

Develop Conceptual Framework for Lean Organization To Achieve Continuous Process Improvement: A Case Study In Al-Hikma Pharmaceuticals Jordan Company

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Abstract: The aimed of this study is to develop a conceptual framework for lean organization which constructed by considering a various levels of the organization operations and multiple performance indicators for improvement the organization performance. Identifying the relevant concepts with organization framework was developed from survey of literature. The proposed framework for lean organization consists of two sections. one section is the enabling factors includes three parts, the first part the dimensions of the lean organization such as operations, empowerment culture, coaching leadership, the multi-functional work teams, dynamic supply chain management, and the total productive maintenance. The second part covers the components of lean system included customer voice, (JIT), and the standardization and simplification of procedures, and the use of the methodology of systemic for problem-solving. Meanwhile, the third part is focusing on the pillars of the system that include lean thinking and learning organization. The other section of the framework offers indicators to continuous process improvement which includes high quality, customer satisfaction, cost reduction, and to shorten production time. However, the proposed framework has been conducted at the Al-Hikma Pharmaceuticals Company in Jordan, which adapted the qualitative analysis method to analyze the collected data through the total frequencies and percentages applications.

Keywords: Lean Organization, Framework, lean system and Continuous process Improvement

I. Introduction

Toyota Corporation has developed during 1980s a system for car production processes called "The Lean Production System (LPS)". This system works to reduce waste at work, and creates an organization of a series of activities and events that achieve added value for both the employees and the customers. The lean system has been design to meet customer expectations through achieving and delivering the high quality product at lowest cost on the right time. This system aims to reduce waste and minimize the deviations in performance. This clarifies that the lean idea helps stakeholder to earn value added by practicing the knowledge of the lean system to eliminate the activities that does not added a values to the customer.

Accordingly, the core of the lean system is focusing on the customer's needs and finding ways to meet those needs, as well as continuous work to eliminate waste as much as possible in the organization. To ensure that the quality of output products, lean organization should develop a series of indicators that express continuous improvement in operational system to achieve high levels of performance. The indicators include such variables like high product and business quality, customer satisfaction, low cost, shorter production cycle time (manufacturing lead time and production cycle time), and reduced delivery time. All these achievements lead to improve productivity indicators, and provide added value for the employees and the market as well.

Lean production which is a manufacturing system that focus on two main issues namely the elimination of waste and respect for people; has received a lot of attention from manufacturing companies worldwide and academicians since Toyota published its system. Theoretically, many academicians (Lewis, 2000, and Cua, et al., 2001) have claimed that lean production can result in positive outcomes, and all these empirical works have been performed on investigating the impact of lean production on business performance rather than building a framework of entire lean organization. The characteristics of lean manufacturing was identified by Karlson and Ahlstrom (1996) as the nine variables of leanness: elimination of waste, continues improvement, zero defect, Just-in-Time (JIT) delivery, pull of material, multifunctional term, decentralisation, integration of functions, vertical information systems and time to market. Philips (2000) suggests that in lean manufacturing companies, the manufacturing space becomes highly responsive to customer demand while producing world-class quality products.

Al-Ali and Abdallah (2015) pointed out that the concept of Just-in-Time (JIT) has often been considered as a preserve of manufacturing and distribution tool or system. However, some researchers look to JIT as a philosophy which evolved to a strategic level where its concept can be applied throughout an

organization. In particular, the cross-functional integration of JIT in various systems like production, supply chain, financial, marketing, human resource and knowledge management can provide continuous improvement and sustain a source of differential advantage for the organization.

II. LEAN Production (Literature Review)

Many manufacturing companies have considered lean production to be central to their manufacturing strategies. Katayama and Bennett (1996) describe lean production as a manufacturing system that use less resource input to produce a higher output performance which lead to customer satisfaction and gain larger market share than those of its competitors. Shahram (2008) provided a theoretical definition for a lean production as a “manufacturing system without waste”, when he defined waste as “anything other than the minimum amount of resources usage that is essential to production”. While Vinodh (2012) studied lean system from its five dimensions: 1. Management responsibilities. 2. Administrative requirements of the lean system 3. Technological issues and technology: 4. Manufacturing strategy, 5. Workforce, empowerment and creativity. Meanwhile, other studies show the requirements and the necessary steps to Transform to the lean system including study of (Georgiana, 2013) where the author pointed to the need to deal with the lean system from a strategic perspective which requires the participation of all the organization 's staff in their different administrative levels.

On the other hand, Sanchez and Perez (2001) deal with lean production system as a conceptual framework based on a set of principles and techniques established by the organization such as multi-disciplinary teams, elimination of non-value added activities, continuous improvement and others to achieve successful business effectiveness and supply just-in time. Radisic (2012) has introduced the components of Just-in-time (JIT) system consisting of process design, suppliers, employees, decision- making and system improvement. However, Gupta (2012) showed the JIT principles that can be integrated in these components and what benefits can be achieved in healthcare environment.

Bhasin, et al (2005) emphasizes in their study that the lean system is: a philosophy, add values, culture, and a vision linked to a long -term strategy. This strategy requires continuous efforts and intermittent work to achieve the lean system. Kootanace, et al (2013) point out that JIT manufacturing consist of several components or elements which must be integrated together to functions in a harmony style to achieve the JIT goals. These elements essentially include the human resources, production, and purchasing, manufacturing, planning and organizing functions of an organization. Diego and Leonardo (2007) pointed out that the importance of the availability of the success factors of the lean system, like motivation and preparation the employees, making changes in the work procedures and processes as well as changing the methodology of the lean system its self to provide a supportive environment for this change.

James (2009) has designed a framework consists of several steps dealing with the supplies which determine the inputs needed to achieve goals of the organization, predicting and estimating the status quo for the organization through developing an appropriate strategies through a range of indicators which contribute in measuring continuous improvement.

However, there are a several authors who described the frameworks as a “tool” used to measure the output of the lean system under study. Anita, et al (2013) has an effort to focus on development tools to measure the performance of the organization that adopts a lean system .The author contends that the traditional financial metrics are no longer sufficient to measure the performance of the lean organization, which requires the introduction of the standards of other non-financial performance measurement to measure the performance of lean system. Rachna, et al (2007) categorized the indicators of lean system in three groups: (a) the relationships with suppliers, and delivery, (b) the relationship with customers and focusing on customer’s needs, and (c) the internal factors like reduction of operations flow, set-up time, improve maintenance, and adapt operations control. Therefore Li-yin, et al, (2006) demonstrate a framework to measure the lean system performance, consist of 45 indicators used to measure the competitiveness within five groups, which are a control group, quality control, time control, health and safety control, and environmental protection control.

Nightingale (2005) viewed a framework to measure the lean system within four groups as: The establishment and the implementation of the lean Strategies, generating the values and procedures. Each group is divided as well to number of indicators presenting the function of the lean system It is worthy to mention that De Toni (2001) dealt with the framework of performance’s measurement from two aspects: the first is linked directly to the costs such as the cost of materials and wages of workers, and the second is not linked to the costs like the quality, flexibility and time.

III. The Conceptual Framework: The Model And Hypotheses

The importance of this study comes from developing the framework of lean organization through taking advantage from the existing models provided by the previous studies. As well as developing a set of indicators for continuous process improvement. The main objective is to apply this framework in a real life

situation. So, this section explores linkages between lean organization and business performance within the context of the Al-Hikma Pharmaceuticals Company in Jordan.

1- Overview:

Worley and Doolen (2006) and Womack and Jones (1990), are sharing the same definition of the lean system as “the methodology aimed to get rid of waste in all activities of the organization, and work on the flow of the value of the activities that contribute to the conversion of raw materials into finished products”. Meanwhile, Alireza, et.al (2011) defined the lean system as “production practices which work to avoid pay expenses on activities and resources that do not add final value to the customer”. Moreover, Womack and Jones (2003) have been presented a five principles of lean thinking, these are: 1. The value; which means to provide added value to the customer at the right time and at the right price, 2. The value flow that means a series of activities under consideration when design and provide the customer with specific products, 3. Flow add value flowing without stop or damage, 4. Pull system means work on the link between supplier and customer and readiness to receive requests for any production to start in the production processes, and 5. Perfection to eliminate all losses and waste from all activities to achieve the final goals of the organization.

On the other hand, Nitin and Garg (2010) have reviewed the benefits of the lean system such as, shortened a production time, reduce the level of inventory, improve the participation of employees, improve quality indicators, and reduce the breakdown of machines, and so on. The question now is how we can build a conceptual framework of lean organization that includes all the operations activities that are running within the organization.

2- Develop a Framework of Lean Organization

Depending upon the previous literature, we shall attempt to develop the proposed conceptual framework of lean organization including the indicators of continuous process improvement through several parts.

The first part will share the enabling factors of lean organization which include the following features:

1. Dimensions of lean organization that consists of managing the lean operations, empowerment culture, coaching leadership, the multi-functional work teams, dynamic supply chain management, and the total productive maintenance.
2. The components of lean system include focuses on the customer voice, just-in-time, the standardization and simplification of procedures, and the use of the methodology of systemic problem-solving techniques.
3. The pillars of the system that include lean thinking and learning organization.

The second part of the framework includes indicators measuring the continuous improvement such as the high quality, customer satisfaction, cost reduction, and shorten production cycle time. In addition to improve the overall productivity indicators and added value to stakeholders as shown in Figure (1).

The term of lean organization here is used to denote the concept of the entire organization and it deals with its dimensions and components. The following is the short explanation of the dimensions of the lean organization.

2.1--The Dimensions of lean organization

1. Managing the lean operations: Operations management is considered as the first home for the application of the lean system in accordance with the lean Toyota production system. As stated above, which is based on creating the value added through the regular flow of operations, and adopting the pull system to meet the customer's requests. In addition to maintaining the inventory levels at a minimum, and scheduling the launch of the small sized batches of the production. The distinguished function of the lean operations management is the focus on the flow of operations that create added value to either organizational business values or/ and work to remove activities that do not add value to the final customer.

2. Empowerment culture: The culture of the lean organization is the main factor to effective and successful transformational experiences to the lean system. Building a lean organization culture may require collective efforts and accumulated active the years to prepare workers to contribute to improving the organization's operations and involving them in decision-making to achieve the organization's goals. The presence of collaborative leadership style in the lean organization system, the perfection and availability culture, the voluntary work teams, and the cooperation between the leader and employees are the deciding factor of successful lean organization.

3. Coaching leadership: One of the constituents key to the success of a lean organization is having a coaching oriented leadership where it has a long and clear vision. It is the leader's responsibility to lead the change and assess individuals to adopt the lean system philosophy by building bridges of trust, mutual respect and

partnerships. The leader of a lean system should also work hard on developing competencies, building work team sharing others ideas and avoiding selfishness and individualism.

4. Multi-functional work teams: building a lean system organization requires rearrange the organization's structure map , forming the work cells ,focusing on completing the tasks , and developing of multi-functional work teams. On the other hand, work teams in a lean organization has the following characteristics a good adaptation speed and an effective communication skill between its members with the ability to exchange work sites among them ,they also characterize as individuals who enjoy different skills and able to share their knowledge among each other .

5. Dynamic supply chain management: Supply chain management is linked to improve the relations in and out the concerned parties in the organization. This management function includes a set of necessary activities to ensure the flow of materials, goods and information among all parties. The supply chain is based on identifying the customer's needs .Then it search and select the supplier who is able to supply the organization with the needed materials for production .Finally, the supply chain management submit the final product and generate added value for the stakeholders.

6. Total Maintenance produced: Total productive maintenance (TPM) plays a significant role in reducing all kinds of waste , increasing productivity , achieving the organization's profit , reducing the expenses of the maintenance , and increasing the efficiency of the assets' utilization. These improvements require lean-oriented thinking and change in the culture of the organization through restructuring the work system according to the principles of the lean system.

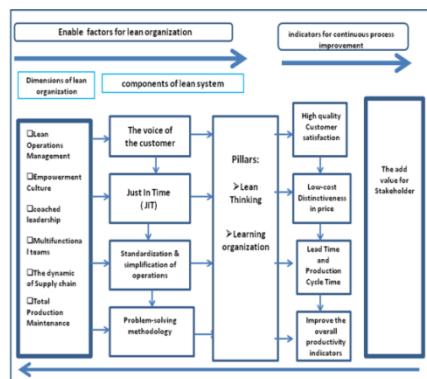


Figure (1) the framework of the lean organization

2.2-The Components of Lean System: The components of lean system are the enabling factors of the lean organization which include the customer voice, Just-in-time (JIT), the standardization and simplification of procedures, systematic approach of problems solving, and the pillars of the existing system to lean thinking and learning organization. Let us describe briefly these components as below.

a. Customer voice: Designing the product according to customer needs and adopting the attraction system based upon on activating the channels of communications with the customer, and considering the customers complains on continuous improvement programs. In most cases, the information required to create these needs come from the voice of the customer (VOC) and the quality function deployment (QFD). These are the places where we gain the knowledge and understanding of the customers' true needs and how those needs create customer value.

b. Just-in-time (JIT) system: The lean production is a product development depends on just-in-time delivery system which relies on delivering the required quantities of goods and services in correct time while avoiding extra quantities on stock. Also it means the achieving high indicators for the necessary resources' utilization and adopting the pull systems as well as producing products and services according to the customer's needs and requirements.

c. The standardization and simplification of procedures: Lean Organization work on simplifying the procedures and rules of work according to specific criteria, on documenting those actions and storing it until needed .and on activating a complete control system to ensure the achievement of the organization's goals.

d. The methodology of systemic for problem solving: lean organization traces the scientific methodology and the formation of working groups (problem-solving teams) to search for the knowledge solutions to deal with business problems. It is the responsibility of the leader to follow up on the problems and find solutions and avoid repetition, then ensure the achieving the continuous improvement indicators.

e. Lean system pillars: The framework of the proposed framework, the lean system is based on the pillars of lean thinking and learning organization. Lean thinking addresses the principles and philosophy lean system that refer to in advance. Meanwhile, learning organization is having the learning organization as an essential part of the foundations of a lean organization. since the learning organization works to explore the knowledge and then invested in achieving the objectives of the lean system, as well as working on developing the strategies for employees continuous learning.

2.3- Continuous Process Improvement Indicators: Many studies have been encouraging the initiatives for continuous improvement in organizations. Having so many indicators used in the previous studies and literature, we offer five indicators to help point the continuous improvement. These indicators are:

a. Customer satisfaction and high quality: Customer focus refers to feedback processing methods that inform an organization what customers want and ensure that it is delivered. Improving performance against customer requirements is the driving force behind lean production. Customers define both the beginning and end of the operational cycle, setting performance requirements and prices based on the amount of value embedded within a product/ service bundle delivered by the entire supply chain. The lean organization aims to meet customer needs and expectations, and exceeding them by offering a good quality products and services. This will require improve the mechanism of designing and manufacturing the product and controlling the costs to meet with the customer's financial ability.

b. Price and low cost:

The cost and price are two critical factors that attract customers willing and ability in achieving and stabling the organization's market share. Traditional cost cutting will not enable organizations to bridge the dramatic expenses differentials. Instead, they will need to rethink their operations and organizations radically. "Lean" is a proven and comprehensive approach to operational transformation that—by focusing on the customer and eliminating waste—enables companies to simultaneously decrease cycle times, increase labor productivity, and improve quality and reliability. These reductions paradoxically increase quality as production problems become more visible and root causes more easily identified and remedied in simplified work processes.

c. Shorter production time: Some of the more common examples of this are reworking (the product or service should have been done correctly the first time), debarring (parts should have been produced without burrs, with properly designed and maintained tooling), and inspecting (parts should have been produced using statistical process control techniques to eliminate or minimize the amount of inspection required). A technique called Value Stream Mapping is frequently used to help identify non-valued-added steps in the processes. The approach increases throughput dramatically by a focus on single-piece continuous flow and a flexible structure of cellular product-family work teams. Since flow starts with the pull of actual customer demand, overproduction is essentially eliminated. Inventory levels are reduced and turns increased through the combination of just-in-time (JIT) and Kanban-controlled production. As a result, Lean significantly reduces working capital requirements.

d. Improving the overall production indicators: The approach increases throughput dramatically by a focus on single-piece continuous flow and a flexible structure of cellular product-family work teams. Since flow starts with the pull of actual customer demand, overproduction is essentially eliminated. Inventory levels are reduced and turns increased through the combination of just-in-time (JIT) and Kanban-controlled production. As a result, Lean significantly reduces working capital requirements. Fixed assets are managed more efficiently through the application of total productive maintenance and revamped accounting systems that seek to measure value in the eyes of the customer. In addition, a by-product of lean system is more available floor space, freeing additional capacity to support a more aggressive sales effort.

e. Add Value to Stakeholders: Stakeholder is any group or individual who directly or indirectly affects or is affected by the level of achievement of an enterprise's value creation processes. The realization of the up mentioned indicators is a great contribution to create the added value for the stakeholders, especially that the objectives of the lean organization are not limited to the achievement of rapid shareholders' only profits, but also they are contributing to achieve the goals of the society, and promoting economic and social growth of communities. The lean system also aims to achieve stakeholder's long-term goals for each of customers,

supplier, workers and civil society as well. In addition to achieve the objectives of shareholders and management then increase their profit and market share.

IV. Research Methodology And Results Analysis

1-Type And Nature Of Study: This paper is a type of exploratory qualitative study because it aims to identify and recognize the reality of applying the lean system, and the availability of infrastructure to build a lean organization, as well as the extent of development of the continuous improvement indicators.

The method applied in this paper is an explorative a conceptual framework (Figure 1) that is developed through the following steps:

- a. To develop and establish the dimensions of lean organization
- b. To develop and establish the components of lean system
- c. To develop and establish an indicators to determine the potential benefits of lean organization
- d. To develop a framework of appropriate performance measurement model that is applicable to the lean organization practices.
- e. To apply the framework and the indicators of performance measurement tools developed in (b) and (c) to monitor in Al-Hikma Pharmaceutical Company in Jordan.

4.2-Sample and Data Collection Methods

This paper is a type of exploratory qualitative study because it aims to identify and recognize the reality of applying the lean system in Al-Hikma pharmaceutical company, and the availability of infrastructure to build a lean organization, as well as the extent of development of the continuous improvement indicators.

The study included 24 interviews with managers of various administration levels and organizational units. The study adapted the qualitative analysis method to analyze the collected data through the total frequencies and percentages applications. The population consists of Al-Hikma pharmaceutical company members In Jordan; the sample will contain people from different positions and titles in the administration and jobs levels in. The study sample is considered as an appropriate deliberate sample.

Methods of Data Collection: We are using two basic sources to collect data and information, namely: a. Secondary sources and represented in foreign books and references and the relevant articles and researches on the topic. b. Primary sources where the data has been gathered through meticulous interviews with the managers at different management levels in the Al- Hikma Company.

The tool used to conduct the in-depth interviews was by only asking the specific questions .The questions were open-ended questions which allow free expression and orientations. The questions have been asked in a way that line up with the requirements of the answer to the proposed framework that addresses the able factors for building the lean Organization and the development of the continuous improvement indicators. In this study, there has been twenty-four interview coordinated and conducted with managers in all levels at Al-Hikma Company For the manufacture of drugs.

The Validity and Reliability Study: To ensure the validity of the analysis there has been done several procedures, namely: a. Displaying the interview questions and the methods used in the analysis of the results to a group of arbitrators to make sure that the questions are appropriate with the objectives of the study then amend the them in accordance with the observations of the arbitrators. b. Relying on documentation and notes taking and recording interviews after having participants' permission and knowledge of such data. The use of the absolute terminology, which do not allow more than one meaning to explain the question to avoid confusion in the understanding of wording of questions. c. getting familiar with the participants during the interviews and taking notes during interviews to support the information collected in the interviews.

The Analysis Method: The qualitative method has been used to analyze the interviews as follows: transforming and classifying the data collected in the interviews according to the proposed general framework of the study and its main themes. Then the answer has been giving a weight .Next the demographic characteristics of the participants have been transformed, coded and classified in accordance with: the administrative level, and practical experience, and scientific specialization. Also, it was used the frequencies inductive analysis and descriptive statistics to calculate the frequency and percentages to sort and recognize the results.

4.3- The Application of Study:

Al-Hikma Company is the public joint stock company was founded in 1978 in Jordan. The company is focusing on developing and manufacturing various pharmaceutical products. Al-Hikma Pharmaceutical Company was registered in London Financial Market In the year 2005, in Nasdaq Financial Market in Dubai in 2006. Al-Hikma Company also owns (27) modern pharmacological factories in accordance with the international standers for (11) countries. Most products hold a license From the Food and Drug

Administration of America and / or the British agency of Regulation of medicines and Health Care products (JKB_Annual Report, 2012).

Analysis of the Results: we've conducted twenty-four interviews with managers in the company; the meetings were with the deputy CEO of the company, and fifteen other managers of middle management, and eight managers of executive management. The range of working experience was from one year to thirty years. The case sample's specialties confined in engineering and pharmacy sciences. Interviews have been conducted over several days and in different sites of the company.

In order to answer questions about the study we have been asking questions that include the variables of the study framework as following:

A. The concept of lean system: The interview addressed a main question about the lean system definition, applications in workplace and the ways to benefit from it to achieve the company's goals. Then ask a question about the types of waste and ways to elimination it.

The study shows 17% of the respondents do not have knowledge of the concept at all. Where less, 27% of respondents have no any idea about the extent of the awareness of the types of waste in the company and the ways to elimination it, and the sources of waste. Table (1) shows the details.

B. Dimensions of Lean Organization: The study has directed questions dealt with lean organization dimensions, operations management, empowerment culture, coaching leadership, multi-functional teamwork, dynamics supply chain, and total maintenance production The Figure (2) shows the details.

C. the components of lean system: It was directed questions about the components of the lean system included: the customer voice, (JIT), the standardization and simplification of procedures methodology for solving problems and the pillars of the system: lean Thinking, and the learning organization. The Figure (3) illustrated the details.

Table (1) The extent of the existence of the concept of lean system in Al- Hikma Company

Lean system		I do not know anything		I have an idea, but is not implemented		There is an initial practices		There are good practices		Apply it exactly	
The Dimensions	Total of questions	Repetition	Ratio	Repetition	Ratio	Repetition	Ratio	Repetition	Ratio	Repetition	Ratio
The concept	18	3	0.17	4	0.22	5	0.28	6	0.28	1	0.05
The Waste	11	3	0.27	1	0.09	4	0.36	2	0.18	1	0.09

D. Indicators of Continuous process Improvement: The study has directed questions distributed to on the participants in the company on the continuous process improvement of indicators, which include: to provide the added- value, high quality and customer satisfaction, and low cost, excellence price, production time , and improve the overall productivity indicators. Figure (4) shows the details.

After reviewing the results, Figure (5) summarized the attempts of applying the concept of the proposed framework to develop of lean organization in Al-Hikma Company. It can see that the company trying to understand the principles of lean organization and an attempt practicing of the concept of the lean system, where up to (28%) of the practices have almost the lean system concepts. The results also show that there is a group of (22%) of respondents was having an idea about the lean system but they believe that the system is not implemented in the company. We also pointed out that (17%) of the respondents have no knowledge of the concept of the lean system, and only (5%) of respondents who believe in successful application of the concept in Al-Hikma Company. Finally, we found that (26-32%) of the respondents believe that the company has the ability to provide the dimensions of a lean organization, and a good attempts of the lean system application.

V. Conclusion

In this study ,our focus was on developing a conceptual framework proposal of lean organization, indicating the dimensions to build a lean organization , and providing a function indicators on continuous process improvement .The framework include all the dimensions the lean system ,the tangible and intangible components of the organization, and the relations with the both internal and external parties. It also addresses the function indicators on continuous process improvement in lean organization, which consists of financial and non financial indicators, and quantitative and qualitative indicators. The study also views how the strategic level is integrated with the operational level to achieve the long term objectives of the organization. The framework also features the characteristics and dimensions of a lean organization in general and the production system in particular. Besides it carries out the possibility to apply this framework on the Jordanian pharmaceutical

company, and it tries to explore the extent of its existence in it. The research concluded that there are lack of knowledge of the lean system concept in the administrative side of the company despite the application of lean System tools in the continuous process improvement initiatives and haven't linked these initiatives to the philosophy and strategy of the organization. The authors of this study have recommended giving this matter sufficient attention and publicizing the benefits of the lean system and the ways to build a lean organization to eliminate the waste and losses in the organization to achieve the competitive advantage.

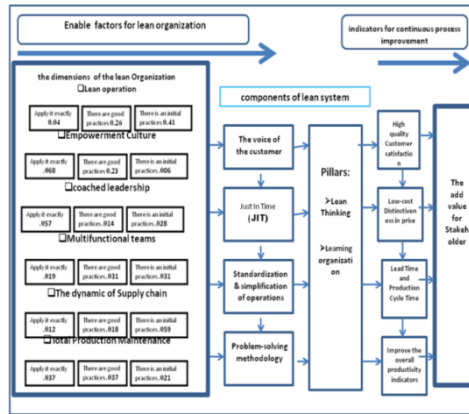


Figure (1) the extent of the existence of lean organization dimensions in Al-Hikma Company

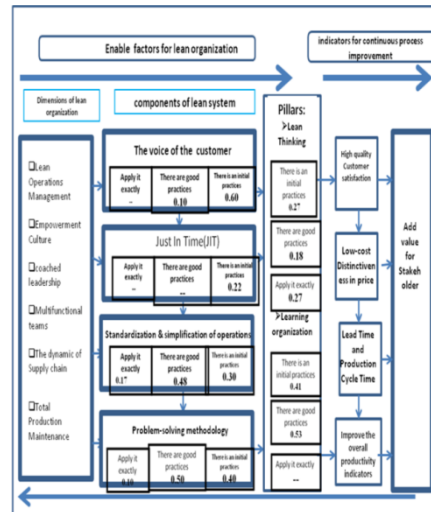


Figure (2) the extent of the existence of components of lean system in Al-Hikma Company

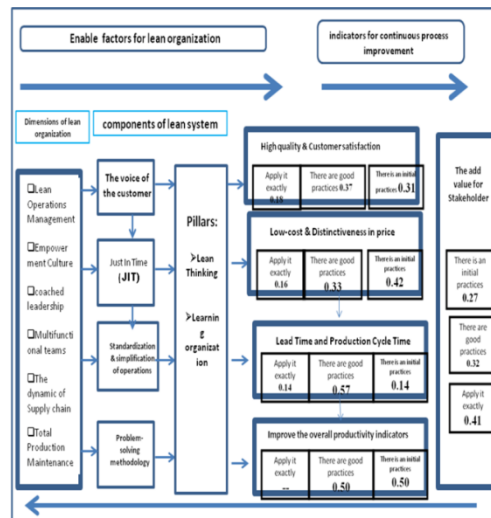


Figure (3) the extent of the existence the indicators of continuous process improvement in Al-Hikma Company

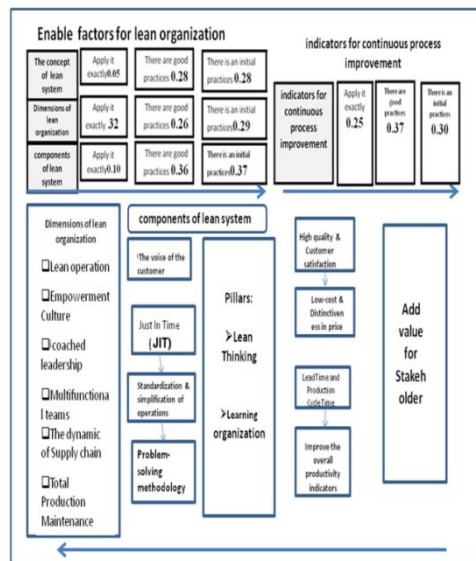


Figure (4)summary to the results to applying the framework of lean organization in Al-Hikma Company.

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