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دراسة اقتصادية لمعايير إدارة الجودة الشاملة لبعض شركات التصنيع الغذائي بالقاهرة الكبري

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المستخلص

اتسم النظام الاقتصادي المصري في السنوات الأخيرة بالتغير السريع والمستمر وبخاصة في القطاع الزراعي الذي يمثل أحد القطاعات الاقتصادية الرئيسية في تطبيق السياسات الإصلاحية, وتهدف إستراتيجية الإصلاح في مصر زيادة مساهمة القطاع الخاص في الاقتصاد القومي و بصفة خاصة في مشروعات التصنيع الغذائي، وتؤكد فلسفة إدارة الجودة , على أهمية التحسين المستمر للمنشات التي ترغب في عملية التطوير بما تحقق الميزة التنافسية للصناعات الغذائية ومن ثم للصادرات المصرية، كما تساهم الجودة في منح الفرص للمنظمة لدخول الأسواق العلمية واحتلال مراكز قوية فيها مقارنة بمنافسيها، وتمثل هدف البحث في بيان معايير إدارة الجودة الشاملة لبعض شركات التصنيع الغذائي، وكذلك نسبة مساهمة الصناعات الغذائية في الناتج المحلي الإجمالي حيث بلغت أقصاها عام 2019 بنسبة 10.2%، و الصادرات السلعية التي بلغت أقصاها عام 2019 أيضا 15.7%، ومدي مساهمة الصناعات الغذائية في التشغيل بنسبة 6.8% عام 2019. واتضح من تحليل الاستبيان أن النسبة الكلية لمعيار التزام الإدارة العليا على أداء مصانع الأغذية بلغت نحو 93.2%، بينما بلغت النسبة الكلية لمعيار التركيز على المستهلك على أداء مصانع الأغذية 82.9%، وبلغت النسبة الكلية لمعيار التحسين المستمر على أداء مصانع الأغذية نحو 89.3%، بينما بلغت النسبة الكلية لمعيار النظم الإدارية على أداء مصانع الأغذية نحو 80.4 %، وأخيرا بلغت النسبة الكلية لمعيار محور الإجراءات التشغيلية على أداء مصانع الأغذية قوي نحو 81.1%.

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An Economic Study of Total Quality Management Standards for Some Food Processing Companies in Greater Cairo

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ABSTRACT

The Egyptian economic system has been characterized in recent years by rapid and continuous change, especially in the agricultural sector, which represents one of the main economic sectors in the implementation of reform policies. On the importance of continuous improvement of the facilities that wish to develop in order to achieve the competitive advantage of the food industries and then of Egyptian exports, and quality contributes to giving opportunities for the organization to enter the scientific markets and occupy strong positions in it compared to its competitors. Food industries, as well as the contribution of food industries to the GDP, which reached a maximum in 2019 of 10.2%, and merchandise exports, which reached a maximum in 2019 as well as 15.7%, and the extent of the food industries' contribution to employment by 6.8% in 2019. And it was clear from the analysis of the questionnaire that the total percentage of the criterion of senior management's commitment to the performance of food factories amounted to about 93.2%, while the total percentage of the criterion of focus on the consumer on the performance of food factories reached 82.9%, and the total percentage of the criterion of continuous improvement on the performance of food factories reached about 89.3%, while The total percentage of the administrative systems criterion on the performance of food factories reached about 80.4%, and finally the total percentage of the criterion of the operational procedures axis on the performance of food factories was strong, as the total percentage amounted to about 81.1%.

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introduction:

The food industry is a pioneer in giving added value to agricultural products that are treated as raw production inputs for food factories. They are dealt with to produce products that satisfy unlimited human desires and needs. Therefore, food processing is considered one of the appropriate means to preserve foodstuffs in a form suitable for consumption for the longest possible period. The economic importance of food industries, for example, reducing losses, preserving nutritional value, lightening weight, increasing shelf life and storage, which leads to achieving food quality and safety and opening the doors for export in light of applicable international standards and measurements.

The agricultural and food industries sector is considered one of the most important pillars on which the Egyptian economy depends, as it contributes about 22% of the amount of Egyptian manufacturing industries, in addition to its important role in supporting the Egyptian food security situation. Food industries exports also contribute about 15% of the Egyptian merchandise exports.

Research problem:

Agricultural products face enormous challenges with regard to the deterioration of the quantity and value of these products, and it is known that agricultural products are perishable and susceptible to pests and insects, which required the manufacture of these products, as the food industries contribute to the local product, export and employment, and to identify obstacles to the application of agricultural and food processing facilities To quality standards in production, manufacturing and marketing processes to achieve a competitive advantage for the food industries in Egyptian production and exports.

Research goal:

The research aimed to explain the role of food industries in supporting the Egyptian economy, and to indicate the extent of the contribution of these industries to the gross domestic product and to the total exports and its contribution also to employment. Quality in improving the efficiency of the manufacturing process in food manufacturing facilities, and economic analysis of each criterion.

Research method:

To achieve the objectives of the research, the descriptive analysis method was used, such as the arithmetic mean, the geometric mean, the weighted average, and relative weights, as well as the quantitative analysis method, where some methods of analysis were used, such as estimating the equations of the general time trend, using the Excel and SPSS programs, in addition to the use of some other statistical criteria that serve research aims.

Data collection sources:

The research relied mainly on two methods of data collection, which are the primary data, which was represented in the design and compilation of questionnaire data, and the published and unpublished secondary data, which are issued by the competent authorities such as the Ministry of Planning and Administrative Reform and the Federation of Egyptian Industries, based on the official records of insured labor at the Ministry of Social Insurance .

Description of the study sample:

A questionnaire was designed to identify some of the total quality management standards in food manufacturing companies. This data was collected from Greater Cairo (Cairo Governorate - Giza Governorate - Qalyubia Governorate). The researcher conducted personal interviews for 45

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companies and there were three incomplete data forms, and therefore the volume of The actual sample is 42 forms.

First: The economic importance of the food industry sector:

- Percentage of the food industry's contribution to the GDP:

It is evident from Table (1) that the share of food industries in the GDP was the lowest at 7.9% in 2008, and the highest at 10.2% in 2019, with an average of about 9% during the study period (2001-2019). By studying the equation of the general time trend in Table (2), it was found that the percentage of the food industries' contribution to the GDP increases by a statistically significant amount, amounting to about 0.21% annually from the average period of the study. The coefficient of determination (R2) shows that 98% of the changes in the percentage of the food industry's contribution to the GDP are due to changes in the factors whose impact reflects the element of time, and the significance of the model as a whole has been proven.

- Percentage of the food industry's contribution to merchandise exports:

Table (1) shows that the share of food industries in commodity exports amounted to the lowest of 12.6% in 2008, and the maximum of 15.7% for the year 2019, with an average of about 14.5% during the study period (2001-2019). By studying the equation of the general time trend in Table (2), it was found that the contribution of food industries to commodity exports increased by a statistically significant amount, amounting to about 0.32% annually from the average period of the study. The coefficient of determination (R2) shows that 83% of the changes in the percentage of food industries' contribution to merchandise exports are due to changes in factors whose impact reflects the element of time, and the significance of the model as a whole has been proven.

Table (1): The economic importance of the food industry sector's contribution to the GDP, merchandise exports and the number of employment in Egypt during the period (2008 - 2019)

Years	Contribution of the food industry to Gross domestic product	Contribution of the food industry to merchandise exports	The number of formal employment (million workers)		
			direct	indirect	gross
2008	7.9	12.6	3.6	1.7	5.3
2009	8.1	12.8	3.8	1.8	5.6
2010	8.2	12.9	3.8	1.8	5.6
2011	8.4	13.4	3.9	1.8	5.7
2012	8.6	14.9	3.9	1.9	5.8
2013	8.7	15.2	3.9	1.9	5.8
2014	9.2	15.3	3.9	1.9	5.8
2015	9.4	15.3	4	1.9	5.9
2016	9.6	15.6	4.1	2	6.1
2017	9.7	15.6	4.3	2.1	6.4
2018	9.8	15.6	4.4	2.2	6.6
2019	10.2	15.7	4.5	2.3	6.8
Average	***9.0**	***14.5**	**4.0**	**1.9**	**6.0**

(*)The geometric mean of the percentages was used.

Source: Compiled from the Ministry of Planning and Administrative Reform, Federation of Egyptian Industries, based on the official records of insured workers at the Ministry of Social Insurance.

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-Number of direct official employment in the food industry sectors:

Table (1) shows that the number of direct official employment in the food industry sectors reached the lowest of 3.6 million workers in 2008, and the maximum of 4.5 million workers for the year 2019, with an average of about 4 million workers during the study period (2001-2019). By studying the equation of the general time trend in Table (2), it was found that the number of direct official employment in the food industries sectors increased by a statistically significant amount, amounting to about 70 thousand workers annually from the average study period, representing about 1.75% annually. The coefficient of determination (R2) shows that 90% of the changes in the number of direct formal employment in the food industry sectors are due to changes in factors whose impact reflects the element of time, and the significance of the model as a whole has been proven.

-Number of indirect formal employment in the food industry sectors:

Table (1) shows that the number of indirect formal employment in the food industry sectors reached the lowest of 1.7 million workers in 2008, and the maximum of 2.3 million workers for the year 2019, with an average of about 1.9 million workers during the study period (2001-2019). By studying the equation of the general time trend in Table (2), it was found that the number of indirect official employment in the food industries sectors increased by a statistically significant amount, amounting to about 50 thousand workers annually from the average study period, representing about 2.63% annually. The coefficient of determination (R2) shows that 89% of the changes in the number of indirect formal employment in the food industry sectors are due to changes in factors whose impact reflects the element of time, and the significance of the model as a whole has been proven.

Table (2): Equations of the time trend of the evolution of the economic importance of the contribution of the food industry sector to the GDP, merchandise exports and the number of employment in Egypt During the period (2008 - 2019)

No.	dependent variable	The equation	R^2	F
1	**Contribution of the food industry to Gross domestic product**	$\hat{Y}_i=7.62 + 0.21X_i$ (122)** (24.7)**	0.98	611.3**
2	**Contribution of the food industry to merchandise exports**	$\hat{Y}_i=12.5+ 0.32X_i$ (37.9)** (7.05)**	0.83	49.7**
3	**Number of direct formal employment**	$\hat{Y}_i=3.55 + 0.07 X_i$ (63.4)** (9.2)**	0.90	85.2**
4	**The number of indirect formal employment**	$\hat{Y}_i=1.64 + 0.05X_i$ (42.2)** (8.8)**	0.89	77.5**
5	**Total number of formal employment**	$\hat{Y}_i=5.2 + 0.12X_i$ (56.9)** (9.4)**	0.90	88.8**

Where: $\hat{Y}_i$: the estimated value of the dependent variable.
X_i: time variable for the time period (2008-2019) where i = (1, 2, 3,..., 12).

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The value in parentheses indicates the calculated (T) value, (R^2) the coefficient of determination, (F) the significant model, (**) the significance of the regression coefficients at the level of significance (0.01).

Source: Calculated from Table (1) by research.

-Total number of official employment in the food industry sectors:

Table (1) shows that the total number of official workers in the food industry sectors reached the lowest of 5.3 million workers in 2008, and the maximum of 6.8 million workers for the year 2019, with an average of about 6 million workers during the study period (2001-2019). By studying the equation of the general time trend in Table (2), it was found that the total number of official employment in the food industries sectors increased by a statistically significant amount, amounting to about 5 thousand workers annually from the average study period, representing about 2% annually. The coefficient of determination (R2) shows that 90% of the changes occurring in the total number of formal employment in the food industry sectors are due to changes in factors whose impact reflects the element of time, and the significance of the model as a whole has been proven.

Second: Standards of total quality management for some food processing companies in Greater Cairo

A) Focus on the consumer on the performance of food factories:

It indicates the extent to which food factories emphasize the need to understand the needs and desires of consumers, as the total quality management methodology is based on that all quality initiatives begin and end with the consumer, because the consumer is a major partner in food factories. Here, food factories must fully understand the needs and desires of the consumer and then work on designing processes that respond to those needs and desires. Relationships with the consumer end one of the main requirements necessary for the success of the variable total quality management practices, as food factories seek to develop long-term relationships with Customers enable it to achieve continuous competitive advantage.

It is clear from the table (3): the weighted average and the estimated percentage of the criterion of focus on the consumer on the performance of food factories is strong, as the total percentage amounted to about 82.9%, where it came in the first place, “The company is conducting a market study to identify the needs and desires of consumers,” which represents about 90.5%, While it came in the second place, “The company focuses on achieving consumer satisfaction by studying their requirements. The company is keen to provide a wide variety of products to meet the needs and desires of the largest number of consumers” representing about 86.5%, while it came in the third place “The company’s management believes that quality is determined by quality.” By meeting the needs of consumers "accounting for 84.9%, while in the fourth rank "the company is characterized by the speed of meeting consumers' desires", which represents about 83.3%, and finally came in fifth place "the company's management believes that quality is determined by meeting the needs of consumers" where It reached about 69.0%.

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Table (3): the weighted average and the estimated percentage of the consumer focus criterion on the performance of food factories

No.	Focus on the consumer	effective	medium	low	arrangement	Estimated percentage	weighted average	Total weights
1	The company conducts a market study; To know the needs and desires of consumers	32	8	2	114	2.71	90.5	1
2	The company is characterized by the speed of meeting the needs of consumers	27	9	6	105	2.50	83.3	4
3	The company focuses on achieving consumer satisfaction by studying their requirements. The company is keen to provide a wide range of products to meet the needs and desires of the largest number of consumers.	29	9	4	109	2.60	86.5	2
4	The company follows up on consumer complaints and provides them with appropriate solutions	5	35	2	87	2.07	69.0	5
5	The company's management believes that quality is determined by meeting the needs of consumers	30	5	7	107	2.55	84.9	3
variable sum		123	66	21	552	2.49	82.9	

Source: collected and calculated from the study sample.

B) Standard of commitment of senior management on the performance of food factories

The administration’s responsibilities begin with supporting the implementation of the quality system and commitment to it, including preparing the quality objectives policy and plan, committing to publishing, implementing and developing them continuously, approving the organizational structure of employees, defining the powers and responsibilities, naming the organization’s representative for quality, and carrying out periodic management review meetings.

It is clear from the table (4): the weighted average and the estimated percentage of the criterion of the commitment of senior management to the performance of food factories is strong, as the total percentage reached about 93.2%, where it came in the first and first repetitive order “The management affirms that consumers are the most important element in its objectives” and “The management sought to Building a reputation among consumers, as characterized by quality and proficiency "representing about 100%, while in the third rank "the management is working hard so that the company's services are distinguished" represents about 98.4%, while it came in the fourth rank "the management is working continuously to fulfill its obligations towards consumers responsible for product quality” representing 96.0%, while it came in the fifth and

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fifth bis “the company has a clear plan on quality and specific goals, and the management is committed to implementing it” "Representing about 93.7%, while in the seventh rank, "The administration is working to spread the culture of quality in all departments and administrative levels", representing about 92.1%, and finally it came in eighth place "The company considers quality as a slogan and its philosophy in setting its business” amounting to about 71.4%.

Table (4): the weighted average and the estimated percentage of the criterion of the commitment of senior management on the performance of food factories

No.	Focus on the consumer	effective	Medium	low	arrangement	Estimated percentage	weighted average	Total weights
1	The company has a clear plan on quality and specific goals, and the management is committed to implementing it.	36	4	2	118	2.81	93.7	5
2	The department works continuously to fulfill its obligations to consumers who are responsible for product quality	38	3	1	121	2.88	96.0	4
3	The company considers quality as its motto and philosophy in the conduct of its business	15	18	9	90	2.14	71.4	8
4	The management supports the principle of delegation of authority and facilitating the flow of information in the company to support its commitment to quality	36	4	2	118	2.81	93.7	5 repeater
5	The administration works to spread the culture of quality in all departments and administrative levels	35	4	3	116	2.76	92.1	7
6	Management emphasizes that consumers are the most important component of its goals	42	0	0	126	3.00	100.0	1
7	The management is working hard so that the company's services are distinguished	40	2	0	124	2.95	98.4	3
8	The management sought to build a reputation among consumers, as distinguished by quality and perfection	42	0	0	126	3.00	100	1 **repeater**
variable sum		284	35	17	939	2.79	93.2	

Source: collected and calculated from the field study sample.

C) The focus of continuous improvement on the performance of food factories

One of the most important factors that ensure the successful application of total quality management is the support and support of the senior management, which stems from its conviction and belief in the necessity of continuous development and improvement. The support and endorsement required from the senior management is represented in declaring the application of total quality management to all administrative levels and workers at their various

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levels, commitment to plans and programs at all levels, allocating the necessary financial, technical and human resources for implementation, defining authorities and responsibilities, and creating the necessary coordination.

It is clear from the table (5): the weighted average and the estimated percentage of the criterion for continuous improvement on the performance of food factories is strong, as the total percentage reached about 89.3%, as it came in the first place, “The company is constantly keen to reduce the disparity or gap between consumers’ expectations about the quality of products and between the quality The actual presented to them "representing about 94.4%, while in the second rank it came, 'The management considers continuous improvement in work as part of the quality requirements.' It represents about 93.7%, while it came in the third rank "The planning, development, examination and presentation of products to the market" came in the second rank. It is considered an integrated process for quality improvement "accounting for 92.9%, while in the fourth and fourth position it is repeated "The company is keen on continuous improvement of the production and service system in order to improve quality" and "The company relies on scientific methods and tools for the purpose of improving quality" which represents about 90.5 %, and finally came in sixth place "the company seeks to assume its responsibilities towards society through continuous improvement of the product" with a rate of 89.3%.

Table (5): the weighted average and the estimated percentage of the continuous improvement criterion on the performance of food factories

No.	Focus on the consumer	effective	medium	low	arrangement	Estimated percentage	weighted average	Total weights
1	The company is keen on continuous improvement of the production and service system in order to improve quality	33	6	3	114	2.71	90.5	4
2	The company is constantly keen to reduce the disparity or gap between consumers' expectations about the quality of products and the actual quality provided to them	35	7	0	119	2.83	90.5	4
3	The company relies on scientific methods and tools for the purpose of improving quality	31	10	1	114	2.71	94.4	1
4	Product planning, development, testing and market introduction is an integrated process of quality improvement	34	7	1	117	2.79	90.5	4 repeater
5	The company seeks to assume its responsibilities towards society through continuous product improvement	13	25	4	93	2.21	92.9	3
6	Management views continuous business improvement as part of quality requirements.	36	4	2	118	2.81	73.8	6
variable sum		182	59	11	676	2.68	**89.3**	

Source: collected and calculated from the field study sample.

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D) Standard management systems on the performance of food factories

The participation and empowerment of employees includes giving the employees the opportunity to express their opinion and constructive criticism, giving them the opportunity to identify performance obstacles, working to find appropriate solutions and giving them the authority to change the ways of performing their work, granting sufficient authority to employees to meet the wishes of customers, and forming work teams that contain all disciplines to design the services they provide. Organization according to information and data collected by scientific methods. Through this understanding of the participation of employees, we find that (Crosby) has defined this dimension as the participation of all employees in the organization in improving services and products. The difference from making the changes you're suggesting. Training and qualifying workers is an essential point within the total quality management, as continuous training and qualification is seen as a means to develop the potentials of workers, each within his job, in order to achieve optimal achievement.

It is clear from the table (6): the weighted average and the estimated percentage of the administrative systems axis criterion on the performance of food factories is strong, as the total percentage amounted to about 80.4%, where it came in the first place, “The company is interested in the participation of all employees in improving quality and performance,” which represents about 87.3%, while In the second rank, “there is a special department in the company’s organizational structure for quality control or assurance,” which represents about 84.9%, while it came in the third rank, “there is a training plan for it to develop employees with the intention based on clear foundations and standards,” representing 84.1%, in When it came in the fourth rank, "the workers participate in the preparation of plans to improve quality", representing about 80.20%, while it came in the fifth rank, "the process of evaluating the heads of departments is conducted on the basis of the quality of the products of their departments", which amounted to about 77.8%, while it came in the sixth rank. "Implementation of training programs based on clear foundations and standards" by 74.6%, and finally, "Implementation of training programs based on clear foundations and standards" came in seventh rank, with a rate of 73.8%.

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Table (6): the weighted average and the estimated percentage of the administrative systems criterion on the performance of food factories

No.	Focus on the consumer	effective	medium	low	arrangement	Estimated percentage	weighted average	Total weights
1	The company is interested in the participation of all employees in improving quality and performance	29	10	3	110	2.62	87.3	1
2	Employees participate in preparing plans to improve quality	23	13	6	101	2.40	80.2	4
3	The company is described as quickly responding to requests and changes by having clear and explicit systems	11	29	2	93	2.21	73.8	7
4	Department heads are evaluated on the basis of the quality of their department's products	21	14	7	98	2.33	77.8	5
5	In the company's organizational structure, there is a special department for quality control or assurance	29	7	6	107	2.55	84.9	2
6	There is a training plan for the development of employees with an intention based on clear foundations and standards	25	14	3	106	2.52	84.1	3
7	Implementation of training programs based on clear foundations and standards	12	28	2	94	2.24	74.6	6
variable sum		150	115	29	709	2.41	80.4	

Source: collected and calculated from the field study sample.

Standard focus of operational procedures on the performance of food factories

Operational procedures are designed to target customers (patients) and their satisfaction through: Existence of clear mechanisms for developing and improving operations to reach the best operational performance and discovering other technological options to improve and develop operations.

It is clear from the table (7): the weighted average and the estimated percentage of the criterion of the operational procedures axis on the performance of food factories is strong, as the total percentage amounted to about 81.1%, where it came in the first place, “Raw materials for the manufacture of products are purchased according to specific specifications,” which represents about 99.2%, While in the second rank, "the company

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maintains an integrated database about suppliers and the goods it purchases," it represents about 98.4%, while it came in the third rank, "the company is keen to deal with suppliers who are confused by the ISO certificate," accounting for 96.8%, while it came in the second rank. In the fourth rank, "the company is working on analyzing processes, results and consumer complaints to show a reduction in the number of conformity cases", which represents about 88.9%, while it came in fifth place, "Verifying the quality of products is done by following inspection methods from time to time", reaching about 88.1 In the sixth rank, “the company’s management is working to determine the nature and causes of the non-conformity within the company, and in light of this, corrective measures are taken” at a rate of 86.5%, while in the seventh arrangement, “the company adopts certain criteria in selecting the supplier or suppliers, or The most important of these criteria is the quality standard "at a rate of 83.3% for each of them, while in the eighth place, "the company relies on a group of suppliers when purchasing its needs", amounting to about 68.3%, while it came in the ninth place "the company relies on a third party in auditing and examining materials Which are purchased from suppliers", amounting to about 51.6%, and finally came in the tenth rank "The company is interested in its procurement regulations with suppliers with the lowest prices, regardless" by 50.0%.

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Table (7): the weighted average and the estimated percentage of the standard of operational procedures on the performance of food factories

No.	Focus on the consumer	effective	medium	low	arrangement	Estimated percentage	weighted average	Total weights
1	Checking the quality of products is done by following inspection methods from time to time	30	9	3	111	2.64	88.1	5
2	The company relies on a group of suppliers when purchasing its needs	8	28	6	86	2.05	68.3	8
3	The company adopts certain criteria in selecting the supplier or suppliers, and the most important of these criteria is the quality standard	27	9	6	105	2.50	83.3	7
4	In its procurement regulations, the company is interested in the suppliers with the lowest prices, regardless of	9	3	30	63	1.50	50.0	10
5	The company maintains an integrated database about suppliers and the goods you buy	40	2	0	124	2.95	98.4	2
6	The company relies on a third party to audit and inspect the materials purchased from suppliers	6	11	25	65	1.55	51.6	9
7	Raw materials for the manufacture of products are purchased according to specific specifications	41	1	0	125	2.98	99.2	1
8	The company is keen to deal with suppliers who are confused by the ISO certification.	39	2	1	122	2.90	96.8	3
9	The company's management is working to determine the nature and causes of non-conformity within the company, and in light of this, corrective actions are taken	28	11	3	109	2.60	86.5	6
10	The company analyzes processes, results and consumer complaints to view the reduction of match count cases	32	6	4	112	2.67	88.9	4
variable sum		260	82	78	1022	2.43	81.1	

Source: collected and calculated from the field study sample.

Recommendations:

1. Development and attention to the food industry sector in order to increase its contribution to the GDP and merchandise exports.

2. Encouraging the state to invest in the food industry sector, where manufactured goods work to reduce waste and increase shelf life and storage, and most countries are directed to rely on manufactured goods rather than fresh ones.

3. Encouraging workers in the food industries sector to apply total quality management, because of its great importance in raising the efficiency of all elements of the production process within the factories.

4. Studying the desires of consumers and the market, as they are the currency that raises the value of food commodities.

5. Continuous improvement of food manufacturing companies is necessary, as there is competition to increase investment opportunities in this field.
6. Laying out effective development and training plans for factory workers on clear foundations and standards and keeping pace with the developments of the times.

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