



# INTERNATIONAL JOURNAL OF RESEARCH IN SOCIAL SCIENCES & HUMANITIES

An International Open-Access Peer Reviewed Refereed Journal

Impact Factor: 8.909

E-ISSN : 2249 – 4642

P-ISSN: 2454 - 4671

## THE ROLE OF THE CLEANER PRODUCTION STRATEGY IN ENHANCING THE MAIN SUCCESS FACTORS

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DOI: <http://doi.org/10.37648/ijrssh.v12i04.015>

**Paper Received:**

07 September 2022

**Paper Accepted:**

25 October 2022

**Paper Received After Correction:**

29 October 2022

**Paper Published:**

30 October 2022



**How to cite the article:** Abbas S.S., Manal J.S.(2022)

The Role of the Cleaner Production Strategy in Enhancing the Main Success Factors, *International Journal of Research in Social Sciences & Humanities*, Oct-Dec 2022 Vol. 12, Issue 4; 250-264 DOI: <http://doi.org/10.37648/ijrssh.v12i04.015>

## ABSTRACT

The business environment is witnessing tremendous developments in the field of production and technology, which requires the development of production methods to go in line with these developments and the increasing competition, which has gone beyond the economic aspects to extend to the environmental aspects, as economic units tended to adopt a cleaner production strategy and through what they achieve by producing environmentally friendly products and achieving economic efficiency. Reducing costs, providing a safe and clean environment for workers, and reducing waste from production operations.

**Keywords:** *Cleaner production, end-of-line processing, key success factors.*

## INTRODUCTION:

Economic units and governments are paying increasing attention to the environment, through what they offer of holding conferences and seminars in which most countries participate, and this indicates a trend towards searching for strategies and technologies that work to achieve efficiency and produce environmentally friendly products. Including the cleaner production strategy, where cleaner production helps achieve sustainability because it depends on economic and environmental mechanisms that contribute to reaching competitive products, because it combines economic and environmental considerations. This is done by reducing waste from the source by reducing its production source, changing the product design, rationalizing the consumption of resources and energy, recycling waste ... etc. The economic and

environmental importance of using the cleaner production strategy is to reduce production costs in terms of saving in materials Energy and efficient exploitation, and the reduction of costs related to the disposal of waste of all kinds, as it produces environmentally friendly products.

## THE FIRST TOPIC: RESEARCH METHODOLOGY AND PREVIOUS STUDIES

### Research Methodology:

**First: The research problem:** economic units face multiple problems related to the increase in wastage of economic resources, the lack of energy sources and the increase in environmental pollution rates as a result of adopting traditional methods of production, producing low quality products and harmful effects on the environment and on human health, as well as the high cost of products compared to

other products. Which showed the need to adopt modern strategies that contribute to the production of products with less environmental impacts and meet the needs and desires of customers without compromising the quality of the product.

In light of the above, the research problem can be identified by the following question:

- Does the cleaner production strategy contribute to assisting the management of the economic unit in making the best use of resources and making technological improvements in the characteristics of the product? Achieving key success factors?

**Second: Research Objectives:** In light of the questions posed to the research problem, the research objectives can be defined as follows:

((Declaration of the knowledge bases of the cleaner production strategy, and its role in achieving the main success factors)).

**Third: The importance of the research:** The importance of the research stems from the necessity of using modern strategies by the economic units for the sustainability of the clean environment. Which helps to rationalize the consumption of natural resources, save energy and adopt modern technology that contributes to reducing production costs and achieving the goals of the economic union.

**Fourth: Research hypothesis:** The research is based on a basic hypothesis that:

"The use of cleaner production helps the management of the economic unit in achieving the main success factors."

**Fifth: Research sources and data collection methods:** The process of collecting data and information in the light of which this research was accomplished was as follows:

- **Theoretical side:** It was relied on a group of foreign and Arab sources related to the topic of research, including books, theses, letters and periodicals available in universities, as well as articles and studies published in the international information network.

**Previous studies:**

A brief presentation of what came from previous studies related to the topic of the research, which dealt with the issues of accounting for material flow costs, and environmental performance, as they were presented as follows:

**1. Master's Thesis in Accounting (Al Sultani, 2020) entitled: (The cost of cleaner production and its role in improving product quality and achieving sustainable competitive advantage)**

The thesis aimed at clarifying the knowledge bases of the cleaner production strategy and sustainable competitive

advantage, with an indication of how to improve the quality of products and achieve environmental requirements by using cleaner production techniques and costs. It is a practical way to achieve sustainable development, and works to improve productivity, reduce damaged and defective, in addition to improving the quality of products and producing environmentally friendly products.

**2. A study (varella & others, 2021) entitled: (Adoption of cleaner production in a pupunha palm heart factory: a systematic literature review and a case study)**

The aim of the study is to assess the environmental and economic benefits of adopting the cleaner production strategy in reusing the waste generated as a result of production processes. and the adoption of cleaner production led to a reduction in large quantities of waste, which were previously unorganized in the environment, which were causing pollution in the environment, and the imposition of fines on the economic units that caused this.

**3. Master's Thesis (Nyambura, 2015) entitled:**

It aimed at evaluating the main success factors for strategic knowledge management and concluded that the organizational environment enables employees to access information freely

and should enhance knowledge and confidence of employees and focus on training provided by the economic unit and establish a culture of teamwork for the purpose of achieving their better performance.

**THE SECOND TOPIC: KNOWLEDGE BASES FOR CLEANER PRODUCTION**

Accordingly, in this topic, the knowledge bases of the cleaner production strategy will be addressed and how to implement it so that the economic unit can work with it.

My agencies:

**First: The concept of a cleaner production strategy:**

The concept of cleaner production is seen as something that can be applied throughout the life cycle of the product, to support the concept of well-being for future generations, where the concept of cleaner production is related to resources and how to preserve the environment, and the adoption of strategies capable of reducing or relatively reducing the unwanted effects of production processes and reduce their risks On the environment (da Silva & Gouveia, 2020:15).

The success of implementing the cleaner production strategy depends on three main pillars:

- 1. Production centers:** Cleaner production focuses on reducing the

use of any kind of inputs such as raw materials and energy, as well as replacing toxic and dangerous raw materials used in the production process with less dangerous materials (Ramos et al., 2021:3).

**2. Service Centers:** When implementing the cleaner production strategy, services help reduce direct and indirect environmental impacts when generating and performing services (Schaltegger et al., 2008:7).

**3. Products:** Cleaner production focuses on the length of the product life cycle and seeks to reduce environmental impacts, starting from the extraction of raw materials to their final disposal (Ramos et al., 2021:3)

1. The researchers believes that in light of the synergy of the three main pillars mentioned above, on which the cleaner production strategy is based, it will lead to reducing the risks of undesirable effects and reducing costs, which in turn achieve a competitive advantage for the economic unit.

**Second: Defining the Cleaner Production Strategy:**

There were many definitions by researchers and professional organizations, and they presented definitions of the cleaner production strategy because of its great importance on the economic and environmental levels, and Table (1-1) shows those definitions.

*Table (1-1) definitions of the cleaner production strategy:*

N	Source	Vision	Definition
1	(Da Silva et al.,2021:1)	Resource efficiency	Continuous adoption of practices that improve economic, environmental and operational performance through the integration of processes and products that enable an increase in the efficiency of raw materials, water and energy, with the aim of not generating, reducing or recycling waste resulting from manufacturing processes.
2	(Neto et al.,2021:1)	Precautionary approach	A precautionary approach to sustainability relates to all phases of the product or service life cycle and is applied by economic units in order to obtain economic and environmental benefits.
3	(KAYA,2021:255)	Environmental management approach	An approach to environmental management that aims to improve the environmental performance of products, processes, and services by focusing on the causes of environmental problems.
4	(Lu et al.,2020:2)	Preventive environmental strategy	An environmental strategy that adopts a comprehensive prevention of production processes and products that are harmful to the environment, through which harm to humans and the environment can be minimized or minimized, and social and economic benefits are maximized.
5	(AL-Munim & Abdul hameed,2021:157)	sustainable development	A mechanism to promote sustainable development by reducing industrial waste and emissions, and by providing and assisting financial and technological resources, so that progress is achieved in a sustainable economy by reducing environmental costs, to achieve developmental benefits for society.

Source: Prepared by the researchers based on the above-mentioned sources.

From the above, the researcher believes that cleaner production is a preventive environmental strategy for products, processes and services in order to conserve energy, water and raw materials, and to remove or reduce toxic materials and waste of all kinds that are produced during production processes or during the life cycle of the product or service, with the aim of mitigating the risks to which it is exposed. environment and people, increasing efficiency, and achieving environmental and economic gains.

**Third: The objectives of the cleaner production strategy:**

The objectives of cleaner production can be defined as follows:

- 1.Improvements in organizational performance, achieving greater competitiveness, and achieving economic and environmental gains for more sustainable development (Lins et al., 2021:2).
- 2.Adopting environmentally oriented technology solutions through integration with research work (Jayasinghe et al., 2021:130).
- 3.Reducing the costs of obtaining inputs from materials, energy, and water: as cleaner production helps to reduce its consumption per unit produced, thus achieving savings in the costs of these natural resources (Al-Sultani, 32: 2020).

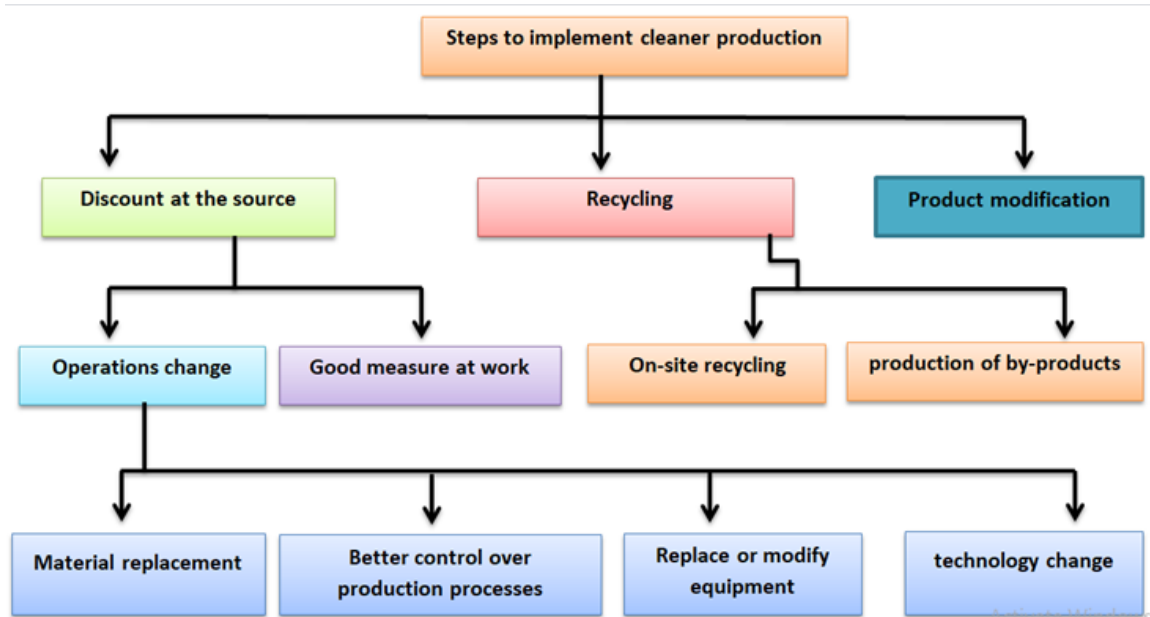
4.Commitment to environmental standards, reducing fines and penalties imposed on economic units as a result of pollutants from their production processes, and improving the relationship with environmental authorities and society (Santos et al., 2018: 119).

5.Cleaner production aims to improve productivity by using modern technology, reduce waste of materials and emissions, reduce energy consumption and reduce the use of toxic and dangerous materials (Al-Khafaji & Al-Tai, 268: 2020).

Based on the foregoing, the researcher believes that the cleaner production strategy aims to make the activities of the economic unit safer, whether for workers, customers or the community surrounding the economic unit. It also seeks to reduce the consumption of materials and energy in order to preserve the rights of future generations and enhance the competitive advantage of the economic unit by raising the level of its efficiency.

**Fourth: Steps to implement the cleaner production strategy:**

There are three steps or procedures for implementing the cleaner production strategy, as shown in Figure (1-3): - (Purwanto, 2021: 16)



*Figure (1-3) Steps to implement a cleaner production strategy.*

**1. Reduction at the source:** Reducing pollution is mainly related to the means used to manufacture the product and not the product itself, and it is necessary for the productive means to enhance the reduction of waste of resources (da Silva & Gouveia, 2020:155). The sources of pollution reduction are represented by two sources:

**A. Good measure at work:** It includes the concept of cleaner production required at all stages of production, and includes various procedural and administrative measures that should be taken to reduce waste and emissions, and these practices can be implemented at every stage of manufacturing including training employees on handling and storing

appropriate materials (Jayasooriya, 2020: 3-4)

**B. Changing the processes:** A change can be made in the processes to reach a cleaner production through changing or substituting materials, or replacing equipment and machinery (Jain, et al., 2018: 252):

- **Substitution or change of materials:** - the choice of materials that are least harmful to the environment or that allow a significant improvement in the life cycle of the product and that are of high quality (da Silva & Gouveia, 2020:248).

- **Better process control:** Ensure that the conditions of the production process are optimal in terms of resource consumption and waste generation. The output of production processes such as temperature,

time, etc. should be monitored and kept as close to the optimum limit as possible (Purwanto, 2021: 17). ).

- **Replacing or modifying equipment and machinery:** Replacing and changing machinery and equipment used in production processes with more efficient ones and training operators in order to reduce waste rates of all kinds (doorasamy, 2015: 238).

-**Technology change:** directing technological changes towards process and equipment modifications to reduce pollution in the production environment in the first place, these changes may be in the production process such as the introduction of new equipment or the use of automation, or the implementation of changes in production process conditions such as flow rates, temperatures and pressures (Nilsson, et al., 2007: 79).

**2. Recycling:** The product should be easily recyclable, in such a way that it either becomes the same type of product again or can be created into a similar product (Karlsson, 2020:8). Recycling is classified according to the following:-

**A. On-site recycling:** Refers to the beneficial application of waste and defects resulting from production processes, they are returned back to the production line for use and utilization (Van Berkel, 2000: 6).

**B. Producing useful by-products:** Recycling the products after their use by the consumer or the customer outside the production plant, after their use, these products are often considered waste and are disposed of (Jain, et al., 2018: 256).

The researchers believes that the maximum benefit should be achieved from the use and consumption of natural resources and the reduction of environmental impacts by reducing the products that are consumed as waste, but they are reused again or recycled into other products that are used instead of throwing them in the landfill.

**3. Product modification:** By changing the characteristics of the product, such as the appearance, extending the life of the new product, making the product easier to repair, or making the product less polluting, changes in product packaging are generally also considered product modifications (Van Berkel, 2000: 6).

**Fifth: The differences between the cleaner production strategy and traditional production (end-of-line treatment):**

Table (1-4) shows the main differences between the cleaner production strategy and the traditional production (end of the line).



**Table (2-4) Comparison between the cleaner production strategy and traditional production (end-of-line treatment).**

N	the range	cleaner production strategy	Conventional output (end of the line) E-O-P
1	Target	Avoid the occurrence of pollutants and emissions rather than trying to treat them.	Treating pollutants and emissions after their occurrence and after the end of production processes and transferring them from one environment to another.
2	Economic dimension	Result in cost reduction, resource consumption reduction	Leads to increased costs, and increased consumption of resources
3	Responsibility	All persons are responsible for the economic unit	Solutions are often developed by experts separately
4	Dealing with pollutants	Preventing pollution by taking measures at the source and working continuously to achieve the highest development through new management practices and methods and stimulating technical developments.	Control of pollutants by means of filters and treatment methods according to standards set by the department, and improvements to existing technologies

*Prepared by the researcher based on the sources (Al-Sultani, 26:2020), (Galanakis, 2021:14).*

The researchers believes that the treatment method at the end of the line treats the waste after its generation and in a traditional manner, which makes it difficult to get rid of it permanently if it is not re-used or recycled (considering it as curative), which adds additional costs to production costs, which is the cost of eliminating pollutants, and thus leads to waste of materials As for the cleaner production strategy, it is a preventive strategy that aims to increase production efficiency by making better use of resources and energy, reducing waste at the source instead of treating it, producing environmentally friendly products and reusing and recycling waste.

### **THE THIRD TOPIC: FACTORS SUCCESS FACTORS**

#### **First: the concept of the main success factors:**

They are considered crucial factors to achieve the objectives of the economic unit and determine the permanent activities that should be undertaken by the economic unit in order to achieve its mission and determine the areas of performance that managers should follow up constantly, and these factors are of paramount importance in the implementation of strategies, which must be clear to all levels of management (Meibodi & Monavvarian, 2010:124) It is also defined as a group of activities or indispensable elements that enable the economic unit to achieve its goals, thus ensuring the successful performance of both current and future operations (Rothberg & Morrison, 2012: 1).

The researchers believes that the success factors are those activities and areas that achieve the success and competitive performance of the economic unit if they are implemented correctly.

### **Second: Sources of Success Factors:**

The understanding and analysis of the environmental, economic and social factors surrounding the economic unit have significant impacts on the strategies it follows and on the success of these strategies ((Buechel, 2014:1), and (Rad) identifies major sources of success as follows (Rad, 2015:337).

**1. Competition:** This type of key success factors is related to the state of the economic unit in relation to its competitors, as all economic units operating in certain businesses do not have similar major success factors, and the strategies, resources and capabilities of economic units towards their competitors determine their success factors.

**2. Environment:** Economic units should recognize the environmental factors that affect their ability to succeed, and these factors are not under the control of those units but should consider them to determine the key factors for success. These factors include industrial legislation, government rules, and the economic environment of each country.

### **Third: Objectives of the success factors:**

Success factors are necessary to achieve the goals of an economic unit, and without such factors, economic units do not have a road map through which to navigate their operations, the senior management should consider the highest priority factors necessary to achieve the strategic objectives at all levels on the activities with appropriate priorities. As well as using accountability methods and measures to measure success in order to improve the application of corrective measures (Rothberg & Morrison, 2012:1 and there are several benefits to the main success factors, including (Parmenter, 2008:3):

1. Minimize pollution and waste to maintain a safe and healthy place.
2. Enhance operational efficiency, improve technology and encourage innovation.
3. Increased productivity and better utilization of resources and energy.

### **Fourth: Enhancing Success Factors**

#### **Under the Cleaner Production Strategy:**

The management of economic units should seek to choose the factors or dimensions that are more important to achieving customer satisfaction and achieving its goals, including:

1. Reducing costs: Cost occupies the interest of all economic units, and this concept is closely related to achieving the

objectives of the economic unit by seeking to reduce product costs. The concept of cost reduction is known as generating more savings in the cost of products and services than in their quality (Al-Obaidi and others, 409: 2010), reducing the cost means producing and providing products at the lowest cost compared to what competitors offer, as economic units face continuous pressure to reduce the costs of the products they provide, so the management of economic units should strive to make continuous improvements and efficient exploitation of resources (Horngren, et al., 2012).

The researchers believe that the use of the cleaner production strategy will contribute to reducing product costs by replacing the raw materials used with others that can be recycled and less emission of polluting materials to the environment, or change the technology used with a technology that is more conserving and exploiting resources in a more efficient manner, in addition to educating workers about the need to work to preserve the environment, in addition to avoiding fines imposed by governments and international organizations as a result of the pollutants and environmental effects produced by economic units, all of this guides and reduces product costs.

**2. Sustainability:** The most common definition of sustainability is to meet the

needs of the present without compromising the ability of future generations to meet their own needs, as manufacturing industries lead to the depletion of the resources provided by nature through unsustainable practices and also lead to the production of industrial waste that pollutes the environment, as the concept of sustainable development provides a solution to the environmental impact and meets the needs of the current and future generation (YUSOF, et al, 2015:54), and there are three basic aspects of sustainability (Al-Jalehawi, 72: 2020):

**A. Economic:** Economic sustainability means the production of goods and services on a continuous basis, and this means using different strategies to better utilize the available resources so that a responsible and beneficial balance can be achieved in the long run.

**B. Environment:** It means ensuring the continuity of natural resources, biodiversity, human health, air, water and soil quality, as environmentally sustainable units are units that consume resources to the extent that their natural system can deal with them, and work to reduce environmental impacts such as waste and emissions resulting from operational activities (Tum, 2014). :64).

**C. Social:** It is an important part of the comprehensive sustainable framework, and it promotes a suitable environment for

coexistence with culturally and socially diverse groups, as well as improving the quality of life for all segments of society while maintaining and developing well-being for future generations (Dogu & Aras, 2019:3).

The researchers believe that economic units should work to reduce the environmental impacts caused by their production processes and products, and conserve resources to ensure the right of future generations, as the environmental effects may result from the use of materials that are harmful to the environment and society, or as a result of the inefficient use of resources and energy, which causes wastage in those resources, and the use of the cleaner production strategy will help in selecting raw materials that can be recycled and ineffective, as well as adopting a technology that preserves the environment, resources and energy from waste and waste, in addition to designing environmentally friendly products. Thus, the research hypothesis was proven (the main success factors are achieved using the cleaner production strategy).

#### **FOURTH TOPIC: CONCLUSIONS AND RECOMMENDATIONS**

**Conclusions: The research concluded a set of conclusions, which are:**

1. The strategy of cleaner production contributes to the economic unit in improving the quality of products, producing environmentally friendly products, achieving efficiency in the exploitation of resources and energy, and improving the image of the economic unit and its obligations towards society.
2. The commitment of the economic unit to using the cleaner production strategy will achieve economic, social and environmental benefits, and contribute to enhancing the performance of the economic unit and distinguishing it from its competitors.
3. The main success factors of strategic knowledge management contribute to identifying the activities and areas that achieve success and the competitive performance of the economic unit if they are implemented correctly.

#### **Recommendations:**

1. The higher management should spread the culture of cleaner production and support the cleaner production strategy for the purpose

of achieving efficiency and less consumption of resources, and moving away from the traditional approach, which treats pollutants after they are generated, and replaces it with a cleaner production strategy that treats pollutants from the source.

2. Encouraging economic units to adopt a cleaner production strategy by the state and organizations concerned with the environment and raising awareness among customers of the need to resort to environmentally friendly products.
3. The necessity of controlling wasted costs in production processes, as well as in the processes of reducing production waste, which would support sustainability, which is one of the important pillars in the success factors of any economic unit.
4. Relying on the perspective of competition in light of achieving success factors that have become at a crossroads due to regional and transcontinental companies by adopting efficient management of resources that would focus on reducing costs while maintaining the quality of products.

**Financial support and sponsorship:** Nil

**Conflict of Interest:** None

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