recurred cycles of action. From a process point of view, there are numerous activities that are shared between various development ventures.

An increased stream is achieved by disposing of the waste in a process, thus new products can be brought to the market at a higher pace (Gustarsson, 2011: 26).

(Kennedy et al., cited in Gastavsson., 2011: 27) contend that Toyota institutionalizes their learning into agendas and surveys all their design against these standards. Those checklists are updated after every project. Product development consists of two value streams:

1. The item value flow is interesting to every venture or enterprise .Enterprise/project is not begun until the option plans have been assessed and settled on. At the point when the venture begins, the hazard ought to be low. Knowledge acquired during and after the project is feed back into the knowledge value stream.

2. The information value stream comprises of information generalized for visual flow over projects and corporation. Agendas and A3 documentation are used to convey this information. Architectural information such as patterns and rules should be part of the information value stream.

In last decades' new product development (NPD) has become a critical process in terms of quality, cost and time. Organizations must design and produce the right products in an efficient way, and must create and deliver the products that meet the needs of all stakeholders. Organizations try to find principles and tools to increase NPD efficiency. Lean Product Development (LPD) as a domain approach addresses these challenges. It is a general idea of Lean Thinking in the field of product development and tries to achieve a value-oriented, resource-efficient, and fast product innovation process (Hoppmann, et al, cited in Motavallian and Sttyvari., 2013: 14).

According to (Locher cited in Motavallian and Sttyvari, 2013: 16) product development system as a practice of lean thinking based on four principles:

1. Distinguishing between knowledge reuse and knowledge creation.

2. Performing development activities concurrently.

3. Distinguishing between good and bad iterations.

4. Maintaining a process focus throughout.

1.8.2. LEAN THINKING AND MANUFACTURING

Manufacturing as a practice of lean thinking is a production philosophy focused on elimination of all waste while increasing customer value. In few words lean thinking implies including more an incentive for clients with fewer assets or as expressed by (Diaz, 2013: 4) it "means adding more value for customers with fewer resources". A lean organization comprehends customer value and centers its key processes to ceaselessly increase it. This strategy takes into consideration the regard for the laborers, the quality of the products and the stability of the process (Diaz, 2013: 4).

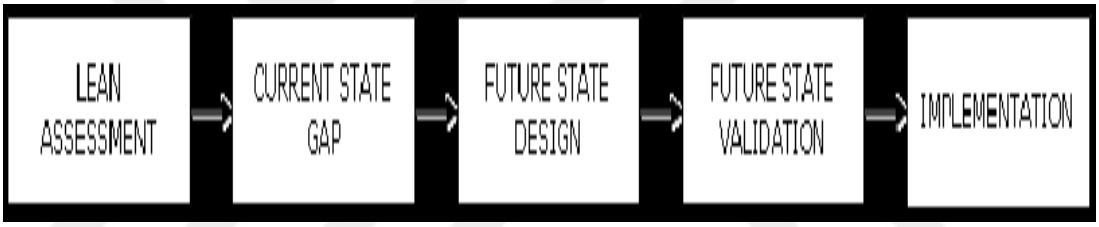
Lean thinking as lean manufacturing is one way to define Toyota's production system. Another definition that describes lean manufacturing is a waste-free production. Muda is the term chosen to refer to lean manufacturing in Japanese; Muda means "waste, and manufacturing system is supported by three Philosophies, JIT, kaizen (continuous improvements) judoka, or autorotation, a form of automation in which machinery automatically inspects each product after producing it, ceasing production and notifying humans if a defect is detected "(Santos, et al., 2006: 9).

(Wilson, 2010: 9) states clearly that "we explore what Lean Manufacturing is and what it is not. In so doing, we will define Lean Manufacturing from several different perspectives and into philosophies". The Toyota Production System is often used interchangeably with the terms Lean Manufacturing and Lean Production (Wilson, 2010: 9). The term Lean Manufacturing has since turned out to be synonymous with the Toyota Production System; however, there are no less than two differences. The first is a somewhat not easily seen distinction and has more to do with the usage of

Lean, while the second is the key difference between Lean and the Toyota Production System. (Wilson, 2010: 9).

Lean manufacturing has been applied inside the process businesses, most notably chemicals what's more, pharmaceuticals sectors. The more extensive utilization of Lean Thinking is progressively likely, yet more than that it is required. Incline thinking is appropriate to all business forms inside the process industries. The challenge , on the off chance that we choose we need to be lean, is whether we know enough about our methods for working, what customers of the business process rely value, and how our businesses operate and need to operate (Melton, T., 2005: 664). And to implement Lean Manufacturing this need to went through five steps, which they were as stated in Figure (13).

Figure 13: "Simulation-Enhanced Approach to Lean Manufacturing"



Source: Marvel, J, H., and Stand Ridge**,** C, R, (2009), "Assimilation – Enhanced Lean Design Process", Gettysburg College (USA), Grand Valley State University (USA), Journal of Industrial Engineering and Management, ISSN: 2013-0953, Pp.90

Depending upon the business, there are a wide range of definitions and points of view of lean manufacturing, to what extent the corporation has been learning out about Lean and what that corporation's genuine destinations are for embracing Lean. Also, it requires keeping far not as much as a large portion of the required stock nearby, brings about numerous less imperfections and produces a more noteworthy and regularly developing assortment of preparations.

Lean manufacturing alludes to an advancing dynamic new procedure of production covering the total undertaking, grasping all aspects of industrial operations (product, manufacturing, corporation and human resources, customer bolster) and including customer supply systems, which is administered by a systemic arrangement of standards, strategies and practices. "Key Lean principles are perfect first-time quality, waste minimization by removing all activities that do not add

value, continuous improvement, flexibility and long-term relationships" (Anvari, et al., 2011: 1587).

Manufacturing processes are generally sequential in nature, they are repetitive. In contrast, Product Development processes are highly iterative with loops to earlier steps and they are not repetitive in the sense that they are in manufacturing, i.e. both input and process do not vary. There can be both sequential and parallel processes (Motavallian and Settyvari., 2013: 18). In manufacturing, each workstation uses Kanban 3 to signal to the supplying station for the next part or work-in-progress. But in Product Development, tasks are fulfilled and passed to the next process as soon as finished. The pace of product development process is typically controlled through the use of schedules (project plans). Scheduling process used in product development is like push processes for scheduling in manufacturing and it is not pull. (Slack; Motavallian and settyvari., 2013); (Oppenheim, Motavallian and Settyvari., 2013: 19).

(Stratton ,2013: 8) confirms that "Lean manufacturing focuses on single-piece flow, defining value from the customer's view, elimination of Muda, minimal inventory, using worker capabilities, fast cycle time, and cellular organization by product lines or product teams (product systems)".

1.8.3 LEAN THINKING AND DESIGN

Design and construction practices are connected to impact safety on construction sites, and safety practices typically implemented during both the design and construction of architecture/engineering/construction, and decided the degree to which each of the distinguished production activities sticks to the standards of lean design/construction and whether lean design/construction practices are especially advantageous or negative to development security.

Seven case studies on building construction projects were conducted which involved interviewing the projects staff, visiting the locations and looking into the project credentials and documents about what has been used in designing and building the projects. Using the information picked up from the case study, the analysts likewise directed a review of Lean Construction Institute (LCI) individuals to acquire master viewpoint from a more extensive portion of the business on the

organization of lean practices to wellbeing. In light of the case studies and survey, the researchers assessed the extent to which lean practices affect construction wellbeing risk and support normally -implemented safety practices (Gambetes and Pestana, 2014: 6).

The design stage is generally recognized as the stage where the customer's thoughts and assumptions are taken into considerations and turned into a physical model by realizing the customer's wants, requests and demands into "procedures, drawings, and technical specifications" (Freire and Alarcón, cited in Marzouk, et al., 2011: 44). Future design includes a general idea configuration and additionally a definite plan that are introduced to bring about the sought execution of the framework. These designs incorporate a future state and in addition powerful correspondence with administration and the plant (Marvel and Standrige, 2009: 99).

Using Lean Thinking in the design process can result in these positive outcomes (Mersereau and Jimmerson., 2011: 3):

1. An improved work environment that is customer centered, flexible, efficient and Affordable.
2. Optimize product flow and work flow to create operational efficiencies.
3. Design plans that incorporate space that is most certainly not over-built to suit inadequate processes, hence decreasing the generally speaking cost of the project.
4. A vision for the future that is clearly developed and communicated with staff, providers, customers, and the community.

1.8.4. LEAN THINKING AND SERVICES

(Kotler and Armstrong، 2012: 224) define services as a form of product that comprises of exercises, advantages, or fulfillments offered available to be purchased that are essentially impalpable and don't bring about the responsibility for. Examples include banking, hotel services, airline travel, retail, wireless communication, and home repair services.

A company must consider four remarkable service characteristics at the point when designing marketing programs: elusiveness, inseparability, variability, and

perish ability as mentioned in Figure (14), (Kotler and Armstrong, 2012: 236). And we can explain these characters as following:

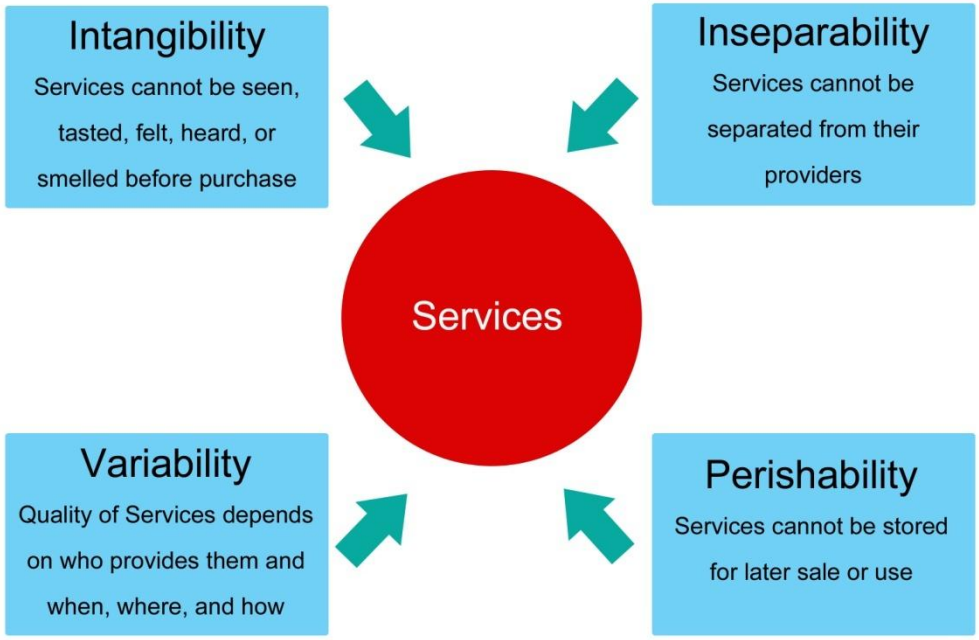
1. Service intangibility: means that services cannot be seen, tasted, felt, heard, and smelled before they are bought. For example, individuals experiencing cosmetic surgery cannot see the outcome before the buy. Air travelers have only a ticket to ensure them that they and their baggage will arrive in safety at the intentional destination, optimistically at the sometime.

2. Service inseparability: means that services can't be isolated from their providers, regardless of whether the providers are people or machines. If a service employee provides the service, then the employee becomes part of the service. Because the customer is also presents the service is produced, provider-customer interaction is especial feature of services marketing. Both the provider and the customer affect the service outcome.

3. Service variability: means that the quality of services depends on who provides them as well as at what time, at which place, and the way they are made available. For example, some hotels-say, Marriott-have reputations for providing better service than others.

4. Service perish ability: means that services cannot be put away for later sale then again use, some doctors charge patients for missed arrangements because the service value existed just by then and vanished when the patient did not appear.

Figure 14: Four Service Characteristics



Source: Kotler**,** P., and Armstrong**,** G, (2012), Principles of Marketing, New Jersey: Pearson Education. 237**.**

To explore the role of lean thinking in services we will explain it through health care as a service domain. “Lean Thinking Health” has emerged in recent years, reflecting the stronger focus on efficiency and patient satisfaction within the health environment. Lean Thinking Health is defined as a management philosophy to create a hospital culture described by increased patient also, other stakeholder satisfaction through continuous changes, in which all employees (managers, physicians, nurses, lab people, specialists, office individuals etc) actively participate in identifying what's more, reducing non-value-adding exercises (waste) (Dahlgaard cited in K. A ij 2015: 101).

However, (Crema and verbano cited in K. A ij, 2015: 103) thinks that there are no enough research and bolster that gave factual proof for the specific features of committed initiative or of a "strong institutional culture that emphatically influence maintainable lean thinking health results". Accordingly, (under cited in K. A ij, 2015: 104) suggests the accompanying solution "a change management point of view keeping in mind the end goal to decide the particular authority qualities and

institutional culture factors that are a piece of the change procedure (throughput) which are expected to fortify the change of the corporation to a state in which it delivers long-term lean thinking health results″. Furthermore, Adler trusts that Statistical confirmation on factors in the change procedure to lean Thinking Health will decrease the usage hole in this mind-boggling environment and permit "the transformation based on lean principles". This, thus, will animate the achievement of wanted health results, for example, lessened quantities of deferrals and blunders (Adler cited in K. A ij, 2015: 104).

CHAPTERV TWO: VALUE - ORIENTED PRODUCT

2.1. INTRODUCTION

The researchers notice that there is a critical need from organization towards value – oriented product. Values seemed to be a hard problem for all the stakeholders, managers, workers, and customers who led to a need for organizations to be able to link their value to business goals and to improving distending of value expectations behind every product they introduced. If product features do not create value, all efforts to improve product process are worthless without using the value-oriented product approach (Hyvonen, 2015: 2).

Current business models in manufacturing, as well as current forms of products, assume that customer, market, and social needs remain fixed over the lifetime of a product. Requirements are pinned down in product specifications. Deviations from an agreed specification often lead to time- and budget-overruns or, even worse, to legal disputes. But in reality, client needs and social or ecological limit conditions change consistently. Static infrastructures, manufacturing and servicing processes, such as maintenance, may therefore soon result underperformance. Given the huge capital investments needed for the creation of new products, this causes high risks for all organization stakeholders' (Gielingh and Nederveen., 2009: 1).

2. 2. VALUE

2.2.1. VALUE DEFINITION

Decision making in organizations is based on a notion of perceived business value or product value. In an optimal situation, the option with most business value is chosen. Based on this, to improve product value understanding the business area should be improved (Hyvonen, 2015: 3). Before delving into the concept of product value, a good understanding of what is value is of great benefit.

(Oppenheim, et al., 2010: 18) define the value for the present purpose as follows: Value is defined as the delivery of a complex system satisfying all stakeholders,

which implies a flawless product or mission delivered with at minimum cost, in the shortest possible schedule, fully satisfying the customer and other stakeholders during the product or mission lifecycle. In this sense, value-added activity satisfies the following three conditions (Oppenheim, et al., cited in Ikonen, 2011: 18):

1. Transform information or material or reduce uncertainty.

2. The customers willing to pay for it.

3. And it is done right the first time.

(Womack and jones, cited in Lindgreen and Wynstra., 2005: 734) argue that the critical starting point four lean thinking is value. Value can only be defined by the ultimate customer; this is sensible characterization of value which connects to more general use of the product.

The major contribution has been the exploration of heterogeneous resource endowments and how these can be the source of advantage if competing organizations are unable to imitate these resources (Amit and Shoemaker, Black and Bola. mahoney and Pandean, cited in Bowman and Ambrosini, 2000). In most contributions to the perspective, resources are assumed to be valuable (one exception being maybe Werner felt (1984) who defines resources as anything which could be thought of as a strength or a weakness of a given organization), and attention has-been focused on isolating mechanisms that prevent rival organizations from replicating the desired resource bundles (Rumelt, cited in Bowman and Ambrosini, 2000). Value is the way in which an individual actor action take on meaning, for the actor herself, by being incorporated into a larger social whole (Graeber, cited in Lindgreen and Wynstra., 2005: 734).

There is no universally agreed-upon view of value. Indeed, (Zeithaml cited in Lindgreen and Wynstra., 2005: 736) gives four different definitions for value:

1. Value is low cost.

2. Value is whatever I need in a product.

3. Value is the quality I get at the cost I pay.

4. Value is what I get for what I give's.

Some of these definitions are explored in more detail in (Doyle, cited in Lindgreen and Wynstra, 2005) who "understands upper hand as the ability to make target customers an offer that they pensive as providing superior value to competitors' offers". Customers buy from those competitors that they perceived as offering the best value.

Value is defined as the base dollars, which must be used in acquiring or manufacturing and product to make the appropriate use and esteem factors (Miles, cited in Lindgreen and Wynstra, 2005: 734). Supporting this definition Lind green & Wynstra., (2005) think that most value studies were concerned with utilize value as the most reduced cost of providing for the dependable performance of a function and with regard value as the least cost of providing the appearance, engaging quality, and features, which the customer wants. (Lindgreen and Wynstra, 2005: 734).

We can understand from the above definitions that value is defined in terms of money; an idea also supported by (Dodd's and Monroe, Lindgreen and Wynstra., 2005). It is good to add that Woodruff Lindgreen and Wynstra (2005) develop the notion of "customer value hierarchy", which is a model that relates "customer desired value" and "customer satisfaction" to received value. Thus, they focus on the function of "perceptions" once more. (Womack and Jones cited in Motavallion and Settyvari., 2013: 11).

A capability given to a customer at the right time at a proper price, as defined in each case by the customer. According to this definition, Value is described by three main attributes: Quality, Cost of Ownership and time. (Slack Motavallion and Settyvari.,2013: 11) argued that in Womack's approach value is measured against an ideal, a condition without waste, while the customers are sensitive to their need in the context of the entire market and they compare products to each other investigated about two other Value perspectives that assist in relating Lean Principles. He thinks it is necessary to understand Stakeholders and Employee Value and their attributes in addition to customer Value. (Slack Motavallion and Settyvari, 2013: 12).

For defining the right value of the products (goods or services) it is necessary to identify real needs, wants as well as wishes of customers. Identifying real customers is not always as easy as it seems. It is a challenge for organizations to find their

customers and their needs, either external customers who explicitly pay for a product or service or internal customers who receive outputs of a task or activity.

It is hard to currently define value because most producers want to make what they are already making. They often fall back on simple formulas like lower cost instead of challenging old definitions and seeing real needs. Moreover, value is often created by the combined effort of different companies and each company tends to define the value of their own, and not the final customer's perspective. In most cases companies, do not consider other related value and this causes them to start improving the processes with the wrong priority. (Womack and Jones, Motavallion and Settyvari, 2013: 12).

Value is defined by the customer (externally focused) and is only meaningfully expressed in terms of a specific product that meets the customer's needs at a specific price and specific time. A common error in traditional manufacturing operations is to define value internally (internally focused) and, if the customer fails to respond, the product is modified or the price is adjusted or a different marketing strategy is tried. (Stratton, 2004: 30).

The other component of value, the exchange value is the value which is the realized for the producer of the goods when the customer decides to pay for the perceived value of the goods. Profit is made when the amount of value from realized exchange value is greater than the sum spent on acquiring and transforming the sold use value total monetary, value does not equal the perceived use value of the product. The total monetary value is usually higher than that. The difference is called consumer surplus. This is the same value consumers typically call a value for money. If two products have the same price but the other has more consumer surplus (maybe the hammer is very decorative), the one with more consumer surplus is chosen (Hyvonen, 2015: 4). A distinction has to be watched between utility value and trade value. Opposite to utility value, trade value can be measured statistically (Linn, 2016:6).

Argue that the value is the way people represent the importance of their own actions to themselves. By speaking to this importance, they have a direct to their action. Value, nevertheless, does not come up from people who are not connected

with the rest of society. Any action, or process, only gets to be meaningful by being coordinated into a few bigger systems of action. Value is the capacity of a good, service, or activity to satisfy a need or provide a benefit to a person or legal entity. (Hyvonen, 2015: 4)

Value also, refers in a lean enterprise, to the knowledge created during development the innovation which yield to satisfy customer needs and development of manufacturing or operational value steams (ward, cited in Neyogi. 2009: 40).

2.2.2. VALUE INNOVATION

Value innovation is a widely-used term. Calls for business reporting to concentrate more on factors, including nonfinancial factors, that create longer-term value date back some years (Ernst and Young, 2013: 3). Value innovation places equal emphasis on value and innovation. Value regardless of innovation have a tendency to emphasize on creating value on an increasing scale, which aims at something that help improves value though in fact it is not enough to distinguish you in the marketplace. Innovation without value tends to be technology-driven, market pioneering, or futuristic, often shooting beyond what buyers are ready to accept and pay for. For examples of market pioneering that shoots beyond what buyers are ready to accept and pay for, Gerard J. Tellis and Peter N. Golder (2002), observed in a study that took them a decade of time that only less than 10 percent of market pioneers "became business winners", with more than 90 percent ending up being business failures. In this sense, (Kim and Mauborgne, 2005: 12) accept that it is indispensable to "recognize esteem advancement instead of innovation development and market spearheading".

Innovation of goods and service is always appreciated by the customers, but there an improvement is costly. For the benefit of the customer, the product needs to something new and different functions. The innovation offers higher quality than the competitive products. Price hike may also decrease the present market value of product. Considerably higher benefit with sensible price settings brings higher customer value**;** it might be the balance of the customers benefit and price.

So, the value is immaterial item. In most of the technology continuously recognized by the customers not by products, prod performance is very important

which is offered by the physical part of products. In any case, service gives the Credibility what's more, sustainability of the victory of the product**.** As the traditional style of communication is not effective enough in developing the stronger and longer relationship with the customers, it ought to be creative and new to be recognized as a Service innovation; second the service system must be so Much effective that it is practical and a product maker. (Aswal and kumar, 2012: 779).

The fundamental goal of the "blue ocean strategy" is to produce value innovation - driving expenses down while simultaneously driving value up for buyers. Value innovation is the foundation of "blue ocean strategy".

Value to buyer = offering utility – offering utility's price

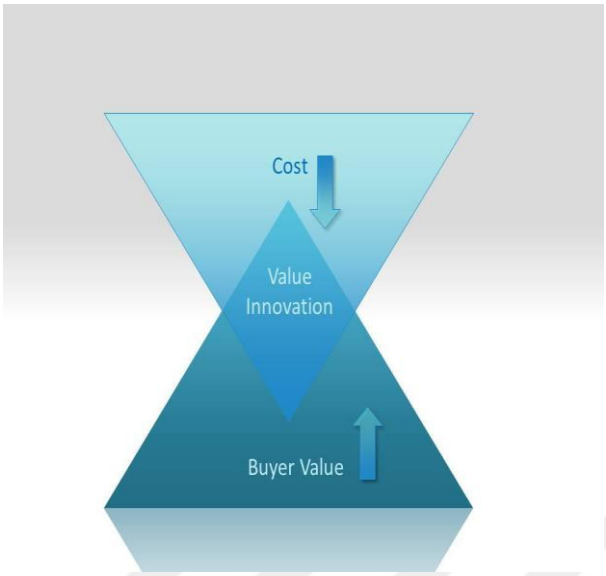
Value of the company = offering's price – offering's price's cost

(Kim and Mauborgne cited in Nicolas, 2011: 20) believe that "value innovation is achievable just when a company's utility, price and cost structures are appropriately adjusted. This entire system approach makes the creation of blue seas maintainable in light of the fact that it coordinates all the corporation's functional and operational activities".

So, value innovation has a positive impact on companies' cost structure and its offer. Moreover, on one hand, an economy of scales is done due to the limitation or expulsion of criteria. On the other hand, the value for the buyer is shown by creating new criteria or adjusting the old ones.

Value-innovation defies one of the most commonly accepted dogmas of competition-based strategy which is the "value-cost trade-off". It is traditionally though that organizations can either make more noteworthy value to the customers at higher cost or make sensible value at a lower cost. Strategy is viewed here as an option to make a decision amongst differentiation and minimal cost. Those that seek to create blue oceans pursue differentiation and low cost simultaneously. In order to fully understand the concept of Blue Ocean Strategy, it is important to know the studies, concepts and theories related to this theory (Kim and Mauborgne, cited in Nicolas, 2011: 20).

Figure 15: Value-innovation: The cornerstone of Blue Ocean Strategy



Source: Kim, W, C., and Maubrgne, (2005), Blue Ocean Strategy, Harvard, p. 16.

2.2.3. BUSINESS (OR PRODUCT) VALUE

Early economics assumed that people are rational and therefore systematically and carefully consider the available options before making decisions, for example, purchasing services. But to be able to make the best possible decision, one would have to understand all the aspects of the decision. That sort of understanding is usually not possible. Term business value or product value is used to describe value assumptions behind business decisions, which could be defined as decisions that have effect on an organization on the long run. Still, there seems tope no consensus on what exactly is product value. The concept of business value is often found in agile literature. (Racheva, et al, 2015: *8*) In their systematical literature review, found out that there exists allot of discussion about creating product value but majority of the papers, practitioners' and scientific, on agile software development did not define the concept. They were also trying to find out in which way agile projects create product value. For that question, as well, they were unable to find any answers. The reason for that finding is, they think, that the concept of business value is more slippery and volatile than most authors seem to assume (Hyvonen, 2015: 6).

The definitions (Racheva, et al.2015: 8) were able to find about business value are the following (Hyvonen, 2015: 7):

1. Business value, as measured in business revenue, stock price, market share, or another business metrics. Value is in the eyes of the customer.

2. Business value is something that delivers benefit to the corporation paying for the product as an expansion in income, an avoidance of costs, or an improvement in service.

3. Business value is a communication vehicle; we use business value to communicate value, priorities, motivation.

4. Business value is what management is willing to pay for; value can only be defined by the ultimate customer. And it can only have only meaning when it is put in terms of a definite product or item (a good or a service, and frequently both of them right now), which satisfies the customer's needs at a certain price at a certain time.

To make identifying business value easier, (Racheva, et al., 2015: 8) deducted five characteristics of business value based on their literate review:

1. Business value in practice tends to be qualitative.
2. Business value tends to be subjective.
3. The sources of business value drive requirements prioritization.
4. Business value of the IT solution requires a degree of trust.
5. The business value of IT solution tends to be dependent on non-IT business processes.

These characteristics still leave the definition of business value very vague. In this regard (Racheva, et al, 2015: 8) summarize the situation stating the key recognizing feature of the deft practice is reprioritization, based on an evaluation of business value that appears to be uncertain and evolving over time. The idea that re-prioritizations driven by calculating a cost function can be discarded as overly simplistic; it seems evident that some non-trivial decision making is involved (Hyvonen, 2015: 8).

According to (Laroche and Corbett, 2008: 3), the business value of a venture (an asset) is measured as the net present value of the after-duty money streams related

with the venture. For example, the business value of an investment in a menu - looked at more broadly, the quest for delivering business value via can be seen as a matter of determining how an organization can use to do the following improvements as suggested by (Laroche and Corbett, 2008: 8):

1. improve management processes - such as planning, controlling, measuring, observing, and/or changing so that management can increment revenues, reduce costs, on the other hand both.

2. Improve operational processes - such as misrepresentation detection, deals campaign execution, customer order processing, purchasing, and/or accounts payable handling - so that the business can increment revenues, decrease costs or both.

In other words, the product or business value lies in its use within management processes that affect operational processes that drive revenue or diminish costs, and/or in its use within those operational processes themselves (Williams and Williams, 2003: 3).

Various businesses nowadays seek to make use of customer relationship management strategies that make a distinction between customers based on their value. In retail banking, a customer with advances, expansive savings accounts, a financial record with substantial equalizations, Visa parities, and according to (Williams and Williams, 2003: 3) a customer who occupations on-line banking is a great deal more significant than customer with only a low-adjust financial records who comes into a branch every now and again. Clearly the bank would not have any desire to lose the previous client, though it may will to lose the last mentioned.

Also, think that for the bank to actualize a "customer relationship management strategy" in light of the distinction in client value, it first needs applications that permit it to know that customers are exceedingly significant, which are profitable, which are less important, and which are evaluable. That information alone, be that as it may, is insufficient to guarantee that the bank does not lose exceedingly esteemed clients. It musts shows, capturing the business value of requires organizations to go well beyond the technical implementation of an environment. Particularly, organizations must lock in effective process engineering and change management in arrange to capture business value from (Williams and Williams, 2003: 3).

2.2.4. MANAGEMENT AND VALUE

Management and value may be portrayed as the third period of this development of management methods of insight. As the prevailing condition surrounding corporation and management has gone from being sure excessively unverifiable and now, making it impossible to complex the earlier management by direction and management by objectives approaches have been not as much as satisfactory. Management and value both deal with developing management systems that can incorporate values into organizational strategies, policies and procedures. Dolan, Garcia and Richey have written extensively about management and value as a strategic leadership tool that can have immensely practical results for organizations, through recognizing the complication inborn in the environment diverting the day by day efforts of people towards an organization's strategic vision updating organizational culture along more humanistic lines and including moral standards into strategic leadership (Larach and Corbett, 2008: 3).

The notion of 'management and value' can perhaps be better understood contrasting it with 'management by instruction' and 'management by objectives'. The early years of management science began in the early 20th century, were educated by military strategy and techniques and introduced linear and rational models for decision-making (Larach and Corbett, 2008: 2). The idea of management and value is fast becoming the principal driver for reengineering competitive and well-being culture (Dolan cited in Dolan and Altman, 2012: 21).

The newborn child years of administration science began in the mid twentieth century, were educated by military technique and proposed direct and normal models for basic leadership

2.2.5. STAKEHOLDERS AND VALUE

A major problem in finding the value is that different interest groups inside company might have completely different value expectations for the same system (Havyonen, 2015: 8). For example, software developers merely want to make product that works and is of high technical quality. Product and project managers often have a higher-level vision and a sales department might expect value to be something that can be clearly communicated to potential customers. A customer's

expectations of the system can also highly differ from the ones of a software provider. All these different groups are stakeholders. Stakeholders are persons, groups and organizations that have to be taken into account when business decisions are made. Other common definitions according to (Bryson, 2015: 8) include:

1. Any person group or corporation that can place assert on the corporation's consideration, resources, or output, or is influenced by that output.

2. Individuals or small groups with the authority to take action to, discuss with, and change the strategic future of the organization.

3. Those individuals or groups who depend on the organization to satisfy their own objective and on whom, now turn, the organization depends.

(Bryson, 2015: 8) hypothesizes that key administration forms that utilize a sensible number of capability done partner examinations will probably be fruitful – that is, meet orders, satisfy missions and make open esteem – than those that don't. He also states that what constitutes to "reasonable" amount of stakeholder analysis is not clear yet. Stakeholder analysis can be an expensive and time consuming process because of the high number of people and time it can require. Performing excessive stakeholder analysis can be seen as a waste of time and money. In view of the idea that extreme stakeholder analysis is waste, the greatest advantage can be accomplished when a correct, not all that much, nor too little, much of planning is carried out. Sometimes it might be enough to make project team aware that there are multiple stakeholders and the other times a deep and systematical stakeholder analysis could be beneficial. The systematic approach is particularly essential for high value open administration extends as they frequently straightforwardly influence individuals' lives and get a ton of open scope (Havyonen, 2015: 9).

According to (McManus, 2005: 21) stakeholders are the general population who infer value of any kind from a procedure. Without identifying the stakeholders, we can not one or the other put together the correct group, nor defines value in a useful way. Stakeholders commonly incorporate all the members involved in the process, those who make use of the output of the process (sometimes called the internal customers) (McManus, 2005: 21), other aberrant clients of the yield (individuals required in the systems more down the esteem stream), the customer of the design or

other final product development output (who might be inside or outer), the outside client for the physical item that will be produced using the outline, and the end client of that product (McManus, 2005: 21).

Partners commonly incorporate the members all the while, the clients of the yield of the procedure (here and there called the inside clients), other aberrant clients of the yield (members in procedures additionally down the esteem stream), the client of the outline or other last item advancement yield (who might be inner or outer), the outside client for the physical item that will be produced using the plan, and the end client of that item.

Other stakeholders may incorporate suppliers of information or assets to the product development process, providers of parts or congregations to the physical product, the organization or undertaking management or leadership, representatives or their delegates, the community in which the process takes place, and the general taxpaying public (McManus, 2005: 21).

The key stakeholders, and their desires for the procedure, its output, and the change of both, should be recognized. In conventional manufacturing plant value stream mapping, the main clarify stakeholders of significance is the purchaser of the result of the production line (a/k/the customer), and his or her desires are thought to be basic - a specific number of units in a given measure of time, on time, and to some standard of value. Different stockholders (proprietors or shareholders, representatives) are certainly expected to benefits from the elimination of waste and interest of perfection, while understood demands are put on a third set (providers, workers) to conform to the improved process. In product development processes, it is regularly the needs of the endeavor that decide pace (e.g., a vast -scale development program may need a certain process completed in a given time to remain on plan), while the downstream processes (or internal customers) define the necessary quality (McManus. 2005: 21).

2.3. PRODUCT

In this study a product is seen as goods and/or services as they commonly used in synergic combinations. However, a product as defined by (Linn, 2016) is" in reality the essence of an individual’s subjective perception". Is in reality the essence

of an individual's subjective observation. Additionally, an item implies anything that can be offered to a business opportunity for consideration, acquisition, use, or consumption that might satisfy a want or need.

Products embrace both tangible intangible things like cars, computers and cell phones, and services, events, persons, places, organizations, ideas, or a mixture of these. The term product is used in this part of the study to include all the items mentioned above. Along these lines, an Apple phoneme Toyota Camry, and a Cafe Mocha at Starbucks are items. Be that as it may, so is a trek to Las Vegas Trade online venture administrations and guidance from your family specialist. In light of their significance on the planet economy, we give exceptional thoughtfulness regarding administrations. (Kotler and Armstrong, 2012: 224).

Product is a key component in the general market advertising. Promoting blend arranging starts with building an offering that conveys an incentive to target customer. This offering turns out to be the foundation on which the company constructs and develops gainful and beneficial customer relationships.

A company’s market offering frequently incorporates both tangible goods and services. At an extreme point, it may offer "pure tangible goods", like soap, toothpaste, or salt; in such a case the services do not go with the product. An organization's market offering regularly incorporates both unmistakable merchandise and ventures. At one extraordinary, the market offer may comprise of unadulterated substantial merchandise, for example, cleanser, toothpaste, or salt; no administrations go with the item. At the other extreme are pure services, for which the market offer comprises basically of a service. Examples include a doctor’s exam on the other hand budgetary administrations. Between these two extremes, in any case, numerous merchandise and-enterprises blends are conceivable.

Today, as products become more commoditized, many companies are moving to another level in creating value for their customers. To isolate their offers, past just making product and conveying service, they are making and overseeing client encounters with their brands or company.

An item can be presented with various features or components. A stripped-down model, one with no additional products, is the beginning stage. The organization can make more elevated amount models by including more components. Features are a focused device for separating the organization's product from competitive ' products. Being the main maker to present a valued new element is a standout amongst the best approaches to contend. In what capacity, an organization can distinguish new features and choose which ones to add to its product.

It ought to occasionally review purchasers who have utilized the product and ask these inquiries: How would you like the product? Which particular elements of the product do you like most? Which elements might we be able to add to enhance the product? The responses to these inquiries give the organization a rich rundown of highlight thoughts. The organization can then evaluate every element as an incentive to customers versus its cost to the organization. Highlights that customer's value exceedingly in connection to expenses ought to be included (Kotler and Armstrong, 2012: 230).

2.3.1. PRODUCT STYLE AND DESIGN

Distinctive product style and design are other components or elements that also contribute to a customer value in the organization. Design is a bigger idea than style. Style just portrays the presence of a product. Styles can be attractive or yawn creating. A "sensational style" may snatch consideration and deliver satisfying aesthetics, however it doesn't necessarily improve the item perform. Unlike style, design is more than shallow-it goes to the exact of a product. Good design contributes to a product's value and in addition to its looks.

Good design doesn’t start with brainstorming new ideas and making prototypes. The first thing we have to do in designing is to profoundly understand customers' wants and needs. More than simple making product or administration traits, it includes forming the client's product utilize involvement product designers ought to ponder product characteristics and specialized particulars and more about how clients will utilize and advantage from the product (Kotler and Armstrong, 2012; 230).

Product design deals with conversion of ideas into reality. Each business corporation needs to design, develop and present new products as a survival and development strategy. Building up the new products and propelling them in the market is the greatest test confronted by the organizations. The whole procedure of need recognizable proof to physical manufacturers of item includes three functions. marketing, product development, manufacturing. Product advancement deciphers the necessities of clients given by advertising into specialized determinations and planning the different elements into the product to these particulars. Manufacturing has the duty of choosing the procedures by which the product can be produced. "Product design and development provides link between marketing, customer needs and expectations and the activities required to manufacture the product" (Kumar and Suresh., 2008: 14).

Product design in the bicycle industry was historically a classic batch-and queue affair in which the marketing department determined a "need," the product engineers then designed a product to serve the need, the prototype department built a prototype to test the design, the tooling department designed tools to make a high-volume version of the approved prototype, and the production engineering group in the manufacturing department figured out how to use the tools to fabricate the frame and then assemble the component parts into a completed bike. Meanwhile, the purchasing department, once the design was finalized, arranged to buy the necessary component parts for delivery to the assembly hall. (Womack and Jones, 2003: 53).

2.3.2. PRODUCT DEVELOPMENT

The product development is vital for environmental improvement of the product. It is during development of the product, including the choice of design and function and the choice of materials, that you take very significant decisions that affect the product’s whole environmental force during its life cycle. The selection of materials and forms and the likelihood of substitution will have an impact all through the item's life cycle, while configuration will affect whether and, provided that is true, how the item can be separated into parts when the time comes to discard it.

The department is of importance to the lifetime and use of the product. For companies that develop products themselves, incorporation of the product.

Dimension in their product development work is a must. At that point at aerials selected and the way they are put together decide a great part of the product's later function and the ecological effects related with its utilization and transfer. It is therefore here that one finds the best potentials for reducing the environmental effects from product. On the off chance that you don't build up your products yourselves you can instead seek influence by presenting your wishes, requirements or proposals concerning the product and its environmental aspects to the organization or organizations in the product chain that conveys/do the product improvement are cleared up (Schmidt,2002: 90).

For many new-product concepts, a product may exist only as a word description, a drawing, or perhaps a crude mock-up. Once the product concept succeeds in the business test it will enter the next process which is known as the product development stage. The product development step, however, now calls for a huge jump in investment. It will show whether the product idea can be turned into a workable product. The R&D division will create and test at least one physical renditions of the product concept. R&D hopes to design prototype that will satisfy and excite consumers and that can be produced quickly and at budgeted costs. Kolter and Armstrong state that "developing effective model can take days, weeks, months, or even years depending upon the product and model strategies ". Regularly, products encounter thorough tests to guarantee that they perform securely and successfully, or that consumers will find value in them. Companies can do their own product testing or outsource testing to other organizations that specialize in testing. (Kotler and Armstrong, 2012: 266).

2.3.3 PRODUCT QUALITY

Is one of the marketer’s major positioning tools. Quality has a direct impact on product performance; thus, it is closely linked to customer value and satisfaction. In the narrowest sense, (Kotler and Amstrong, 2012: 230) defined quality as “freedom from defects.” They also add that "most customer focused organizations go past this tight definition. Rather, they characterize quality as far as making client product and fulfillment ". The American Society for Quality defines quality as the characteristics of a product that bear on its ability to satisfy stated or implied customer needs.

Similarly, Siemens defines quality this way: “Quality is the point at which our customer return and our products wear's” (Kotler and Armstrong, 2012: 230).

Total quality management (TQM) is an approach in management where all the company's personnel are continuously in improving the quality of goods, services and business procedures. For most top companies, customer-driven quality has become a way of doing business. Today, companies are taking a “return on quality” approach, is another approach in which companies think of quality as a sort of investment and think that all efforts made to improve the quality as steps leading finally to bottom –line results.

Product quality has two measurements: level and consistency. In creating a product, the marketer must first pick a quality level that will bolster the product’s situating. Here, product quality implies execution quality; in other words the product can achieve its purposes. For example, a Rolls-Royce provides higher performance quality than a Chevrolet: It has more comfortable ride, provides more lavishness and “creature comforts,” and it is durable Companies rarely try to offer the highest possible performance quality level; couple of clients need or can manage the cost of the abnormal amounts of value offered in products, for example, a Rolls-Royce vehicle, a Viking range, or a Rolex watch. Instead, companies pick a quality level that matches target showcase needs and the quality levels of contending products. Past quality level, if quality is consistent it means that it is of a high level.

Here, product quality means conformance quality—flexibility from deformities and consistency in conveying a focused-on level of execution. All companies should endeavor at achieving high standards of quality. In this sense, a Chevrolet can have the same amount of value as a Rolls-Royce. In spite of the fact that a Chevy doesn't perform at an indistinguishable level from a Rolls-Royce, it can convey as reliably the quality that clients pay for and anticipate (Kotler and Armstrong, 2012: 230).

2. 3.4. PRODUCT LIFE CYCLE

To explore the product life cycle, it is necessary to explain the relationship between product and technology, first of all, new technology used for new products as it will give better impact against the other technological products. Second it must fulfill the customer expectation and it should have recognized by its innovative

approach. Third its functionality is distinguished by the rate of selection by gaining the customer retention**.** And thus, it will increment the peak value of product life cycle, as the new product will manage in showcase just when it is at standard with other mechanical product and the long attainable time**.** Thus, expanding product performance and including new product functions by applying the new and imaginative technology are the fundamental technique of the product innovation and increment **(**Aswal and Kumar., 2012: 778).

After propelling the new product, management needs that product to appreciate a long and happy life. In spite of the fact that companies that all their products will be sold all the way through, they try their best that to get reasonable gains that can cover the expenses spent on that product. Managements are aware that each product will have a life cycle, although its exact shape and length is not known in advance.

A company's products are conceived, grow, mature, and after that decay, similarly as living things do. To stay imperative, the association should consistently grow new products and oversee them successfully through their lifecycles. (Kotler and Armstrong, 2012: 273).

According to (Kotler and Armstrong, 2012: 273) the product life cycle has five distinct stages as shown in Figure (16), display a typical product life cycle, the course that a product's sales and profits take over its life time as follows:

1. Product development which starts at the moment when the company thinks of producing a new product and developing it begins when the company finds and develops another-product thought. During this stage deals are zero, and the company's investment costs mount.

2. Introduction is a period of introducing the product in the market. During this period the sale is slow. Profits are nonexistent in this stage because of the heavy expenses of product introduction.

3. Growth period. During this period the product is well accepted in the market and the profit increases.

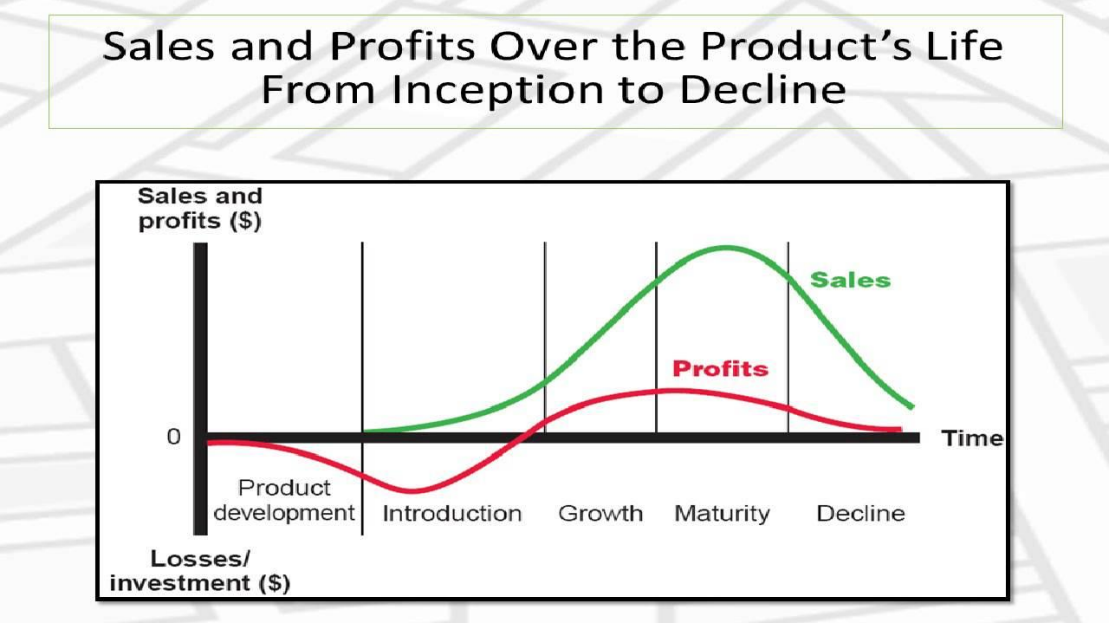
4. Maturity is a time of stoppage in deals development on the grounds that the product has accomplished acknowledgment by most potential purchasers. Benefits

level off or decrease on account of expanded marketing expenses to protect the product against rivalry.

5. Decrease is the period when deals tumble off and benefits drop.

Not all products take after every one of the five phases of the product life cycle. A few products are presented and pass on rapidly; others remain in the development organize for a long, long time. Some enter the decay arrange and are then cycled over into the development organize through solid promoter repositioning. It appears that an all-around oversaw brand could live for eternity. Admired brands like Coca-Cola, Gillette, Budweiser, American Express, Wells Fargo, Kikkoman, and TABASCO sauce, for example, are as yet going solid after over 100 years. TABASCO sauce gloats that it's more than 140 years of age and still prepared to proceed for very a while.

Figure 16: Product Life Cycle



Source: Kotler, P., and Armstrong, G, (2012), Principles of Marketing, New Jersey: Pearson Education, p.237.

The product life cycle idea can portray a product class (fuel controlled autos), a product frame (SUVs), or a brand (the Ford Escape). The product life cycle idea applies distinctively for each situation. Product classes have the longest lifecycles;

the sales of many product classes stay in the mature stage for a longtime. Product forms, in contrast, tend to have the standard product life cycle shape. Product structures, for example, dial phones and VHS tapes went through a general history of presentation, quick development, development, and decrease.

A particular brand's life cycle can change rapidly due to changing competitive attacks and reactions. For instance, in spite of the fact that lain soaps dry (product class) and powdered detergents (product shape) have appreciated genuinely long life cycles, the life cycles of particular brands have had a tendency to be much shorter. Today's chief and top brands of powdered clothing cleanser/laundry are Tideland Cheer; they have been the chief and top brands for about 100 years now.

The product life cycle concept also can be applied to what are known as styles, fashions, and fads. Their special life cycles are shown in Figure (17) (Kotler and Armstrong, 2012: 274):

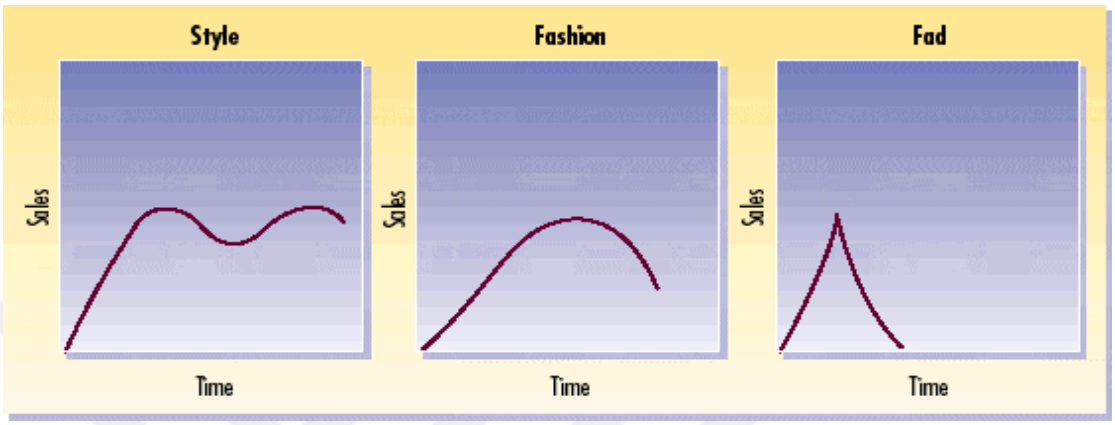
A style is an essential and unmistakable method of expression. For instance, styles show up in homes (pilgrim, farm, transitional), apparel (formal, easygoing), and craftsmanship (realist, surrealist, unique). Once a style is developed, it might keep going for eras, going all through vogue. Al style has a cycle demonstrating a few products of restored intrigue.

A fashion is at present accepted or famous style in a given field. For instance, the more formal business clothing look of corporate dress of the 1980s and1990s offered route to the business easygoing look of the 2000s. Designs have a tendency to develop gradually, stay mainstream for some product and after that decay gradually.

A Fads are brief times of surprisingly high deals driven by buyer energy and prompt product or brand notoriety. A trend might be a piece of a generally ordinary life cycle, as on account of late surges in the offers of poker chips and embellishments. Then again, the trend may contain a brands or products whole life cycle. “Pet rocks” are a classic example. After hearing his companions whine about that it was so costly to watch over their puppies, publicizing marketing specialist Gary Dahl kidded about his pet shake. He soon wrote a spoof of a dog training manual for it, titled “The Care and Training of Your Pet Rock.” Soon Dahl was selling some 1.5 million ordinary

beach pebbles at $4 a pop. Yet the fad, which broke one October, had sunk like a stone by the next February. Dahlia's recommendation to the individuals who need to prevail with a craze: Enjoy it while it endures. Different cases of crazes incorporate the Rubik's Cube and low-crab diets (Kotler and Armstrong, 2012: 274).

Figure 17: Styles, Fashions, and Fads



Source: Kotler, P., and Armstrong**,** G, (2012), *Principles of Marketing*, New Jersey: Pearson Education, p.274.

Product life cycle concept can be used by marketers as a means for describing how products and markets function. And when used carefully, the product life cycle concept can help in developing good marketing strategies for its different stages. However, utilizing the product life cycle idea for determining, product presentation or creating marketing strategies shows some viable problems. For example, in practice, it is difficult to forecast the sales level at each product life cycle stage, the length of each stage, and the shape of the product life cycle curve. Using the product life cycle idea to create showcasing procedure additionally can be troublesome on the grounds that methodology is both a cause and an aftereffect of the product life cycle. The product's present product life cycle position recommends the best marketing strategic, and the subsequent advertising methodologies influence product execution in later stages.

Moreover, marketers should not blindly push products through the traditional product life cycle stages. Instead, marketers often defy the "rules" of the life cycle and position or reposition their products in unexpected ways. By practicing this, they can save develop or declining products and return them to the development stage of

the life cycle. On the other hand, they can jump hindrances to moderate consumer acknowledgment and move new items forward into the growth stage.

The lesson learnt from the product life cycle is that companies must always seek innovation and creativity otherwise products will no more exist. Regardless of how effective its present product lineup, an organization should skillfully deal with the life cycles of existing products for future achievement. And to grow, it must build up a constant flow of new products that convey new an incentive to clients (see Real Marketing 9.2). We took a gander at the product advancement phase of the PLC in the initial segment of this section. We now take a gander at techniques for each of the other life-cycle stages. (Kotler and Armstrong, 2012: 274).

2.3.5. PRODUCT DIFFERENTIATION

(Kotler, 2001: 11) thinks that some products permit possible differentiation while other products allow some or high differentiation. For example products like chicken, steel and aspirin come under those products that have potential for differentiation. On the other hand Starbucks and P&G products offer some differentiation. Automobiles and furniture allow high differentiation. Accordingly, the seller confronts a lot of design parameters, including:

1. Form: (Kotler, 2001: 11) states that "many products can be differentiated in form- the size, shape, or physical structure of a product". Consider the numerous conceivable structures taken by products, for example, headache medicine. an spite of the fact that ibuprofen is basically a product; it can be separated by dose estimate, shape, covering, and activity time.

2. Features: 'Features are the characteristics that supplement the product's basic function" (Kotler, 2001: 11). Marketers start by inquiring recent buyers about extra features that would improve fulfillment, then deciding which would be gainful to include, given the potential market, cost, and price.

3. Performance quality: Performance quality according to (Kotler, 2001: 11) is "the level at which the product's primary characteristics operate The Strategic Planning Institute found an essentially positive relationship between relative product quality and quantifiable profit. However, there are unavoidable losses to higher execution

quality, so advertisers must pick a level suited to the objective market and adversaries' execution levels.

4. Conformance quality: high conformance quality is one of the important qualities expected by purchasers. It is how much the greater part of the created units is indistinguishable and meet the guaranteed particulars. The issue with low conformance quality is that the product will frustrate a few purchasers.

5. Durability: (Kotler, 2001: 11) defines durability as "a measure of the product's expected operating life under natural or stressful conditions, is important for products such as vehicles and kitchen appliances." However, the extra price must not be excessive; what's more, the product should not be liable to fast innovative out of date quality.

6. Reliability: Buyers take the reliability of a product into high consideration. It is a measure of the likelihood that a product won't glitch or flop inside a predefined day and age. Maytag, which manufactures major home appliances, has an outstanding reputation for creating reliable appliances.

7. Reparability: Normally buyers like those products that can be fixed and repaired easily. Reparability is a measure of the ease of fixing a product when it malfunctions or fails. A vehicle made with standard parts that are effectively supplanted has high reparability. Perfect reparability would exist if clients could settle the product themselves with little cost or time.

8. Style: Style refers to that quality of a product that shows how that product looks. It is a quality that usually attracts the attention of the buyer and encourages him to buy it. Aesthetics have played a key role in such brands as Apple computers, Mont blank pens, Godiva chocolate, and Harley-Davidson motorcycles. Style has the benefit of making distinctiveness that is hard to duplicate; however, strong style does not always mean high performance.

9. Design: Design is also a differentiation quality that attracts the attention of the buyer. Manufacturers are aware of this fact and they compete to produce best designs. Design is the incorporating force that fuses all of the qualities just examined; this implies the creator needs to make sense of the amount to put

resources into shape, include improvement, execution, conformance, strength, dependability, reparability, and style. To the organization, an all-around designer product is one that is anything but difficult to produce and disseminate. To the customer, an all-around planned product is one that is lovely to take a gander at and simple to open, introduce, utilize, repair, and discard. The creator needs to consider these variables. (Kotler, 2001: 12)

2.4. VALUE – ORIENTED PRODUCT

Organizations create value through their superior ability to organize and coordinate activities; they can deliver products and ventures that are esteemed by society and difficult to create something otherwise. Economists and sociologists have acknowledged and theorized this role of corporation for over more than two centuries (Weber, 1947; Parsons, 1956b; Say, 1971/1803; Smith, 1991/1776), it was also discussed and studied under organizations' strategies and theories by (Priem and Butler, 2001; Holcomb, Holmes Jr., and Connelly, 2009; Pies, Beckmann, and Hielscher, 2010: 1).

Corporation also creates values through their focus on the production of goods and services through their marketing and competitive activities, corporations promote capitalist and other values within and outside their boundaries. Amongst the values that corporation advance are riches, and the trade esteem and utilize estimation of products and work (Graeber, 2005; Harvie, 2005; Harvie and Milburn, 2010; Wilmot, 2010).

The first role has been studied economists and sociologists over the last two centuries (Kluckhohn, 1951; Parsons, 1956; Clegg, 1981; Smith, 2006; Marx, 2006). Both roles of corporations need to be considered if we are to understand what corporations are, what sort of activities they involve, and what their influence on society is. The idea of value can't be defined without reference to a few kinds of value; and, on the other hand, values can't be realized without some form of value creation (Kraaijenbrink, 2011: 2).

(Kotler and Armstrong, 2012: 274) think "it is important to distinguish between a product idea, a product concept, and a product image. A product idea is an idea for a possible product that the company can see itself offering to the market. A product

concept is a detailed version of the idea stated in meaningful consumer terms". A product picture is the way buyers see a real or potential product. (Kotler and Armstrong, 2012: 274)

Other businesses are guided by the product idea, which holds that consumers support those products that offer the most quality, performance, or innovative features. Managers in these organizations concentrate on making better products and enhancing them after some time, expecting that purchasers can assess quality and performance.

Product Oriented organizations frequently design their products with next to zero customer input, assuming that their specialists can design extraordinary products. A General Motors official said years back: in what manner, can the general population realize what sort of auto they need until they see what is accessible gm today asks customer what they value in an auto and incorporates showcasing individuals in the earliest reference point phases of design. However, according to (Kotler 2001) "the product concept can lead to marketing myopia. Railroad management thought that travelers wanted trains rather than transportation and overlooked the growing competition from airlines, buses, trucks, and automobiles". Universities, department establishments, and the mail station all expect that they are putting forth general society the correct product and ask why their business slip. These organizations time after time are investigating a mirror when they ought to watch out of the window (Kotler, 2012: 274).

The value – orientated product build has not received much consideration from researchers relative to other strategic orientations. Among specialists, two dominant focuses of view have been taken concerning product orientation. (Pelham cited in Sembhi, 2010) contends that organizations with strong product orientations support efficiencies what's more, cost minimization with regard to decision-making. Thus, organizations that have effectively realized the benefits of a strong value – orientated product have done so by focusing on production efficiencies, cost minimization and mass appropriation (Kaufman et al. cited in Sembhi, 2010: 18).

It is interesting to note that the characteristics of a product orientation to note struggle with a market orientation. Market orientation fights that corporations make

decisions placing the most elevated priority on customer needs and inclinations, however, organizations with strong product orientations often make decisions based on efficiencies and cost minimization (Pelham cited in Sembhi, 2010). In addition, from a new product development and marketing point of view, researchers have also pointed out that being too customer centered (i.e., marketed oriented) can lead to inertia and prevent innovation and the development of new products (e.g., Leonard-Barton cited in Sembhi, 2010: 19).

CHAPTER THREE: LEAN THINKING AND ITS ROLE IN THE DEVELOPMENT OF VALUE – ORIENTED PRODUCT

3.1. STATEMENT OF THE PROBLEM

Lean thinking one of the most crucial tools aims to provide a new way to think about how to organize human activities to deliver more benefits and value to individuals and society while eliminating waste. This study will be conducted at Industrial companies in Duhok governorate in the Kurdistan region of Iraq. The study has been examined on 16 different industrial companies in Duhok governorate such as (Hammed Dairy Factory, Qug Factory for Iron , You sash Dairy Factory, Gera Factory for Mineral Water, Serener Factory for Plastic Pipes, Teayan Factory for Mineral Water, Maff Factory for Producing Pipes, Mazy Factory for Mineral Water, Hayman Factory for Furniture, Marie Factory for Dairy, Zakho Factory for Dairy, Roovyan Factory for Mineral Water, Life Factory for Mineral Water, Zalal Factory for Mineral Water, Abhaa Factory for Chips Food, Brothers Factory Foodstuffs) plants in this area, because this place is very rich in terms of natural resources, and Representing the Industrial Zone of Duhok governorate.

3.2. PURPOSE OF THE STUDY

The main objective of this study is to determine the influence of lean thinking on value - oriented product at Industrial companies in Duhok governorate in the Kurdistan region of Iraq.

3.3. RESEARCH QUESTIONS

The study adopted a number of questions as leading phrases to construct its problem and to achieve its objectives, and these questions are:

1- What concepts of lean thinking are relevant for the industrial organizations?

2- What are the fundamentals activities leading to create a value-oriented product in the respondent’s organizations?

3-How can concepts of lean thinking improve the strategy of value - oriented product?

4- How can the respondent's organizations eliminating wastes in their manufacturing systems in order to support value- oriented product development?

5- Is there any impact of lean thinking dimensions on value - oriented product at **i**ndustrial companies in Duhok governorate in the Kurdistan region of Iraq?

3.4. LIMITATIONS OF THE STUDY

There are some limitations in this research which need to be noted because of their impact on the results of the study. First, the researcher faced problem with distributing questionnaires to the study sample. This is because of the position of factories which were far from each other. Second, it was difficult to find proper materials about the second variable which is value-oriented product.

3.5. DEFINITION OF TERMS

LEAN THINKING

Lean Thinking, a popular Japanese method that was mainly developed in Toyota as the Production System. Many companies have attempted to actualize it in general framework or have embraced a segment of the strategy, with a specific end goal to enhance their inside procedures. Today corporations face challenges as serious worldwide rivalry, fast innovation development, rapid client desires and quality demands (King, cited in Aziz, 2011: 17).

VALUE – ORIENTED PRODUCT

VALUE

Value is defined as the delivery of a complex system satisfying all stakeholders, which implies a zero-defect product or mission delivered with minimum cost, in the

shortest possible schedule, fully satisfying the customer and other stakeholders during the product or mission lifecycle (Ikonen, 2011: 18).

PRODUCT

According to (Kotler and Armstrong, 2012: 224) a product is "anything that can be offered to a market for attention, acquisition, use, or consumption that might satisfy a want or need". Products incorporate both tangible objects and intangible objects. Products like cars, computers, or cell phones come under tangible objects whereas services, events, persons, places, organizations, ideas, or a mixture of these are generally put under intangible objects. Accordingly, an Apple phoneme, Toyota Camry, and a Cafe Mocha at Starbucks are considered as products. In the same way things like " a trip to Las Vegas, E-Trade online investment services, and advice from your family doctor are also looked upon as products" (Kotler and Armstrong, 2012: 224). It is worth mentioning that this study uses the term "product" to refer to the tangible objects only.

3.6. SIGNIFICANT OF THE STUDY

Obviously, nowadays many factories work to improve their products and reduce costs by eliminating wastes, which lead to increase profits, for this they utilize some strategies such as taking in to consideration the role of lean thinking and its development on value-oriented product). Additionally, in Duhuk governorate there are a large number of factories and this number has been increased after the establishment of Investment law in the region in 2006.

This study is significant because it will help managers to develop their products and finding appropriate way to use raw-material and decreasing wastes that appears in their companies. Also help them to introduce the products with a value that give benefits to their companies and customers.

3.7. RESEARCH METHODOLOGY

3.7.1 INTRODUCTION

This chapter gives an overview of the research methodology. It includes research design, research framework, research hypothesis, population and sampling, research instruments, data collection, and data analysis.

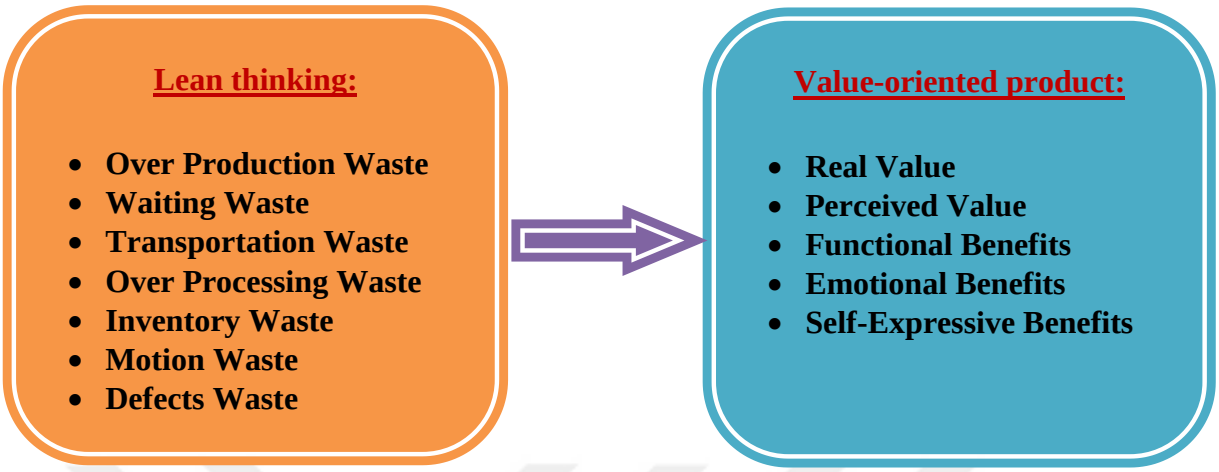
3.7.2 RESEARCH DESIGN

According to Vogt (1993; cited in Hussey and Hussey, 1997: 114), research design is "the science (and art) of planning procedures for conducting studies so as to get the most valid findings". The research design is extremely important because it determines the success or failure of the study. Determining research design will provide researchers a detailed plan which will be used to guide their research (Collis and Hussey, 2003). The purpose of this study is hypothesis testing. This study is a correlation study because it examines the relationship between lean thinking and value-oriented product in the Industrial companies in the Kurdistan region. Moreover, the relationship will be measured by some determined tools. It is both quantitative and qualitative study and uses the survey and interview methods to collect data. The unit of analysis for this study is a person who works in the Industrial companies in the Kurdistan region.

3.7.3 RESEARCH FRAMEWORK

In this study the lean thinking represent the independent variable and value-oriented product is considered as the dependent variable. The figure below shows model of the research variables and explain the relations between the variables and their dimensions:

Figure 18: Research framework



3.7.4 RESEARCH HYPOTHESES

According to the literature review and the conceptual framework, the following hypotheses are developed to be tested in this research:

Hypothesis One:

H_0: There is no significant correlation between lean thinking and value - oriented product in the respondent's Industrial organizations.

H_1: There is a significant correlation between lean thinking and value - oriented product in the respondent's Industrial organizations.

Hypothesis Two:

H_0: There is no significant effect for lean thinking in the value - oriented product in the respondent's Industrial organizations.

H_1: There is a significant effect for lean thinking in the value - oriented product in the respondent's Industrial organizations.

Hypothesis Three:

H_0: There is no significant difference in variables of the present study belonging to the demographic characteristics for the respondent's individual in the respondent organizations.

H_1: There is a significant difference in variables of the present study belonging to the demographic characteristics for the respondent's individual in the respondent organizations.

3.7.5 POPULATION, SAMPLING, AND SAMPLE SIZE

The sampling is an important element of a positivistic research. This is because the difficulties for researchers to get access to the entire population or to be able to collect data from all members of the population being studied (Remeny, et al., 1998). According to (Maylor and Blackmon, 2005: 195), a "sample is the subset of those social units you have selected to study". The population of this study is all employees of Industrial companies in Kurdistan.

3.7.6 RESEARCH INSTRUMENTS

In this study the research instruments are a self-administered questionnaire and interview. According to (Wilson, 2014:151), a self-administrated questionnaire means that the audience completes it without the assistance of a researcher (interviewer). In this study, the questionnaire is used to collect data from targeted participants to achieve the objective of the research. The questionnaire is specifically designed to find the relationship between lean thinking and value-oriented product in the Industrial companies in the Kurdistan region. This questionnaire includes two sections. The first section contains demographic information such as gender, age, level of education, years of employment (experience), and Training course. The second section is divided into two parts.

Part 1: Consists of 39 structured questions adapted from Womack and Jones (2003).

Part 2: Consists of 20 structured questions adapted from Womack and Jones (2003). The respondents are required to rank questions based on a five-point Liker scale as shown below:

Strongly disagree =1, Disagree =2, neither agree nor disagree =3, Agree =4, and strongly agree =5.

3.7.7 DATA COLLECTION

3.7.7.1 PRIMARY DATA

According to (Wilson, 2014: 151), primary data can be collected by researchers themselves by using various tools such as questionnaires, observation, and interviews; these data are unique and tailored specifically to a particular study. Wilson (2014: 151) also mentions that primary data can be supported because of the following three reasons. First, "when existing secondary data are unavailable; second, existing secondary data may not be appropriate to your study; finally, some institutions require students to undertake primary research, whereas in others may not be a necessity". For this research, primary data were collected by a printed questionnaire and interview. The questionnaires were distributed among all factories. For this study a total of 132 questionnaires were distributed; 120 completed questionnaires were received, and the response rate was 91%. In addition, twelve managers and production managers have been selected to be interviewed in this study.

3.7.7.2 SECONDARY DATA

For this study, secondary data were collected mostly from textbooks, journal articles, magazines, and Internet, which were presented in the literature review. Furthermore, findings from earlier research done in the same area have served as a valuable basis of supporting material.

3.8 DATA ANALYSIS AND RESULTS DISUSSION

The data collected will be processed using the statistical package for social science (SPSS V.20). This package is considered to be the most widely used to analyze quantitative data for social science (Bryman and Bell, 2011: 9). Data were analyzed by using descriptive statistics to describe the respondents' profile. Correlation will be used to determine the relationship between independent variable (lean thinking) and dependent variable (value-oriented product). Multiple regression analysis will be utilized to determine which independent variables have more influence on the dependent variable.

This chapter devoted to the results discussion through the description of the surveyed organizations, questionnaire distribution, study sample, interview analyzing, and individuals who have been distributing the questionnaire to them, the rationale for selecting these samples, description of variables, and testing research hypotheses as follows**:**

3.8.1 DESCRIPTION OF SURVEYED ORGANIZATIONS

The choice of the field in which the study conducted is an important topics and most important pillars that contribute to the success or failure of the study; because it is the primary source to get the study data and access to accurate results, researcher has to choose different manufacturing sectors in the province of Duhok as a society for the study, and the rationale for selecting these sectors are:

1. There is an intense competition between organizations working in these sectors in the province of Duhok.
2. Community use of the products offered by organizations working in these sectors with huge quantities.
3. The direct contact and continuous interaction between customers and organizations working in these sectors.
4. The present study attempt to submit proposals for the study sample organizations, to evaluate the performance and development of their products to rely on local products as much as possible and reduce imported from other countries.
5. The most selected organizations surveyed in different sectors from each other in terms of products offered in the market.

3.8.2 QUESTIONNAIRE DISTRIBUTION

As for the study sample, has been selected as the official individuals who occupy functional positions in the surveyed organizations, starting with the organization manager and his assistant and department heads working in production function; who have knowledge and experience in manufacturing field. It was distributed (132) form of the study questionnaire in the surveyed organizations. After checking the correct forms of collected questionnaire, to make sure they are suitable and valid for

analyzing, thus the final sample becoming (120) form, as shown in the Table (4), and then the response average is a proportion of (90. 9%).

Table 4: Questionnaire Distribution

Seq.	Organization Title	Distributed Questionnaire	Collected Questionnaire	Valid Questionnaire
1	**Hammed Dairy Factory**	1	1	1
2	**Qug Factory for Iron**	5	5	5
3	**You sash Dairy Factory**	10	10	10
4	**Gera Factory for Mineral Water**	10	10	10
5	**Saranser Factory for Plastic Pipes**	9	7	7
6	**Teayan Factory for Mineral Water**	10	10	7
7	**Maff Factory for Producing Pipes**	7	7	5
8	**Mazi Factory for Mineral Water**	5	5	5
9	**Hayman Factory for Furniture**	4	4	4
10	**Maraee Factory for Dairy**	5	5	5
11	**Zakho Factory for Dairy**	6	5	5
12	**Roovyan Factory for Mineral Water**	25	25	25
13	**Life Factory for Mineral Water**	10	9	9
14	**Zalal Factory for Mineral Water**	6	6	6
15	**Abhaa Factory for Chips Food**	2	2	2
16	**Brothers Factory Foodstuffs**	17	15	14
	Total	132	126	120

3.8.3 DEMOGRAPHIC CHARACTERISTICS OFPARTICIPANTS

In this section the researcher analyzing the data obtained from industrial organizations at Dohuk Govern ate – Kurdistan Region of Iraq, by using descriptive statistics to describe the demographic characteristics of participants, as well as interpret the obtained output information using (SPSS V.20) Package's, as shown in Table (5):

1. The Gender: Results of the analysis indicate that the percentages of (92.5%) from selected participants at the sample are male, while the ratio of female was (7.5%). This high ratio of male is a normal rate because working at manufacturing organizations need physical abilities available among males if we compare them with female.

2. Education Level: Demographical data related to the education level shows that (40.8%) percentage of the sample hold a Secondary school or less education level, this indicate that they represent the majority of the sample, the rest of sample distributed between technical diploma (30%), bachelors (23.3%), and master (5.8%). While the PhD level recorded (0%) percentage.

3. Total service years: the results in Table (5) explain that the majority of participant's total service years between (1 less than 5 Year) were represent (42.5%) from the sample. And (40%) from the sample have a total service years of (5 less than10 Year), while the participants who has (More than 10 Year) formed (`17.5%).

4. Service years in your position: This indicator shows that that (46.7%) of participants have (1 less than 4 years) working in their position, (38.3%) of them working in their position for (4 less than 8 years), while (15%) of them stay in their position for (more than 8 years).

5. Training course: This characteristic indicate that the majority of the participants engaged in training course and about (28.3%) of them in specific training, (31.7%) in general training, while (40%) of them never participated in any training course.

Table 5: Demographic Distribution for Participants' Characteristics

Variable	Class	Frequency	Percent
Gender	Male	111	92.5
	Female	9	7.5
Age	25 less than 35 Year	56	46.7
	35 less than 45 Year	31	25.8
	45 less than 55 Year	28	23.3
	More than 55 Year	5	4.2
Education Level	Secondary school or less	49	40.8
	Technical diploma	36	30.0
	Bachelor	28	23.3
	Master	7	5.8
	PhD	0	0.0
Total service years	1 less than 5 Year	51	42.5
	5 less than10 Year	48	40.0

Variable	Class	Frequency	Percent
	More than 10 Year	21	17.5
Service years in your position	1 less than 4 Year	56	46.7
	4 less than 8 Year	46	38.3
	More than 8 Year	18	15.0
Training course	Specific training	35	28.3
	General training	37	31.7
	Never participated	48	40.0
Total		120	100.0

3.8.4 STATISTICAL TESTING CONDITIONS FOR ESEARCH DATA

Statistical analysis according to parametric tests require the need for a number of statistical conditions in the data that will be analyzed in order to applying the necessary statistical indicators, and to determine whether the data collected is valid for a parametric test or by nonparametric tests, to check the current study data are met that conditions so it has been conducting the following tests:

1. Normal Distribution: To test the normality of the data for this study we use normal distribution according to Kolmogorov - Smirnov test. as it showed the results of the analysis in the Table (6), and all results of the calculated values (P-Value) was larger than the value of the default level of significance (0.05) for the study, and by reference to the values of calculated (Z) for the variables dimensions of the current study it seemed to be higher than the values of tabulated (Z). This in turn leads us to conclude that the current study data follow a normal distribution, both at the level of the main variables of the study or at the level of the dimensions of those variables.

Table 6: The Normal Distribution

Variables	Variable Dimensions	Mean	STD	Normality K – S	Tabulated Z	P-Value
Lean Thinking	Over production Waste	3.638	0.738	1.255	4.751	0.086
	Waiting Waste	3.328	0.758	0.953	4.616	0.321
	Transportation Waste	3.225	0.795	1.038	4.516	0.240
	Over Processing Waste	3.522	0.733	0.937	4.651	0.348
	Inventory Waste	3.338	0.781	0.903	4.616	0.389
	Motion Waste	3.1733	0.971	1.024	4.680	0.245
	Defects Waste	3.612	0.691	1.091	4.751	0.217
Total Indicator		3.405	0.625	1.006	4.387	0.251
Value – Oriented Product	Value	4.267	0.478	1.054	5.122	0.238
	Product	3.949	0.541	1.203	4.772	0.111
Total Indicator		4.108	0.408	1.078	4.758	0.225

2. Independency: To determine the independence of the study variables, it has to be detected autocorrelation phenomenon between the dimensions of independent variable to make sure that there is no high correlation between them (Multi co linearity). If we found that the value of calculated variation inflation coefficient (VIF) is not exceed value (10), and the calculated value of the tolerance greater than (0.05), this is a sign that our independent variable dimension has passed those two tests. And according to the results of variation inflation coefficient (VIF) and Tolerance indicators for each dimension of the independent variable in the study as shown in Table (7), it is noted that the values of (VIF) for all variables was less than (10) and ranged between (1.710 – 3.037), also the tolerance values ranged between (0.329 - 0.585), which is greater than (0.05), this is an indication that there is no high correlation between the dimensions of independent variable.

Table 7: VIF & Tolerance Tests

Lean Thinking Dimensions	VIF	Tolerance
Over production Waste	1.710	.585
Waiting Waste	2.500	.400
Transportation Waste	2.473	.404
Over Processing Waste	2.609	.383
Inventory Waste	2.192	.456
Motion Waste	3.037	.329
Defects Waste	1.733	.577

3. Homogeneity of Variance: In order to identify the homogeneity of variance for the data of the current study, we depend on the application of Levine's Test. Since the natural distribution of data for the study pointed out that it takes the form of a normal distribution, it is possible to conduct this testing to ensure that the homogeneity of variance for all the variables and its dimensions. Note that the homogeneity condition considered accrued if the value (P-Value > 0.05), which gives an indication that the variation of a homogeneous or equal groups, and vice versa if the value (P-Value ≤ 0.05), this indicates a lack of homogeneity of variance**.**

According to the Levine's test results shown in the Table (8), the calculated values for (P-Value) for the study variables and its dimensions were greater than the value of the default level of significance for the study of the (0.05), which refers to verify the homogeneity of variance data requirement, this analysis was supported by the values of calculated (F) were all lower than the (F) tabulated value (3.921) and varying the freedom of (1.118).

Table 8: Homogeneity of Variance Test

Variables	Dimensions	Levine's Test	P-Value	F	P-Value
Lean Thinking	Over production Waste	1.704	0.091	0.477	0.491
	Waiting Waste	1.587	0.115	0.481	.489
	Transportation Waste	1.768	0.080	1.918	0.169
	Over Processing Waste	1.182	0.240	0.165	0.686
	Inventory Waste	1.720	0.088	0.130	0.719
	Motion Waste	1.539	0.112	2.187	0.142
	Defects Waste	0.052	0.958	0.691	0.407
Value -Oriented Product	Value	1.717	0.089	1.618	0.206
	Product	0.991	0.324	0.206	0.651

3.8.5 INTERVIEWS ANALYSIS

In this paragraph, we trying to describe field results of the data obtained from interviews conducted by a researcher with the officials of the surveyed organizations, the questionnaire was designed for this purpose as described in the appendix (1). The interview took place with the director of the factories in the respondent organizations, among (16) organizations there are four of them have refused to conduct the interview and so the results of the analysis focused on the interview of (12) factories Manager, whose gender were all male. The results of the analysis and described in the Table (9) as follows:

1. The respondent organizations produce between one and four products.
2. All respondent organizations suffer from different types of waste, which ranged between one (about 8.3%) and seven kinds of waste (about 100%).
3. All respondent organizations check their products with quality system such as laboratory checking or by stress checking.
4. Most of the respondent organizations (about 91.7 %) have a manufacturing system depend on implementing both Lean-Thinking (LT) and Value Oriented Product (VOP), except one organization depends on Value Oriented Product.
5. The efforts of about (75%) of the respondent organizations concentrate on both quality (Q) and product value (PV), while the rest (25%) focused their efforts upon quality only.
6. About (75%) of the respondent organizations thought that the importance for their customers are both quality and product value, as (16.7%) of them thought that the

quality is important thing to their customers, while (8.3%) of them thought that the product value is important thing to their customers. According to the results of interviews we can conclude that the respondent organizations is the best site for our field study as they experiencing or suffering from different types of waste and they applying lean thinking to limit that waste, as well as the majority of them focused on value oriented product in their manufacturing system.

Table 9: Interview Results Description

Organization Name	Interview Date	Products Number	Waste Type *	Quality System	Manufacturing System	Q & PV Importance to	
						Organization	Customer
Hammed Dairy Factory	7/11/2016	1	OPW, WW, OPW, DW	Lab. Checking	LT & VOP	Q & PV	Q & PV
Qug Factory for Iron	Reject the interview						
You sash Dairy Factory	14/11/2016	2	OPW, IW, DW	Lab. Checking	LT & VOP	Q	Q
Gera Factory for Mineral Water	9/11/2016	**3**	OPW, OPW, DW	Lab. Checking	LT & VOP	Q & PV	Q & PV
Saranser Factory for Plastic Pipes	Reject the interview						
Teayan Factory for Mineral Water	14/11/2016	4	OPW , DW	Lab. Checking	LT & VOP	Q & PV	Q & PV
Maff Factory for Producing Pipes	12/11/2016	2	OPW, IW, DW	Stress Checking	LT & VOP	Q & PV	Q
Mazi Factory for Mineral Water	6/11/2016	1	-	Lab. Checking	LT & VOP	Q	Q & PV
Hayman Factory for Furniture	8/11/2016	2	OPW, OPW,, DW	Lab. Checking	LT & VOP	Q & PV	Q & PV
Maraee Factory for Dairy	15/11/2016	2	OPW, DW	Lab. Checking	LT & VOP	Q & PV	Q & PV
Zakho Factory for Dairy	Reject the interview						
Roovyan Factory for Mineral Water	5/11/2016	**3**	OPW, WW, TW, OPW, IW, DW	Lab. Checking	LT & VOP	Q & PV	Q & PV
Life Factory for Mineral Water	Reject the interview						
Zalal Factory for Mineral Water	12/11/2016	**3**	All Wastes	Lab. Checking	LT & VOP	Q & PV	PV
Abhaa Factory for Chips Food	13/11/2016	**2**	DW	Lab. Checking	VOP	Q	Q & PV
Brothers Factory Foodstuffs	17/11/2016	3	OPW, OPW, IW, DW	Lab. Checking	LT & VOP	Q & PV	Q & PV

*** The abbreviations represent the seven types of waste as categorized by lean thinking system.**

3.8.6 DESCRIPTION OF THE RESEARCH VARIABLES

Descriptive statistics tests have been applied in the description of the study variables and dimensions, according to the views of respondents in the respondent organizations and by adopting frequencies, percentages, means, and standard deviations. The results of the analysis are as follows**:**

First: Description Lean Thinking Variable

We try in this part and through the application of a number of descriptive statistics indicators to describe the views of individuals in the study sample in the responsive organizations towards the dimensions of the lean thinking variable, as follows**:**

1. Description of the overproduction waste dimension: analysis results mentioned in Table (10) refer to the responses of the respondents in the respondent organizations towards the description of overproduction waste dimension, which represents frequencies, percentages, means, and calculation of standard deviations of the relevant parts of (X1-X7) which tend towards agreement on the availability of this dimension at respondent organizations, as follows**:**

a. At the macro level for all measurement statements of this dimension show that the respondent organizations agreed on the content of the statements that measure this dimension in terms of the value of the coefficient of variation, which amounted to (28.85%), which indicates the severity of the agreement between the respondents in the respondent organizations that they suffer from the existence of overproduction waste, because the more the rate of coefficient of variation reduces and approaches zero, the more that will indicate the severity of homogeneity in the responses to the sample this has come in terms of each of the arithmetic mean which amounts to (3.64) and standard deviation amounting to (1.049), indicating agreement of the respondent organizations that reliance on manufacturing before determining the demand has led to the presence of over production waste, which caused suffering from an over production for the market need, and the existence of a surplus in human

resources working in the production, and the emergence of an increase in the cost of the final product storage**.**

b. On the micro-level for the statements of this dimension, it has been shown that the respondent organizations have the flexibility to change production plan according to the changing demand of the final product, and this has come in terms of the statement (X6), which amounted to the value of its coefficient of variation which is (21.54%), which represented the greatest value for the coefficient of variation between the statements of this dimension, reaching the arithmetic mean of value (4.10) and the standard deviation is (0.883). This result indicates that the respondent organizations have the flexibility to change production plan in accordance with changing demand for the final product**.**

Table 10: Over Production Waste Descriptive Statistics

Items	Mean	STD	Coefficient of Variance %
X1	**3.66**	**1.126**	**30.77**
X2	**3.62**	**1.021**	**28.20**
X3	**3.29**	**1.064**	**32.34**
X4	**3.79**	**1.003**	**26.46**
X5	**3.44**	**1.158**	**33.66**
X6	**4.10**	**.883**	**21.54**
X7	**3.56**	**1.091**	**30.65**
Total Indicator	**3.64**	**1.049**	**28.85**

2. Description of the waiting waste dimension: The data listed in Table (11) describe the results of the analysis of the answers that the respondents in the respondent organizations provided towards the description of the waiting waste dimension, which represents frequencies, percentages, means, calculation of standard deviations of the relevant paragraphs (X8 – X13) which tend towards agreement on availability of this dimension to the respondent organizations, as follows**:**

a. At the macro level for all measurement statements of this dimension it was shown that the respondent organizations agreed on the content of the statements that measure this dimension and so in terms of the value of the coefficient of variation, which amounted to (32.41%), which indicates the severity of the agreement between

the respondents in the respondent organizations that they suffer from having the waiting waste, however, less than the levels of overproduction waste and by comparing the difference between the two coefficients. This has come in terms of each of the arithmetic mean which is (3.36) and the standard deviation which is (1.090), indicating agreement with the respondent organizations that they have waste in waiting caused by multiple factors and suppliers, including the delay in the supply of raw materials, delays in the arrival of spare parts, and high levels of motion to their employees, and the presence of bottlenecks between production stations, and the emergence of long waiting periods when access to information about production**.**

b. On the micro-level statements of this dimension, it has been shown that the respondent organizations strongly suffer from long waiting periods when they change the production lines from one product to another, and this has come in terms of the paragraph (X11), which amounted to a coefficient of variation valued as (28.82%), which represented the lowest value of the coefficient of variation between paragraphs of this dimension, reaching the arithmetic mean of value (3.65) and with a standard deviation that amounted to (1.052).

Table 11: Waiting Waste Descriptive Statistics

Items	Mean	STD	Coefficient of Variance
X8	**3.18**	**1.092**	**34.34**
X9	**3.60**	**1.141**	**31.69**
X10	**3.27**	**1.035**	**31.65**
X11	**3.65**	**1.052**	**28.82**
X12	**3.37**	**1.069**	**31.72**
X13	**3.10**	**1.148**	**37.03**
Total Indicator	**3.36**	**1.090**	**32.41**

3. Description of transportation waste: The results of the analysis mentioned in Table (12) show that the respondents' answers in the respondent organizations towards the description of transportation waste, which represents frequencies, percentages, means, and calculation of standard deviations of the relevant paragraphs (X14-X19) which tend towards agreement on the availability of this dimension of the respondent organizations, as follows**:**

a. At the macro level for all measuring statements of transportation waste it was shown that the respondent organizations agreed on the content of the statements that measure this dimension and this came in terms of the value of the coefficient of variation, which amounted to (33.77%), which indicates the severity of the agreement among the respondents in the respondent organizations that they suffer from having transportation waste, and this has come in terms of each of the arithmetic mean which is (3.23) and standard deviation which is (1.089), indicating agreement among the respondent organizations that they have problems of transportation waste because of long spaces between production stations, a weak smooth flow of raw materials and parts of semi-manufacturing between production stations, inefficient transportation methods that increase materials handling operations, irregular paths of transportation and materials between production stations movement**.**

b. On the micro-level statements of this dimension, it has been shown that the respondent organizations suffer from transportation waste because of its dependence on the method of manufacturing cells by collecting similar machines in a single production plant which has increased from the time of the product between the production stations transfer, and this has come in terms of the phrase (X14), which amounted to the value of coefficient difference which is (22.87%), which represented the lowest value of the coefficient of variation between the terms of this dimension, reaching the arithmetic mean with the value of (2.98) and standard deviation which is (0.901)**.**

Table 12: Transportation Waste Descriptive Statistics

Items	Mean	STD	Coefficient of Variance
X14	**3.94**	**.901**	**22.87**
X15	**3.14**	**1.162**	**37.01**
X16	**2.98**	**1.260**	**42.28**
X17	**3.15**	**1.113**	**35.33**
X18	**3.16**	**1.069**	**33.83**
X19	**2.98**	**1.029**	**34.53**
Total Indicator	**3.23**	**1.089**	**33.77**

4. Description of the over processing dimension: The analysis results listed in Table (13) indicate to respondents' answers in the respondent organizations regarding the description of the over processing waste, which represents frequencies, percentages, means, and calculation of standard deviations of the relevant paragraphs (X20-X24) which tend towards agreement on the availability of this dimension to the respondent organizations, as follows:

a. At the macro level for all measurement statements of this dimension, it is shown that the respondent organizations agreed on the content of the statements that measure this dimension and so in terms of the value of the coefficient of variation, which amounted to (30.54%), which indicates the severity of the agreement among the respondents in the respondent organizations that they suffer from having over processing waste. This has come in terms of each of the arithmetic mean which is (3.52) and standard deviation which is (1.076), indicating agreement among the respondent organizations that they suffer from an over processing waste, which resulted in long periods when they switch production templates from product to product, and the adoption of the push system of the product from production station to another, and the existence of human resources skills that outweigh the requirement in the manufacturing of the product.

b. On the micro-level statements of this dimension, it has been shown that the respondent organizations rely on productive maintenance method reduce time spent in the product manufacturing processes, and this has come in terms of the phrase (X23), which amounted to the value of variation coefficient (25.23%), which represented the lowest value of the coefficient of variation between the terms of this dimension, reaching the arithmetic mean of value which is (3.96) and the standard deviation which is (0.999).

Table 13: Over Processing Waste Descriptive Statistics

Items	Mean	STD	Coefficient of Variance
X20	**3.44**	**1.151**	**33.46**
X21	**3.06**	**1.095**	**35.78**
X22	**3.40**	**1.118**	**32.88**
X23	**3.96**	**.999**	**25.23**
X24	**3.75**	**1.015**	**27.07**
Total Indicator	**3.52**	**1.076**	**30.54**

5. Description of inventory waste: The analysis results listed in Table (14) indicate to respondents' answers in the respondent organizations with regards to the description of the inventory waste dimension, which represents frequencies, percentages, means, and calculation of standard deviations of the relevant paragraphs (X25-X29) which tend towards agreement on the availability of this dimension of the respondent organizations, as follows:

a. At the macro level for all measurement statements of this dimension, it is shown that the respondent organizations agreed on the content of the statements that measure this dimension and so in terms of the value of the coefficient of variation, which amounted to (32.06%), which indicates the severity of the agreement among the respondents in the respondent organizations that they suffer from having inventory waste, and this has come in terms of each of the arithmetic mean which is (3.38) and the standard deviation which is (1.084), indicating agreement with the respondent organizations that they suffer from inventory waste due to multiple factors, including the presence of high amounts of raw materials in the stores, as well as material under operation, and suffering from damage in the final product.

b. On the micro-level statements of this dimension, it has been shown that the respondent organizations suffer from the emergence of the quantities and high levels of substances under the operating and the production processes, and this has come in terms of the phrase (X29), which amounted to a coefficient of variation that values at (26.46%), which represented the lowest value of the coefficient of variation between phrases of this dimension, reaching the arithmetic mean which is (3.73) and standard deviation which is (0.987).

Table 14: Inventory Waste Descriptive Statistics

Items	Mean	STD	Coefficient of Variance
X25	3.62	1.117	30.86
X26	3.73	.987	26.46
X27	2.93	1.113	37.99
X28	3.46	.978	28.27
X29	3.16	1.223	38.70
Total Indicator	3.38	1.084	32.06

6. Description of motion waste: The analysis results listed in Table (15) indicate to respondents' answers in the respondent organizations concerning the description of the motion waste dimension, which represents frequencies, percentages, means, and calculation of standard deviations of the relevant paragraphs (X30-X34) which tend towards agreement on the availability of this dimension of the respondent organizations, as follows:

a. At the macro level for all measurement statements of this dimension, it is shown that the respondent organizations agreed on the content of the statements that measure this dimension and so in terms of the value of the coefficient of variation, which amounted to (37.03%), which indicates the severity of the agreement among the respondents in the respondent organizations that they suffer from having motion waste, and this has come in terms of each of the arithmetic mean which is (3.21) and standard deviation which is (1.190), indicating agreement with the respondent organizations that they suffer from motion waste, which resulted in a surplus in the movement of materials under the operating and workers between production stations, and the presence of a delay in product movement final mismatch between the assembly lines, and the lack of standardized movements of both labor and raw materials between the output terminals.

b. On the micro-level statements of this dimension, it has been shown that the respondent organizations suffer from an over motion of personnel between production processes and production stations, and this has come in terms of the phrase (X31), which amounted to a coefficient of variation which is (31.19%), which represented the lowest value of the coefficient of variation between the terms of this

dimension, reaching an arithmetic mean that values at (3.45) and a standard deviation that estimates as (1.102).

Table 15: Motion Waste Descriptive Statistics

Items	Mean	STD	Coefficient of Variance
X30	**3.35**	**1.255**	**37.46**
X31	**3.45**	**1.102**	**31.19**
X32	**3.10**	**1.155**	**37.26**
X33	**3.18**	**1.261**	**39.65**
X34	**2.99**	**1.177**	**39.36**
Total Indicator	**3.21**	**1.190**	**37.03**

7. Description of the defects waste dimension: The analysis results mentioned in Table (16) indicate to respondents' answers in the respondent organizations regarding the description of the infrastructure for customer's social relationship management representing frequencies, percentages, means, and calculation of standard deviations of the relevant paragraphs (X35-X39) which tend towards agreement on the availability of this dimension to the respondent organizations, as follows:

a. At the macro level for all measurement statements of this dimension, it was shown that the respondent organizations agreed on the content of the statements that measure this dimension and so in terms of the value of the coefficient of variation, which amounted to (28.97%), which indicates the severity of the agreement among the respondents in the respondent organizations that they suffer from the presence of production waste , since the more the percentage coefficient of variation reduces and approaches zero, the more it will indicate the severity of homogeneity in the answers to the sample, and this has come in terms of both the a thematic mean which is (3.61) and the standard deviation which is (1.046), indicating agreement with the respondent organizations that they have an over production for the market demand, causing a rise in inventory levels and they suffer from an increase in the inventory's cost.

b. On the micro-level statements of this dimension, it has been shown that the respondent organizations are trying to explore the causes of errors in defective products in order to take corrective actions to it, and this has come in terms of the phrase (X39), which amounted to a coefficient of variation that is valued as (22.30%), which represented the lowest value of the coefficient of variation between phrases of this dimension, reaching an arithmetic mean that is valued as (4.09) and a standard deviation that is valued as (0.826).

Table 16: Defects Waste Descriptive Statistics

Items	Mean	STD	Coefficient of Variance
X35	2.92	1.274	43.63
X36	3.81	.998	26.19
X37	3.96	.883	22.30
X38	3.28	1.251	38.14
X39	4.09	.826	20.20
Total Indicator	3.61	1.046	28.97

Based on the analytical description of the dimensions of the lean thinking, it can be concluded that the respondent organizations suffer from varying levels of each of the over production waste, waiting waste, transportation waste, over processing waste, inventory waste, motion waste, and defects waste.

Second: Description of the value - oriented product variable

A number of descriptive statistics indicators have been applied in order to describe the value oriented product variable by its two dimensions, according to the sample's views in the responded organizations, according to the following paragraphs:

1. Value description: it is shown from the analysis of the results listed in Table (17) that respondents' answers in the respondent organizations regarding the description of the value dimension which is represented by statistical standards descriptive of the relevant paragraphs (Y1-Y8) tend towards agreement on the availability of this dimension to the respondent organizations, and these results were as follows:

a. At the macro level for all measurement statements of the value it is shown that the respondent organizations agreed on the content of the statements that measure this dimension and so in terms of the value of the coefficient of variation, which amounted to (17.90%), which indicates the severity of the agreement among the respondents in the respondent organizations that they recognize the benefits in the product and provided it to their customers and satisfy their needs, since the more the rate of the coefficient of variation reduces and approaches zero, the more it will indicate the severity of homogeneity in the sample's answers, and this has come in terms of each of the arithmetic mean which is (4.24) and standard deviation which is (0.759), indicating agreement with the respondent organizations that they are trying to reduce the cost of their products to the least extent possible.

b. On the micro-level expressions of this dimension, it has been shown that the respondent organizations take into consideration the safety of use of their products by customers as one of the perceived value by the customer, which is keen on those organizations, and this has come in terms of the phrase (Y6), which amounted to the value of the coefficient of variation them (21.54%), which represented the lowest value of the coefficient of variation between the terms of this dimension, reaching the arithmetic mean which is (4.31) and standard deviation which is (0.646).

Table 17: Value Descriptive Statistics

Dimensions	Items	Mean	STD	Coefficient of Variance
Real Value	Y1	4.14	.882	21.30
	Y2	4.13	.755	18.28
	Y3	4.23	.907	21.71
	Y4	4.30	.747	17.29
Perceived Value	Y5	4.28	.712	16.64
	Y6	4.31	.646	14.99
	Y7	4.29	.666	15.52
	Y8	4.42	.656	21.30
Total Indicator		4.20	0.759	17.90

2. Product Description: it is shown from the results of the analysis in Table (18) that are related to statements describing this dimension, represented by (Y9 – Y20) the following:

a. At the macro level for all product measurement statements, it is shown that the respondent organizations agreed on the content of the statements that measure this dimension and so in terms of the value of the coefficient of variation, which amounted to (23.45%), which indicates the severity of the agreement among the respondents in the respondent organizations that they recognize that the value of the product has embodied in functional, emotional and self-benefits provided by the product targeted by it to the customer, and this has come in terms of each of the arithmetic mean which is (3.95) and standard deviation which is (0.925), indicating agreement with the respondent organizations they depend on each of the functional benefits and emotional benefits to get a response from customers for their products.

b. On the micro-level statements of this dimension, it has been shown that the respondent organizations strongly focused on the self-benefits of their products granted an opportunity to expand and grow in the market, and this has come in terms of the phrase (Y19), which amounted to the value of the difference coefficient (17.99%), which represented the lowest value of the coefficient of variation between phrases of this dimension, reaching an arithmetic mean that values at (4.18) and a standard deviation that values at (0.912).

Table 18: Product Descriptive Statistics

Dimensions	Items	Mean	STD	Coefficient of Variance
Functional Benefits	Y9	4.09	.830	20.29
	Y10	4.21	.869	20.64
	Y11	4.02	.745	18.53
	Y12	4.12	.862	20.92
Emotional Benefits	Y13	3.71	1.072	28.89
	Y14	3.77	1.073	28.46
	Y15	3.72	1.030	27.69
	Y16	3.81	1.079	28.32
Self-Expressive Benefits	Y17	4.04	.854	21.14
	Y18	3.73	.985	26.41
	Y19	4.18	.752	17.99
	Y20	3.99	.912	22.86
Total Indicator		3.95	0.926	23.45

3.8.7 Statistical Test of Hypotheses One

The following steps are conducted to test the correlations between research variables:

First: Correlation test at macro level: This part deals with an overview of the correlation at the macro level between lean thinking and value-oriented product. It was found from the results of correlation analysis in Table (19) that there is a significant and negative correlation between lean thinking and value-oriented product, which amounted to (- 0.872) at the significant level (0.01), and this mean that there are significant levels of correlation between lean thinking and value-oriented product in the respondent organizations. It can be concluded from this that the more responsive organizations adopt the strategy of lean thinking in order to reducing or minimize the seven wastes in the manufacturing operations, that would lead to increasing the quality of the value-oriented product.

Second: Correlation test at the micro level: To understand more comprehensively the role of the dimensions of lean thinking in enhancing the level of engagement with the value-oriented product variable and its dimensions, the analysis of correlation at the micro level for the dimensions of these variables has been made. The results of this analysis as in Table (19) indicate to the following**:**

1. It was shown that there is a negative significant correlation relationships between all dimensions of lean thinking variable which are represented by each of the over production waste, waiting waste, transportation waste, over processing waste, inventory waste, motion waste, and defects waste and between value – oriented product variable which reached (0.740), (0.369), (0.426), (0.657), (0.318), (0.201), (0.744), respectively, at significant level of (0.01) and (0.05). It can be concluded that the more respondent organizations are able to reduce the wastes of the seven levels in their manufacturing system, the more that would lead to raise their capacity to achieve the desired levels of value - oriented product.

2. It was shown that the strongest correlation was between the dimensions of the defect waste, over production waste, over processing waste, and the value oriented product with the significant values at the level of (0.01), while the lowest value of the

correlation coefficient was between the dimension of the motion waste and the value-oriented product with a significant level estimated as (0.05). This refer that, if the respondent organizations wish to achieve a value - oriented product at the highest possible levels, they have to reduce each of defect waste, the over processing waste, and over production waste due to their higher correlation level than other types of wastes.

Table 19: The Correlation Between Variables

Variables and Dimensions	Value Dimension		Product Dimension		Value-Oriented Product (VOP)	
	Correlation Coefficient	P-value	Correlation Coefficient	P-value	Correlation Coefficient	P-value
Over Production Waste (OPW)	- 0.742**	0.000	- 0.549 **	0.000	- 0.740 **	0.000
Waiting Waste (WW)	- 0.374 **	0.000	- 0.377 **	0.000	- 0.369 **	0.000
Transportation Waste (TW)	- 0.408 **	0.000	- 0.206 *	0.024	- 0.426 **	0.000
Over Processing Waste (OPW)	- 0.538 **	0.000	- 0.570 **	0.000	- 0.657 **	0.000
Inventory Waste (IW)	- 0.288 **	0.001	- 0.288 **	0.001	- 0.318 **	0.000
Motion Waste (MW)	- 0.035	0.708	- 0.237 **	0.009	- 0.201 *	0.028
Defects Waste (DW)	- 0.703 **	0.000	- 0.593 **	0.000	- 0.744 **	0.000
Lean Thinking (LT)	- 0.781 **	0.000	- 0.674 **	0.000	- 0.872 **	0.000

*** Significant at level P ≤ 0.05; ** Significant at level P ≤ 0.01**

Based on the correlation results contained in Table (20), the first main hypothesis is rejected, which refer to that (There is no significant correlation between lean thinking and value - oriented product), and accept the alternative hypothesis which states that (There is a significant and negative correlation between lean thinking and value-oriented product).

3.8.8 Statistical Test of Hypotheses Two

To verify the extend of the effect of the independent variable and its dimensions represented by lean thinking in the value - oriented product variable, the researcher resorted to the application of simple linear regression and multi-regression by using statistical packages (SPSS) and the results of the analysis showed the following**:**

1. The Effect According to the Macro Indicator: The results of the data analysis in Table (20) indicate that there is a significant effect of lean thinking in the value - oriented product at the level of its macro indicator, the calculated P-Value was (0.000) which is much less than the value of the significant default level adopted by the study which is (0.05), and this supports that the F value that is calculated which is (343.438) was greater than its tabulated value which is (3.921) with degrees of freedom were (1, 118), which refers to the significant effect and at the level of (0.05). Accordingly, it can be concluded that there is an effect of the variable of lean thinking in the value - oriented product variable, which means that the respondent organizations when rely on lean thinking in their production processes this will contributes to the improvement of value - oriented product levels when they performing their operations. The other results of this analysis at the macro level refer to the following**:**

a. In light of the regression equation the value of (B_0) was (0.357) which mean that there is appearance of the variable value - oriented product through its dimensions with value (0.357) when the value of lean thinking variable is equal to zero, through the adoption of the areas that limit the seven waste levels. This result can be interpreted that the value - oriented product draws most of its features with high levels of lean thinking adopted by the respondent organizations**.**

b. The value of (B_1) was amounted to (1.367), and this is a sign that any change about amount to (1) in a lean thinking variable will eventually lead to a change that estimates at (1.367) in the value of value - oriented product variable, and this is a great change that can be invoked to explain the effect relationship between independent variable lean thinking in the dependent variable value - oriented product.

c. The value of (R^2) is amounted to (0.744), which indicates that the rate of (74.4%) of the changes in the value-oriented product can be attributed to lean thinking, i.e. the explanatory value of the independent variable in what happens to responder variable was (74.4 %), and this result indicates that the ratio of the remaining effect which is (25.6%) goes back to other effect factors not included in the default model adopted by the researcher in the current study**.**

Table 20: Effect of Lean Thinking in Value - Oriented Product

Model	Beta	R^2	F	P-Value
Constant	0.357	-	-	-
Lean Thinking	1.367	0.744	343.438	0.000

Tabulated F (1,118) = 3.921 ; n = 120 ; P ≤ 0.05

2. The Effect According to Micro Indicator: The multiple regression analysis has been applied through (**Stepwise**) method to identify effect levels of the dimensions of the lean thinking about in the value - oriented product for the responded organizations, and the results of the analysis had produced the following four regression models, according to the data Table (21):

a. First model: This model includes the dimension of defect waste only after all dimensions of other lean thinking variable have been excluded. The results of the analysis indicated that the dimension of the product defect waste has a higher effect in the value - oriented product of the other dimensions of the independent variable, depending on calculated (P-value) which amounted to (0.000), and it is much lower than the default level of significance for the study which estimates as (0.05). The significance of this impact confirms the (F) value that is calculated which amounts to (151.044), which is greater than its tabulated value which is (3.921) with degree of Freedom is (1,118). Also, the (t) value that is calculated which amounted to (12.290), is greater than its tabulated value which amounts to (1.658) with degree of Freedom is (118). The explanatory value to the dimension of product defect waste according to the (R^2) value which amounted to (0.561), which means that this model explains a rate (56.1%) of the change that is happening in the value - oriented product goes back to the dimension of product defect waste, and the rest rate of (43.9 %) which goes back to other explanatory factors that are not included in this model. Based on these results, it is possible to conclude that if the respondent organizations want to improve value - oriented product to achieve success in this area, they have to reduce the product defects waste and this can be done by invoking its possibilities and capabilities in the application of lean thinking strategy**.**

b. Second model: The dimension of the over production waste was included in the second model besides the dimension of the product defect waste after that all dimensions of other lean thinking variables have been excluded. The results of the

analysis indicated that the dimensions of product defect waste and over production waste have a higher effect in the value - oriented product than the other dimensions of the independent variable, depending on the calculated value of (P-value), which amounted to (0.000), (0.000) respectively for each of these dimensions, which is much lower than the default level of significance for the study which is (0.05). The (F) calculated value is confirms the significance of this effect which is (124.518), and it is greater than its tabulated value which is (3.074) with a degree of Freedom is (2,117), as well as the (t) calculated value, which amounted to (7.236) and (6.598) respectively for each of the product defect waste and the over production waste, which it is greater than its tabulated value which is (1.658) with a degree of Freedom is (117). The explanatory value for the dimensions of the product defect waste and the over production waste by the (R^2) value is amounted to (0.680), meaning that the model explains a rate (68%) of the change that is happening in the value - oriented product due to those two dimensions, and the rest rate (32%) belonging to other explanatory factors that are not included in this model. Based on these results, it is possible to conclude that if the respondent organizations want to work in accordance to achieve the requirements of the value - oriented product and achieve success in this area, they have to reduce or minimize the product defect waste and the over production waste and this can be done by adopting the lean thinking in its manufacturing operations.

c. Third model: The dimension of over processing waste was included into the third model besides the dimensions of product defect waste and over production waste and having excluded other dimensions of lean thinking variable. The results of the analysis indicated that the dimensions of the waste of product defect, over production waste, and over processing waste have a higher impact on value - oriented product than the other dimensions of the independent variable, depending on the calculated (P-value), which amounted to (0.000) for each of these dimensions, and this is a value that is much lower than the default level of significance for the study which is (0.05). The significance of this effect confirms the (F) calculated value that is (110.054), which is larger than its tabulated value amounted (2.683) with degree of freedom is (3,116), as well as the (t) calculated value which amounted to (3.432), (7.490), (5.159) for each of the product defect waste, over production waste, and

over processing waste respectively, and it is larger than its tabulated value which is (1.658) with degree of freedom is (116). The explanatory value of the three dimensions according to the (R^2) value which amounted to (0.740), means that this model explains the rate of (74%) from the change happening in the value - oriented product, which goes back to the three dimensions included in this model, and that there is a rate of (26%) that goes back to other explanatory factors that are not included in this model. Based on these results, it is possible to conclude that the respondent organizations should adopt reducing the defects waste, over production waste, and over processing waste if they want to improve the value - oriented product and to achieve success in this area.

d. Fourth model: The dimension of the inventory waste was included in the fourth model as well as the dimensions of product defect waste, over production waste, and over processing waste after excluding other dimensions of lean thinking variable. The results of the analysis indicate that the dimensions of the product defect waste, over production waste, over processing waste, and inventory waste have a higher effect in the value - oriented product than the other dimensions of the independent variable, depending on the calculated (P-value) amounted to (0.000) for each of these dimensions, which is much lower than the default level of significance for the study which is (0.05). The significance of this impact confirms the F calculated value was (104.963), which is higher than its tabulated value which is (2.451) with degree of freedom is (4,115), as well as the t calculated value which amounted to (2.660), (8.365), (5.949), (4.905) for each of the four mentioned dimensions respectively, which is greater than its tabulated value which is (1.658) with degree of freedom is (115). The explanatory value for the four dimensions according to the (R^2) value which amounted to (0.785), which means that this model explains the rate of (78.5%) of the change that is happening in the value - oriented product and which goes back to the dimensions of product defect waste, overproduction waste, over processing waste, and inventory waste, and the rest rate of (21.5%) belonging to other explanatory factors that are not included in this model. Based on these results, it is possible to conclude that the respondent organizations, in order to operate in accordance with the value - oriented product strategy, they should limit the product

defect waste, overproduction waste, over processing waste, and inventory waste by adopting lean thinking in their production process.

Table 21: Effect of Lean Thinking Dimensions on Value-Oriented Product

Model	Dimensions	B0	B1	R^2	F	df	t	P-Value
First Model	DW	1.703	0.591	0.561	151.044	1 118 119	12.290	0.000
Second Model	DW	1.322	0.378	0.680	124.518	2 117	7.236	0.000
	OPW		0.316			119	6.598	
Third Model	DW	0.881	0.201	0.740	110.054	3	3.432	0.000
	OPW		0.325			116	7.490	
	OPW		0.271			119	5.159	
Fourth Model	DW	0.170	0.145	0.785	104.963	4	2.660	0.000
	OPW		0.331			115	8.365	
	OPW		0.286			119	5.949	
	IW		0.455				4.905	

Tab. F = (3.921), (3.074), (2.683), (2.541); Tab. T = (1.658); P ≤ 0.05; n = 120.

The researcher concludes from the analysis of the four regression multiple samples mentioned, that this analysis has ruled out the waste of waiting and the waste of transportation and motion waste, and inferred from that these types of wastes have no effect on the value - oriented product which can be attributed to the fact that the respondent organizations did not suffer from these kinds of wastes at high levels like all other types.

With reference to the results of the regression at the macro and micro level analysis, the second main hypothesis is rejected, which states that (There is no significant effect for lean thinking in the value - oriented product), but the alternative hypothesis is accepted, and it states that (There is significant effect for lean thinking in the value - oriented product).

3.8.9 STATISTICAL TEST OF HYPOTHESES THREE

The researcher applied the Independent-Sample T test for the demographic characteristics of which contain two categories, and the test of One Way ANOVA for the demographic characteristics of which contain three categories and more, in order to test the hypotheses of the differences between the current study variables and dimensions, according to the demographic characteristics of the respondents, and the results of this analysis produce the following results:

1. Gender Characteristic: By adopting the differences analyses using Independent Two Sample T - Test according to gender characteristic, as the results in the table (22) show there are no significant differences in both variables, lean thinking, and value - oriented product, which can be attributed its source to the variation of the gender characteristic among the respondents in the respondent organizations. This conclusion build according to the values of calculated (T) for each variable, which amounted to (1.611), (1.039) respectively, which is less than the tabulated value of (T) which amounting to (1.658) with degree of freedom (118), and to confirms the validity of these results we can return to the values of calculated (P-value) for these variables, which amounted to (0.110), (0.311), respectively, and which is greater than the value of the default level of significance for the study of the (0.05). Accordingly, there is no need to conduct post hoc tests because of the emergence of differences between males and females when they exercise both lean thinking and value-oriented product.

Table 22: Differences According to Respondent's Gender

Variables	Mean		t value	Tab. T	P-Value
Lean Thinking	Male (111)	4.802	1.611	1.658	0.110
	Female (9)	4.966			
Value-Oriented Product	Male (111)	4.190	1.039		0.311
	Female (9)	4.360			

N =120; fd. = 118

2. Age Characteristic: By adopting the differences analyses using Independent One Way ANOVA according to age characteristic, as the results in the Table (23) show there are no significant differences in both variables, lean thinking, and value -

oriented product, which can be attributed its source to the variation of the age characteristic among the respondents in the respondent organizations. This conclusion build according to the values of calculated (F) for each variable, which amounted to (0.192), (0.119) respectively, which is less than the tabulated value of (F) which amounting to (2.683) with degrees of freedom (3,116), and to confirms the validity of these results we can return to the values of calculated (P-value) for these variables, which amounted to (0.901), (0.948), respectively, and which is greater than the value of the default level of significance for the study of the (0.05). Accordingly, there is no need to conduct post hoc tests because of the emergence of differences between respondent's age characteristic when they exercise both lean thinking and value-oriented product.

Table 23: Differences According to Respondent's Age

Variables	F value	Tab. F	P-Value
Lean Thinking	0.192	2.683	0.901
Value-Oriented Product	0.119		0.948

N =120; fd. = (3,116)

3. Certification Characteristic: By adopting the differences analyses using Independent One Way ANOVA according to certification (or Study Achievement) characteristic, as the results in the Table (24) show there are significant differences in both variables, lean thinking, and the value - oriented product, which can be attributed its source to the variation of the certificate characteristic among the respondents in the respondent organizations. This conclusion build according to the values of calculated (F) for each variable, which amounted to (7.529), (7.183) respectively, which is greater than the tabulated value of (F) which amounting to (2.683) with degrees of freedom (3,116), and to confirms the validity of these results we can return to the values of calculated (P-value) for these variables, which amounted to (0.000), (0.000), respectively, and which is less than the value of the default level of significance for the study of the (0.05). Accordingly, there is a need to conduct post hoc tests because of the emergence of differences between respondent's certificate characteristic when they exercise both lean thinking and value-oriented product.

Table 24: Differences According to Respondent's Certification

Variables	F value	Tab. F	P-Value
Lean Thinking	7.529	2.683	0.000
Value-Oriented Product	7.183		0.000

N =120; fd. = (3.116)

And to identify the source of statistical differences toward lean thinking and value-oriented product variables, which are attributed to respondent's certification, the researcher depends on post hoc tests by applying the method of Sceffe, and the results showed as the following:

a. Results in Table (25) show that the differences in lean thinking variable confined between the categories of secondary, technical diploma, and bachelor's certification according to calculated (P-value) for them which are less than the default (P-value) of the study amounted (0.05). And to identify which of these categories is the source of that differences, it has to be adopted the comparison between their means, and it was found that the bachelors certification mean has reached (4.935) and it was the largest mean between other categories, which they amounted to (4.883), (4.269) for the secondary school and technical diploma certification respectively, so it can be concluded that the differences in lean thinking resulting from individuals with a bachelor's degree because they are one of the most individuals interested in understanding and achieving the requirements application of lean thinking in their organizations from other categories of certification .

Table 25: Sceffe Post Hoc Test for Respondent's Certification

Class	Secondary School	Technical Diploma	Bachelors	Master
Secondary School	-			
Technical Diploma	0.003	-		
Bachelors	0.887	0.001	-	
Master	0.461	0.972	0.272	-

b. Results in Table (26) show that the differences in value-oriented product variable confined between the categories of secondary, technical diploma, and bachelor's certification according to calculated (P-value) for them which are less than the default (P-value) of the study amounted (0.05). And to identify which of these

categories is the source of that differences, it has to be adopted the comparison between their means, and it was found that the bachelors certification mean has reached (4.334) and it was the largest mean between other categories, which they amounted to (4.331), (3.921) for the secondary school and technical diploma certification respectively, so it can be concluded that the differences in value-oriented product resulting from individuals with a bachelor's degree because they are one of the most individuals interested in understanding and achieving the requirements application for value-oriented product in their organizations from other certification categories.

Table 26: Sceffe Post Hoc Test for Respondent's Certification

Class	Secondary School	Technical Diploma	Bachelors	Master
Secondary School	-			
Technical Diploma	0.001	-		
Bachelors	0.997	0.007	-	
Master	0.992	0.269	0.999	-

4. Length of Service Characteristic: By adopting the differences analyses using Independent One Way ANOVA according to length of service in the career characteristic, as the results in the Table (27) show there are significant differences in both variables, lean thinking, and value - oriented product, which can be attributed its source to the variation of the length of service in the career characteristic among the respondents in the respondent organizations. This conclusion build according to the values of calculated (F) for each variable, which amounted to (3.753), (8.150) respectively, which is greater than the tabulated value of (F) which amounting to (3.074) with degrees of freedom (2,117), and to confirms the validity of these results we can return to the values of calculated (P-value) for these variables, which amounted to (0.026), (0.000), respectively, and which is less than the value of the default level of significance for the study of the (0.05). Accordingly, there is a need to conduct post hoc tests because of the emergence of differences between respondent's length of service in the career characteristic when they exercise both lean thinking and value-oriented product.

Table 27: Differences According to Respondent's Length of Service

Variables	F value	Tab. F	P-Value
Lean Thinking	3.753	3.074	0.026
Value-Oriented Product	8.150		0.000

N =120; fd. = (2,117)

And to identify the source of statistical differences toward lean thinking and value-oriented product variables, which are attributed to respondent's length of service in career, the researcher depends on post hoc tests by applying the method of Sceffe, and the results showed as the following:

a. Results in Table (28) show that the differences in lean thinking variable confined between the classes of (1 less than 5) years and (5 less than 10) years for length of service according to calculated (P-value) for them which are less than the default (P-value) of the study amounted (0.05). And to identify which of these class is the source of that differences, it has to be adopted the comparison between their means, and it was found that the (5 less than 10) years mean has reached (4.876) and it was the largest mean than the other class, which amounted to (4.725), so it can be concluded that the differences in lean thinking resulting from individuals with a (5 less than 10) years' service in their career because they are one of the most individuals interested in understanding and achieving the requirements application of lean thinking in their organizations from other classes of service length in career.

Table 28: Sceffe Post Hoc Test for Service Length

Class	1 Less than 5	5 Less than 10	10 years and more
1 Less than 5	-		
5 Less than 10	0.039	-	
10years and more	0.991	0.183	-

b. Results in Table (29) show that the differences in value-oriented product variable confined between the classes of (1 less than 5) years, (5 less than 10) years, and (10 years and more) for length of service according to calculated (P-value) for them which are less than the default (P-value) of the study amounted (0.05). And to identify which of these class is the source of that differences, it has to be adopted the

comparison between their means, and it was found that the (10 years and more) mean has reached (4.353) and it was the largest mean than the other classes, which amounted to (4.306), (4.000) so it can be concluded that the differences in value-oriented product resulting from individuals with length service of (10 years and more), because they are one of the most individuals interested in understanding and achieving the requirements application of value-oriented product in their organizations from other classes of service length in career.

Table 29: Sceffe Post Hoc Test for Service Length

Class	1 Less than 5	5 Less than 10	10 years and more
1 Less than 5	-		
5 Less than 10	0.001	-	
10years and more	0.922	0.034	-

5. Service in Position Characteristic: By adopting the differences analyses using Independent One Way ANOVA according to service length in the current position characteristic, as the results in the Table (30) show the following:

a. There are no significant differences in lean thinking variable which can be attributed its source to the variation of the service in the current position characteristic among the respondents in the respondent organizations. This conclusion build according to the values of calculated (F), which amounted to (1.572), which is less than the tabulated value of (F) which amounting to (3.074) with degrees of freedom (2,117), and to confirms the validity of these results we can return to the values of calculated (P-value) for this variable, which amounted to (0.212), which is greater than the value of the default level of significance for the study of the (0.05). Accordingly, there is no need to conduct post hoc tests because of the emergence of differences between respondent's length service in the current position characteristic when they exercise both lean thinking and value-oriented product.

b. There are significant differences in value - oriented product, which can be attributed its source to the variation of the service length in the current position characteristic among the respondents in the respondent organizations. This conclusion build according to the values of calculated (F) for each variable, which

amounted to (3.555), which is greater than the tabulated value of (F) which amounting to (3.074) with degrees of freedom (2,117), and to confirms the validity of these results we can return to the values of calculated (P-value) for this variable, which amounted to (0.032), which is less than the value of the default level of significance for the study of the (0.05). Accordingly, there is a need to conduct post hoc tests because of the emergence of differences between respondent's service lengths in the current position characteristic when they exercise value-oriented product.

Table 30: Differences According to Respondent's Service in Position

Variables	F value	Tab. F	P-Value
Lean Thinking	1.572	3.074	0.212
Value-Oriented Product	3.555		0.032

N =120; fd. = (2,117)

And to identify the source of statistical differences toward value-oriented product variable, which are attributed to respondent's service length in current position, the researcher depends on post hoc tests by applying the method of Sceffe, and the results in Table (31) show that the differences in value-oriented product variable confined between the classes of (1 less than 4) years and (4 less than 8) years for service length in the current position according to calculated (P-value) for them which are less than the default (P-value) of the study amounted (0.05). And to identify which of these class is the source of that differences, it has to be adopted the comparison between their means, and it was found that the (4 less than 8) years mean has reached (4.310) and it was the largest mean than the other class, which amounted to (4.067), so it can be concluded that the differences in value-oriented product resulting from individuals with a (4 less than 8 years' service in their career because they are one of the most individuals interested in understanding and achieving the requirements application of value-oriented product in their organizations from other classes of length service in the current position.

Table 31: Sceffe Post Hoc Test for Service Position

Class	1 Less than 4	4 Less than 8	8 years and more
1 Less than 4	-		
4 Less than 8	0.032	-	
8 years and more	0.772	0.487	-

6. Training Course Characteristic: By adopting the differences analyses using Independent One Way ANOVA according to training course characteristic, as the results in the Table (32) show there are no significant differences in both variables, lean thinking, and value - oriented product, which can be attributed its source to the variation of the training course characteristic among the respondents in the respondent organizations. This conclusion build according to the values of calculated (F) for each variable, which amounted to (2.258), (0.567) respectively, which is less than the tabulated value of (F) which amounting to (3.072) with degrees of freedom (2,117), and to confirms the validity of these results we can return to the values of calculated (P-value) for these variables, which amounted to (0.109), (0.569), respectively, and which is greater than the value of the default level of significance for the study of the (0.05). Accordingly, there is no need to conduct post hoc tests because of the emergence of differences between respondent's training course characteristic when they exercise both lean thinking and value-oriented product.

Table 32: Differences According to Respondent's Training Course

Variables	F value	Tab. F	P-Value
Lean Thinking	2.258	3.072	0.109
Value-Oriented Product	0.567		0.569

N =120; fd. = (2,117)

Based on the results of previous differences analysis it must reject the third hypothesis, which states that (There are no significant differences in variables of the present study belonging to the demographic characteristics for the respondent's individual in the respondent organizations), then we must to accept the alternative hypothesis, which states that (There are significant differences in variables of the

present study belonging to some of demographic characteristics for the respondent's individual in the respondent organizations).

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CONCLUSION AND RECOMMENDATIONS

A number of conclusions and suggestions drawn from the results of the current study and that can be reviewed in accordance with the following paragraph:

Conclusion

1. The respondent organizations depended on manufacturing products before determining the demand, this has led to the presence of over production waste, which caused her suffering from a surplus in production for a market need, the existence of a surplus in human resources working in the production, and the emergence of an increase in the cost of the final product stock.

2. The field results indicate that the respondent organizations show that it suffers from a waiting times waste which caused by multiple factors, including delays in suppliers in the supply of raw materials, delays in the arrival of backup parts, high turnover levels to their employees, and the presence of bottlenecks between production stations, and the emergence of long waiting periods when the human resources get information on production.

3. The respondent organizations agree that they have problems of transportation waste appearance because of a distance spaced between production stations, a weak flow of raw materials and parts of semi-manufactured between production stations, inefficient transportation methods that increase the handling of materials operations, and irregular paths material transfer traffic between stations production.

4. It has been shown that the respondent organizations indicate that the appearance of transportation waste is due to its dependence on the cells manufacturing method by collecting similar machines in a single production station which has increased from the time of product transfer between stations.

5. The respondent organizations suffer from over processing waste, which resulted in long periods when they switch production templates from product to product, and the adoption of the push system for the product from station to another in the production

operations, and the existence of human resources skills outweigh the requirement in the manufacture of the product.

6. We conclude that the respondent organizations suffer from inventory waste due to multiple factors, including the presence of high amounts of raw materials in the stores, as well as material under operations, and suffering from the damage in the final product.

7. The respondent organizations state that they suffer from motion waste, which resulted in a surplus in the movement of materials under the operating production stations, and the presence of a delay in the final product of a mismatch between the assembly lines, and the lack of standardized movements of both labor and raw materials between the output terminals.

8. It indicates that there is a kind of agreement with the respondent organizations that they suffer from defects waste due to their surplus production over to the need of the market, causing a rise in inventory levels and they have suffered from the increase in the cost of inventories.

9. Based on the analytical description of the dimensions of the lean thinking can be concluded that the respondent organizations suffer from varying levels of each of the over production waste, waiting times waste, transportation waste, over processing waste, inventory waste, motion waste, defects waste.

10. The respondent organizations realize benefits in their products and they trying to provide that benefits to their customers in order to satisfy their needs.

11. It indicates that the respondent organizations take into consideration the safety of use of its products by customers as one of the values perceived by the customer, which is keen on those organizations.

12. The respondent organizations realize that the value of the product has materialized in the functional, emotional and self-benefits provided by the product targeted by it to their customers.

13. The respondent organizations indicate that they strongly focused on the self-expressive benefits of the products in order to grant an opportunity to expand and grow in the markets.

14. There was a significant level of correlation between lean thinking and value – oriented product in the respondent organizations, so we can conclude that the more respondent organizations adopted lean thinking in their production operations to reducing or minimizing the seven wastes it would lead to increasing the quality of the value – oriented product.

15. It concludes that the more able respondent organizations in reducing levels of the seven wastes in their production processes, this will lead to raise their capacity to achieve the levels of the value – oriented product.

16. It Can be concluded that there is an effect of lean thinking variable in value – oriented product variable, which means that the respondent organizations rely on lean thinking in their production processes in order to improve the value – oriented product levels when they performing their manufacturing operations.

17. The data analysis has been indicated the transportation waste and motion waste has inferred from the other types of wastes because they have no effect on the value – oriented product which can be attributed that the respondent organizations did not suffering from them at high levels like other types.

18. There are no significant differences in variables, lean thinking, and value - oriented product, which can be attributed its source to the variation of the demographic characteristics such as gender, age, and training course among the respondent's individuals in the respondent organizations.

19. There are significant differences vary from variable to another, lean thinking, and value - oriented product, which can be attributed its source to the variation of the demographic characteristics such as study certification, length of service in career, and length of service in current position among the respondent's individuals in the respondent organizations.

Recommendations

1. It is essential that the respondent organizations to adopt a pull system in their production process instead of the push system in order to reduce the over production waste, and the adoption of withdrawal from the market of the product to ease the burdens of inventory waste and defects waste.

2. If the respondent organizations wish to achieve value – oriented product at the highest possible levels it must reduce the defects waste, over production waste, over processing waste, and inventory waste in apace higher than other types of wastes because of their high effects level upon the manufacturing of product in that organizations.

3. The respondent organizations must make a market studies to determine the demand on their products before producing them.

4. It is necessary for the respondent organizations to produce according to manufacturing plans depend on the estimated demand and on the real needs for the customer.

5. The respondent organizations must abandon the style of producing what could be produced and the adoption of production according to market needs instead of that strategy.

6. We recommend that the respondent organizations depend on total corrective maintenance instead of total productive maintenance, in order to make a consistency between the pull system and maintenance system.

7. We recommend that the respondent organizations depend on a mixture of manufacturing systems instead of depending only on cell manufacturing system according to their manufacturing needs and circumstances.

8. The respondent organizations must reconsider in its depending on the existing transportation systems to curb waste in transport operations between the production stations, and reconstruct the movement tracks of materials between those stations.

9. We recommend that the respondent organizations rely on lean thinking as a strategy to eliminate the waste levels in their production operations, and gain the of benefits of this strategy especially when conducting with all type of wastes.

10. To achieve the elimination in inventory waste due to suppliers, the respondent organizations should depend on a diversification strategy for supplying raw materials sources.

11. We recommend that the respondent organizations make benefits from the relation between the variables of the current study by applying the results of this study in their organizations.

12. The respondent organizations should focus on training their human resources on how to apply lean thinking and value – oriented product as some new strategies in their work.

13. Rehabilitation of production surplus human resources and take advantage of their qualifications and skills in other sites in the respondent organizations.

14. Renew production machines through the adoption of modern technology in order to reduce the over operating waste as well as reduce the material stock in the manufacturing stations.

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APPENDIXES

Appendix - 1: Interview Questionnaire Form

- Organization Name:
- Organization Address:
- Your Name:
- Your Gender:
- Your Job Title:
- Your Position:
- Your Organization E-mail:

1. What kinds of products your organizations produce? Name them please.

- ……
- ……
- ……

2. What type of waste presented now in your organization manufacturing system?

Waste Type	**Indicate one or more**	**Why they do they exist?**	**What actions do you made to eliminate them?**
Over production			
Waiting			
Transportation			
Over Processing			
Inventory			
Motion			
Defects			

3. What Type of quality system your organization depend to inspect its product?

- ……
- ……
- ……

4. Have your organization try to implement:

Lean Thinking In Manufacturing? Yes …….. No …….

Value – Oriented Product? Yes …….. No …….

5. What is important to:

Your organization? Quality ……/ Product Value…… /Both …….

Your Customers? Quality ……/ Product Value…… /Both …….

6. Thanks for your kindly participation in this questionnaire.

Date: / / 2017

Appendix - 2: Questionnaire

Dear Respondent …

Thank you for taking a part of your time to participate in this study survey. The main purpose of this questionnaire is to collect a data for our study which titled:

First: Lean Thinking and its Role in the Development of Value – Oriented Product:

It is an analytical study for the opinions of officials in a sample Industrial company – Dohuk Governorate. Please note that we are interested in your opinion about the questionnaire items for an academic purpose only, in order to get a Master Degree in the Department of Business Administration, Binğol University. There is no need to mention your name in this survey. We appreciate highly your kind cooperation and valuable time in completing the attached questionnaire.

Note: If you have any questions you can communicate with the researcher according to the information contained in the bottom of this form.

- Dilshad Ahmed Salman
- Master student
- Department of Business Administration
- Binğol University
- The researcher
- E-mail: dilshad . katoli @ gmail.com
- Mobile: Turkish (05312030892) korek (07504593400).

Personnel Information

Please put the (√) sign in the place that shows your opinion regards the item.

1- Gender: □ Male □ Female

2-Age: □25 less than 35 □35 less than 45 □45 less than 55 □55 and more.

3-Education Level: □Secondary School or less □ Technical diploma

□ Bachelor □ Master □ PhD

4- Total service years: □1 less than 5 □5 less than10 □10 and more.

5- Service years in your position: □1 less than 4 □4 less than 8 □8 and more.

6-Training course: □Specific training □General training □Never participated

Second: Lean Thinking variable:

A popular Japanese method that was mainly developed in Toyota as the Production System, the lean Thinking philosophy in shortly is about eliminating all waste and synchronizing necessities in order to, on the short and long term, meet the requirements of the customers and markets.

Waste: is anything other than the minimum amount of equipment, materials, parts and working time which is absolutely essential to add value to the product.

#	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Over Production Waste:						
X1	We have an over-production because of producing a surplus amount of the markets and customers' needs.					
X2	There is a need in our organization for finished products storage because of our over production.					
X3	Because of the over production rate, we have a surplus number of human resources working in our organization.					
X4	We depend on a master production plan in our organization instead of using plans for each work station.					
X5	We have a cost increase in finished products storage because of our over-production.					
X6	We possess the flexibility to change production plan in accordance with the changing demand on the finished product					
X7	We usually depend on manufacturing our products before determining the demand for it.					
Waiting Waste						
X8	We have a machine waiting because our raw material vendors are serving another customer.					
X9	We suffer from delays in the arrival of spare parts for the machines in the suitable					

#	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	time.					
X10	We have a problem of high labor turnover levels in the production lines.					
X11	We have to wait intervals when changing production lines from one product to another					
X12	In our factory, there is a waiting time and bottle necks appear between workstations.					
X13	In our organization, we take a long waiting time to obtain information that related to production.					

Transportation Waste

X14	We depend on manufacturing cells style by grouping similar machines in a single production station in order to eliminate transportation time.					
X15	In our factory, there is a long distance between workstation and another, or between machine and another.					
X16	There is an existence of outdated in our tools and equipment which used in material transfer between the production workstations					
X17	There is an appearance in our factory for a problem of weakness flow of raw materials and semi-manufactured materials between the workstations.					
X18	We suffer of insufficient and non-standardized transportation methods which increase transportation operations by double handling and searching.					
X19	We suffer from traffic congestion in a number of paths for material transfer between workstations					

Over Processing Waste

X20	To change the production line manufacturing new products we take a					

#	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	long time.					
X21	We have an increase in work in processing amounts because of over processing time.					
X22	In our processing for products we depend on push system one workstation to the next workstation.					
X23	We depend on total productive maintenance to decrease the lost time for product processing.					
X24	We have a human resource with skills over our needs in product processing.					

Inventory Waste

X25	We have an existence of high levels of raw materials inventory in our stores.					
X26	We have an existence of high levels of work-in-process inventory between production workstations.					
X27	We suffer from product damages because of have over inventory in our stores.					
X28	The existence of work-in-process increase the time for searching, selecting, grasping, reaching, moving, and handling.					
X29	We have a high level of storage, holding cost because of over inventory in raw materials and finish products.					

Motion Waste

X30	We have a surplus work-in-process motion during processes and production workstations.					
X31	We have a surplus worker motions during processes and production workstations.					
X32	We suffer from delay in products motion because of the un consistency between assembly lines.					
X33	There is no flexibility for human resource motion between production lines and					

#	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	workstations.					
X34	There are no standard motions of the workers and materials during production process in our factory.					

Defects Waste

X35	We have increasing in the number of defects pushes to pro-duce more products to compensate the loss.					
X36	We try to use various methods in products quality inspection in our factory.					
X37	We depend on workstation automation in order to illuminate defects in our products.					
X38	In our factory, we suffer from reproduce and repairing defective products.					
X39	We try to explore the causes of errors in defective for our products to take the corrective actions.					

Third: Value – Oriented Product variable:

Organizations create value through their superior ability to organize and coordinate activities; they are able to produce goods and services that are valued by society and hard to produce otherwise.

#	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	Value: The extent to which a good or service refers to how much benefits will be to the organization, and how it is perceived by customer to meet his or her needs.					

Real Value

Y1	We are trying to reduce the cost of our product to the lowest extent possible.					
Y2	Real value is very useful and valuable to our production system and organization as all.					
Y3	We are trying to include the real value to					

#	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	all the components of our products.					
Y4	Gaining real value contribute in giving us the excellence opposite the competitors.					

Perceived Value

Y5	Our product has an acceptable standard of quality from customers.					
Y6	We are taking in consideration the safety use of our product by customers.					
Y7	The quality of our product is relative to its price.					
Y8	Our product is familiar to customers and society as friendly to environment.					
	Product: A product's value proposition is a statement of the functional, emotional and self-expressive benefits delivered by the brand that provides value to the target customer.					

Functional Benefits

Y9	We include our product with functional benefits to make a greatest impact on customers.					
Y10	We depend on functional benefits to support our stronger position relative to competitors.					
Y11	We rely on functional benefits to achieve differentiation to our product.					
Y12	We rely on the functional benefits of the product in order to achieve ease of use by the customer					

Emotional Benefits

Y13	Our organization depend on emotional benefits to get a positive feeling from customer toward our product					
Y14	We seek for emotional benefits from our product in order to satisfied customer.					
Y15	We depend on emotional benefits from our product to get customer loyalty.					

#	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Y16	We depend on emotional benefits from our product to improve our organization reputation.					

Self-Expressive Benefits

Y17	Our vision is to use self-expressive benefits to tighten the relationship with customers.					
Y18	We depend on self-expressive benefits to focus on act of using the product instead of the result of using it.					
Y19	Self-expressive benefits give our organization the opportunity to expand and grow.					
Y20	Depending on self-expressive benefits raise our product value in markets.					

Appendix - 3: ÖZGEÇMİŞ

KİŞİSEL BİLGİLER

Adı Soyadı	**Dilshad Ahmed Salman**
Doğum Yeri	**Duhok/ Iraq**
Doğum Tarihi	**1 / 7 /1983**

LİSANS EĞİTİM BİLGİLERİ

Üniversite	**Duhok Üniversitesi**
Fakülte	**İdare ve Ekonomık**
Bölüm	**İşletme Bölümü**

YABANCI DİL BİLGİSİ

İngilizce	**KPDS (…..) ÜDS (….) TOEFL (….) EILTS (….)**
…	**İngilizce Dilinde Kurs**

İŞ DENEYİMİ

Çalıştığı Kurum	**Yüksek Öğretim ve Bilimsel Araştırma Bakanlığı**
Görevi/Pozisyonu	**Dekanlığın Direktörü**
Tecrübe Süresi	**6 Yıl**

KATILDIĞI

Kurslar	**Öğretimi Metodolojisi**
Projeler	**----------**

İLETİŞİM

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