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THE IMPACT OF GREEN PRODUCTION DIMENSIONS ON ACHIEVING SUSTAINABLE DEVELOPMENT

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Abstract : This study aims to illustrate the influence of green production dimensions on the attainment of sustainable development, to enhance the efficiency of industrial entities. This trend is deemed essential in safeguarding the environment against pollution and waste generated by manufacturing procedures, particularly in light of technological advancements and the obstacles encountered by these organizations in implementing significant modifications and use them As an effective means towards obtaining environmentally friendly products, The problem of the study is what is the relationship between the green production dimensions and sustainable development and the impact that it can have on it. The significance of this study lies in its emphasis on encouraging factory management to remain abreast of environmental shifts by devising innovative measures to minimize waste and emissions stemming from production procedures, while also engaging in waste recycling, and avoiding material waste and excessive energy consumption. In order to attain the study's objectives, a 32-item questionnaire was utilized. The study sample consisted of 60 participants who were selected from different departments of the Diwaniyah tires factory. Two primary hypotheses were formulated in accordance with the aim of the investigation. To scrutinize the outcomes and validate the conjectures, a series of statistical techniques were employed utilizing the statistical software (SPSS.vr.26) and (AMOS.vr.26). The study's findings indicate a significant correlation and causal relationship between the dimensions of green production and sustainable development. The factory's application of the dimensions of green production will be sufficient to reduce the pollution rate in pursuit of sustainable development, and enable it to be innovative in product development processes in a way that enhances environmental, social and financial performance at the same time, as well as attracting new customers.

Keywords: green production dimensions, sustainable development, Sustainable Production, Green Supply Chain, Sustainable Green Operations, Environmental Management.

Introduction: Many organizations have resorted to adopting many appropriate environmental means, measures, procedures and policies, in response to the pressures of environmental protection, and the intensity of competition to maximize returns and reduce negative impacts on the environment and thus achieve good and continuous economic performance as a basis for achieving sustainable development (Mujahedi & Brahimi, 2012:77).

The escalation of environmental pollution resulting from industrial operations has resulted in the accumulation of vast quantities of waste that pose a threat to the environment. This has led to the development of specialized management approaches aimed at safeguarding the environment and mitigating the adverse effects of pollution (Guo et al., 2019: 3). Consequently, organizations have been compelled to adopt contemporary techniques and systems in their manufacturing processes to tackle environmental issues while operating in a socially and ethically responsible manner. The concept of green production is a fundamental aspect of environmental discourse, characterized by a scientific methodology and practical application that prioritizes resource efficiency in production processes. This approach results in a decrease in waste and emissions, as well as associated pollutants, while simultaneously enhancing the competitive advantage of the organization (Handhal, 2017:85).

The research inquiry pertains to the correlation between the dimensions of green production and sustainable development, as well as the potential influence it may exert on the latter. The significance of this research stems from its focus on a dynamic subject matter, aimed at generating ecologically sustainable commodities and fostering economic prosperity with minimal environmental repercussions. Given that numerous nations encounter challenges related to pollution and waste, which consequently result in environmental degradation, this study is of paramount importance. The objective of the study was to investigate the influence of the dimensions of green production, followed by an analysis of the correlation between said dimensions and sustainable development.

The Study hypothesis

In light of the study purpose, the following two hypotheses were formulated:

- There is a significant correlation between the independent variable (green production dimensions and the dependent variable (sustainable development).
- There is a significant effect relationship between the independent variable (green production dimensions and the dependent variable (sustainable development).

Sample and Community of the Study

The tires factory in Diwaniyah was selected as an applied field of study because of its significant role in supplying the local community with its products and its enjoyment of highly qualified cadres and energies. Additionally, the tires factory was selected as an applied field of study because it was a viable option. They were each given a questionnaire, their questions were answered, and many components of the research were elucidated for them. There were a total of sixty respondents. We got a total of sixty questionnaires, which means that our response rate was one hundred per cent.

Statistical Methods Used

The following statistical techniques were used:

Arithmetic Mean, Standard deviation, Variance coefficient, Relative significance, Confirmative factor analysis, Correlation analysis, Regression analysis, T-test, F-test, Alpha-Kronbach Coefficient.

LITERATURE REVIEW

First: Green Production

The conventional approach to production prioritized meeting customer demands and maintaining competitiveness. However, the implementation of rigorous environmental protocols and regulations necessitated the development of a novel system known as green production. This system emphasizes the reduction of resource consumption through waste management, enhancement of productivity, efficiency, quality, and customer satisfaction, with a focus on environmentally friendly production of goods and services (Abualfaraa et al., 2020: 4).

As per Luthra et al. (2016:151), the implementation of environmentally and socially responsible practices is aimed at mitigating the adverse impacts of manufacturing activities while simultaneously achieving economic benefits. This approach facilitates the attainment of profitability and operational efficiency for organizations, thereby enhancing their competitive advantage.

Digalwar et al. (2017:1390) characterized it as a contemporary production system that aims to mitigate environmental impacts throughout all stages of the production process while simultaneously enhancing the competitiveness of the organization.

According to Shahria and colleagues (2019:21), the production system is designed to minimize the utilization of natural resources and mitigate environmental waste or pollution.

According to Bu et al. (2020: 5), implementing this strategy is deemed effective for the organization's business as it aims to attain a sustainable and clean environment by producing products that are environmentally friendly and pose no harm.

According to Ibrahim (2020:68), the concept of environmentally friendly production entails the implementation of production processes that minimize waste in the utilization of natural resources, while also reducing pollutants and emissions that have detrimental effects on the environment and society.

Abbas (2022:3) posits that the process system pertains to environmental sustainability by means of producing eco-friendly commodities and services through waste reduction and mitigation of environmental pollution.

According to Madah (2023:7), a sustainable approach to design activities is necessary to encompass all production stages and minimize environmental impact, natural resource depletion, and raw material usage while enhancing product efficiency. The aforementioned suggests that implementing a deliberate production system aimed at minimizing waste and emissions generated during manufacturing operations, while ensuring the efficient allocation of resources in a secure setting, can enhance the competitive edge of an organization. It is noteworthy that there exist various terms that are interchangeable with green production, such as clean manufacturing, environmentally friendly manufacturing, environmentally responsible production, and cleaner production.

Green Production Importtance

The relevance of environmentally responsible manufacturing resides in the following areas: (Ishikomo&Uduk, 2017:11); (AbdulRashid et al.,2017:193)

- Reducing the wastage of resources and minimizing pollution.
- The recycling of waste.

- Using renewable resources and energy sources that are less harmful to the environment.
- Increasing the productiveness of the manufacturing process and the quality of the goods.
- Decrease the expenses of the raw materials.
- Reduced costs associated with protecting the environment and employees' safety.
- Raise your profitability and secure a position of superiority in the market.
- The production of items that are less harmful to the environment, hence reducing the overall negative influence on the environment.

Green Production Benefits

(Almaz, 2004:14) refers to the most important benefits of green production as follows: (Handhal, 2017:85)

- Saving funds: through the optimal use of resources, focusing on improving business and performance by providing environmental needs, as well as reducing the organization's cost structure.
- Pollution prevention: by encouraging organizations to reconsider their waste reduction practices at the source rather than trying to control pollution at the end of the process.
- Reducing health risks: Green production achieves healthy workplaces through good management and achieving more economic benefits.

Green Production Practices

(Ghazillaetal., 2015: 665), (Ishikomo & Uduk, 2017: 109) agree that green production practices are: (Ibrahim, 2020: 73-74)

- Increase production efficiency.
- Reducing raw material costs by recycling waste instead of purchasing new materials.
- Reducing the costs of environmental and professional procedures.
- Improving the work of the organization by reducing the negative environmental impact.
- Pollution prevention by reducing the use of energy, raw materials and solid waste.
- Recycle products.
- Use of renewable materials and environmentally friendly energy.
- Redesigning products and processes.
- Training employees on product stewardship practices.

Green production practices include improving production processes to reduce waste and emissions, through green practices performance measures (Masoumik et al., 2015:673):

- Environmental product design to reduce material and energy consumption.
- Design products to recycle, reuse or recover materials/components.
- Designing products to avoid the use of hazardous substances in products and production processes.
- Design products to reduce or avoid emissions during product use.
- Product design considering product cycle costs.
- Using environmentally friendly raw materials (recyclable/renewable energy) in products and replacing polluting and dangerous materials and parts.

Green Production Dimensions

There are a set of dimensions that a group of researchers have agreed on. We review them in the following table:

Table (1) the opinions of a group of researchers about the green production dimensions

	Green Production Dimensions / Researchers, year	Sustainable production	Green Supply Chain	Sustainable green operations	Environmental Management	Product Life Cycle	Green Engineering
1	Kopac, 2009	*	*		*		
2	Nambiar, 2010		*	*	*		
3	Karlsson, 2011	*		*			
4	Wang&Sezen, 2011	*	*		*	*	*
5	Baines etal.,2012		*	*	*		
6	Davim, 2013	*	*		*		
7	Roszak et al., 2015	*		*			
8	Zeya, 2015	*		*	*	*	*
9	Richard, 2016	*	*	*			
10	Liua et al., 2019	*	*	*		*	

		Total	8	7	7	6	3	2
		Retio	80%	70%	70%	60%	30%	20%

In light of the foregoing in Table (1), the dimensions that obtained an agreement percentage of (60%) or more will be approved.

- Sustainable production: The idea of sustainable development incorporates it as one of its tenets. It arose in the early 1980s as a reaction to rising knowledge and concern about the effect that economic development and the worldwide expansion of business had on the surrounding environment. It comprises the production of more environmentally friendly goods using manufacturing techniques and systems, as well as the establishment of a more environmentally friendly supply chain (Badurdeen et al. al.,2015:3346).
- Green supply chain: It is the process of environmental thinking in supply chain management and includes product design, material sources and selection, manufacturing processes, and delivery of the final product to customers. Additionally, it includes product management after its use has been exhausted, such as recycling, as well as product management after its use has been exhausted (Petljak et al., 2018:3).
- Sustainable green operations: These are the policies, ideas, and procedures that strive to decrease operations that are damaging to the environment, with the ultimate goal of generating environmentally friendly green goods to combat environmental deterioration (Gill, 2017:412).
- Environmental management is a methodical process that aims to enhance environmental performance via an ongoing cycle to manage the activities of an organization that either already have or have the potential to affect the environment (Waxin et al., 2019:495).

Second: Sustainable Development

The concept of sustainable development was initially introduced by Edward Barbier, who defined it as an economic pursuit that prioritizes the enhancement of social welfare while minimizing environmental degradation and depletion of natural resources (Abdel-Khaleq,1998:242). According to Othman and Magda (2010:22), sustainable development represents a novel development philosophy that has paved the way for fresh outlooks concerning the future of our inhabited territories. Attaining advancements and enhancements in the quality of life of the populace within a particular locality and temporal context. According to Muhammad et al. (2015:351), societal progress is characterized by the transition towards clean industries and technologies that minimize energy and resource consumption while reducing the emission of gases and pollutants. According to Ali (2015:122), sustainable development is characterized by the harmonization of environmental, economic, and social development, resulting in a mutually beneficial relationship among the three dimensions. This entails economic efficiency, social equity, and environmental sustainability. According to Bahamdan and Al-Deeb (2022:173), the achievement of human well-being in the present and future generations is dependent on the prudent utilization and development of natural resources. This involves ensuring the stability and growth of individuals, while also bolstering the economy, which serves as a catalyst for progress. According to Mashkoor et al. (2023:6), it is observed that... The integration of green accounting into the firm's management system is imperative for enhancing its environmental and economic efficacy.In conclusion, the aforementioned is a corporate tactic that seeks to enhance financial, societal, ecological, and technological facets by promoting efficient resource utilization and minimizing emissions and pollution through the adoption of clean energy.

Sustainable Development Dimensions

The concept of sustainable development may be broken down into three primary facets that are all interconnected and mutually supportive:
(Al-Shammari & Jiyad, 2020:8)

1. The economic aspect: The growth of present societies has to be economically sustainable in such a manner that prevents the burden of these expenses from being borne by future generations. The element of time plays a critical role in the process of development, namely in the formulation of strategies and schedules for meeting requirements over extended and varying intervals of time.
2. The Social Dimension: This aspect places the human person at the heart of development and emphasizes achieving that goal as its main aim. It deals with social issues that are brought to light by (social justice, fighting poverty, distributing resources, and providing social services to those who are in need), as well as the necessity of involving individuals in the process of making decisions that affect their lives openly and honestly.
3. The environmental dimension: It is represented in the extent to which the Earth can absorb the waste left by man in exchange for providing his needs for energy and natural resources that require man to carry out his activities without depleting or harming the environment.
4. The technical dimension: the shift toward technology that is both cleaner and more efficient, particularly in developed nations whose industrial operations often result in environmental degradation (Muhammad et al., 2015:351).

Sustainable development Principles

The idea of sustainable development is founded on a collection of guiding principles, which are summarized as follows in this sentence: (Muhammad et al., 2015:343)

- The utilization of the systems approach in formulating and executing sustainable development strategies. The integrated approach aims to sustain the livelihoods of communities across economic, environmental, and social domains while minimizing any detrimental interrelationships between these domains. The utilization of the systems approach in the formulation and execution of sustainable development strategies.
- Public involvement (development from below): by establishing an appropriate kind of decentralization that allows official and popular entities to engage in the planning, execution, and follow-up of development plans. This is accomplished via decentralization.
- The concept of making the most efficient use of an economy's available resources.
- The idea of maximizing the use of one's economic resources via careful and well-planned extension of their useful life.
- The principle of ecological equilibrium and the preservation of biodiversity.
- The notion of maintaining the traits and qualities of nature while simultaneously creating and expanding systems of production, investment, and consumption.

RESULTS AND DISCUSSION

The researchers collected a sample consisting of (60) viewers, the questionnaire was distributed to them, then the data was entered into the statistical program SPSS vr.24 and its results were analyzed. The results drawn by the researchers were represented by the frequencies of the answers, their ratios, the arithmetic mean and the standard deviations for each paragraph of the questionnaire, in addition to finding correlation coefficients and effect coefficients.

The stability and reliability of the questionnaire

Cronbach's alpha coefficient values have been found, which measure the stability and credibility of the questionnaire items, as shown in the table below, as the high values of this coefficient indicate the stability and credibility of the questionnaire used by the researchers:

Table (2) Cronbach's alpha coefficients

Dimension or axis	Paragraph	Alpha-Cronbach
SP	4	0.92
GSC	4	0.83
SGO	4	0.86
EM	4	0.89
GPD	16	0.95
EcD	**4**	**0.88**
SoD	**4**	**0.85**
EnD	**4**	**0.81**
TeD	**4**	**0.82**
SDD	**16**	**0.94**
Total	**32**	**0.97**

Frequencies and general statistics:

Here, the researchers extracted the values of general statistics, such as frequencies, their percentages, arithmetic mean, and standard deviations for all items of the questionnaire, and they were placed in the following table:

Tabel (3) General statistics of the questionnaire items

Item		Strongly dis agree	Dis agree	Undecided	agree	Strongly	Mean	Std. Deviation	CV	Importance	Item		Strongly dis agree	Dis agree	Undecided	agree	Strongly	Mean	Std. Deviation	CV	Importance
SP1	Frequency	0	7	6	19	27	4.12	1.019	25	82	EcD1	Frequency	0	1	10	37	11	3.98	0.656	16	80
	Percent	0	11.9	10.2	32.2	45.8						Percent	0	1.7	16.9	62.7	18.6				

SP2	Frequency	0	6	9	19	25	4.07	0.998	25	81	EcD2	Frequency	5	0	15	31	8	3.63	1.015	28	73
	Percent	0	10.2	15.3	32.2	42.4						Percent	8.5	0	25.4	52.5	13.6				
SP3	Frequency	0	2	10	26	21	4.12	0.811	20	82	EcD3	Frequency	0	5	7	25	22	4.08	0.915	22	82
	Percent	0	3.4	16.9	44.1	35.6						Percent	0	8.5	11.9	42.4	37.3				
SP4	Frequency	0	1	7	35	16	4.12	0.672	16	82	EcD4	Frequency	0	5	17	17	20	3.88	0.984	25	78
	Percent	0	1.7	11.9	59.3	27.1						Percent	0	8.5	28.8	28.8	33.9				
SP	Frequency	0	16	32	99	89	4.1059	0.70130	17	82	EcD	Frequency	5	11	49	110	61	3.8941	0.65687	17	78
	Percent	0.0	6.8	13.6	41.9	37.7						Percent	2.1	4.7	20.8	46.6	25.8				
GSC1	Frequency	0	0	10	37	12	4.03	0.615	15	81	SoD1	Frequency	0	0	7	23	29	4.37	0.692	16	87
	Percent	0	0	16.9	62.7	20.3						Percent	0	0	11.9	39.0	49.2				
GSC2	Frequency	0	0	1	38	20	4.32	0.507	12	86	SoD2	Frequency	0	0	8	15	36	4.47	0.728	16	89
	Percent	0	0	1.7	64.4	33.9						Percent	0	0	13.6	25.4	61.0				
GSC3	Frequency	0	0	6	39	14	4.14	0.571	14	83	SoD3	Frequency	0	0	0	33	26	4.44	0.501	11	89
	Percent	0	0	10.2	66.1	23.7						Percent	0	0	0	55.9	44.1				
GSC4	Frequency	0	0	5	42	12	4.12	0.528	13	82	SoD4	Frequency	0	0	7	15	37	4.51	0.704	16	90
	Percent	0	0	8.5	71.2	20.3						Percent	0	0	11.9	25.4	62.7				
GSC	Frequency	0	0	22	156	58	4.1525	0.36263	9	83	SoD	Frequency	0	0	22	86	128	4.4492	0.38220	9	89
	Percent	0.0	0.0	9.3	66.1	24.6						Percent	0.0	0.0	9.3	36.4	54.2				
SGO1	Frequency	0	4	2	38	15	4.08	0.749	18	82	EnD1	Frequency	0	0	7	16	36	4.49	0.704	16	90
	Percent	0	6.8	3.4	64.4	25.4						Percent	0	0	11.9	27.1	61.0				
SG	Freq	0	0	0	3	2	4.4	0.4	1	8	En	Freq	0	3	0	1	3	4.5	0.7	1	9

O2	uency				5	4	1	95	1	8	D2	uency				7	9	6	49	6	1
	Percent	0	0	0	59.3	40.7						Percent	0	5.1	0	28.8	66.1				
SGO3	Frequency	0	3	2	23	31	4.39	0.788	18	88	EnD3	Frequency	0	0	7	31	21	4.24	0.652	15	85
	Percent	0	5.1	3.4	39.0	52.5						Percent	0	0	11.9	52.5	35.6				
SGO4	Frequency	2	0	2	17	38	4.51	0.858	19	90	EnD4	Frequency	0	1	5	29	24	4.29	0.696	16	86
	Percent	3.4	0	3.4	28.8	64.4						Percent	0	1.7	8.5	49.2	40.7				
SGO	Frequency	2	7	6	113	108	4.3475	0.57426	13	87	EnD	Frequency	0	4	19	93	120	4.3941	0.31556	7	88
	Percent	0.8	3.0	2.5	47.9	45.8						Percent	0.0	1.7	8.1	39.4	50.8				
EM1	Frequency	0	0	13	21	25	4.20	0.783	19	84	TeD1	Frequency	0	0	5	47	7	4.03	0.454	11	81
	Percent	0	0	22.0	35.6	42.4						Percent	0	0	8.5	79.7	11.9				
EM2	Frequency	0	0	17	12	30	4.22	0.872	21	84	TeD2	Frequency	0	0	0	46	13	4.22	0.418	10	84
	Percent	0	0	28.8	20.3	50.8						Percent	0	0	0	78.0	22.0				
EM3	Frequency	0	1	1	25	32	4.49	0.626	14	90	TeD3	Frequency	0	0	8	33	18	4.17	0.647	16	83
	Percent	0	1.7	1.7	42.4	54.2						Percent	0	0	13.6	55.9	30.5				
EM4	Frequency	0	0	6	30	23	4.29	0.645	15	86	TeD4	Frequency	0	0	13	32	14	4.02	0.682	17	80
	Percent	0	0	10.2	50.8	39.0						Percent	0	0	22.0	54.2	23.7				
EM	Frequency	0	1	37	88	110	4.3008	0.52477	12	86	TeD	Frequency	0	0	26	158	52	4.1102	0.35741	9	82
	Percent	0.0	0.4	15.7	37.3	46.6						Percent	0.0	0.0	11.0	66.9	22.0				

It is clear from the above table and according to the values of frequencies and percentages that the sample tends to agree and strongly agree with the paragraphs of the questionnaire and the following figures show the values of relative importance for each paragraph of the dimensions of the questionnaire:

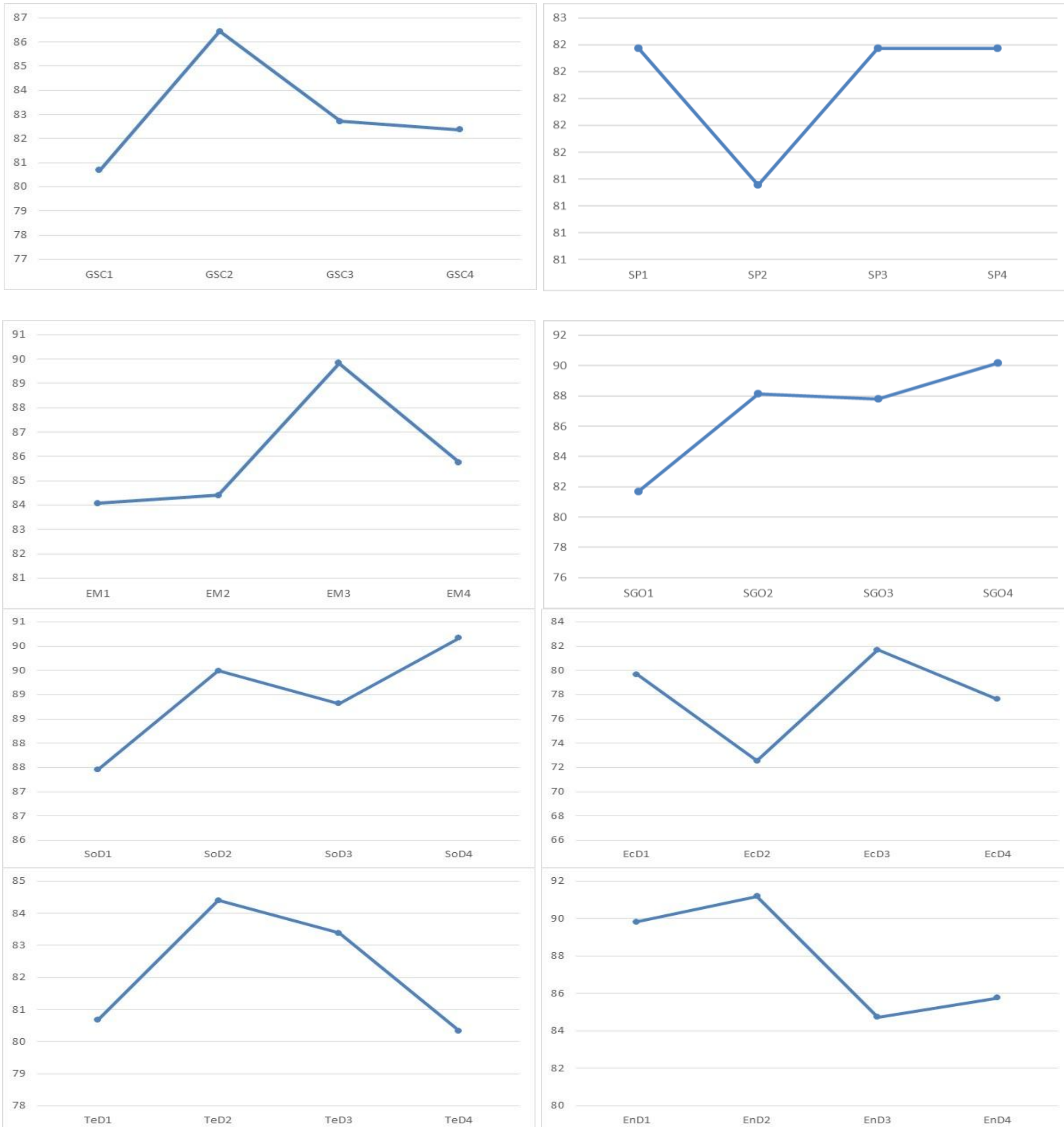

Figure (1) Values the relative importance of the dimension paragraphs

Confirmative factor analysis of the questionnaire axes

Here, the confirmatory factor analysis will be used to form a model constructive diagram intended for analyzing the paragraphs of the questionnaire based on the regression weights estimated through it. The accuracy of the model will also be measured through some criteria such as the ratio of the chi-square value to the degree of freedom and (comparative fit index) CFI, (Tucker-Lewis index) TLI, and (root mean square error of approximation) RMSEA, where their values were found and included in the following table, and through them it turns out that the paragraphs can measure the dimensions and their axes.

Table (4) Standards and decisions in accepting or rejecting models

	SDD			GPD		
Parameter	Parameter Value	Comparison	Decision	Parameter Value	Comparison	Decision
X^2/ df	449.622/98=4.58	Less than 5	Accepted	443.842/98=4.52	Less than 5	Accepted
CFI	0.87	More than 0.50	Accepted	0.85	More than 0.50	Accepted
TLI	0.84	More than	Accepted	0.82	More than 0.50	Accepted

		0.50				
RMSEA	0.00	Less than 0.08	Accepted	0.00	Less than 0.08	Accepted

The structural diagram of the questionnaire axes was built using the AMOS statistical program, as shown in the following two figures:

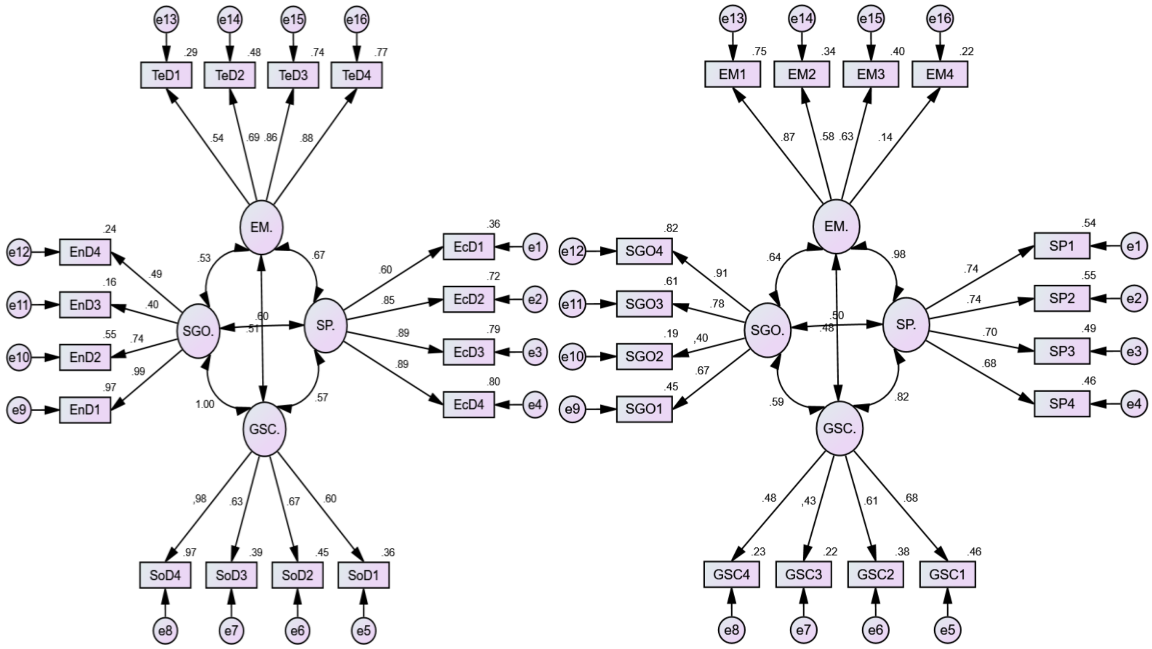

Figure (2)The schematic diagram of the axes

The standard regression weights show that there is a different interpretation between the paragraphs of dimensions and axes, and thus they contribute to the interpretation of those dimensions and axes according to their regression values. The following table includes these weights.

Table (5) Standard regression weights for each of the paragraphs

Item	SP1	SP2	SP3	SP4	GSC 1	GSC 2	GSC 3	GSC 4	SGO 1	SGO 2	SGO 3	SGO 4	EM 1	EM 2	EM 3	EM 4
Estimate	0.735	0.744	0.703	0.68	0.675	0.613	0.434	0.478	0.67	0.402	0.779	0.907	0.866	0.585	0.632	0.443
Item	EcD 1	EcD 2	EcD 3	EcD 4	SoD 1	SoD 2	SoD 3	SoD 4	EnD 1	EnD 2	EnD 3	EnD 4	TeD 1	TeD 2	TeD 3	TeD 4
Estimate	0.603	0.848	0.891	0.892	0.596	0.667	0.626	0.979	0.987	0.743	0.399	0.486	0.537	0.69	0.857	0.877

Correlations and their significance

The researchers found the values of the correlations and their significance between the two axes of the research, and the significance of those correlations was tested by formulating the following null hypothesis (there is no significant correlation between the two axes of the study under the significance level of 5%) against the following alternative hypothesis (there is a significant correlation between the two axes of the study Below the 5% significance level, the correlation values are shown in the following table:

Table (6) The relationship between the two axes of the study

Correlations						
		SP	GSC	SGO	EM	GPD
EcD	Pearson Correlation	.611**	.651**	.731**	.672**	.734**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	59	59	59	59	59
SoD	Pearson Correlation	.715**	.625**	.761**	.677**	.776**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	59	59	59	59	59
EnD	Pearson Correlation	.783**	.704**	.853**	.758**	.863**

	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	59	59	59	59	59
TeD	Pearson Correlation	.446**	.780**	.548**	.398**	.574**
	Sig. (2-tailed)	.000	.000	.000	.002	.000
	N	59	59	59	59	59
SDD	Pearson Correlation	.718**	.760**	.815**	.713**	.828**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	59	59	59	59	59
**. Correlation is significant at the 0.01 level (2-tailed).						

Through the results, we notice that the correlation between the GPD axis and the SDD axis amounted to 0.828, which is a statistically significant value under the level of significance of 5%, thus rejecting the null hypothesis and accepting the alternative hypothesis, and we conclude that there is a direct and significant correlation between the GPD axis and the SDD axis under the level of significance of 5%.

Concerning the correlation between the dimensions of the GPD axis and the SDD axis, we conclude that there is a direct and significant correlation between the SP dimension and the SDD axis under the 5% level of significance, where the correlation value between them was 0.718, and we conclude that there is a direct and significant correlation between the GSC dimension and the SDD axis under the 5% level of significance, where The value of the correlation between them was 0.760. We also conclude that there is a direct and significant correlation between the dimension SGO and the SDD axis under the level of significance of 5%, where the value of the correlation between them was 0.815. Between them is 0.713. The following graph shows the correlation values in the above table.

Figure (3) The relationship between the two axes of the study

The effect of the GPD axis and its dimensions on the SDD axis

Here the effect of the GPD axis and its dimensions in the SDD axis was investigated, and the main null hypothesis of the effect of the GPD axis in the SDD axis is:

H0: There is no significant effect of the GPD axis on the SDD axis.

Against the alternative hypothesis:

H1: There is a significant effect of the GPD axis on the SDD axis.

As for the sub-hypotheses, there are four hypotheses:

The first null sub-hypothesis:

H0: There is no significant effect of the SP dimension in the SDD axis.

Against the alternative hypothesis:

H1: There is a significant effect of the SP dimension in the SDD axis.

The second null sub-hypothesis:

H0: There is no significant effect of the GSC dimension in the SDD axis.

Against the alternative hypothesis:

H1: There is a significant effect of the GSC dimension in the SDD axis.

The third zero sub-hypothesis:

H0: There is no significant effect of the SGO dimension in the SDD axis.

Against the alternative hypothesis:

H1: There is a significant effect of the SGO dimension in the SDD axis.

Fourth null sub-hypothesis:

H0: There is no significant effect of the EM dimension in the SDD axis.

Against the alternative hypothesis:
H1: There is a significant effect of the EM dimension in the SDD axis.
The results extracted from the data of the studied sample are presented in the following table:

Table (7) represents the results of the impact analysis

dependent variable	Independent variable	Coefficient	F- Test	F-Test Significance	Effect Parameter	T - Test	T-Test Significance
SDD	SP	%52	60.504	.000	.718	7.778	.000
	GSC	%58	77.749	.000	.760	8.818	.000
	SGO	%66	112.527	.000	.815	10.608	.000
	EM	%51	59.084	.000	.713	7.687	.000
	GPD	%69	124.260	.000	.828	11.147	.000

Through the above table, it is clear that there is a direct and significant effect of the GPD axis on the SDD axis, where the value of the determination coefficient was 69%. This means that the model used is able to explain the differences by 69%. The F test value was (124.260), which is a significant value under the 5% significance level. As for the value of the effect parameter, it amounted to 0.83, and its t-test was 11.147, which is a significant value below the 5% level and indicates the existence of a significant direct effect, from which we conclude that an increase in the value of the GPD axis by one unit leads to an increase in the value of the SDD axis by 0.83.

There is a direct and significant effect of the SP dimension in the SDD axis, where the value of the coefficient of determination was 52%, which means that the model used is able to explain the differences by 52%. The value of the F test was (60.504), which is a significant value under the 5% significance level. As for the value of the effect parameter, it amounted to 0.72, and its t-test was 7.778, which is a significant value below the 5% level and indicates the existence of a significant direct effect, and from it we conclude that an increase in the value of the SP dimension by one unit leads to an increase in the value of the SDD axis by 0.72.

There is a direct and significant effect of the GSC dimension in the SDD axis, where the value of the coefficient of determination was 58%, which means that the model used is able to explain the differences by 58%. The value of the F test was (77.749), which is a significant value under the 5% significance level. As for the value of the effect parameter, it amounted to 0.76, and its t-test was 8.818, which is a significant value below the 5% level and indicates the existence of a significant direct effect, and from it we conclude that an increase in the value of the GSC dimension by one unit leads to an increase in the value of the SDD axis by 0.76.

And the existence of a direct and significant effect of the SGO dimension in the SDD axis, where the value of the coefficient of determination was 66%. This means that the model used can explain the differences by 66%. The value of the F test was (112.527), which is a significant value under the 5% significance level. As for the value of the effect parameter, it amounted to 0.82, and its t-test was 10.608, which is a significant value below the 5% level and indicates the existence of a significant direct effect, and from it we conclude that an increase in the value of the SGO dimension by one unit leads to an increase in the value of the SDD axis by 0.82.

There is a direct and significant effect of the EM dimension in the SDD axis, where the value of the coefficient of determination was 51%, which means that the model used is able to explain the differences by 51%. The value of the F test was (59.084), which is a significant value under the 5% significance level. As for the value of the effect parameter, it amounted to 0.71, and its t-test was 7.687, which is a significant value below the 5% level and indicates the presence of a significant direct effect, from which we conclude that an increase in the value of the EM dimension by one unit leads to an increase in the value of the SDD axis by 0.71.

The following graph shows the effect of the GPD axis and its dimensions on the SDD axis, depending on drawing the t-test values for it:

Figure (4) It shows the t-test values for the effect of GPD and its dimensions on SDD

It is clear from the figure that the strongest effect on the SDD axis was for the SGO dimension, followed by the GSC dimension, thirdly the SP dimension, and finally the EM dimension.

CONCLUSION

Through the previous results, the researchers reached a set of conclusions, the most important of which are:

High values of Cronbach's alpha indicate the stability and reliability of the questionnaire used by the researchers. The sample tends to agree strongly with the items of the questionnaire. The results of the confirmatory factor analysis, based on the standard regression weights, showed that there is a different interpretation between the paragraphs of dimensions and axes, and thus they contribute to the interpretation of these dimensions and axes according to their regression values. We conclude that there is a direct and significant correlation between the GPD axis and the SDD axis at the 5% level of significance. So We conclude that there is a direct and significant correlation between the SP, GSC, SGO, and EM dimensions and the SDD axis under the 5% level of significance.

We conclude that an increase in the value of the GPD axis by one unit leads to an increase in the value of the SDD axis by 0.83. As well as increase in the value of the SP dimension by one unit leads to an increase in the value of the SDD axis by 0.72. and to increase in the value of the GSC dimension by one unit leads to an increase in the value of the SDD axis by 0.76. and to increase in the value of the SGO dimension by one unit leads to an increase in the value of the SDD axis by 0.82. and to increase in the value of the EM dimension by one unit leads to an increase in the value of the SDD axis by 0.71.

The strongest effect on the SDD axis was the SGO dimension, followed by the GSC dimension, thirdly the SP dimension, and finally the EM dimension.

Therefore it must

-The factory must abandon traditional technology and move towards advanced technology that guarantees the improvement of its operations and the definitive disposal of waste through its recycling in a way that guarantees environmental protection and rationalization of consumption.

-Establishing the importance of environmental protection in a way that enhances the factory's ability to deal with various environmental issues effectively.

-The need to be aware of the preparation and formation of production processes to improve compliance with global environmental principles and directives.

-Ensure that green production processes are invested in a way that results in environmentally friendly and safer products.

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Appendix (1) Questionnaire form

First: Green Production Dimentions

1. Sustainable Production (SP)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely
1	The factory works to meet the needs of existing customers, not at the expense of depleting resources to meet the needs of prospective customers.					
2	The factory seeks to manufacture our products with as few resources as possible.					
3	The factory tries to use renewable energy sources.					
4	The factory works on sustaining the natural resources involved in the production processes.					

2. Green Supply Chain (GSC)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely
1	The factory stores the products in warehouses designed according to scientific methods that reduce time and movement to the lowest level when transporting them.					
2	The factory sometimes contracts with suppliers and customers and completes deals through the use of modern means of communication without the need to use means of transportation that result in emissions harmful to the environment.					
3	The least expensive method is chosen when shipping goods.					
4	In the factory, the final product is delivered to customers by means of transportation that adopt environmentally friendly fuels.					

3. Sustainable Green Operations (SGO)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely
1	The factory recycles many materials that were previously used as inputs to produce the new product.					
2	Work on product design according to environmental design methods.					
3	The factory uses many processes that treat volatile pollutants during production operations, such as the use of precipitators.					
4	The factory treats waste that cannot be used in the future in landfills that do not leave a negative impact on the environment.					

4. Environmental Management (E.M)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely
1	The factory is committed to preserving the environment.					
2	We work according to the ISO 14000 series of environmental management standards.					
3	The factory's philosophy is that it can contribute to environmental protection.					
4	The factory uses a tool to analyze the pattern and effect of environmental failure to preserve the environment.					

Second: Sustainable Development Dimensions

1. Economic Dimension(Ec.D)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely

1	The factory is making profits by using less resources.					
2	The factory works to provide services at lower costs.					
3	The factory relies on economic models to achieve sustainability.					
4	The factory is keen to rationalize energy consumption.					

2. Social Dimension(So.D)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely
1	The factory takes into account fairness in the distribution of wages.					
2	Our factory seeks to meet the needs of the community in which it operates.					
3	Constant search for customers' changing desires.					
4	The factory provides industrial security requirements for workers.					

3. Environmental Dimension(En.D)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely
1	Take measures that allow controlling emissions resulting from the production process.					
2	The factory develops programs for activities with serious environmental impacts.					
3	Directing human resources to ensure sound environmental management.					
4	The factory works to reduce pollution by using clean materials (environmentally friendly).					

4. Technological Dimension(Te.D)

NO	Paragraphs	completely agree	Agreed	agreed to some extent	do not agree	do not agree completely
1	Our factory works to reduce pollution by using environmentally friendly energy.					
2	The factory works to reduce pollution by using clean technology.					
3	Our factory produces environmentally friendly products, which reduces the negative impact on the environment.					
4	The factory recycles its products after they are used up.					