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ПЕРЕВАГИ ПРИНЦИПУ ПРИЙНЯТТЯ РІШЕНЬ, ЗАСНОВАНИХ НА ФАКТАХ В ПРОЦЕСІ ВПРОВАДЖЕННЯ TQM В ЛІВІЙСЬКІЙ МЕТАЛУРГІЙНІЙ КОМПАНІЇ LISCO

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ADVANTAGES OF FACT-BASED DECISION-MAKING PRINCIPLE ON TQM IMPLEMENTATION AT LIBYAN IRON & STEEL COMPANY LISCO

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Анотація. *Стаття присвячена дослідженню особливостей формування та прийняття управлінських рішень, що засновані на фактах в процесі впровадження принципу загального управління якістю в лівійській металургійній компанії LISCO. Метою статті є визначення ролі принципів впровадження загального управління якістю (TQM) щодо якості продукції в Лівійській металургійній компанії (LISCO). В статті проведено дослідження особливостей діяльності лівійських компаній та встановлено, що лівійські виробничі компанії, на прикладі лівійської металургійної компанії LISCO, стикаються з великою кількістю труднощів та перешкод при впровадженні та підтримці сучасних систем управління якістю. В статті представлено визначення дефініцій «якість», «управління якістю» та «загальне управління якістю». Доведено, що оскільки на сьогоднішній день «загальне управління якістю» все ще є новою концепцією, яка на даний час впроваджується в діяльність лівійської компанії LISCO, постає питання про покращення застосовуваних методів управління якістю. Дана стаття продемонструвала, що лівійським компаніям та їх керівництву також бракує знань про програми та підходи до загального управління якістю. Крім того, проведене в статті дослідження та аналіз поточної діяльності лівійської компанії, зможуть допомогти керуючим особам – менеджерам, управлінцям та керівникам, які приймають рішення на основі фактів в процесі управління виробничими компаніями та проєктами, що реалізуються в процесі їх діяльності; також ці дослідження дозволять компаніям сконцентрувати увагу на сильних і слабких системи управління в цілому, що пов'язані із впровадженням загальних систем якості. В статті також зазначається, що лівійська компанія LISCO докладає багатьох зусиль, щоб спробувати розробити та запровадити систему загального управління якістю та ефективно застосовувати її в діяльності компанії в цілому та в процесі реалізації окремих проєктів зокрема. Проте, в статті наголошується, що зважаючи на наявність великої кількості труднощів та складнощів впровадження системи загального управління якістю в діяльність компанії (найпотужнішими з яких є вплив екзогенних факторів, деякі технічні аспекти, інтеграція та розвиток працівників лівійських компаній), стає очевидним, що впровадження даної системи на сьогоднішній день можливо лише частково та потребує поетапного запровадження. Також в статті постає питання про необхідність комплексного підходу до досліджень щодо формування та впровадження системи загального управління якістю в компанії LISCO та аргументовано актуальність подальших досліджень у даній сфері.*

Ключові слова: *управління проєктами, загальне управління якістю (TQM), впровадження TQM, якість, контроль якості, бракована та дефективна продукція, прийняття рішень на основі фактів*
Формули: 0; рис.: 1; табл.: 1; бібл.: 15

Annotation. *The article is devoted to the study of the peculiarities of the formation and management decisions, based on facts in the process of implementing the principle of Total Quality Management in the Libyan Iron & Steel Company LISCO. The aim of the article is to determine the role of the principles of implementation of total quality management (TQM) in relation to product quality in the Libyan Metallurgical Company (LISCO). The article examines the peculiarities of Libyan companies and found that Libyan manufacturing companies, on the example of the Libyan Iron & Steel Company LISCO, face many difficulties and obstacles in implementing and maintaining modern quality*

management systems. The article presents the definitions of "Quality", "Quality Management" and "Total Quality Management". It is proven that since today "Total Quality Management" is still a new concept that is currently being implemented in the activities of the Libyan company LISCO, the question arises about improving the applied quality management methods. This article demonstrated that Libyan companies and their management still have lack of knowledge about programs and approaches to Total Quality Management. In addition, the study and analysis of the current activities of the Libyan company will help managers and executives who make decisions based on facts in the management of manufacturing companies and projects implemented in the course of their activities; also, these studies will allow companies to focus on the strengths and weaknesses of management systems in general, which are associated with the implementation of common quality systems. The article also notes that the Libyan company LISCO makes many efforts to try to develop and implement a system of Total Quality Management and effectively apply it in the company as a whole and in the process of implementing individual projects in particular. However, the article emphasizes that due to the large number of threats and difficulties in implementing a Total Quality Management system in the company's activities (the most powerful of which are the impact of exogenous factors, some technical aspects, integration and development of Libyan company's staff), it becomes clear that systems to date is only partially possible and requires phased implementation. The article also raises the question of the need for a comprehensive approach to research on the formation and implementation of the Total Quality Management system in LISCO and argues the relevance of further research in this area.

Key words: *project management, Total Quality Management (TQM), TQM implementation, quality, quality control, rejected and defected products, fact-based decision-making*

Formulas: 0, fig.: 1; tabl.: 1, bibl.: 15

Introduction. Libyan manufacturing companies such as Libyan Iron & Steel Company (LISCO) are struggling with many difficulties in implementing and maintaining some suitable quality management systems. TQM nowadays still a new concept which is now introduced in LISCO having the objectives of improving the quality of quality. They are also lacking the knowledge of Total Quality Management (TQM) applications and approaches. In addition, these analyses can assist decision makers to focus on the strengths and weaknesses related to implementation of quality systems. The company has made several efforts to try to adopt this system and apply it within the company despite the presence of many difficulties, the most important of which is the culture of the surrounding environment and other technical matters especially related to the integration and development of employees and since studies on this topic are considered insignificant in the company, therefore more studies related to such issue are advised.

Literature review. A considerable amount of literature has been published on theory of quality management. These studies were suggested by gurus of TQM as Deming W. E. [11], Crosby P. [12]. Juran J. [13], Feigenbaum A. V. [14], Schonberger R. [15] and others. In Libya, the issue of quality of the organization involved scientists such as Shibani A. [2,3], Ganjian E. [2], Soetanto R. [2] and others. However, despite the presence of a significant scientific and practical base, scientists still continue exploring this field.

Aims. This study is conducted to determine the role played by Total Quality Management (TQM) implementation principles on products quality in Libyan Iron & Steel Company (LISCO).

Results. Libyan manufacturing companies such as Libyan Iron & Steel Company (LISCO) are struggling with many difficulties in implementing and maintaining some suitable quality management systems. TQM nowadays still a new concept which is now introduced in LISCO having the objectives of improving the quality of quality. They are also lacking the knowledge of Total Quality Management (TQM) applications and approaches. In addition, these analyses can assist decision makers to focus on the strengths and weaknesses related to implementation of quality systems. The company has made several efforts to try to adopt this system and apply it within the company despite the presence of many difficulties, the most important of which is the culture of the surrounding environment and other technical matters especially related to the integration and development of employees and since studies on this topic are considered insignificant in the company, therefore more studies related to such issue are advised.

Quality is usually considered as a combination of characteristics of an object, which testifies to its ability to satisfy

identified needs, the author's proposed definition of the concept of quality management for a company as the system of management, aimed at planning, implementation, improvement and quality control of the company in accordance with the established policy and objectives of the company, with the participation of all its units. Customer satisfaction depends on the fact that the company has an effective quality management system. Thus, an integrated quality management system is created and implemented as a means of ensuring the implementation of specific policies and the achievement of quality objectives set by top management. Therefore, special attention is paid to the formation and documentation of the company's management policy on the quality of products provided to consumers. [1]. Manufacturing companies in Libya face difficulties to introduce Total Quality Management system. The original result indicates that lack of skilled labour, employee culture resistance to change, and lack of management commitment and leadership are correlated with a variety of factors that hinder advancement. A lack of benchmarking and employee resistance to change were found to be the top two obstacles. Proper training should be provided to workers to reduce employee resistance and there should be more participation in different stages of implementation [2].

Real problem for the construction sector in Libya is the implementation of quality projects. The main factors influencing the implementation of quality management systems in construction projects are top management commitment, communication, teamwork, employee involvement, and work environment and culture. [3]. Libyan companies have established their quality platform by gaining the ISO 9000 certificate which is useful for implementing the TQM. Some TQM dimensions, including management, communication, training and development, employee involvement and recognition, and culture. Nowadays, applying quality management system in Libyan companies will be a difficult challenge due to current approaches to management. The adoption of TQM for the company is a major culture and job change, where employees are used to some more conventional methods. [4]. It’s more effective of TQM Knowledge in developing economics such Libya, to establish researches those focusing on practical work rather theoretical reviews, therefore, any study to investigate affecting factors are essential for successful implementation of total quality management (TQM) in Libyan companies [5]. LISCO, which is considered as a largest steel manufacturing company in the country, has been certified the ISO-9001:2000 award, even though applying TQM tools are still essential to the company in order to improve quality and production operations. [6].

Also**,** LISCO, owned by the Libyan Government is one of the largest industrial companies in the region and produces a range of iron and steel products. It employs nearly 7000 people distributed in different sectors and facilities [7]. The management structure in means of hierarchical positions for executives in LISCO; [8] this structure takes the vertical form in sequence. Top management is representing general manager, managers, and head of departments; together they plan and decide company’s policies whereas, other units at lower levels help in these tasks by feeding back to top levels. Cooperation between all levels and people in the company has the potential to ensure implementation and practicing TQM system, where communication of exchanging information clearly and effectively is likely to support and coordinating activities and solving conflicts by several steps or procedures that may include defining problems, selecting and applying options, and reviewing the results of these options prior decision making. TQM is a bulk of either dependent or independent components.

According to the literature, these components are: critical factors, tools, techniques and practices. These components can be classified into two dimensions: the management system such as (leadership, planning, human resources, etc.), and the technical system which are (tools and techniques ((run charts, control charts, Pareto

diagrams, brainstorming, tree diagrams, histograms, scatter diagrams, flowcharts, etc.)) [9].

Total quality management is a managerial approach that seeks to increase customers' satisfaction by improving certain organizations' aspects. These aspects include the organizations' processes, workplace culture, products, and services [10].

The approach has eight components, which are customer-focused, integrated system, communications, continual improvement, total employee involvement, fact-based decision making, and strategic approach. These components and their contents vary but collectively guide the successful implementation of the said managerial approach. For instance, the fact-based decision-making element emphasizes the need for an organization to collect and analyzing performance data prior to making any predictions or decisions [11].

In relation, the paper focuses on the performance data of Libyan Iron and Steel Company's eight plants. It reveals the existing relationship between the collected data and their graphs to the implementation of the Total Quality Management System by the said company. Performance data is more of a necessity and, thus, a goldmine in the organizations' implementation of the Total Quality Management System. The following Table 1, shows a numerical data in percentage of defected (second grade) and rejected products for different factories in LISCO. The data collected from quality department in the company during the period of five years from 2015 to 2019 respectively.

Table 1

Percentage of defected and rejected products in LISCO

Year		2015		2016		2017		2018		2019	
Product Grade % / Plant		Defected	Rejected	Defected	Rejected	Defected	Rejected	Defected	Rejected	Defected	Rejected
Steel melt shop 1		1.52	0.16	1.21	0.34	2.21	0.05	1.64	0.46	2.04	0.37
Steel melt shop 2		11.21	1.47	12.92	0.53	10.46	2.09	7.39	2.37	8.2	0.95
Bar and Rod mill	Bars	4.31	0.27	4.96	0.22	5.66	0.45	7.6	0.75	1.61	0.92
	Rod	1.16	0.09	0.59	0.08	2.22	0.36	2.19	0.43	0.92	0.57
Sections mill		44.07	0.36	42.63	0.83	16.37	0.11	40.33	0.59	33.72	0.21
Hot rolling mill		13.06	0.19	16.65	0.3	16.85	0.17	18.34	0.12	14.86	0.13
Pickling line		7.22	0	2.72	0.02	6.67	0.03	4.98	0.11	1.46	0.03
Cold rolling mill		4.35	0	1.88	0	2.6	0	2.86	0	1.75	0

Source: made by author

The purpose of these data is to be analysed in terms of studying the current situation of quality in LISCO, wherever; the good quality is the targeted goal to apply modern quality management systems. The contextual data and their respective graphs illustrate the Libyan Iron and Steel Company's defect and reject rates of their second-hand products from 2015 to 2019. However, the rates are spread across the eight company's plants. These plants are the Steel melt shop 1, Steel melt shop 2, Bars Mill, Rod mills, Sections Mill, Hot rolling mill, Picking line, and the Cold rolling mill. Initially, the data and graphs as shown in Figure 1 demonstrate the defect and reject rates of second-hand products collectively for all the eight company's plants.

The presented data and graphs reveal various aspects of the Libyan Iron and Steel Company. First, Libyan Iron and Steel Company continuously experience a high rate of defects second-hand products than the rejected ones in all its eight plants. For instance, the rate of defect products for all the company's eight plans in all the years is either slightly below or above five, unlike the rejected one. The reject rate is seen to be either close to or zero.

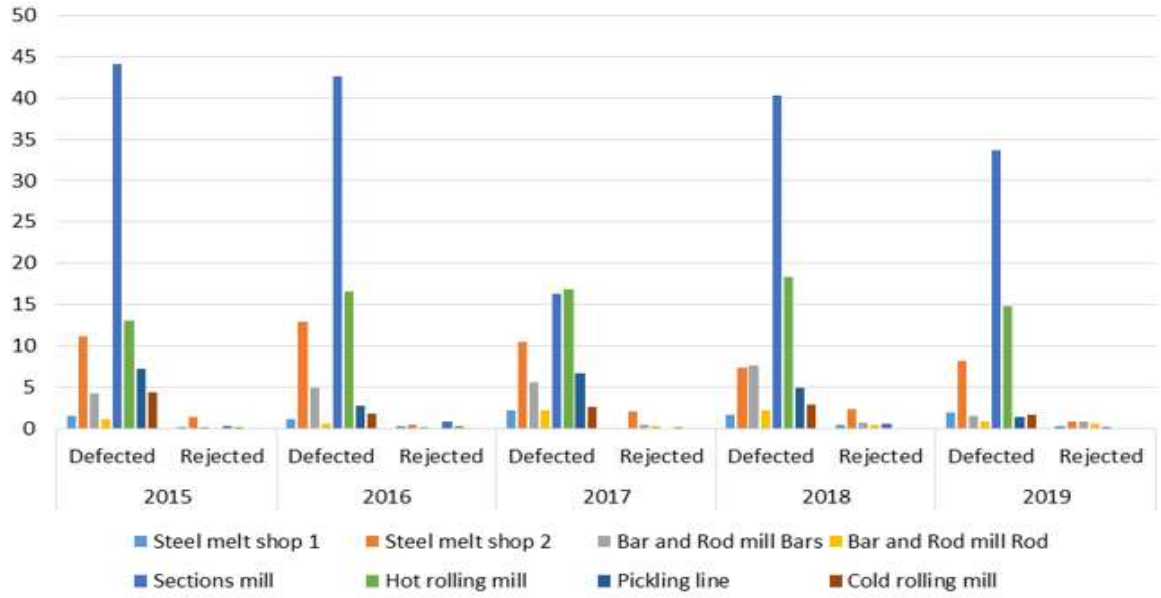

Fig. 1. Dynamics of defected and rejected products in LISCO

Source: made by author

Secondly, Libyan Iron and Steel Company have a high rate of second-hand defect products on its Sections mill plant across the five years. The graphs depict the Sections mill plant as one that has a 30 % plus defect rate of its second hand for five years, except for 2017, where it records approximately 17%. Hot rolling mill and Steel melt shop two also records a high defect rate, but not as much as that of Sections mill plant. However, there is a low defect rate of the company's second-hand products at both its Rods mill and Steel melt shop one plant.

On top of the above, the data and graphs indicate a high rejection rate at the Steel melt shop two company's plants for all the years. The Steel melt shop two plant records slightly below or above 1% rejection rate for the four years apart from 0.53% in 2016. Still, there are high rejection rates at Bars mill, Rods mill, and Sections mill company's plants across the five years. However, there are low rejection rates at the hot rolling mill and Picking line plants. Most imperative, the Libyan Iron and Steel Company lack any rejection scenarios at its Cold rolling mill.

The contextual data, its graphs, and their above relative interpretation relate to the successful company's implementation of the Total Quality Management system through the fact-based decision making concept. The three aspects are set to enable the company to engage in fact-based decision-making processes. Fact-based decision making is a primary element and principle of Total Quality Management System [11].

The principle emphasizes the importance of organizations' performance data in their implementation of the Total Quality Management system. For instance, the data informs the organization of its performance rate. The data also enables the organization to improve its accuracy in making decisions, predict based on an informed history, and achieve a consensus [11].

Thus, such data is crucial to an organization in making a fact-based decision, especially on its future performance. Similarly, the contextual data, graphs, and their interpretation inform Libyan Iron and Steel Company on its eight plants' recent performance. An excellent example is where the data and graphs disclose on the poor performance of its Steel melt shop two plants than all the others. The said plant has the highest rate of rejected products and is among the plants with a high defect rate across the five years. Such high defect and reject rates translate to the Steel melt shop two plant's poor performance. As a result, the Libyan Iron and Steel Company will make an accurate decision of its eight plants, when majoring its focus on the Steel Melt shop two as the least performing. [10].

Conclusions. To conclude, Libyan Iron and Steel Company's data and graphs reveal the defect and reject rates of its second-hand products in all the eight plants. As such, both the data and the graphs disclose the eight plants' performance. An extensive analysis of the data indicates Steel Melt Shop 2 as the least performing plant. The data relates to the company's implementation intent of total quality management system through the fact-based decision making concept. The presence of the earlier will enable the latter to engage in fact-based making decisions. As a result, the data will help Libyan Iron and Steel Company to make an accurate decision and predict based on an informed history.

Література:

1. Данченко О. Б., Бєлова О. І., Сафар Х. М. Забезпечення ефективного управління якістю торгових підприємств шляхом використання концепції TQM. *Вчені записки університету «КРОК».* 2019. Вип. 2 (54). С. 90-96.

2. Абдуссалам Шибані, Мессауд Сайдані, Наваль Гербал, Оцінка перешкод, що заважають впровадженню TQM в лівійських організаціях. *Впровадження загального управління якістю в лівійській будівельній галузі. Організація та управління проєктами,* 2010. Вип. 2, No 4, С.382–403.

3. Шибані А., Соєнтано Р., Ганджан Е., Сагу А., Гербал Н. Емпіричне дослідження повного управління якістю в Лівії: запропонований настанова щодо впровадження. *Міжнародний журнал інформаційних систем у секторі послуг,* 2012. Вип. 4 (1): С. 40-52. URL : http://www.igi-global.com/article/empirical-investigation-total-qualitymanagement/62249.

4. Мохаммад Мунір Ахмад Редха Ельхуні. Критичні фактори якості для успішного впровадження TQM в лівійському нафтогазовому секторі. *Бенчмаркінг.* 2014. №. 21. Вип. 5. С. 713-733. DOI: http://dx.doi.org/10.1108/BIJ-06-2012-0045.

5. Салех А., Сассі Р., Інтеграція звіту про якість витрат із прикладом використання інструментів TQM: на барі та штанговому млині (TS-4) LISCO, 1-а конференція промислових технологій (CIT2017). 2017.

6. Шетван А., Айфа А., Баді І. Мінімізація витрат на виробництво рідкої сталі в лівійській металургії. *Міжнародний журнал інженерії та інформаційних технологій (IJEIT),* Том.5, №1, 2018.

7. Елхусейн Х. Еласфер, Аждар Карамі. Ефективність обраних практик управління людськими ресурсами щодо результативності діяльності організації та цілей. *Тематичне дослідження Лівійської металургійної компанії.* 2014.

8. Хуан Хосе Тарі. Компоненти успішного загального управління якістю. *The TQM Magazine*. Вип. 17. № 2, 2005. С. 182-194.

9. Аль-Шдайфат Е. А. Впровадження загального управління якістю в лікарнях. *Журнал медичних наук університету Тайба*. 2015. 10 (4), С. 461-466.

10. Топалович С. Впровадження загального управління якістю з метою покращення виробничих показників та підвищення рівня задоволеності споживачів. *Технологія Procedia*, 2015. № 19, с. 1016-1022.

11. Демінг В. Едвардс. Поза кризою / Центр перспективних інженерних досліджень MIT, Кембридж, Массачусетс: MIT, 1982.

12. Кросбі Філіп. Якість безкоштовна. Нью-Йорк: McGraw-Hill, 1979.

13. Джуран Джозеф. Джуран про планування якості. Нью-Йорк: McGraw-Hill, 1988.

14. Фейгенбаум А. В. Загальний контроль якості. Нью-Йорк: McGraw-Hill, 1983.

15. Шонбергер Річард. Побудова ланцюжка клієнтів. Нью-Йорк: Вільна преса, 1990.

References:

1. Danchenko, O. B. Bielova, O. I. Safar, H. M. (2019), “Ensuring effective quality management of trade enterprises through the use of the concept of TQM”, *Vcheni zapysky universytetu «KROK»*, vol. 2 (54), pp. 90-96.

2. Abdussalam, Shibani Messaoud, Saidani and Nawal Gherbal (2010), “An Evaluation of Obstacles Preventing Implementation of TQM in Libyan Organisations”, *Vprovadzhennia zahalnoho upravlinnia yakistiu v liviiskii budivelnii haluzi. Orhanizatsiia ta upravlinnia proiektamy*, vol. 2, №4, pp.382-403.

3. Shibani, A. Soetanto, R. Ganjian, E. Sagoo, A. and Gherbal, N. (2012), “An empirical investigation of total quality management in Libya: a proposed guideline of implementation”, *Mizhnarodnyi zhurnal informatsiinykh system u sektori posluh*, vol. 4 (1). pp. 40-52, retieved from : http://www.igi-global.com/article/empirical-investigation-total-qualitymanagement/62249.

4. Mohammad Munir Ahmad Redha Elhuni (2014), “Critical quality factors for successful TQM implementation in Libyan oil and gas sector”, *Benchmarkinh*, vol. 2.1, iss. 5, pp. 713–733. DOI: http://dx.doi.org/10.1108/BIJ-06-2012-0045.

5. Saleh A., Sassi R. (2017), Integrating the quality cost report with the TQM tools case study: at the bar and rod mill (TS-4) LISCO. 1st Conference of Industrial Technology (CIT2017).

6. Shetwan, A. Aifa, A. and Badi, I. (2018), “Cost minimization of liquid steel production in Libyan Iron and Steel”, *Mizhnarodnyi zhurnal inzhenerii ta informatsiinykh tekhnolohii (IJEIT)*, Vol. 5, №1.

7. Elhusein H. Elasfer, Azhdar Karami (2014), “The effectiveness of selected human resources management practices on organisational performance and objectives”, Tematychne doslidzhennia Liviiskoi metalurhiinoi kompanii.

8. Juan Jose´ Tarı´(2005), "Components of successful total quality management", *The TQM Magazine*, vol. 17, №2, pp. 182-194.

9. Al-Shdaifat, E. A. (2015), "Implementation of total quality management in hospitals", *Journal of Taibah University Medical Sciences*, №10(4), pp.461-466.

10. Topalović, S. (2015), "The implementation of total quality management in order to improve production performance and enhancing the level of customer satisfaction", *Procedia Technology*, vol. 19, pp. 1016-1022.

11. Deming W. (1982), Edwards. Out of the Crisis // MIT Centre for Advanced Engineering Study, Cambridge, MA: MIT.

12. Crosby, Philip (1979), Quality is Free. New York: McGraw-Hill.

13. Juran, Joseph (1988), Juran on Planning for Quality. New York: McGraw-Hill.

14. Feigenbaum, A. V. (1983), Total Quality Control. New York: McGraw-Hill.

15. Schonberger, Richard (1990), Building a Chain of Customers. New York: Free Press.

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