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The Impact of Sustainability to Strengthen the Competitiveness of Industrial Companies

Dr. Basman J. Mazahrih
Faculty of Administrative and Financial Sciences, Accounting Department, Philadelphia University, Amman Jordan
E-mail: bmazahrih@philadelphia.edu.jo

Dr. Haider Baniata
Faculty of Administrative and Financial Sciences, Accounting Department, Philadelphia University, Amman Jordan
E-mail: hbaniata@philadelphia.edu.jo

Dr. M- Hael A. Ghafeer
Faculty of Administrative and Financial Sciences, Accounting Department, Jerash University, Jerash, Jordan
E-mail: al-alordhael@hotmail.com

Abstract
This paper deals with the sustainability dimension as one of the contemporary strategic tools in evaluating the industrial companies performance. Also, this study explores the application of sustainability dimension and its impact on achieving the success in the competitive field of industrial companies. Coping with the growing dynamics of the competitive society in which companies operate and ensuring the strengthening of the competitiveness of the companies have become challenging issues.Despite significant research interest in the field of sustainability, an extensive review of the literature revealed no substantive evidence of attention being paid to the impact of sustainability to strengthen the competitiveness of industrial companies. In addition, there has been little work done in this field of study.This study contributes to knowledge concerning the impact of sustainability on competiveness. It does this by improving understanding of industrial companies roles and responsibilities and how this intersects with stakeholders expectations.The research problem can be formulated in the following question: Does the application of the sustainability dimension affect strengthening the competitiveness?".This paper depends on an exploratory study by scanning the field for several companies in the engineering industries sector in Syria by using a questionnaire to determine the impact of sustainability performance on strengthening competitiveness.
The most important findings of the research are:

- There is a very good positive and direct correlation between the sustainability and enhancing cost advantage.
- There is a strong positive and direct correlation between the sustainability and enhancing quality advantage.
- There is a good positive and direct correlation between the sustainability and enhancing environmental advantage.

Keywords: Sustainability dimension, environmental advantage, competitive advantage, quality advantage, cost advantage

1. Introduction

The rapid developments in the modern production society, such as increased local and international competition, the speed of technological progress, the diversity of customer needs, and the short product life cycle, have showed inadequate traditional and management evaluation performance methods to cope with these developments, therefore, they impose new dimensions to the concepts of cost, the content of the measurement accuracy, and cost comparisons methods.

Those factors have led to the emergence of measuring sustainability performance as one of the strategic performance tools, which focuses on the hidden side of profitability, exemplified by the cost resulting from reducing the cost and rationalization of expenditure, provided that it is done from a strategic perspective that leads to the creation of greater value for the society; because adding extra value to society is considered a strategic goal which is achieved through integration of the financial and sustainability activities.

Therefore, this research deals with measuring sustainability performance method as one of the strategic management evaluation performance tools, their impact on achieving success in the competitive field of industrial companies, achieving competitive advantages through the company to outdo competitors' capabilities, coping with the growing dynamics of the competitive society's in which they operate, and ensuring the

strengthening of the competitiveness of the company.

2. Research problem

The research problem is the inability of many companies in the modern production society to achieve strategic goals, and therefore the research problem can be formulated in the following question: "Does the application of the sustainability dimension affect strengthening the competitiveness?"

3. The importance of the research

Theoretically, the importance of the research comes from the following aspects:

- Managerial needs for comprehensive and integrated information on all aspects of performance and costs associated with it to be able to run it in a way that leads to strengthening competitiveness.

- The growing importance of measuring sustainability performance as a way to manage cost and profit.

Practically, the importance of the research stems from the following aspects:

- The need for the application of the research topic in the light of the increasing competition and rapid changes in the modern production world society, and the most important, the technological development and its impacts on the reality of the industrial society in Syria, particularly in the sector of engineering industries.

- The importance of the engineering industries sector which forms 53% of the total industrial production sectors in Syria, according to the statistics of the Ministry of Industry. The industrial sector consists of four basic sectors: engineering industry sector, chemical industry sector, food industry sector and textile industry sector. In addition, the engineering sector is considered as one of the most sectors dependent on modern and advanced methods in the field of manufacturing and information systems.

4. Research objectives

Every successful management of any company should maintain competitive advantages, which are based on a unique strategy, because the strategic management of the cost oversees the success of the competitive company in the long term. So, the objectives of the research are to study the impact of the application of sustainability dimension on strengthening competitiveness.

5. Research hypotheses

Based on the research problem, importance and objectives, the research hypotheses were formulated in the following form:

There is not a significant correlation between the sustainability dimension and strengthening competitiveness.

Ramifications for this hypothesis are the following sub-hypotheses:

- There is not a significant correlation between the sustainability dimension and enhancing cost advantage.

- There is not a significant correlation between the sustainability dimension and enhancing quality advantage.

- There is not a significant correlation between the sustainability dimension and enhancing environmental advantage.

6. Research Methodology

The researcher, in the light of the importance, objectives and hypotheses, depends on the descriptive analytical methods in the preparation of the research as follow:

- The first approach is based on extrapolation and analysis of literature (books, letters, Arab and foreign periodicals and researches on the international information network) related to the intellectual aspects of the research for the purposes of rooting scientific research topic.

- The second approach is based on devising a general framework for the subject of the research

supporting the requirements of the application.

The researcher also depends on an exploratory study by scanning the field for several companies in the engineering industries sector in Syria by using a questionnaire to determine the impact of sustainability dimension on strengthening the competitiveness of companies.

7. Research limits

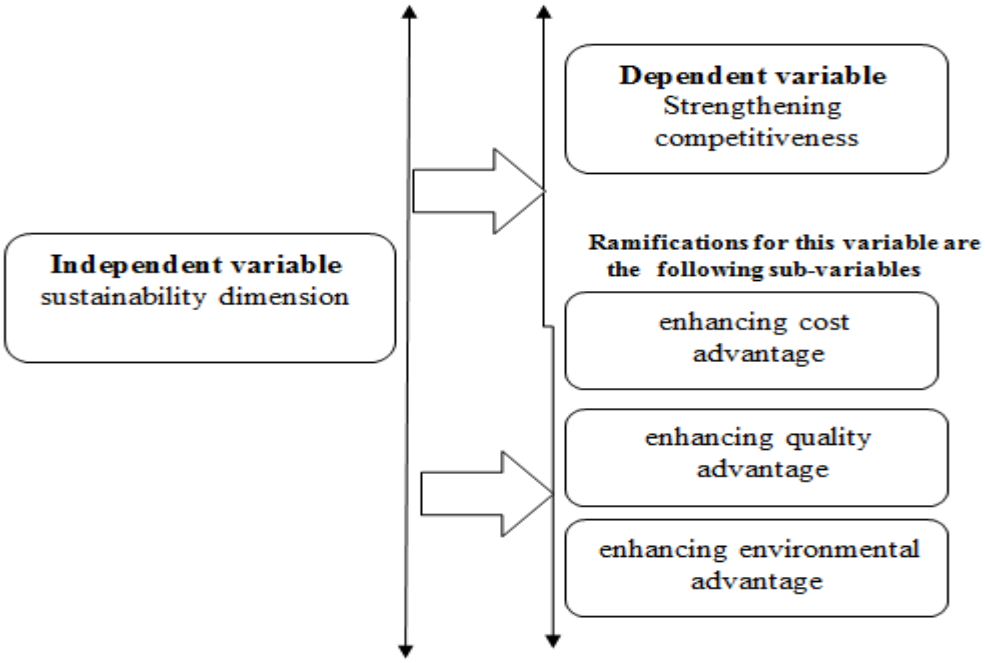
The research limits include a range of spatial and technical limits as follows**:**

- Spatial limits: the field study was conducted on private engineering industries sector in the provinces of Damascus Countryside and Aleppo, whose capital exceeds 200 million Syrian pounds.

- Technical limits**:** the field study was limited to a variable of strengthening the competitiveness of only three variables, namely (enhancing cost advantage, enhancing quality advantage and enhancing environmental advantage).

8. Research model

Based on research problem the model is illustrated by the dependent and independent variables as follows:



Source: prepared by the researcher

9. Previous studies

There is a critical link between economic development and sustainability performance. Development activities often require exploitation of natural resources, but these resources are limited. With the remarkable growth in the global economy over the last few decades, there are a number of pressing constraints on development, and entrenched problems, such as, economic disparity and poverty, over-consumption of resources and environmental deterioration, pollution and contamination (Fenchel et al., 2003; Coulson and Monks, 1999; Jeucken, 2001). These issues prompted people to carefully rethink how to protect this unique planet - the Earth - and led to the recent development of the concepts of sustainability and SD.

Sustainability and SD are often used interchangeably, but sometimes as different concepts. Therefore, it is essential to clarify the two concepts. This study aligns with Bebbington and Gray (2000) in distinguishing between the two terms. Sustainability is conceptualized as a state or, according to Sikdar (2004), as a goal, while SD is a process of human actions to achieve and maintain that state or goal. However, from a business perspective and application, Isaksson and Garvare (2003) argue that SD represents a modified version of the triple bottom line concept. This concept is often used to indicate different types of companies performance measures, including the three dimensions, namely, financial, environmental and sustainability performance (Elkington, 1998).

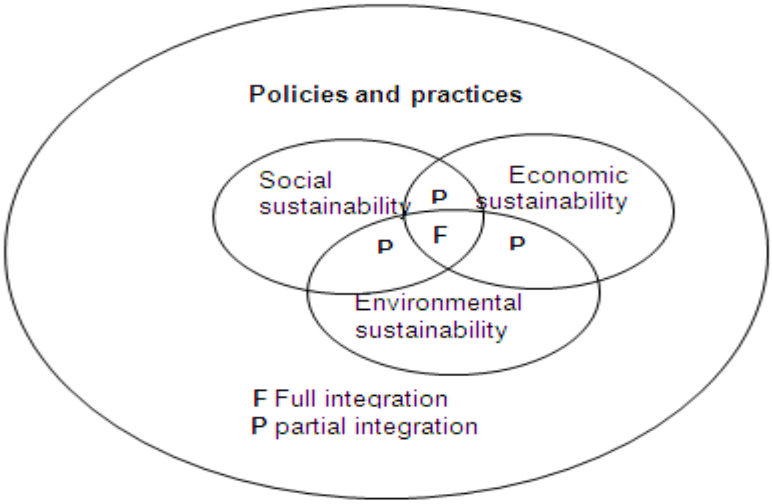
Widespread use of the term SD began in the early 1970s in association with the UN Conference on Human Environment in Stockholm in 1972. The most enduring definition of SD was formulated in 1987, in what is called the Brundtland Report, by the UN World Commission on Environment and Development (WCED) led by Gro Harlem Brundtland of Norway. This report defined SD as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"[1]. Thus, the wisdom of SD is to restrain the rate of use of natural resources in order to keep enough for future generations and fulfil their needs (Sikdar, 2004). In addition, this definition, if adopted by business, offers a way of reconciling economic and environmental objectives by incorporation of environmental concerns into business operations. Since 1987, scholars and corporate management have been asking why and how corporations should incorporate environmental concerns into strategic decision making (Sharma and Vredenburg, 1998). Thus, the Brundtland Report postulates a positive role for corporations in furthering the cause of environmental protection and raises the management of environmental concerns to a strategic issue (Sharma and Vredenburg, 1998). Furthermore, this research is informed by two other relevant definitions of SD that are commonly used. They are:

"Creating long-term shareholder value by embracing opportunities and managing risks derived from economic, environmental and sustainability developments" (Environmental Law Advisory, 2004); and
"Evaluating business from a triple bottom line perspective - incorporating economic, environmental and sustainability value issues into decision-making" (Environmental Law Advisory, 2004).

These definitions have created interest and generated debate. Many agree that defining SD is difficult and does not provide sufficient information for implementation (Callens and Wolters, 1998; Sikdar, 2004; Epstein and Roy, 2003). For example, Ekins and Vanner (2007) are of the opinion that no one form of sustainability strategy suits all sectors. In addition, Callens and Wolters (1998) argue that although definitions of SD are still vague and incomplete, what is important is to understand and observe the underlying determinants of sustainability. In their opinion this vagueness is often due to using general terms and the discipline (or lack of it) of the researchers. In addition, Epstein and Roy (2003) criticize Brundtland's definition describing it as 'macroeconomic' and saying it does not provide sufficient information on how this concept should be operationalized at the company level. They also point out that managers still question how to implement, improve and measure corporate progress towards sustainability.

Difficulties with definitions and precision have led to scholarly debate. Consequently, two major advances were developed to address the criticism of SD definitions. First, attempts have been made to make SD more specific. In trying to solve this dilemma of general terminology, some authors (Dyllick and Hockerts, 2002; Sikdar, 2004) try to select precise consensual elements to give some direction by identifying the indicators of sustainability and disclosing them. This view has been expressed as an illustration of the overlapping ellipses indicating that the three pillars can be mutually reinforcing in the following figure.

The interaction of the three pillars of sustainable development



Source: Adapted from Dyllick and Hockerts, 2002; Sikdar, 2004

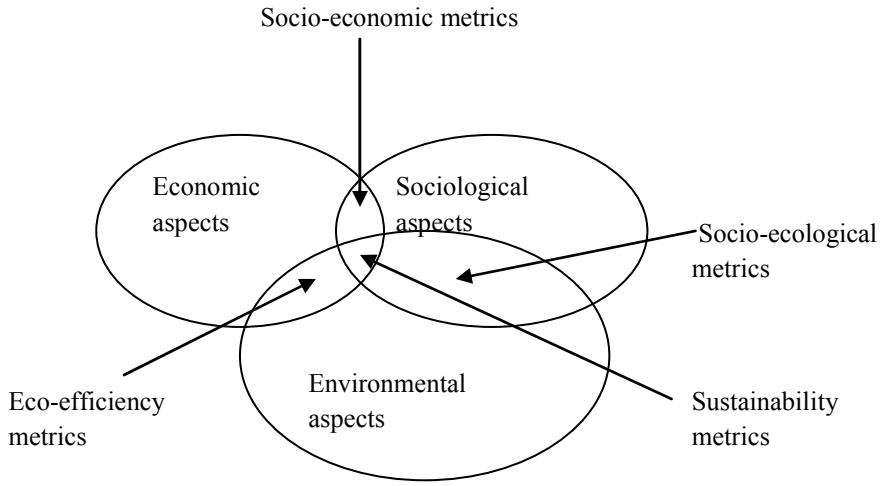
The above figure presents the concept of SD as the integration of sustainability, economic and environmental

[1] http://www.un-documents.net/ocf-02.htm.

objectives as that they are complementary and interdependent. A sustainable business seeks a better quality of life for its stakeholders while maintaining nature's ability to function over time by minimizing waste, preventing pollution, promoting efficiency and developing resources to revitalize the economy. Decision-making in a sustainable business stems from shared information among stakeholders. A sustainable business resembles a living system in which human, natural and economic elements are interdependent and draw strength from each other. This suggests that the three pillars of SD should be integrated wherever possible and mutually supported by sustainable policies and practices (Sharma and Vredenburg, 1998; Elkington, 1998). SD has been articulated by some authors as a balance between economic prosperity, environmental protection and sustainability equity (Elkington, 1998; Pearce and Warford, 1993; Lynn, 1994).

Sustainability requires decision-makers to consider the needs of future generations and integrate economic, environmental and sustainability dimensions into business operations. The decision-making process requires identifying the elements in each of the three pillars to effectively assess their contribution to sustainability as illustrated in the following figure.

The intersecting circles to illustrate utilizing sustainability metrics



Source: Sikdar, 2004

Therefore, some scholars suggest sustainability metrics to facilitate the integration process, measure the value for sustainability, and characterize progress towards sustainability (Morse et al., 2001; Sikdar, 2004). Sikdar (2004) supports using metrics to identify specific indicators to minimize the uncertainty of the broad applications of SD aspects. Each metric contains a number of indicators to measure the behavior of a system or an entity or an company.

The challenge for implementing SD is not only integration and measurement of indicators but also the belief in sustainability as a beneficial goal for the business. Sharma and Vredenburg (1998) contend there are three streams of literature regarding the concept of implementing and measuring SD, and the belief in sustainability as a useful target. The first stream has focused on redefining the broad meaning of the concept SD, but, in fact, the literature says little about how a SD model can affect a firm's competitiveness. The second stream of writers has cautioned that the implementation of SD may be hazardous for financial performance, but useful for engaging in environmental protection, as long as environmental practices have paybacks within an economic timeframe. Finally, the third stream of literature attempts to demonstrate how firms adopting sustainability and environmental strategy might gain a competitive advantage (Dowell, Hart and Yeung, 2000; King and Lenox, 2001; Klassen and Mclaughlin, 1996). The third stream relies primarily on case studies and academic surveys to support their arguments. Sharma and Vredenburg (1998) noted that the validity of the hypothesized linkages between the financial, sustainability and environmental performance were seen to have implications for a firm's competitiveness. The fundamental requirement for implementing SD in this regard is that effective sustainability measurement should consider the complete triple bottom line of economic, environmental, and societal performance (Bennett and James, 1998). These aspects need to be integrated and balanced, in order to obtain a comprehensive understanding of a sustainable product or service from the perspective of different stakeholders (Dyllick and Hockerts, 2002).

10. The theoretical framework for research

10.1The sustainability dimension concept

Due to increased sustainability responsibility and then the magnitude of sustainability commitments, which constitute a significant portion of the total commitments of the facilities, and the increasing lawsuits won by the owners against a lot of facilities that its operations cause harm to the society , in addition to the persistence of sustainability awareness among members of the community, it seems that interested community and stakeholders oversee the facility's financial and non-financial performance, so that they can assess the sustainability responsibility of the facility in an objective manner, which in turn, affects the decisions of investors. Also, the demand by managements for this information is increased in order to reveal the extent of the entity's ability to achieve the objectives of the strategy which are to provide a high quality product at a reasonable price and without harming the society (the production of sustainability friendly products).

So, some researchers believe that another dimension should be added which is the sustainability dimension, whereas this dimension answer the following question : how does the sustainability community evaluate us ? The importance of this dimension is the need for establishing the facility's responsibility towards the society in which it operates. Perhaps, while producing products, the facility generates some harmful activities to the society , a so-called " lost introvert at risk," On the other hand, it may be that the product itself has some harmful side effects to consumers , so the established behavior of the firm will be influenced by the sustainability sensitivity of those who deal with the facility, or buy its products (product responsibility).

While facilities recognize the importance of the sustainability dimension, the need for the formation of sustainability management systems and the need to consider the costs associated with sustainability activities on the budget, but many still unaware to the sustainability of enterprises as being in charge, in addition to a lack of tools established to manage and control efforts for sustainability.

The assessment of sustainability performance is defined as a method to facilitate decision making by managements about the sustainability performance by choosing specific indicators, data collection and analysis, evaluation of information in accordance with the standards of sustainability performance, reporting, information delivery and periodic inspection , and ultimately the development of this method or approach.

The importance of assessing the enterprise performance, from the sustainability point of view, is based on the ground, that it has become a requirement under the laws to reduce costs, whether it is relevant to its activity or as a result of its sustainability responsibility, and this is done by setting goals that lowers the cost and impact on the society in order to win customer satisfaction and to establish a good reputation in the community.
The importance of the sustainability dimension is to achieve the following objectives:

- Businesses should support and respect the protection of internationally proclaimed human rights
- Businesses should make sure they are not complicit in human rights abuses
- Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining
- Businesses should uphold the elimination of all forms of forced and compulsory labor
- Businesses should uphold the effective abolition of child labor
- Businesses should uphold the elimination of discrimination in respect of employment and occupation
- Businesses should work against corruption in all its forms, including extortion and bribery
- Businesses should assess the products and services responsibility concerning the products and services that directly affect stakeholders and customers health and safety
- Businesses should be involved voluntarily in sustainability activities that create more loyalty among stakeholders to companies. Some activities may include but not limited to:
    - Subscribing in charitable associations
    - Participating in chartable educational activities

- Providing scholarships and support researches
- Availability of qualified staff and pursuing an ambitious sustainability posts
- The imposition of principles and proper sustainability behavior on the staff
- Commitment of workers and officials toward maintain safety and environment

This paper suggests that sustainability performance should become a key element in the strategy established to achieve a balanced performance. There is thus a need to add a sustainability dimension to the balanced performance measurement method. Therefore, it is necessary to stretch the concept of performance evaluation to consider the sustainability performance as well. Consequently, in order to boast the firm's performance, an integration of social, economic and operational performance becomes a necessity.

10.2 The concepts of competitiveness, competitive advantage and enhancing the competitive advantage:
The competitiveness is defined as the skill, technique or the outstanding source which allow company to produce values and benefits for customers more than what the competitors can offer, and emphasizes its excellence and difference from those competitors' point of view who accept this difference and excellence because it brings them more benefits and values that are superior to what other competitors offer them.

The competitive advantage is defined as: the superiority of the company to competitors, resulting from the exploiting of the essential competences of the company in creating greater values in the form of low prices or unique advantages that satisfy the customers' needs and achieve their satisfaction.

The enhancing of competitive advantage is defined as: prolonging the usefulness of the application of a unique strategy to maximize the value, through acquiring competitive advantages which are difficult for competitors to be imitated.

The researcher believes that the enhancing competitive advantage requires the usage of the company strengths and unique capabilities to achieve the following:

- Defending the company against the cases of imitation to its competitive advantage by other companies.
- Maintaining the current competitive advantages and developing them.

10.3Competitive advantages
There were many writers' and researchers' perspectives in identifying competitive advantages which can be clarified in table (1):
Table (1) competitive advantages, according to the view of some writers and researchers:

Table No. (1): the target sample, and the actual sample

Study	History	Competitive advantages
Wheelwright	**1987**	Low cost, superior quality, reliability of delivery
Koufteros et al	**1997**	Competitive pricing, quality value to the customer, delivery reliability and product innovation
Holweg	**2005**	Low-cost, quality, delivery reliability, and the timing of company to entry into the market
Albakri	**2008**	Cost, quality, flexibility and delivery
Dacey	**2007**	Low-cost, quality, speed of response to customers, response time and innovation
Alissa	**2009**	The lowest price, quality of service, responsiveness to customers
Altami	**2009**	Cost, quality, time, flexibility, service, environment

Source: prepared by the researcher.

The researcher believes that the difference of competitive advantages is due to the difference in the time period of each study and the different sectors that are being studied, and the study in this research will be limited to the competitiveness through the following competitive advantages:

- **Cost advantage**

This advantage relies on the ability of the company to provide service or goods at low cost compared to competitors and as a result getting a larger market share to the company.

- **Quality advantage**

The product quality is not just the removal of defects and shoddy, but it is an opportunity to search for a new method that adds a higher and greater value than the customers' expectations. It adds another burden which determines the customers' demands.

- **Environment advantage**

The environment advantage is one of the modern and important competitive advantages in light of the great interest in the environment, because there is a responsibility of the companies of what might impact the environment from the exercise of their activities, whether damages visible or invisible. Concern for the environment one of the company's responsibilities under laws relating to environment and which obliges companying certain obligations that it fulfilled.

In addition to the growing expectations of the community and the regional and international levels on the company focusing on providing goods and environmentally friendly products.

The enhancing environment advantage includes several directions as follows:

- Operations and environmentally friendly products.
- Reducing waste and environmental responsibility.

11. The field study

11.1 Research community

The research community consists of directors of the following departments**:** public administration of the company, financial management, human resource management, production management and sales management in the companies of the engineering industries sector in Syria. The reason for choosing these departments is that they are the most important key departments in the company and which have a direct relationship in

- The development of policies and strategies and monitoring their implementation.
- Product development and improving their quality.
- Study the market and competitors, customers' preferences and the extent of their satisfaction with company products.

11.2 Sample research

A random sample of 265 people, spread over (53) companies operating in each of the provinces of Damascus Countryside and Aleppo was withdrawn. Five questionnaires were distributed in each company. The number of distributed questionnaires was (265), (224) questionnaires were restored, the other (21) questionnaires were excluded because of the lack of validity of the analysis, and therefore only (203) questionnaires were used in the analysis according to table (2):

Table No. (2): the target sample, and the actual sample

Number of questionnaires distributed	265
Number of questionnaires restored	224
Number of questionnaires excluded	21
Number of questionnaires used in the analysis	203

Source: prepared by the researcher

As it is shown in the above table, that the response rate has amounted to approximately 77% (203/265), this ratio is considered suitable for statistical analysis and a realistic outcome.

11.3 The characteristics of the research sample (descriptive statistics)

The researcher displays in this part the personal characteristics of the respondents of the sample which are based on their answers to the questions contained in the questionnaire within a paragraph of public information in terms of age, educational attainment, specialization and number of years of practical experience as follows:

A- **Sample distribution according to age group**

Table (3) the sample distribution according to age group through the frequencies and percentage.

Age group	frequency	Percentage
30 years old and younger	21	%10.3
from 31 to 40 years	103	50.7%
from 41 to 50 years	46	22.7%
older than 50 years	33	16.3%
Total	203	100.0%

Source: prepared by the researcher based on the results of the statistical analysis of the questionnaire

The previous table shows that the percentage of the people aged (31-40 years) occupy first rank. When respondents rating by age group they accounted for 50.7% of the total sample size. The percentage of the people aged (41-50 years) has reached (22.7%) of the total sample size and the owners of this class came in the second place which means that a class of people aged (31-50 years) constitutes 73.4% of the total sample size. This age group is characterized with acceptable knowledge and skill, which gives a positive indication of the presence of a great deal of credibility with the respondents and then answers the questionnaire adequately and helps strengthening governance at the research hypotheses. The percentage of people over 50 years has come third at a rate of (16.3%) of the sample size. The last age group in the order was the class of the people aged (30) years old and younger accounted for 10.3% of the total sample size, which refers to the non-adoption of these companies to the younger age groups less than thirty years as director of companies engineering industries sector.

B - Distribution of sample according to Qualifications:

Table (4) shows distribution of respondents according to their qualification through the frequencies and percentages set forth in the following table:

Table (4): Distribution of the sample according to qualification

Qualification	Frequency	Percentage
BS degree	174	85.7%
Master	17	8.4%
Doctorate	7	3.4%
Other certificates	5	2.5%
Total	203	100.0%

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

The table shows that holders of BS degree occupy first place when respondents rating by qualification. The percentage of respondents carrying BS degree accounted to (85.7%).The percentage of respondents who hold advanced degrees in research sample (MS) was (8.4%) and the holders of this class came in second place. As for PhD holders, they came third by a ratio of (3.4%)which refers to the scientific level of the respondents who can answer scientifically the phrases in the questionnaire which enhances the credibility of the statistical analysis. The final category in the ranking is the respondents who hold the other certificates with percentage of (2.5%) and represented in certificates of vocational and technical institutes.

C- The distribution of the sample according to the scientific specialization.

Table (5): shows distribution of respondents according to the scientific specialization of the managers in the research sample.

Table (5): Distribution of the sample according to the scientific specialization.

scientific specialization	frequency	Percentage
Engineering	68	33.5%
Accounting	64	31.5%
Management	43	21.2%
Other specialties	28	13.8%
Total	203	100.0%

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

The Previous table shows that the percentage of specialists in engineering amounted to (33.5%) from the overall sample and occupied the first rank at the classification of the sample according to scientific specialization. The percentage of specialists in accounting amounted to (31.5%),and it amounted to (21.2%) in management whereas it amounted to (13.8%) in the other specialization such as humanities, law, education and sociology.

From the above mentioned ratios, notice that most of the respondents have a scientific specialization which enables them to answer the questionnaire as required which enhances the credibility of this tool.

D –The distribution of respondents according to years of experience:
Table (6) shows the distribution of the respondents according to years of experience of the research sample..

Table (6): Distribution of the research sample according to experience.

years of experience	Frequency	Percentage
5 years or less	8	3.9%
From 6 to 10 years.	98	48.3%
From 11 to 15 years	64	31.5%
More than 15 years	33	16.3%
Total	203	100.0%

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

The Previous table shows that the percentage of the years of experience up to 5 amounted to (3.9%) whereas the percentage of years of experience ranging from (6-10 years) amounted to (48.3%) and occupied the first rank.
The percentage of respondents whose years of experience range from (11-15) amounted to 31.5%, whereas the respondents with years of experience more than 15 amounted to (16.3%).

From the previous percentages we notice that 96% of the sample exceeds 5 years of experience, which means that the majority of respondents have sufficient experience which enables them to answer the questionnaire that enhances the credibility of this tool .

12. Test of validity and reliability of the tool used
It has been ascertained that the questionnaire prepared for this research is valid to measure what it has been prepared to measure and it includes all the elements that must be included in the analysis on one hand and the clarity of paragraphs and vocabulary on the other hand in order to be understood by the respondents through the following:

12.1 Virtual sincerity
Virtual sincerity has been confirmed through the distribution of the questionnaire on the number of arbitrators to know the extent of its sincerity in the measuring of research variables. The number of arbitrators is (5) from the Faculty of Economics at the University of Aleppo. In the light of arbitrators' opinions some phrases have been modified, some have been deleted, some have been reworked and others have been added.

12.2 The reliability of the questionnaire
Reliability testing was conducted on a sample research by using the coefficient of Alpha Cronbach. The Alpha Cronbach values mange between (0-1) and in order to be characterized reliably, the minimum value for coefficient must be not less than (0,70).
Table (7) shows the results of the analysis of Alpha Cronbach coefficient for each part of the questionnaire.

Table (7): Alpha Cronbach coefficient for each part of the questionnaire.

Part of the questionnaire	The Alpha Cronbach value	Reliability evaluation	Ranking
Balanced scorecard	0.722	Acceptable	3
Cost advantage	0.709	Acceptable	4
Quality advantage	0.801	Acceptable	1
Environmental advantage	0.763	Acceptable	2
All parts	0.914	High	-------

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

We notice from Table (7) that the value of Alpha Cronbach coefficient for the questionnaire parts ranging from (0.709) for the variables phrases part of cost advantage, and (0.801) for the variables phrases part of quality advantage. This means that the value of the Alpha Cronbach coefficient for all parts of the questionnaire is greater than (0.70). This indicates that the research tool characterized by internal consistency between its phrases. The value of the coefficient Alpha Cronbach for total phrases questionnaire has reached (0.904) and this value is high which in turn indicates that the degree of stability is well characterized by the questionnaire which is valid

for measuring what it has been prepared for.

13. Testing hypotheses

Analysis of variance (ANOVA) has been used in the program SPSS18 in order to know whether the regression models used in the research is significant or not, and the study of the relationship between the factors extracted as independent variables on one hand and strengthening competitiveness as the dependent variable on the other hand when the level of significance is (5%).

Hypotheses have been statistically tested by using SPSS 18, using the correlation coefficients between the independent variables and the dependent variable for each hypothesis which were tested by regression test in order to find correlation coefficients between dependent variables and independent variables to determine whether there is a correlation, and the strength of the relationship between these variables, and then the regression equations were prepared relying on the F-Test and T-Test to determine the degree of significance of regression equations and significance variables.

1- There is not a significant correlation between the sustainability and enhancing cost advantage.

To determine whether there is a significant correlation or not between the sustainability as the independent variable on one hand and the dependent variable (enhancing cost advantage) on the other hand, the regression analysis was performed and the results were as follows:

Table (8): The significant and definition of the regression model to the axis of sustainability /enhancing cost advantage

Independent variable	correlation coefficient (R)	determination coefficient (R2)	Value F	significant	Value T	significant
sustainability F	0.86	0.74	653.20	0.000	25.49	0.000
	Regression model estimated			B0	1.865	0.000
				B1	0.131	0.000

Source: Prepared by the researcher based on the results of the statistical analysis of the questionnaire

It is obvious from table (8) that the model representative of variables axis of sustainability / enhancing cost advantage is significant, because the value of Sig (F) (0.000) is smaller than (0.05).

The value of the correlation coefficient (R) which describes the strength of the correlation between the independent variable sustainability and the dependent variable enhancing cost advantage is (86%).This value indicates the existence of a very good positive and direct correlation between the independent variable and the dependent variable.

The value of (T) calculated in absolute terms for the sustainability as an independent variable was (25.49) which is greater than the value of T spreadsheet.

Thus the null hypothesis that says "there is not a significant correlation between the sustainability and enhancing cost advantage has been rejected, whereas the alternative hypothesis that says" There is a significant correlation between the sustainability and enhancing cost advantage when the level of significance is 5%" has been accepted.

The value of the coefficient of determination R^2 shows that the information provided by the sustainability explains 74% of the improvement in the enhancing cost advantage which is acceptable rate.

From the above mentioned information the researcher was able to reach the estimated regression model equation and related to axis sustainability to enhancing the cost advantage which takes the following form*:

$$Y_1 = b_0 + b_1 F$$

$$Y_1 = 1.865 + 0.131\ F \quad \text{..... .... (1)}$$

* Y_1 :The dependent variable in the regression equation which represents the enhancing cost advantage

- F The independent variable in the regression equation which represents sustainability.

2- There is not a significant correlation between the sustainability and enhancing quality advantage.
To determine whether there is a significant correlation or not between the sustainability as the independent variable on one hand and the dependent variable (enhancing quality advantage) on the other hand, the regression analysis was performed and the results were as follows:

Table (9): The significant and definition of the regression model to the axis of sustainability /enhance quality advantage

Independent variable	correlation coefficient (R)	determination coefficient (R2)	Value F	significant	Value T	significant
sustainability F	0.90	0.80	854.72	0.000	29.23	0.000
	Regression model estimated			B0	1.718	0.000
				B1	0.139	0.000

Table prepared by the researcher based on the results of the statistical analysis of the questionnaire.

It is obvious from table (9) that the model representative of variables axis of sustainability / enhancing quality advantage is significant, because the value of Sig (F) (0.000) is smaller than(0.05).

The value of the correlation coefficient (R) which describes the strength of the correlation between the independent variable sustainability and the dependent variable enhancing quality advantage is (90%).This value indicates the existence of a strong positive and direct correlation between the independent variable and the dependent variable.

The value of (T) calculated in absolute terms for the sustainability as an independent variable was (**29.23**) which is greater than the value of T spreadsheet.

Thus the null hypothesis that says "there is not a significant correlation between the sustainability and enhancing quality advantage" has been rejected, whereas the alternative hypothesis that says "There is a significant correlation between the sustainability and enhancing quality advantage when the level of significance is 5%" has been accepted.

The value of the coefficient of determination R^2 shows that the information provided by the sustainability explains 80% of the improvement in the enhancing quality advantage which is a good an acceptable and high rate.

From the above mentioned information the researcher was able to reach the estimated regression model equation and related to axis sustainability to enhancing the quality advantage which takes the following form*:

$$Y_2 = b_0 + b_1 F$$

$$Y_2 = 1.718 + 0.139\ F \quad \text{..... .... (2)}$$

3- There is not a significant correlation between the sustainability and enhancing environmental advantage.
To determine whether there is a significant correlation or not between the sustainability as the independent variable on one hand and the dependent variable (enhancing environmental advantage) on the other hand, the regression analysis was performed and the results were as follows:

Table (10): The significant and definition of the regression model to the axis of sustainability /enhancing environmental advantage

Independent variable	correlation coefficient (R)	determination coefficient (R2)	Value F	significant	Value T	significant
sustainability F	0.84	0.71	621.79	0.000	24.82	0.000
	Regression model estimated			B0	1.90	0.000
				B1	0.109	0.000

Source: prepared by the researcher based on the results of the statistical analysis of the questionnaire.

* - Y_2 :The dependent variable in the regression equation, which represents the enhance quality advantage

- F The independent variable in the regression equation, which represents sustainability.

It is obvious from table (10) that the model representative of variables axis of sustainability / enhancing environmental advantage is significant, because the value of Sig (F) (0.000) is smaller than(0.05).

The value of the correlation coefficient (R) which describes the strength of the correlation between the independent variable sustainability and the dependent variable enhancing environmental advantage is (84%).This value indicates the existence of a good positive and direct correlation between the independent variable and the dependent variable.

The value of (T) calculated in absolute terms for the sustainability as an independent variable was (24.82) which is greater than the value of T spreadsheet.

Thus the null hypothesis that says "there is not a significant correlation between the sustainability and enhancing environmental advantage has been rejected, whereas the alternative hypothesis that says "There is a significant correlation between the sustainability and enhancing environmental advantage when the level of significance is 5%" has been accepted.

The value of the coefficient of determination R^2 shows that the information provided by the sustainability explains 71 % of the improvement in the enhancing environmental advantage which is an acceptable rate.

From the above mentioned information the researcher was able to reach the estimated regression model equation and related to axis sustainability to enhancing the environmental advantage which takes the following form*:

$$Y_3 = b_0 + b_1 F$$

$$Y_3 = 1.90 + 0.109\ F \quad \text{..... .... (3)}$$

From the results of testing the previous three sub-hypotheses, the null hypothesis that says that "There is not a significant correlation between the sustainability and strengthening competitiveness" is rejected, whereas the alternative hypothesis that says "There is a significant correlation between the sustainability and strengthening competitiveness when the level of significance is 5%" is accepted.

14.The results

- There is a very good positive and direct correlation between the sustainability and enhancing cost advantage.
- There is a strong positive and direct correlation between the sustainability and enhancing quality advantage.
- There is a good positive and direct correlation between the sustainability and enhancing environmental advantage.
- Most of the firms are interested in applying the appropriate standards that qualify them to get the certificate of ISO 26000, because obtaining quality certificates make it easy for them to deal with the foreign firms.
- Engineering facilities industry enjoy a high level of safety and health due to, first, the new labor law text which emphasizes the need for comprehensive insurance and, second, the proliferation of insurance companies
- Despite the sector's contribution to provide monetary and non-monetary donations, but they do not live up to the community ambition and growing community service
- Most of the managers in the companies of engineering industries sector believe that the least

* - Y_3 :The dependent variable in the regression equation, which represents the enhance environmental advantage

- F The independent variable in the regression equation, which represents sustainability.

expensive way to reduce the cost of the product is through the continuous improvement of mutual relations between the basic activities of the company, through the reduction of waste and raising the level of quality.

- The interaction of the companies' managements and modern technological developments is weak, because of the high cost of acquiring of modern technology connected to the financial capacity of the company to make adjustments to production lines, and interest of company to have a reserve of industrial expansion.

15. The recommendations

Depending on the results of the field study in the engineering industries sector in Syria the following recommendations can be provided:

- The necessity is to support and pay attention of senior management to apply sustainability to achieve the substantial reductions in production costs to strengthen competitiveness.

- The necessity is to focus on the employees, to be scientifically and practically rehabilitated, and to develop their awareness of sustainability issues. Especially, the employees in the finance and cost departments, who should develop their awareness of cost and sustainability management systems concerning the importance of developing, and increasing their efficiency and competence to serve contemporary administrative purposes.

- The necessity is to focus on the sustainability aspects, such as using society friendly materials, supporting and respecting the protection of internationally proclaimed human rights, making sure companies and working against corruption in all its forms, including extortion and bribery

- The necessity is to support and pay attention of senior management to consider sustainability aspects and comply with sustainability regulations to achieve stakeholders' expectations, consequently, substantial reductions in costs to strengthen competitiveness.

- The necessity for development of measuring and evaluating sustainability performance systems applied in the Syrian industrial plants to be efficient strategic information systems, through the adoption of comprehensive modern approaches of sustainability management, in order to achieve profitability targets and to strengthen their competitiveness.

- The need is for increasing interest in the sustainability, cultural and educational activities because of the profound impact on the development of society in general.

- The necessity of developing information systems applied in the Syrian industrial companies to be efficient strategic information systems through the adoption of comprehensive modern entrances of cost management in order to achieve profitability targets and to strengthen their competitiveness. Because the application of balanced scorecard method cannot be discussed and applied in isolation of other modern methods and entrances, which cannot replace one another, but they are interrelated and must be employed in an integrated manner with each other.

- The necessity to focus on the factor of technological development and research and to raise their own funds, because the engineering industries companies depend basically on creativity and innovation.

- The necessity of focusing on the environmental aspects, such as using environment friendly materials, and recycling the industrial waste, because it contains harmful substances to environment.

- The necessity of focusing on customers' satisfaction through the survey and receiving complaints.

16. Future research

As there is still confusion and compromise with regard to the impact of sustainability to strengthen

competitiveness of industrial companies, further research should consider more case studies to explore the relationship between sustainability and strengthening competitiveness.

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Questionnaire

Please tick the appropriate answer for you:
General Data:
Name: ----------

Age	Answer
30 years and younger	
From 31 to 40 years	
41 to 50 years	
more than 50	

Qualifications	Answer
BS degree	
Master degree	
Doctorate degree	
Other certificates	

scientific specializations	Answer
Engineering	
Accounting	
Management	
Other specializations	

years of experience	Answer
5 years or less	
From 6 to 10 years	
From 11 to 15 years	
More than 15 years	

Please tick the appropriate answer:

Sustainability						
The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	The management of the company takes advantage of the mutual relations with suppliers in order to increase net profit and effectively manages financial resources.					
2	The management of the firm takes advantage of the mutual relations with customers in order to increase net profit.					
3	The management of the company Improves the flexibility and the speed of their response to expected changes in the market.					
4	The management of the company qualify and train employees on environmental, sustainability and economic constantly.					
5	The management of the company tries to continue modernization of machinery and equipment used in production processes.					
6	The company has a department for research and development.					
7	Your company checks and apply the environmental related ISO 14001					
8	Your company adheres to the standards and laws related to the environment					
9	Your company is keen to use environmentally-friendly packaging materials					
10	Your company works on the disposal or recycling of industrial waste in a manner that is not harmful to the environment					
11	Your company reports on environmental costs, assessment and management					
12	Your company takes into account the interests of the local community.					
13	Your company accepts trainees from rehabilitation institutions or individually					
14	Your company meets ISO 18001 certification requirements (relating to occupational safety and health).					
15	Your company supports and respects the protection of internationally proclaimed human rights					

Strengthening competitiveness:

The cost advantage						
The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	The management of the company tries to reduce waste and loss to the least extent in material costs.					
2	The management of the company tries to reduce waste and loss to a less extent in wages					
3	The management of the company tries to reduce waste and loss to the least extent in the industrial indirect costs					
4	The management of the company tries to reduce waste and loss to the least extent in marketing and administrative costs.					
5	The management of the company tries to reduce waste and loss to the least extent in storage costs.					
6	The management of the company tries to reduce waste and loss to the least extent in the cost of quality.					
7	The management of the company tries to reduce waste and loss to the least extent in environmental costs.					
8	The senior management evaluates the cost performance for sections, quarterly and annually.					

The Quality advantage						
The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	The management of the company supports reducing the percentage of the defective and damaged products, compared with similar companies.					
2	The management of the company does its best to produce products that have specifications which identical to the standard specifications.					
3	The management of the company supports of the improvement of the quality of the product design.					
4	The management of the company supports the application of the requirements for ISO certification.					
5	Circulating of the quality standards to all the employees at the company.					
6	The management of the company enhances a awareness about the quality in the company.					

The Environment advantage						
The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	The management of the company works on identifying activities related to environment in the activities of the company.					
2	The management of the company works on identifying costs related to environment activities in the company.					
3	The management of the company works on studying the alternatives available to the environmental treatments.					
4	The management of the company tries to study and analyze the impact of the environmental dangers.					
5	The management of the company works on applying the appropriate Environmental standards that qualify it to get a certificate of ISO 14001.					