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Determination Of Availability Of Cleaner Production Requirements And Mechanisms For Strengthening

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Abstract

The research seeks to verify the availability of cleaner production requirements in the General Company for Electrical and Electronic Industries, and by selecting a number of dimensions that reflect the cleaner production and according to the agreement of most writers and researchers in this subject, which are (good operational applications, replacement of raw materials, Equipment, recycling use). In order to achieve the practical aspect of the research and to reach the results, the inspection list was adopted as a main tool for gathering information. After the field collaboration of the researchers to the site of the research and the field on the process of production and obtaining the required documents as well as conducting a number of interviews with the managers concerned to find out the reality of the company investigated in terms of availability Cleaner production requirements for the purpose of completing the inspection list and answering the research questions and determining the extent of ownership of the company inspected for cleaner production. The research reached a number of conclusions and recommendations. The main conclusion is that the general average level of cleaner production reached 0.84 out of 2 and 0.42 percentage points. The gap is 0.52, indicating that the level is below ambition. The most important recommendation was that the company's management should strive to apply more practices that lead to raising the level of cleaner production.

Keywords: cleaner production, Production processes

Determinación de la disponibilidad de requisitos de producción más limpia y mecanismos para fortalecer

Resumen

La investigación busca verificar la disponibilidad de requisitos de producción más limpia en la Compañía General de Industrias Eléctricas y Electrónicas, y seleccionando una serie de dimensiones que reflejen la producción más limpia y de acuerdo con el acuerdo de la mayoría de los escritores e investigadores en este tema, que son (buenas aplicaciones operativas, reemplazo de materias primas, equipos, uso de reciclaje), Para lograr el aspecto práctico de la investigación y alcanzar los resultados, se adoptó la lista de inspección como herramienta principal para recopilar información. Después de la colaboración de campo de los investigadores al sitio de la investigación y el campo sobre el proceso de producción y obtención de los documentos requeridos, así como la realización de una serie de entrevistas con los gerentes involucrados para descubrir la realidad de la empresa investigada en términos de Disponibilidad Requisitos de producción más limpia para completar la lista de inspección y responder las preguntas de investigación y determinar el alcance de la propiedad de la empresa inspeccionada para producción más limpia. La investigación llegó a una serie de conclusiones y recomendaciones. La conclusión principal es que el nivel promedio general de producción más limpia alcanzó 0,84 de 2 y 0,42 puntos porcentuales. La brecha es de 0,52, lo que indica que el nivel está por debajo de la ambición. La recomendación más importante fue que la gerencia de la compañía debería esforzarse por aplicar más prácticas que conduzcan a elevar el nivel de producción más limpia. Palabras clave: producción más limpia, procesos de producción

Introduction:

For a better quality of life, many governments and civil society organizations struggled to prevent and prevent industrial companies from doing business that causes environmental damage either through government laws or legislation or through campaigns by some civil society organizations to limit practices that To the pollution of the environment, and there is no doubt that the environmentally friendly practices carried out by industrial companies in different countries of the world have led to a very

significant reduction in the contribution of these companies to pollution of the environment by reducing toxic emissions resulting from production processes or after the use of And c, as well as re-use of some parts of the product after consumption. Therefore, this paper was presented to provide solutions to the company investigated to become the least damage to the environment after determining the availability of cleaner production requirements and ways to strengthen them. After reviewing a number of studies were selected a number of dimensions that obtained the agreement of most writers and researchers and using the checklist was collected information on And the research reached a number of conclusions and recommendations. The most prominent conclusion was the low level of cleaner production in the inspected company.

The second topic dealt with the theoretical aspect of the research. It dealt with the basic concepts of the subject, while the third topic dealt with the practical aspect of the research, which is the essence of the research. The fourth topic focuses on presenting the most important conclusions and recommendations that were reached, which aim to indicate the availability of cleaner production requirements and the most important methods through which to increase it.

The first topic

Research Methodology:

First: Research problem

Business organizations are struggling to survive in the market. In order to achieve this, they are implementing many different methods and methods to achieve this. In view of the great changes in the business environment and the industrial environment, new challenges have been imposed on them to develop and continuously update the work methods for success. The adoption of cleaner production is one of the methods that has been applied to business organizations in recent decades. The organizations are facing great pressure in order to ensure that their products are harmless as well as waste and waste disposal before they are disposed of. And the requirements of government agencies on the other hand.

After the field visits of the company inspected and access to production processes can identify the problem of research, which can be expressed through the following questions:

- 1- What is the level of cleaner production in the company in question.
2. Does the inspected company work to implement cleaner production requirements.
3. What are the reasons for the low level of cleaner production?

Second: Research Objectives

This research aims to achieve the following objectives:

- 1 - To identify the concept of cleaner production and the most important practices (dimensions) that express it.
2. Determine the availability of cleaner production requirements in the inspected company.
- 3 - Determine the level of each dimension through the percentage owned by.
- 4 - To provide a study that can serve the company investigated in the field of environmental protection from pollution.
- 5 - Determine the most important mechanisms and methods through which to achieve a high level of cleaner production.

Third: The importance of research

The importance of research can be summarized in the following points:

- 1 - Completion of a study on the subject of cleaner production that the company can benefit from in order to enhance its reputation in the market and in front of the authorities responsible for protecting the environment.
- 2- To benefit from the study in determining the cleaner production requirements that the company can provide.
- 3 - Provide a conceptual framework to support the decision maker in the company investigated by identifying the concept of cleaner production and the most important dimensions that it contains and the role it occupies in enhancing the competitiveness of the company investigated.

Fourth: The hypothesis of research

In order to achieve this research in accordance with the approved methodology, it is necessary to identify a main hypothesis that reflects the answer to the research questions, which can be formulated as follows:

The main premise: “The General Company for Electrical and Electronic Industries has an acceptable level of cleaner production requirements and is qualified to offer environmentally friendly products.”

Fifth: Research tool

The search was based on a check list as a major tool in collecting the data needed for the research. The list was prepared after reference to a number of previous relevant studies, including Toprak & Anis, 2017: 2 (Ayalew, 2005) (Johannson & Winroth, 2009) (Rahmadyanti & Dwijanto, 2016). For the purpose of converting survey question questions into quantitative expressions and obtaining greater accuracy in the analysis of data contained therein, Use the triple lycert scale which included the following weights (Fully Available 2, Partially Available 1, Not Available 0).

Sixth: Methods of analysis

A number of methods and statistical methods were adopted for the purpose of analyzing the data obtained from the company surveyed by using the checklist. The methods adopted were the frequency distribution, percentages, mean and mean mean, in order to determine the level of answers of each paragraph of the examination list. Sherif, 163,2008):

$$1 - \text{Result} = \frac{[(\text{Total Frequency} \times \text{Weight})/(\text{Total Duplicates})]}{}$$

$$2 - \text{Percentage} = \frac{[(\text{total of frequencies} \times \text{weight})/((\text{total of frequencies} \times 2))]}{}$$

$$3 - \text{mean mean rate} = \frac{[(\text{percentage} \times \text{average})/(\text{result})]}{}$$

Seventh: A community and a research sample

The research dealt with the General Company for Electrical and Electronic Industries, one of the formations of the Ministry of Industry, Minerals and Machinery.

The date of the establishment of the General Company for Electrical and Electronic Industries dates back to 1967, officially opened on 28/4/1967, in the Rusafa side of Baghdad in the Waziriya area. It is part of the Ministry of Industry and Minerals and is based on its interest in the industrial side. The local market of various types of electrical equipment and equipments, and the company endeavors in the services provided to all the parties that deal with them.

A decision was taken in 2016 to merge the General Company for Electrical and Electronic Industries with Al-Ezz General Company, which is also one of the Ministry of Industry and Minerals formations, which was established in 1997 in order to supply the local market with various electronic devices.

The General Company for Electrical and Electronic Industries was named after the General Company for Electrical Industries merged with Al-Ezz General Company. The company aims to supply the local market with various electrical and electronic devices.

The second topic

The theoretical side

First: the emergence and evolution of the concept of cleaner production

A survey of the literature on cleaner production shows that there is a consensus that most of the development of this concept dates back to the beginning of 1989 (after UNEP launched cleaner production in response to a question on the sustainability mechanism) Gavrilescu, 2004: 46)

The concept of cleaner production quickly gained recognition in the 1990s in various parts of the world and in various projects. It achieved positive

results and was expected to be applied in many industrial sectors, although this optimism was cautious in the mid-1990s. As studies have shown that the implementation of cleaner production has faced different determinants and its growth has been progressing slowly (Dieleman, 2007: 81)

Second: Cleaner production concept

The increasing awareness of environmental issues has led to increasing pressures on business organizations to reduce the environmental impact of production and consumption of goods and services. Business organizations have turned their attention to clean or green production to counter these pressures. And less environmental damage in the first place as well as the effective use of energy and materials, (Perminder & Sangwan, 2011: 1).

Hossain, 2015, notes that cleaner production is a planned route to facilitate the efficient use of resources (raw materials, water and energy) to prevent pollution and reduce emissions from industrial activities. Cleaner production has been planned to help companies make more efforts in less time and provide greater value With less impact on the environment and improved economic and environmental efficiency (Hossain, 2015: 74). Abdul Aziz and Aziz, 2011, defines cleaner production as the process of creating an integrated defense environment that contributes to the creation of less harmful processes and products and reduces the risks to humans and the natural environment. Cleaner production promotes better service to society (Abdul Aziz and Aziz, 2011: 29)

Is one of the concepts addressed by literature that addresses environmental concerns related to the process of industrialization because manufacturing plays a major role in the efforts of companies to become more environmentally conscious. (Johansson & Winroth, 2009: 3). Cleaner production is a strategy to protect the environment, While improving industrial efficiency, profitability and competitiveness of enterprises, and is a tool that can contribute to sustainable forms of development (Gavrilescu, 2004: 47)

Third: Areas of Cleaner Production Application

Cleaner production can be applied in the following areas (Ayalew, 2005: 12-13:

1. Production processes: White production is produced from one or a combination of conserving raw materials, water and energy, eliminating toxic and hazardous substances and reducing the quantity and degree of pollution of all emissions and waste from the source during the production process.

2. Products: Cleaner production aims to reduce the environmental, health and safety effects of products throughout their entire life cycle, starting from the extraction of raw materials through manufacturing and use to the final stage of disposal of the product.

3. Services: Cleaner production involves inclusion of environmental concerns in the design and delivery of services (Ayalew, 2005: 12-13)

Fourth: the benefits of cleaner production

UNEP introduced a definition of cleaner production in 1989 as “a continuous and integrated strategic application of environmental protection towards processes, products and services for increasing overall efficiency and minimizing damage, human and environmental risks.” The concept of cleaner production was subsequently expanded by joining the sustainable development trend. In 2004, Direct contribution to the concept of cleaner production in the economic dimension through the diagnosis of “the use of strategies, methods and tools of better management”, cleaner production was applied to production processes, protection of raw materials and energy, and removal of toxic substances and reduce the Toxic emissions and waste products and to prevent or minimize the negative effects of the product throughout the life cycle, and cleaner production is brief, the continued implementation of the strategy to protect the environment with integrated processes, products and services “, (Toprak & Anis, 2017: 2).

Halam (2016) cleaner production is one of the three approaches used to reduce waste by focusing on pollution prevention. This approach relates to planned activities to eliminate emissions and waste and is seen as an input to continuous improvement. This approach can provide organizations with an advantage over their competitors This approach can lead to a reduction in the costs of raw materials and waste disposal. It can also help reduce production cycle time by eliminating unnecessary steps in production processes and thus providing benefits to organizations expressed by increasing productivity and efficiency. Ziz cash flow and profitability arising from reduced costs. (Hallam, 2016: 1816)

Fifth: Cleaner production dimensions

Some authors and researchers release cleaner production by practices, applications or components. These dimensions measure the availability of cleaner production, an approach to identifying areas that are inefficient with resource use and waste management. This is done by focusing on the environmental aspects and the effects of industrial processes, The following dimensions are agreed by Johansson & Winroth, (Rahmadyanti & Dwijanto, 2016) (Ayman, 2016) It can express cleaner output:

Good Operational Applications: Good Operating Practices

It is also referred to as Housekeeping, which is the administrative and administrative measures of the Organization, which can be used to reduce pollutants and toxic emissions, reduce costs and increase efficiency. These applications can be achieved in all sections of the Organization, including: (A) Applications in management and personnel: These include motivating and rewarding staff as well as training in emission reduction and pollution reduction programs.

B - Handling of stored materials and handling methods: It includes practices related to dealing with stored materials and the creation of proper storage conditions to reduce their damage and leakage and their impact on the environment.

Maintenance of machinery and equipment: Maintenance and durability of machines to reduce emissions and contaminants obtained as a result of their aging.

W - Waste sorting: Work on the isolation of hazardous wastes and prevent their mixing with non-hazardous waste.

2. Replacement of raw materials: means a change in raw materials for the production of cleaner production, reduction or elimination of hazardous substances entering the production process as well, and changes in materials can avoid the generation of hazardous wastes within the production process (Ayalew, 2005: 19).). They also increase productivity through the use of high-quality raw materials without compromising quality and cost. Substituting materials also means replacing existing materials with other environmentally friendly materials (Toprak & Anis, 2017: 3)

3. Modernization of equipment: The current production equipment is changed here for the purpose of increasing productivity, reducing waste or improving product quality. (Johrisson & Winroth, 2009: 4), including improved automation of the production process, optimal processes, redesign of the rates and replacement of the process (Johansson & Winroth, 2009: 4)

(Toprak & Anis, 2017: 3). It also means the development of existing equipment to produce less waste and to ensure more efficient production processes (Toprak & Anis, 2017: 3)

The product update also includes a change in the characteristics of the product to increase productivity, reduce waste and improve quality (Gavrilescu, 2004: 61). Toprak & Anis, 2017 Product Update is one of the main addresses of cleaner production to reduce pollution from products. Products are updated by changing the properties they carry, and product

changes require constant review of their requirements, such as weight reduction and product thickness, Recycle more easily and change packaging with Provide the minimum protection of the product from the packaging method. (Toprak & Anis, 2017: 3).

5. Reuse and recycling: refers to the reuse of previously available materials (Gavrilescu, 2004: 61), while the recycling process refers to the recovery of waste materials that were produced in the in-house manufacturing activities (Johansson, The recycling process involves the collection, reuse, or use of different parts of the waste. Unrecoverable waste can be recycled or sold, as waste can be sold to consumers or other companies (Toprak & Anis, 2017). : 3)

The third topic

View the results of the checklist on the dimensions of cleaner production and analysis

Introduction:

This section presents the results achieved through the application of the checklist on the dimensions of cleaner production to determine the availability of these dimensions in the company the General Company for Electrical and Electronic Industries. This is done by conducting a survey and analysis of the dimensions that have been adopted in this research. Was reached through the checklist using some statistical methods and tools, namely, the frequency distribution, percentages and arithmetic computation of the paragraphs in order to determine the level of answers of each and as shown below:

First: good operational applications

Good operational applications during the production process have an important role in reducing pollution and toxic emissions during the production process and thus taking care of the environmental aspects. This is done by taking a number of procedures through which to achieve this, and by conducting the analysis of the checklist which included a number of questions that will be (7) is the highest score of (2) out of (16) score, or (0.13), which is higher than the average mean of (0.06) so this ratio is acceptable as it refers to The existence of a good level of good operational applications in terms of the adoption of scheduling programs for maintenance activities to avoid holidays that could cause damage and waste, while the paragraph (6) on (0) out of (16), indicating that the company does not have rules and procedures guide (8,5,4,3,2,1) each paragraph obtained (1) score of (16) and a percentage of each paragraph (0.06), which is equal to the average mean (0.50), which means that the gap reached (0.50),

which means that the ratios and values The answers to the checklist for determining the level of good operational applications were unacceptable, requiring more efforts from senior management to raise the level of good operational applications by focusing on the reasons for doing so and taking actions that reduce the gap.

Table (1) Checklist of good operational applications

s	items	Search metrics		
		Fully available	Partially unavailable	not available
1	There is an interest from The organization management in the environmental aspects of its operations.		✓	
2	There is an interest in training workers in good cleaning applications.		✓	
3	Applying procedures and practices to prevent damage to stock of all kinds.		✓	
4	Isolation and separation of industrial waste.		✓	
5	The Department keeps the work places organized and not crowded to avoid accidents causing pollution.		✓	
6	Guiding rules and procedures are available to optimize energy use.			✓
7	The organization adopts scheduling programs for maintenance activities to avoid holidays.	✓		
8	There is control over the products of high pollution equipment.		✓	
	Weights	2	1	0
	Duplicates	1	6	1
	The result:	2	6	0
	the average		1	
	percentage		0.50	
	Average mean rate		0.06	

Second: Replacement of raw materials

Indicates the extent to which the company seeks to replace the raw materials that enter the production which are toxic or dangerous or at least reduced, which means reducing waste and pollution and achieving cleaner production, and after the process of data collection using the checklist on this dimension and analysis will determine the level of cleaner production Which contributes to this dimension, and through the examination of the results of the checklist and in Table (2) it becomes clear that paragraphs (6,5,4,3) have the same score, which amounted to (1) for each paragraph out of (12) (0.08), which is slightly lower than the slightly satisfactory average of 0.07 (2) that paragraph (1) did not obtain any degree and this is certainly unacceptable, as this indicates that the company does not rely

on the reliance on storage materials by providing (0.83), which means that the gap was (0.58). This indicates that the percentages and values of the answers to the checklist regarding the level of substitution of raw materials Were unacceptable, requiring further efforts from senior management to contribute to the As a result of the modernization and replacement of raw materials and to change the design of products to contribute to achieve this.

Table (2) List of the examination of replacement of raw materials

s	items	Search metrics		
		Fully available	Partially unavailable	not available
1	The organization reduces reliance on warehouse materials by providing materials directly from the source.			✓
2	The organization is working to reduce the amount of toxic substances used in products.		✓	
3	The organization is replacing toxic substances with environmentally friendly materials.		✓	
4	There are measures that limit the emission of pollutants from substances entering production processes.		✓	
5	Reusable and recyclable materials are relied upon..		✓	
6	The company is working on the use of raw materials with a longer productive life.		✓	
	Weights	2	1	0
	Duplicates	0	5	1
	The result	0	5	0
	the average		0.83	
	percentage		0.42	
	Average mean rate		0.07	

Third: Modernization of equipment

The modernization of equipment leads to technological change, which is aimed at modifying the machines and equipment, thereby reducing the toxic emissions generated by them. Companies that do so contribute to cleaner production. By analyzing the data collected using the checklist on this dimension The level of cleaner production contributed by this dimension can be determined, and by reference to the results of the checklist and as shown in Table 3, it is clear that paragraphs (6.5,1,1) have the same score of (1) (0.07), which is an acceptable percentage, which is higher than the average (0.04) indicating that there is a simple interest of the company in the design of production processes, which focus on the use of renewable materials and recycling with simple modifications to the machines and equipment to reduce energy consumption, As for paragraphs (7,3,2) These paragraphs did not achieve any degree, which indicates the weakness of the company’s attention to these paragraphs, which means low production efficiency due to lack of interest in the increase of automation operations,

as well as the trend towards the use of renewable energy in production processes. The final results show that the overall rate of technological change reached (0.57) and (0.29), which means that there is a gap of (0.71), which necessitates the company to move towards the change in technology according to the paragraphs that appear in Table (3) In order to reduce the gap and thereby contribute to cleaner production.

Table (3) Checklist of equipment update

s	items	Search metrics		
		Fully available	Partially unavailable	not available
1	There is an interest from The design of machinery and equipment is reviewed to reduce the emission of waste and contaminants.		✓	
2	The organization is looking for practices to increase automation to improve the operational efficiency of production lines.			✓
3	Modification of machinery and equipment is carried out to improve operational efficiency.			✓
4	The Department is working on modifications to the machines to reduce energy consumption.		✓	
5	The organization adopts advanced technology for sensing emissions sources in the production process.		✓	
6	The company designs production processes with a focus on the use of renewable and recyclable materials.		✓	
7	The company designs production processes with a focus on the use of renewable energy			✓
	Weights	2	1	0
	Duplicates	0	4	3
	The result	0	4	0
	the average	0.57		
	percentage	0.29		
	Average mean rate	0.04		

Fourth: Product Update

Some companies make continuous changes in the characteristics and characteristics of their products in order to reduce toxic emissions during the use of the product, and sometimes even after the completion of the use and disposal, and by analyzing the data collected using the checklist on this dimension can determine the level of cleaner production that It is clear to us that all the paragraphs included in the list of examination of this dimension (1) score for each paragraph of (10) and by (0.1) Somewhat as being equal to the average mean (0.1) indicating that there is a simple interest of the company to design the product and make some adjustments in order to reduce toxic emissions, to do some measures to improve the reliability of the product, and in general the general rate (1) and a percentage of (0.50) Indicates a gap (0.50) that the company should reduce by increasing interest and focus on making further adjustments in the design

of the products it offers, in a way that reduces the waste or toxic substances produced when using it.

Table (4) Product Update Checklist

s	items	Search metrics		
		Fully available	Partially unavailable	not available
1	Product design is reviewed to reduce emissions and waste.		✓	
2	The organization is working to reduce the negative impacts of its products on the environment.		✓	
3	Quality specifications are increased to minimize environmental impacts.		✓	
4	The organization is working to make adjustments to the composition of the product to minimize environmental impacts.		✓	
5	Many measures are taken to improve the reliability of the product (actual performance of the product)...		✓	
	Weights	2	1	0
	Duplicates	0	5	0
	The result	0	5	0
	the average		1	
	percentage		0.50	
	Average mean rate		0.10	

Fifth: reuse and recycling

Recycling refers to the reduction of waste from the source and during the process of production. The waste reuse process reduces the use of raw material energy during the production process, which contributes to the enhancement of cleaner production, and through the examination of the results of analysis of the data check list that determine the level of ownership of the company inspected for this dimension Table (5) shows that paragraphs (5,4,3,2) are obtained at (1) of the total of (10) grades and by (0.1), which is somewhat acceptable, which is higher than the mean average rate of (0.08) Indicate a slight interest from the company in reuse of some of the waste generated during uncle As well as the use of some valid parts of the products after the actual use of them, while the achievement of paragraph (1) did not achieve any degree indicating the lack of interest from the company to conduct practices aimed at reducing the raw materials used in products, (0.80) and a percentage (0.40) indicating a gap of 0.60. The company should work to reduce it by increasing attention and focus on the reuse of materials from residues that appear during the production process as well as reducing raw materials used In the product.

Table (5) List of reuse and recycling

s	items	Search metrics		
		Fully available	Partially unavailable	not available
1	Apply practices to reduce the use of raw materials.			✓
2	The organization is working to reuse the damaged materials.		✓	
3	The organization re-uses some parts of the valid products after actual use.		✓	
4	The organization is conducts practices to treat waste and waste generated during the production process.		✓	
5	The organization is working to replace materials and help with less impact on the environment.		✓	
	Weights	2	1	0
	Duplicates	0	4	1
	The result	0	4	0
	the average		0.80	
	percentage		0.40	
	Average mean rate		0.08	

Eighth: Present the total results of the inspection list to determine the level of cleaner production

In order to determine the level of cleaner production in the General Company for Electrical and Electronic Industries, to determine the gap between the actual and the required level and to determine the means of reducing them, the level of contribution of each dimension to the cleaner production and the total level of cleaner production should be determined. Checklist for determining the level of cleaner production for each dimension and total agencies: Table (6) summarizes the results of the inspection lists for determining

Table (6) level of cleaner production

S	Output Cleaner	The size of the gap	percentage	the average
1	Good operational applications	0.50	0.50	1
2	Change in raw materials	0.58	0.42	0.83
3	Technological change	0.71	0.29	0.57
4	Changes in product design	0.50	0.50	1
5	Reduce and recycle	0.60	0.40	0.80
	General Average	0.58	0.42	0.84

By looking at the results in Table (6) obtained from the checklist, some points can be clarified as follows:

1. The gap between the level of the company's ownership of cleaner production and the level required to achieve cleaner production

reached a general average of (0.58) ie, the percentage of achieving cleaner production reached (0.42). Which requires the company to move towards attention in large dimensions that did not contribute to achieve this and is not able to achieve now.

2. The dimensions (good operational applications and changes in the design of the product) achieved the highest percentage of the contribution to achieve cleaner production and reached (0.50) in the inspection list, which means that their contribution was (0.50) and the gap (0.50) And making changes in product design more.

3 - Getting the dimensions (changes in raw materials, shrinkage and recycling) to close ratios of (0.40,0.42), respectively, requires work to reduce the gap through attention to paragraphs that led to the reduction.

As shown in table (3), after the modernization of equipment, the lowest percentage reached (0.29), which led to the gap (0.71) which is very high, which requires working to focus more on this dimension since it will contribute significantly in Achieving cleaner production, as technological change plays a major role in influencing raw materials and finished products as well as minimizing negative impacts on the environment.

Figure (1) shows a diagram of the percentages of the cleaner production dimensions in the investigated company. The horizontal axis in the figure shows the dimensions of the cleaner production represented by the figures from (1) to (5). The number (1) represents the good operational applications which achieved (0.50) The figure (2) shows the change in raw materials which achieved (0.42), while the number (3) technological change, which has achieved the lowest rate (0.29) The number (4) reflects the changes in the design of the product has achieved (0.50), while the number (5) represents the reduction and recycling, which achieved (0.40), while the vertical axis between percentages Ed cleaner production, which was obtained from the results of checklists after applying methods of descriptive statistics on the data.

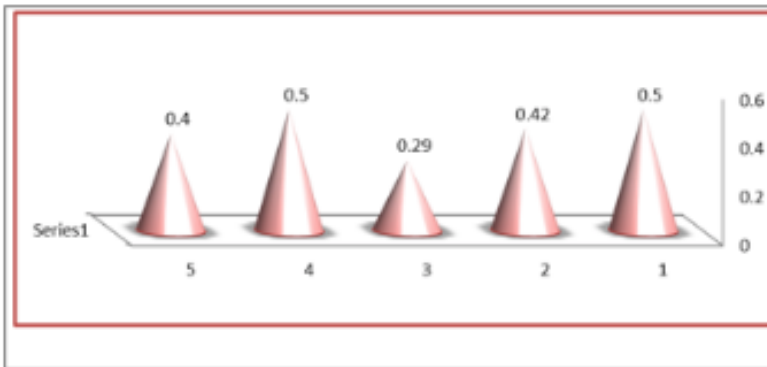


Figure (1) Total percentages of cleaner production

The fourth topic

Conclusions

In light of the analysis of the results of the data appeared in the checklist and obtained by the research company, we can show a number of conclusions reached by the research as follows:

- 1- The results of the research show that the company owns the highest level of cleaner production, which is in the following (good operational applications, product update). The rate is (1) for each dimension of (2), with an achievement rate of (0.50) This requires the company to increase the good operational applications and make changes in the design of the product, thereby increasing their contribution to cleaner production.
2. The replacement of raw materials reached an average rate of 0.83 and a percentage of (2) and an achievement rate of (0.42). This means that the contribution of this dimension has decreased in achieving cleaner production due to the company's low interest in direct contact with the suppliers and providing raw materials Without reliance on storage.
- 4- The reuse and recycling dimension reached 0.80 of the degree of (2) and 0.40 percentage point (0.60), which indicates a low interest in reuse of materials and parts used or re- Seriously recycled.
- 5 - The lowest rate was achieved after updating the equipment and achieved an achievement rate of (0.29), which indicates the low con-

tribution of this dimension to achieve cleaner production due to lack of focus on the modernization of equipment because of the lack of potential as well as the lack of a clear vision of the company to activate this and focus on Add new product lines and neglect old ones.

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