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مواكبة البحث العلمي وتطويره في ضوء متطلبات التنمية المستدامة

The application of the lean manufacturing system and its impact on (Applied study in the prefabricated building competitive policies factory)

Mueyyed Akram Omar arslan[1], Sawsan Ibrahim Rajab[2]
Sivadass Thiruchelvam[3], Gasim Hayder[3],
[1] College of Graduate Studies, University Tenaga Nasional (UNITEN), 43000 Kajang, Malaysia
[2] Northern Technical University, Kirkuk Technical Institute, Iraq
[3] Department of Civil Engineering, College of Engineering, University Tenaga Nasional (UNITEN), 43000 Kajang, Malaysia
Alparslan1961.ma@gmail.com

Abstract:
The Lean Manufacturing philosophy emerged as a result of a broader philosophy that characterized the Japanese management in its view and management of things and in all fields and areas. In the field of industrial engineering, they consider it the other side of the Toyota Production System or one of the phrases that can be used for the synonym of the phrase Toyota Production System.
The term lean is derived from reducing the use of resources and not wasting them in the sense of achieving high efficiency in their uses. Where the content of an agile system generally revolves around achieving high achievement while minimizing the use of time, warehousing, and labor, in other words, excluding all activities that do not add value to the customer through the product or service.
In this context, the (Toyota Company) experience is a pioneering model in the field of lean manufacturing, which it started in the early eighties of the last century, taking advantage of its ability to streamline the process and use the continuous improvement approach to reduce waste and losses, as well as employing the Just In Time production system, In providing the best customer service.
Keywords: Lean manufacturing, competitive policy, prefab factory.

تطبيق نظام التصنيع الرشيق وأثره على السياسات التنافسية (دراسة تطبيقية في معمل البناء الجاهز)

المستخلص:
ظهرت فلسفة التصنيع الرشيق كنتيجة لفلسفة أوسع اتسمت بها الإدارة اليابانية في نظرتها وادارتها للأمور وفي كافة الحقول والمجالات ، هذه الفلسفة تعرف بـ(فلسفة التحسين المستمر)، فالتصنيع الرشيق لم يولد وينمو بعيدا عن ما يعرف بنظام تويوتا الإنتاجي ، بل ان الكثير من المفكرين الإداريين والعاملين في مجال الهندسة

الصناعية يعتبرونه الوجه الاخر لنظام تويوتا الإنتاجي او احد العبارات التي يمكن استخدامها لمرادف عبارة نظام تويوتا الإنتاجي.

إن مصطلح الرشيق (lean) مشتق من التقليل من استخدام الموارد وعدم التبذير فيها بمعنى تحقيق الكفاءة العالية في استخداماتها. حيث يدور محتوى النظام الرشيق بشكل عام حول تحقيق إنجاز عالي مع التقليل من استخدام الوقت، الخزين، العمل، بعبارة أخرى استبعاد كافة الأنشطة التي لا تضيف قيمة إلى الزبون من خلال المنتج أو الخدمة.

وفي هذا السياق تعد تجربة (شركة تويوتا) نموذج ريادي في مجال التصنيع الرشيق بدأت به في بداية الثمانيات من القرن الماضي مستفيدة من قدرته على انسيابية العملية واستخدام نهج التحسين المستمر في تقليل الهدر والضياعات، فضلاً عن توظيف نظام الإنتاج في الوقت المحدد Just In Time، في تقديم أفضل خدمة للزبائن.

الكلمات المفتاحية: التصنيع الرشيق ، السياسة التنافسية ، معمل البناء الجاهز.

Methodology

First: the study Problem

Lean manufacturing is one of the modern pioneering systems that many organizations have adopted in reducing and eliminating all types of waste and loss among all activities that do not add value to the customer and the application of this system, which is a systematic entrance to excellence through continuous improvement, continuous flow of products and rapid response to the customer's desires to obtain Required quality.

From the foregoing, the researcher believes that there are a number of questions that can contribute to clarifying the contents of the study problem, namely:

1. Does the organization in question have a clear vision of the Lean Manufacturing System؟

2. Does Lean Manufacturing contribute to the competitive policy in the organization under study؟

Secondly. the importance of studying

The study gains importance in its attempt to measure the relationship between lean manufacturing and competitive policy in the organization under study.

Third. Objectives of the study

In light of the study questions and in line with its importance, the study seeks to:

1. Presenting some theoretical concepts for the management of the organization in question about the Lean Manufacturing System, its principles and characteristics.

2. Revealing the importance of Lean Manufacturing and the methodology it adopts.

3. Measuring the relationship between the application of lean manufacturing and quality improvement.

Fourthly: Study hypotheses

1. There is a significant correlation between lean manufacturing and competitive policies.

2. There is an influence relationship between lean manufacturing and competitive policies.

Theoretical framework

First Axis: Lean Manufacturing

First:. Concept and importance

Lean manufacturing was first presented by (Womack, et. al., 1999) in his book The Machine that Changed the World (Green, 2000) tried to clarify the idea of Lean manufacturing by presenting a package of ideas that are continuous improvement, flat organizational structures, work teams, Waste elimination, resource efficiency and use, supply chain management On the other hand, Japanese companies of all kinds have adopted this concept in reducing costs by eliminating waste. In this context, Kapltrick (2003) indicated that agility makes the organization more responsive to market trends as well as delivering products and services faster and at less cost compared to non-agile organizations.

Types of wastage:

A. Waste due to defects in products

This waste occurs as a result of cases of non-conformity with the previously specified specifications in the products, and this type of waste is removed through the improvement of production processes and the elimination of defects.

B. Wastage as a result of transportation

Moving materials is a costly and time consuming process. In order to reduce or eliminate waste, it is necessary to reorganize the work site and work method to ensure the continuous flow of production.

T. Storage Wastage

Storage may be the most important source because it does not add value to the final product. There are several ways to reduce the quantities of stockpiles, including reducing the processing time by synchronizing production and improving skills that lead to a reduction in the level of stockpile

The Wastage resulting from the increase in production.

It entails costs that are difficult to estimate, especially with regard to products that are damaged in storage. And this type is removed by manufacturing the specific quantity that customers demand on time, in addition to feasibility studies and others.

C. Wasted waiting times

Increasing the length of the queue leads to an increase in waiting time, and this waste is removed by synchronizing work with loading, depending on flexible workers and flexible equipment

H. Wastage during operations

This waste arises during the production process for reasons that result from errors in the method or method of production. Any step that can be canceled or stop producing any unnecessary part can be removed and working to expand productive thinking beyond economies of scale and speed.

X. Waste caused by movement

Movement must be designed efficiently, and this waste is removed by conducting movement studies to achieve economy and consistency in movement for competitive and productivity policy. Figure (2) presents the aforementioned seven types of waste.

second Axis: the concept of competition philosophy, competitive policies

Concept of competition philosophy:

It is a system of economic relations under which a large number of buyers and sellers fall, and each of them acts independently of others to reach its maximum profitability, which is the power of supply and demand: the supply of goods alongside sellers in their group, and the demand for goods on the side of buyers in their group.

Competitive Policies:

Two types of Competitive Policies will be indicated as given below and my agencies-:

1 - Price policies: here the price of the product is the factor that the company controls, where some find that the price factor is the most important in the competitive base, while others see that the price competition of other elements of the marketing mix is the most important in this area within the case of price competition. (Brustatiene, & Rutkauskas 2000: 173).

2 -Non-price policies: The role of non-price policies is no less important than the role of price policies.

Non-price policies cannot be reduced, as is the case with the price reduction strategy. For example, if the consumer is attracted to the products of the organization as a result of low prices, then this consumer can easily buy from another competitor as long as this competitor offers a better price. This cannot be achieved. For the non-price competition, in which it is difficult to react quickly on the part of competitors.

-Price competition leads us to a kind of bargaining and bargaining with consumers, and this does not happen in non-price competition.

The non-price policy often allows the organization's management to open new markets to sell its products as long as this competition provides a high-quality product that matches the consumers' desire. On the contrary, the low price does not enable it to enter the markets if the product does not have a certain quality that matches Consumer needs and wants.

Non-price competition often leads to an increase in the profits that the organization seeks to achieve, how it enjoys a competitive advantage in the market and does not have to reduce the price as a result of the reactions of competitors (Brustatiene, Rutkauskas, 2000, 188).

Among the non-price policies, we clarify the following_:

1 .Product policy: The product policy plays an important role in strengthening the competitiveness of business organizations, as achieving competitiveness through products requires providing products with an advanced level of quality through strengthening research and development units.

2 .Pricing policy: Through the pricing process, the organization can sell its products at an appropriate price to consumers, and at relatively low prices compared to competitors, which is the main advantage of the organization through which it outperforms competitors.

3. Promotion and Advertising Policy: Promotion is a form of communication that aims to build cognitive benefit to the target audience about the promoted goods or services. Promotion overcomes the buyer's ignorance problem by providing information about the institution, commodity, prices, or uses of the commodity. ..etc.,

4. Distribution policy: that distribution is the element through which goods and services are delivered from the places of their production to the places of their consumption at the appropriate time, place, quality, quantity, and price. .

5. Policy of development and innovation: The survival goal of the institution dictates that it pay attention to developing its products or services and inventing new products so that it can raise these products to the level of consumer needs and desires that are characterized by a high degree of development.

6 .The policy of product differentiation and quality improvement: Distinguishing the products and services provided by business organizations leads to satisfying the desires and needs of consumers through a continuous competitive advantage. Relatively high but with better profitability.

7. Service policy before and after-sales: The importance of this function is based on a philosophical idea, which is that the product is not important if the consumer is not aware of how to use it or repair it in the event, he expects it. Therefore, attention to the services provided is a very vital issue and helps in attracting customers to deal with the company. Al-Sumaida'i and Youssef, 2006, 113).

Fourth: Lean Manufacturing Objectives

The main objective of a Lean Manufacturing system is the continuous elimination of waste and the addition of value through continuous improvement. Mekong-2004 refers to the sub-goals he identified as follows:

1. Reducing losses in large proportions.
2. Reducing production cycle times and waiting period.
3. Reducing stock levels.
4. Improving the morale of the workers and thus improving their productivity.
5. Optimum use of material resources.
6. Assuring flexibility in changing production from one product to another.
7. 7. Maximizing outputs.
8. High product quality in terms of conformity to specifications.

The third axis: the relationship between lean manufacturing and competitive policies

There is a close relationship between Lean Manufacturing and Competitive Policy, as Lean Manufacturing can be considered as an approach based on recovering all kinds of waste and loss. By adopting this approach and adhering to its principles and requirements, the required quality can be reached. On the other hand, the quality competitive policy can provide a good basis for Lean manufacturing. Through the communication between the Lean Manufacturing philosophy and the competitive policy to reach quality, which is to eliminate waste, and to strive for continuous improvement. In addition to the above, the merging of the two will generate a single continuous improvement philosophy through which the most difficult obstacles and problems facing organizations can be faced.

Sixthly. Description of the respondents

In line with the direction of the study, the researcher distributed a questionnaire form to the respondents, as (32) forms were distributed, all of which were distributed to the directors of departments, divisions and major formations, and (24) valid forms were obtained for analysis. :

(1) Table

Characteristics of the surveyed individuals in the research organization

age categories	No.	The ratio
20-30	4	16.67
31-40	16	66.66
41-50	4	16.67
and over −51	0	0
Academic achievement	No.	The ratio
prep	4	16.66
Higher Diploma	9	37.50
BSc	10	41.67
MSc	1	4.17
Length of service in the company	No.	The ratio
1-5	9	37.50
6-10	11	45.83
11-15	3	12.50
16-20	1	4.17

Seventh: Description and diagnosis of the study variables

This paragraph includes identifying the nature of the study variables and the attitudes expressed by individuals in the research organization about the main variables represented by lean manufacturing and quality.

1 .Describe and diagnose lean manufacturing system variables

Table (2) indicates the frequency distributions, the mean and the standard deviation of the variables of the Lean manufacturing system at the level of the organization in question. (95.8%) of the surveyed individuals confirmed the interest in the arrangement and cleanliness of workplaces on a continuous basis to create a healthy atmosphere for production, and this supports the value of the mean (4.50). With a standard deviation of (0.722) for the variable (X16), and the same is the case for the variable (X17), where (95.8%) of the respondents confirm that the organization's workers are trained on periodic maintenance procedures, and the value of the arithmetic mean and standard deviation is (4.417), (0.584) respectively.

(54.2%) believes that the organization seeks to get rid of all unnecessary movements, including wrong directions and waiting times. The arithmetic mean value of the variable (X18) reached (3.625) and the standard deviation (1.0135), while the respondents' answers about the variable (X19) indicate that (66.7%) have multiple skills that enable them to deal with various operations in the organization. The mean value is (3.875) and the standard deviation is (0.947), and (79.2%) of the respondents believe that there is great interest in maintaining machines and equipment in order to improve their performance and efficiency. The value of the arithmetic mean and standard deviation of the variable (X20), respectively (4.208), (0.779).

(91.7%) of the interviewed individuals confirm that the organization seeks to get rid of defects resulting from the discontinuation of machines in production, and the arithmetic mean of the variable (X21) reached (4.417) and the standard deviation (0.654), while (70.9%) of the respondents indicate that the organization seeks to Achieving the goal of zero-stop machines based on the experiences of working individuals, and the mean value of the variable (X22) was (3.958) and the standard deviation was (0.859). And (62.5%) of the respondents believe that the organization seeks to achieve the time of zero numbers by relying on the knowledge and experience possessed by the workers, and the value of the arithmetic mean (3.833) and the standard deviation (1.049) for the variable (X23). On the other hand, (66.7%) of the respondents indicated that the organization constantly trains its employees on speed skills in preparing and preparing machines, and this is supported by the arithmetic

mean value of (3.750) and the standard deviation value of (1.032) for the variable (X24), and (75%) agree The respondents indicated that the organization seeks to achieve a clear and understandable production system for all employees, as the arithmetic mean value of the variable was (X25) (4.00) and the standard deviation was (1.022).

On the other hand, the results of the variables (X28, X24, X30) expressing the organization's interest in improving its production processes, eliminating waste and spreading its culture came as follows: (79.1%) of the respondents confirm the organization's interest in improving its production processes and with an arithmetic mean (4.250) with a standard deviation (0.794). While (66.6%) indicates that the organization seeks to eliminate all types of waste, and this is confirmed by the value of the arithmetic mean and standard deviation of (4.00) - (0.834), respectively. As for the level of spreading this culture among workers, the mean value was (3.833) and the standard deviation was (1.274).

2 .Description and diagnosis of competitive policy variables

The data in Table (3) refer to the recurring distributions of the competitive policy variables in the organization in question. A large percentage (87.5%) of the individuals surveyed indicate that the administration undertakes to adopt continuous improvement and strive to search for contemporary quality programs. This supports the value of the arithmetic mean and standard deviation of the variable (X1).) (4.167), (1.007), respectively, while (75%) believe that the senior management in the organization seeks to achieve quality goals as one of the most important effective strategies to achieve the goals of the organization, where the value of the mean (3.875) and the standard deviation (1.191) for the variable (X2), while (54.1%) sees that the senior management is familiar with the concepts, tools and principles related to quality, and the value of the arithmetic mean and standard deviation of the variable (X3) is (3.583) and (1.060), respectively. (83.3%) of the interviewed individuals believe that the organization adopts a culture that guarantees the delivery of high-quality products to its customers. The mean value and standard deviation (4.250) (0.944) for the variable (X4), respectively.

While (87.3%) of the respondents believe that the organization adopts effective contexts to deal with information returned from the customer, which are guaranteed by complaints with an arithmetic mean (4.167) and a standard deviation (0.761) for the

variable (X5), while (79.2%) indicates that the organization has allocations This supports the arithmetic mean value of (3.958) and standard deviation of (0.999) for the variable (X6). (91.6%) of the interviewed individuals confirm that there are in our organization the foundational structures of the information system, as the arithmetic mean and standard deviation of the variable (X7) reached (4.375) (0.647), respectively.

While (70.8%) believes that the organization has machines and production equipment at a high level that ensures the achievement of the required quality, and this is confirmed by the arithmetic mean value of (4.167) and the standard deviation (0.992) for the variable (X8). (75%) of the individuals surveyed indicate that the organization possesses cadres with appropriate skills, and the value of the arithmetic mean (4.125) and the standard deviation (0.992) for the variable (X9).

(66.6%) of the interviewed individuals believe that the organization has financial allocations for quality-oriented training activities, and the arithmetic mean and standard deviation of the variable (X10), respectively (3.917) (0.974) are available, and (58.4%) indicates that the researched organization depends on its internal capabilities in training employees on quality concepts and tools, the mean value was (3.50) and the standard deviation (1.063) for the variable (X11). (3.750) and standard deviation (1.260) for the variable (X12). While (58.4%) believe that the organization is taking appropriate measures to remove the causes of quality problems and put their repetition, and the arithmetic mean of the variable (X13) reached (3.542) and the standard deviation (1.103), while (75%) of the individuals surveyed indicate that continuous improvement provides an effective environment to achieve the required quality, the mean value was (3.197) and the standard deviation (0.776) for the variable (X14).

(2) Table1

Frequency distributions, percentages, and standard deviations of the Lean Manufacturing variables

For a scale / Variables	Arithmetic mean	Strongly disagree		disagree		neutral		agree		Strongly agree		standard deviation
		%	No.	%	No.	%	No.	%	No.	%	No.	
X1	4.167	4.2	1	4.2	1	4.2	1	45.8	11	41.7	10	**1.007**
X2	3.875	8.3	2	4.2	1	12.5	3	41.7	10	33.3	8	**1.191**
X3	3.583	4.2	1	8.3	2	33.3	8	33.3	8	20.8	5	**1.061**

X4	4.083	–	–	8.3	2	8.3	2	50.0	12	33.3	8	**0881**
X5	4.250	8.3	1	8.3	2	8.3	2	33.3	8	50.0	12	**0.944**
X6	4.167	4.2	1	8.3	2	8.3	2	54.2	13	33.3	8	**0.761**
X7	3.985	4.2	1	4.2	1	12.5	3	50.0	12	29.2	7	**0.999**
X8	4.375	–	–	–	–	8.3	2	45.8	11	45.8	11	**0.647**
X9	4.167	–	–	4.2	1	25.0	6	20.8	5	50.0	12	**0.963**
X10	4.125	–	–	8.3	2	16.7	4	29.2	7	45.8	11	**0.992**
X11	3.917	–	–	8.3	2	25.0	6	33.3	8	33.3	8	**0.974**
X12	3.500	–	–	25.0	6	16.7	4	41.7	10	16.7	4	**1.063**
X13	3.750	4.2	1	20.8	5	4.2	1	37.5	9	33.39	8	**1.260**
X14	3.542	8.3	2	4.2	1	29.2	7	41.7	10	16.7	4	**1.103**
X15	3.917	–	–	4.2	1	20.8	5	54.2	13	20.8	5	**0.776**

(3) Table

Frequency distributions, percentages, means, and standard deviations of competitive policy variables

For a scale / Variables	Arithmetic mean	Strongly disagree		disagree		neutral		agree		Strongly agree		standard deviation
		%	No.	%	No.	%	No.	%	No.	%	No.	
X16	4.500	-	-	4.2	1	-	-	37.5	9	58.3	14	0.722
X17	4.414	-	-	-	-	4.2	1	50.0	12	45.8	11	0.584
X18	3.652	-	2	-	-	37.5	9	29.2	7	25.0	6	1.135
X19	3.875	-	-	8.3	2	25.0	6	37.5	9	29.2	7	0.947
X20	4.208	-	-	-	-	20.8	5	37.5	9	41.7	10	0.779
X21	4.417	-	-	-	-	8.3	2	41.7	10	50.0	12	0.654
X22	3.958	-	-	4.2	1	25.0	6	41.7	10	29.2	7	0.859
X23	3.833	-	-	12.5	3	25.0	6	29.2	7	33.3	8	1.049
X24	3.750	-	-	16.7	4	16.7	4	41.7	10	25.0	6	1.032
X25	4.000	-	-	12.5	3	12.5	3	37.5	9	37.5	9	1.022
X26	3.417	4.2	1	16.7	4	29.2	7	33.3	8	16.7	4	1.100
X27	3.583	-	-	16.7	4	33.3	8	25.0	6	25.0	6	1.060
X28	4.250	-	-	-	-	20.8	5	33.3	8	45.8	11	0.794
X29	4.000	-	-	-	-	33.3	8	33.3	8	33.3	8	0.834
X30	3.833	8.2	2	-	-	37.5	9	8.3	2	45.8	11	1.274

Testing the study model and its hypotheses

O no. The relationship between lean manufacturing and competitive policy

Table (4) indicates the nature of the relationship between Lean manufacturing and competitive policy, where the overall indicator between Lean manufacturing and competitive policy indicates a positive significant correlation, as the correlation value reached (0.860) at the level (0.05), and this relationship confirms the importance of the role of the Lean manufacturing system. In the competitive policy of the study sample company. In light of this result, the hypothesis is accepted.

(4) Table

The Correlation between Lean Manufacturing and Competitive Policy

dependent variable / independent variable	**Competitive variables**
Lean Manufacturing System	0.860

N = 24 P≤ 0.05.

Secondly. Impact of Lean Manufacturing on Competitive Policy

The results of the regression analysis in Table (5) indicate that there is a significant effect of the Lean manufacturing system on competitive policy, as the calculated (F) value reached (62.29), which is greater than its tabular value of (4.30) at the two degrees of freedom (1.22) and the level of significance (0.05), The coefficient of determination reached (R2) (0.73), which indicates that the differences in competitive policy in other than Lean Manufacturing, and by following the beta coefficients (B) and testing (t) for them, it is found that the calculated (t) value amounted to (7.89) which is greater than its value. The tabular value of (1.71) at two degrees of freedom (1.22) and a level of significance (0.05), and this proves the validity of the second hypothesis.

(5) Table

The influence relationship between Lean manufacturing system and competitive policies

dependent variable / independent variable	R^2	التنافسية		F	
		B1	B0	calculated	tabular
Lean Manufacturing System	0.73	0.936 (7.89)	0.273	62.29	4.30

N = 24 P ≤ 0.05.

Conclusions and Recommendations

First: Conclusions

The study reached a number of conclusions, as follows:

1 .Adopting the agile approach leads to operating the organization efficiently and effectively, at the lowest cost, and heading towards the goal of zero waste.

2 .The application of the Lean Manufacturing System leads to reducing costs and competitive policy, allowing the organization to obtain a market share from competitors and providing better working conditions for employees.

Secondly. Recommendations

In light of the conclusions, a number of recommendations can be presented, as follows:

1 .Educating the organization's employees about paying attention to the lean manufacturing system by motivating the workers financially and morally in the production and service departments.

2 .That the senior management pay attention to training on the lean manufacturing approach, its types, and the benefits that can be achieved in the event of reducing or eliminating waste.

3. Provide the requirements for the application of the lean manufacturing system in the organization.

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ملحق رقم (1)

بسم الله الرحمن الرحيم

استمارة الاستبانة

م/استمارة الاستبانة

عزيزي الاستاذ المحترم.....

تحية طيبة.....

أضع بين يديك استمارة الاستبانة التي أعدت لأغراض البحث العلمي وهي جزء من متطلبات اجراء بحث في ادارة الاعمال الانشائية (إدارة المشاريع) بـ (أثر تطبيق نظام التصنيع الرشيق في السياسات التنافسية(دراسة تطبيقية في الشركات الإنتاجية الانشائية)).

لذا نرجو الاجابة على التساؤلات التي تضمنتها الاستبانة بدقة لأجل الوصول الى نتائج أ كثر علمية.

علما ان المعلومات سيتم استخدامها لأغراض البحث العلمي فقط.

شاكرين تعاونكم معنا ومن الله التوفيق

الباحثون

ضع علامة (X) إمام الإجابة الصحيحة :

أولا: السمات الشخصية

7 – الجنس : ذكر ☐ أنثى ☐

8 – المسمى الوظيفي : **مدير شركة** ☐ **نائب مدير الشركة** ☐ **رئيس قسم** ☐

9 – المؤهل العلمي: ثانوية عامة فأقل ☐ دبلوم متوسط ☐ بكالوريوس ☐ دراسات عليا ☐

10 – عدد سنوات الخبرة : 1–5 ☐ 6–10 ☐ 11–16 ☐ 16 فأكثر ☐

ثانيا : معلومات عامة عن الشركة :

1 – سنة تأسيس الشركة .....

2 – عدد العاملين بالشركة .....

3 – مكان الشركة :

محافظة

4 – الشركة حاصلة على :

شهادة المواصفات الدولية ISO 9000 ☐ علامة الجودة ☐ شهادة الإشراف ☐ جميع ما سبق ☐

5 – هل تهدف شركتكم الوصول إلى الجودة الشاملة ؟ نعم ☐ لا ☐

ثالثا :عناصر وابعاد الإنتاج الرشيق :

✓ **ضع علامة امام العبارة التي تعتقد بانها ملائمة**

أ: معايير تنظيم موقع العمل (5s)	**موافق بشدة**	**موافق**	**محايد**	**لا أوافق**	**لا أوافق تماما**
العبارات					

1	يقوم معمل البناء الجاهز بالتخلص من المواد الغير ضرورية في أماكن العمل لتحقيق تدفق صحيح للمواد وحركة سهلة للعاملين					
2	يستخدم معمل البناء الجاهز أسلوب البطاقات لتحديد المواد والعدد والأدوات التي تم استخدامها					
3	يقوم المعمل على تنمية الوعي للعاملين بأهمية 5S وجعلها جزءا من ثقافة العمل.					
4	يقوم المعمل على توحيد إجراءات ارجاع المواد والأدوات الى الأماكن المخصصة لها .					
5	يقوم المعمل بوضع المواد والأدوات في أماكن يسهل الوصول اليها من قبل العاملين .					
6	يتم تنظيف الأدوات والمعدات المستخدمة وأماكن العمل بعد انتهاء كل وجبة عمل .					

ب: معايير الصيانة المنتجة الشاملة (TPM) Total preventive Maintenance		موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات						
7	يحاول المعمل تطبيق الصيانة المنتجة الشاملة للمعدات والمكائن لتحسين الأداء .					
8	يوجد في المعمل فريق الصيانة يشارك فيه افراد من مستويات إدارية متعددة لجراء اعمال الصيانة .					
9	اهتمام قسم الصيانة في المعمل بأجزاء المعدة التي فيها استهلاك او تدهور لتقليل العيوب .					
10	يهتم المعمل بالمقترحات المقدمة من قبل الافراد العاملين في قسم الصيانة لتحسين أداء المعدات					
11	يقوم المعمل بتامين العدد والأدوات والتسهيلات للقيام بالصيانة الشاملة .					

12	يقوم المعمل بفتح دورات تدريبية لأعمال الصيانة .					

ج: معايير التحسين المستمر (C.I) Continues improvement		موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات						
13	يوجد في المعمل فرق عمل متعددة الوظائف للقيام بالتحسينات المستمرة .					
14	وجهة نظر المعمل في التحسين المستمر هو لإزالة الهدر من جميع الأنظمة داخل المعمل .					
15	سعي المعمل الى نشر ثقافة إزالة الهدر للمنتسبين .					
16	من أولويات المعمل برامج التحسين المستمر وبشكل مستمر .					
17	وجود سيطرة نوعية للجودة للمنتجات المقدمة .					
18	مساهمة من قبل الزبون في اعمال التحسينات المستمرة للمنتج المعمل .					

هـ: معايير التصنيع الخلوي Cellular Manufacturing		موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات						
25	تقوم الإدارة العليا للمعمل باستخدام الترتيب الداخلي الذي يحقق تدفق انسيابي للمواد وبدون فاقد للانتظار وتداخل في عمليات الإنتاج .					
26	رئيس وعمال الخط الإنتاجي مسؤولون عن معالجة الأخطاء داخل عملية الإنتاج .					
27	يمكن خفض مخزون المواد النصف مصنعة من					

	خلال التصنيع الخلوي .					
29	يتمكن العاملون بالسيطرة النوعية من خلال تطبيق التصنيع الخلوي وبشكل واضح .					
30	تقوم الإدارة العليا بفتح دورات تدريبية مختلفة لرفع كفاءة العمال والمنتسبين .					

رابعا : عناصر وابعاد السياسة التنافسية :

ب : سياسة التسعير		موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات						
36	توجد لدى الشركة سياسة متنوعة للأسعار تتلاءم مع منتجات وقطاعات السوق المختلفة.					
37	تهدف الشركة من خلال عملية التسعير إلى تعظيم الربح فقط .					
38	تهدف الشركة من خلال عملية التسعير إلى بيع منتجاتها بسعر مناسب الى المستهلكين.					
39	تأخذ الشركة بعين الاعتبار ردود أفعال الوسطاء في حالة تحديد الأسعار لمنتجاتها لأنها ذوي أهمية في توزيع المنتجات وترويج لها .					
40	تقوم الشركة بتوفير معلومات عن درجة استجابة المستهلكين للتغيرات في أسعار المنتجات .					
41	الأسعار المنخفضة نسبيا مقارنة بالمنافسين هي الميزة الأساسية للشركة التي تتفوق من خلالها على المنافسين .					

د: سياسة التوزيع	موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات					

49	تعمل الشركة على إيصال منتجاتها إلى الزبون في مكان والوقت والمكان المناسبين.					
50	تعمل الشركة على تحديد مستوى كثافة التخطية السوقية المطلوبة من وقت لأخر					
51	تقوم الشركة بتقييم قنوات التوزيع الخاصة بها من وقت لأخر .					
52	تسعى الشركة إلى امتلاك شبكة توزيع واسعة ومتنوعة.					
53	من السهولة الحصول على منتجات الشركة من قبل المشترين .					

د: سياسة التطوير والابتكار		موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات						
54	تعطي الشركة اهتماما كبيرا لابتكار منتجات جديدة .					
55	توصف الشركة بالابتكارية والتطوير السريع للمنتجات الجديدة .					
56	تأخذ الشركة بآراء العملاء عند تطوير منتجات الشركة.					
57	يتم إشراف رؤساء أقسام في عمليات وتطوير وتحسين المنتجات .					
58	يمكن للشركة تعديل الخطوط الإنتاجية لإنتاج منتجات جديدة في الوقت المناسب.					

هـ: سياسة تمييز المنتجات وتحسين جودتها	موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات					

59	تسعى الشركة الى تمييز منتجاتها عن منتجات المنافسين بقصد خلق ميزة تنافسية.					
60	تعمل الشركة على تحسين جودة منتجاتها لجذب عدد اكبر من الزبائن .					
61	تقوم الشركة بعمل تغييرات متكررة لنماذج وموديلات المنتجات بغرض تمييزها عن منتجات المنافسين .					
62	الهدف من تمييز الشركة لمنتجاتها وتحسين جودتها هو تلبية رغبات وحاجات الزبائن.					

و: سياسة خدمات قبل وبعد البيع		موافق بشدة	موافق	محايد	لا أوافق	لا أوافق تماما
العبارات						
63	تعطي الشركة اهتماما واسعا لخدمات المقدمة قبل واثناء عملية البيع لدورها في جذب الزبائن .					
64	تعطي الشركة اهتماما واسعا لخدمات الشركة بعد عملية البيع بكسب ولاء الزبائن.					
65	تحرص الإدارة على منح صلاحيات الكافية لعاملي لتقديم الخدمات المناسبة للزبائن .					
66	تحرص الشركة على الاتصال المباشر مع الزبائن بقصد تقديم الخدمة في الوقت المناسب .					
67	تعتقد الشركة بان تقديم خدمات ما بعد البيع إحدى الوسائل الهامة في كسب ولاء الزبون .					
68	في حالة حدوث أي خلل في تقديم الخدمة يتم اتخاذ الإجراء التصحيحي بما يضمن رضا الزبائن .					