New Trends Affecting the Energy Policy in Global Level, Country Level and Company Level

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ABSTRACT

Recent events like the Russian-Ukrainian war and the corona pandemic have caused some changes in the energy industry. Despite being the primary source of energy in the world, fossil fuels have an adverse effect on the environment as a result of their large GHG emissions and air pollution. As a result, in order to create energy with the best efficiency and the least amount of environmental harm, the transition to renewable energy should be accelerated with the appropriate innovation. In this thesis, the impacts of energy generated from renewable sources are investigated from a global, national, and corporate standpoint. To accomplish the goals of the thesis, the author uses a questionnaire. Approximately 71 people took part in this survey. The findings indicate that the energy industry's adoption of renewable energy sources was stated to lessen pressure on energy prices, improve the capability of the world's energy to treat with the unavoidable effects of climate change, and lower costs related to pollution produced by fossil fuels. Additionally, it is said that utilizing renewable energy gives organizations a competitive advantage in the market. Because renewable energy provides a quick return on investment (ROI), can reduce energy prices, and can draw in new customers, it can also help businesses indirectly enhance productivity and income.

Keywords: corona pandemic, Russian-Ukrainian war, GHG emissions, air pollution, fossil fuels, Renewable energy.

1- Introduction

Renewable energy comes from various sources like wind, sun, hydropower, geothermal energy, biomass, and hydropower. Previously, these sources were referred to as "alternative energy sources." The amount of useful energy from fossil fuels (oil, gas, coal, natural gas, and nuclear power) is quickly running out at the start of the twenty-first century, while renewable energies (wind and solar) are yet too underdeveloped to provide adaptable alternative. Since fossil fuels are limited sources and expectations indicate that potential oil reserves will not be sufficient to meet the world's needs until the latter part of the twenty-first century, humanity is heading towards a future in which it depends on renewable energy [1].

Modern economies must function successfully for which energy security and efficiency are essential. Renewable energy sources (such as solar, wind, water flow, biomass, etc.) are becoming more and more significant, and there is a definite trend toward them taking a larger portion of the total energy produced and consumed [2].

The phenomena which affecting Earth now are worrying since over the past 20 years, the planet has experienced its greatest temperatures ever recorded and its highest CO2 concentration ever. Data indicate that 2010 to 2019 were the hottest years on record

for the planet, and that 2019 was among the three warmest years ever recorded. We must mention that 2023 summer was the hottest for all time.Violent weather occurrences occur significantly more frequently as a result of climate change, which also has an impact on human existence worldwide. However, it's crucial to keep in mind that there is a two-way interaction between the climate change and population, as the latter influences the former by supporting activities that increase greenhouse gas emissions. One of the goals of EU climate policy is to boost the usage of renewable sources. Additional measures are required to ensure the security of the energy supply because renewable energy sources now make up a larger portion of the energy mix [3].

A distinguishing aspect of the world's energy landscape is the integration of growing volumes of renewable energy into energy systems. With 173 nations adopting a minimum of one clean energy goal by the finish of 2015—greater than four times in 2005—targets for the use of renewable energy sources are now extensively used. Additionally, in order to promote their aims, 146 nations have adopted renewable energy policies. These measures aim to achieve context-dependent objectives like improved wellness, access to energy, security of energy, and economic expansion. Renewables implementation has also been aided by the cost-competitiveness. Renewable sources of energy like biofuel for electricity, hydroelectricity, geothermal energy, solar PV, and onshore wind may currently cope with electricity produced from fossil fuels in many locations across the world on a cost-only foundation [4] [5].

1.1. Problem Statement

By 2030, the world must provide affordable, reliable, and sustainable energy to everyone, despite accelerated progress in the past decade. In 2017, 3 billion people worldwide had access to clean cooking fuels, causing millions of deaths annually. Despite increasing renewable energy usage, it is crucial to accelerate its adoption in all fields[6].

The European Union's high oil and gas prices have increased due to Russia's war in Ukraine, raising concerns about energy sustainability. Russia is a major supplier, accounting for two-fifths of European gas consumption in 2021. The EU plans to reduce its reliance on Russian gas by two-thirds this year. Russia insists on receiving gas payments in roubles, which was rejected by the G-7 industrialized nations. The decision to include a restriction on Russian energy imports has divided EU Member States, potentially causing gas rationing and isolating Russia from a significant supply of hard currency[7].

1.2. Research Questions

After reviewing the study's background, the following questions are raised and must be answered:

1. At the global level, to what extent do fossil fuels affect the climate?
2. How could clean/renewable energy provide solutions to the climate problem as a substitution to fossil fuel?
3. At the global level, how could the Russian-Ukrainian war affect the stability of energy in the world?
4. At the global level, how could Corona pandemic affect the energy prices in the world?
5. At the country level, what are the new renewable energy trends which could be used by countries to improve their energy system?
6. At the company level, how is planning to adopt a sustainable energy approach?
7. At the company level, what are the benefits from adopting renewable energy sources?

1.3. Research Objectives

According to the research inquiries, this research seeks to:

1. Find the effect of non-renewable energy on global climate and the need to fast transition to clean energy.
2. State the effects of Russian-Ukrainian war and Corona pandemic on the energy market stability.
3. Mention the new renewable energy trends which developed recently to enhance the efficiency of energy generation.

4. Investigate the advantages of implementing new trends of renewable energy by different countries and companies.

1.4. Study Significance

This study's primary goal is to present three distinct perspectives on the latest energy trends. The findings of this study are of great significance to the world, countries, organizations, researchers and academicians. Most of the related literature were of a great concern about types of renewable resources and give a little shadow on the new technologies. This study is different as it conducts a review of the most recently types and developments in the renewable energy field and investigate the effect of them on world, country and company. From the global perspective, the study combines between the impacts of non-renewable energy on world climate and how it could affect the individuals, the solutions of this problem offered by renewable energy resources, the effect of the current war between Russia and Ukraine on the world energy state, and how the energy prices were affected in the Corona virus period. From the country and organization perspective, the study investigates the types of renewable energy could be implemented, the advantages from using renewable resources on the country energy state and how could organizations add these new types in their plans. It could be seen that the study combines between different fields and this will help researchers and academicians to gather more data. This study will serve as a resource for future studies on relevant subjects and help academics working on related issues. Other researchers are therefore, be able to expand these perspectives and discover new trends of renewable resources and their potential impact.

2- Literature Survey

Based on the important considerations and the prior researchers on new trends of energy resources described in the literature, the literature survey would evaluate the researcher's choice of this topic. Additionally, it would show the significance of the study and how could it add value to the research in the energy field.

About 30% of the world's energy system will be made up of renewable sources by the year 2050. In order to reduce costs and enhance integration, a combination of enabling trends and demand trends is required to actualize global trends in renewable energy. Advanced material and manufacturing techniques, micro- and nano-electronics, nanotechnology, industrial biotechnology, and photonics are some examples of advanced technologies[8]. For the renewable energy business to grow as efficiently as possible, innovations are crucial. Another study explores novel concepts and predictions for the future of renewable energy sources such hydro, solar, wind, ocean, geothermal, and biomass[9]. The construction of renewable generating capacity reached even a further record in 2021 despite persistent logistical challenges and increased costs, while consumer interest in biofuels was close to pre-Covid levels. However, the Russian Federation's (hence referred to as "Russia") invasion of Ukraine has shaken the agricultural and oil sectors, resulting in an unprecedented global energy disaster. To speed up the transition to sustainable energy technology, reduce dependency on Russian supply, and protect customers from rising costs of energy, many countries are putting forward plans. Renewable energy has an enormous chance to reduce prices and reliance on fossil fuels in the near and longer terms[10]. Another article states that there is a need for the growth and advancement of technology, request, and sources of clean energy. To reduce the cost per unit of output, it is essential to increase the generation of power using renewable energy sources. Numerous important factors, including growth in the population, price of energy, the environment, and technological advances, have an impact on how much energy is consumed[11]. Another report shows unequivocally how solar and wind energy have increased while our reliance on fossil fuels has decreased. A prediction of 14214 GW in 2040 confirms the global trend of rising investment in renewable energy, up from 5584 GW in 2020. The World Economic Forum projected that by 2050, there will be a total of more than 21 trillion kilowatt hours of energy produced

[12][13]. There is no doubt, energy figures are changing year by year, thus in order to keep updated, it is necessary to follow the International Energy Agency (IEA) publications each year.[14][15].

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3- Methodology

Quantitative research collects and analyses data using statistical methods, whereas qualitative study uses phrases with deeper significance. For learning different kinds of information, both are essential. Qualitative as well as quantitative information can be gathered using a variety of ways. Utilize a data collection method that will help you address your study topic(s). There are several ways to collect data, both quantitatively and qualitatively.

Here are some instances of methods for gathering quantitative data:

- Surveys: Whether online, in person, or over the phone, a sample is given a list of closed-ended or multiple-choice questions.
- Experiments: used to develop cause-and-effect relationships when variables are adjusted and under control.
- Observations: maintaining track of individuals in their natural environment, unhindered by extraneous influences.

Here are some examples of qualitative data collection techniques:

- Interviews: Respondents are verbally asked open-ended questions.
- Focus groups: conversations about a topic with many people to gather perspectives for future research.
- Ethnography: Long-term involvement in a group or organization with the goal of carefully evaluating its culture and behavior.
- Analysis of the body of work by other writers that has been published.

The researcher prefers to rely on the quantitative method in the research methodology. That by relying on the questionnaire as a tool for collecting data from those interested in the field of energy. Especially with regard to specialists in the field of energy in the petroleum company. Where the questionnaire depends on measuring the current situation of energy at the global, regional, and company levels so that the researcher can reach a set of recommendations that in turn help in adopting sustainable energy.

A questionnaire, which consists of a number of questions or other components, is used to find out more about the viewpoints, actions, or opinions of respondents. It is important to take into account the study aims while constructing a questionnaire, arrange the questions in a meaningful order, and choose the appropriate administration strategy. A questionnaire can be computer-based, telephone-based, private, postal, open-ended, multiple-choice, or scale-based, among other formats. As the primary method of data collection, questionnaires offer the following advantages: homogeneity since each person is offered the identical questions, Cost-effectiveness, the potential to gather data more quickly, the researcher's bias should be minimal or nonexistent during the data collection process, participants typically have enough time to think over their answers compared to interviews, and the viability of using an internet survey to reach respondents in remote locations.

3.1. Study Hypotheses

Based on the literature reviewed, some hypotheses were recognized which need to be tested. These hypotheses are as the followings:

H1: There is a significant relationship between adoption of new trends of renewable energy and the global energy sector.

H2: There is a significant relationship between adoption of new trends of renewable energy and the development of countries' energy sector.

H3: There is a significant relationship between adoption of new trends of renewable energy and the companies' energy planning.

The conceptual framework model of this study is depicted in Figure (3.1):

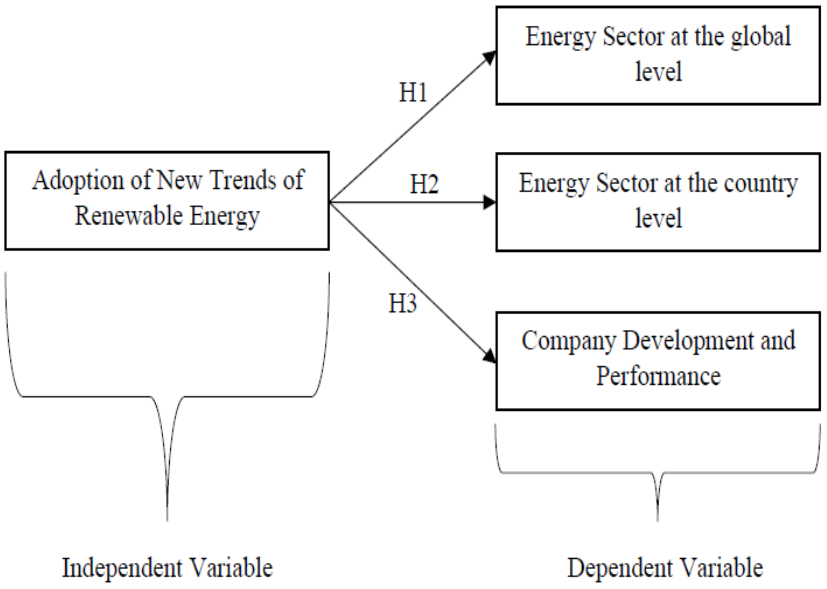

Figure (3.1): Conceptual framework model

3.2 Research Design

Research design is a decision an investigator makes regarding the elements of his study and the development of specific design elements. An ordered sequential, step-by-step approach is not a part of a research design. Planning for research is typically done logically while understanding its applicability. In choosing research components, the study's goals are taken into consideration. The foundation for constructing a research project is provided by research hypotheses. The following elements make to a research design:

- A research approach or procedure.
- A sampling method.
- Selection of research instruments.
- Selection of statistical methods.

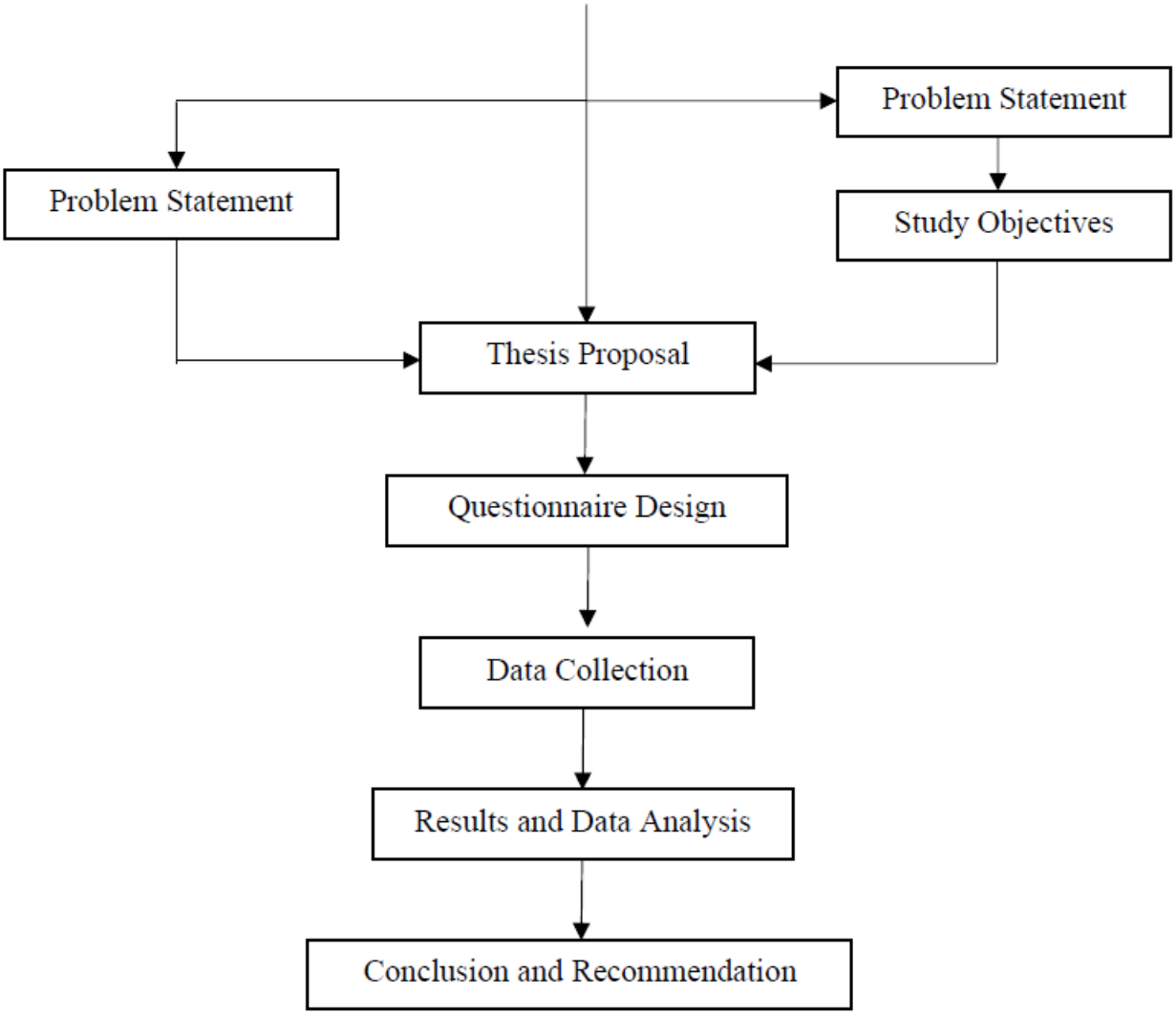

Figure (3.2): Research Flow Chart

3.3 Data Collection Methods

The research work for the study has utilized a variety of data sources. The theoretical and practical components of the current study are based on each other. Theoretically, the researcher drew from relevant scientific studies for the current investigation. On the practical side, a descriptive and analytical approach is used to gather data, evaluate it, and test hypotheses.

There are two categories of data collection techniques:

1. Primary source: a questionnaire was created specifically to gather primary data about all the study variables and the demographics of the research sample and hospitals based on prior empirical studies and the research aims.
2. Secondary source: To comprehend the theoretical underpinnings of the study and create its model and hypotheses, books, journals, and theses were used.

3.4. Data Analysis

The following statistical techniques were applied in this study:

1. Descriptive statistics are used to describe all the study variables and questions in order to meet the first and second research objectives. These statistics include percentages, frequencies, means, and standard deviation.
2. In order to evaluate the model's goodness-of-fit, a structural equation model was run.
3. The research hypotheses about the impact of adopting new trends in renewable energy on the energy industry from the global, national, and company perspectives

were further tested using structural path analyses.
4. Analysis of Variance was additionally employed to examine the variations in group means and the associated method.

4. Data Analysis And Interpretation

By delivering the survey to the target sample and employing a questionnaire, the researcher uses the survey instrument to get the necessary data. There have been about 71 valid responses collected.

The researcher enters the data using (SPSS) for the purpose of analyzing the data collected. Also, appropriate statistical procedures were used for data analysis, such as the descriptive statistical method with frequency, percentages, mean, and standard deviation.

a. The characteristic of the study sample:

The following characteristics of the study sample that was used in the purpose of analyzing the data of the applied study can be ascertained by the researcher:

- **Distribution of the sample members according to Age:**

The findings indicated that 30:40 had the highest percentage according to age, with a rate of 33 and a percentage of (46.5%), and that 22:30 was second, with a rate of 22 and a percentage of (31%), and this can be clarified Through Table IV.1 and Figure IV.1:

Table (4.1): Frequency distribution of the study sample as per Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	22:30	22	31.0	31.0	31.0
	30:40	33	46.5	46.5	77.5
	Above 40	16	22.5	22.5	100.0
	Total	71	100.0	100.0	

- **Distribution of the sample members according to What is your gender:**

The findings indicated that males had the highest percentage, with a rate of 38 and a percentage of (53.5%), followed by females with a rate of 31 and a percentage of (43.7%), and this can be clarified Through Table IV.2 and Figure IV.2:

Table (4.2): Frequency distribution of the study sample according to What is your gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	31	43.7	43.7	43.7
	Male	38	53.5	53.5	97.2
	Prefer not to state	2	2.8	2.8	100.0
	Total	71	100.0	100.0	

- **Distribution of the sample members according to What is your experience level:**

The findings indicated that the response to the question, "What is your experience level?" was "Above 10 Years," which received the highest percentage with a rate of 33 and a percentage of (46.5%), followed by "5–10 Years," which received a rate of 33 and a percentage of (29.6%), and this can be clarified Through Table IV.3 and Figure IV.3:

Table (4.3): Frequency distribution of the study sample according to what is your experience level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Recently Employed	4	5.6	5.6	5.6
	1:5 years	13	18.3	18.3	23.9

	5:10 years	21	29.6	29.6	53.5
	Above 10 years	33	46.5	46.5	100.0
	Total	71	100.0	100.0	

- **Distribution of the sample members according to What is your education level:**

According to the findings, Graduate Degree (Masters, Ph.D.) received the highest percentage, with a rate of 33 and a percentage of (46.5%), followed by Bachelor's Degree with a rate of 32 and a percentage of (45.1%), and this can be clarified Through Table IV.4 and Figure IV.4:

Table (4.4): Frequency distribution of the study sample according to what is your education level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School Diploma	2	2.8	2.8	2.8
	Bachelor's Degree	32	45.1	45.1	47.9
	Graduate Degree (Masters, Ph.D.)	33	46.5	46.5	94.4
	Other	4	5.6	5.6	100.0
	Total	71	100.0	100.0	

- **Distribution of the sample members according to Do you encourage the world transition from fossil fuels into renewable energy?**

Do you support the global switch from fossil fuels to renewable energy? poll results indicated that the largest percentage did. With a rate of 65 and a percentage of (91.5%), was in favor of Yes, which was followed by No with a rate of 6 and a percentage of (8.5%), and this can be clarified Through Table IV.5 and Figure IV.5:

Table (4.5): Frequency distribution of the study sample according to Do you encourage the world transition from fossil fuels into renewable energy?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	65	91.5	91.5	91.5
	No	6	8.5	8.5	100.0
	Total	71	100.0	100.0	

- **Distribution of the sample members according to Which type of renewable energy projects is used in your community or company?**

Which form of renewable energy projects are employed in your town or firm, according to the data, is used by the biggest percentage? was favorable to Solar, receiving a rate of 32 and a percentage of (45.1%), followed by Other, receiving a rate of 16 and a percentage of (22.5%), and this can be clarified Through Table IV.6 and Figure IV.6:

Table (4.6): Frequency distribution of the study sample according to Which type of renewable energy projects is used in your community or company?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Solar	32	45.1	45.1	45.1
	Wind	8	11.3	11.3	56.3
	Hydropower	9	12.7	12.7	69.0
	Biomass	6	8.5	8.5	77.5
	Other	16	22.5	22.5	100.0
	Total	71	100.0	100.0	

- **Distribution of the sample members according to The major disadvantage of fossil fuels in energy production is that it pollutes the environment and causes climate changes by emitting greenhouse gases.:**

The outcomes indicated that most of the participators have an agreement with the statement that the main drawback of using fossil fuels for energy production is that they harm the environment and contribute to climate change by releasing greenhouse gases. Neutral received a rate of 20 and a percentage of (28.2%), while Agree received a rate of 19 and a percentage of (26.8%) was in favor, and this can be clarified Through Table IV.7 and Figure IV.7:

Table (4.7): Frequency distribution of the study sample according to The major disadvantage of fossil fuels in energy production is that it pollutes the environment and causes climate changes by emitting greenhouse gases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	5.6	5.6	5.6
	Disagree	11	15.5	15.5	21.1
	Neutral	20	28.2	28.2	49.3
	Agree	19	26.8	26.8	76.1
	Strongly Agree	17	23.9	23.9	100.0
	Total	71	100.0	100.0	

The answers reflect that people have not clearly understand the detrimental effects of using fossil fuels in electricity production.

- **Distribution of the sample members according to To which extent you agree with that employing renewable energy will benefit the world financially and environmentally?**

According to the results of the question "To what extent do you agree that using renewable energy will benefit the world financially and environmentally," the biggest percentage agreed. Strongly Agree came in second with a rate of 16 and a percentage of (22.5%), and Agree came in first with a rate of 25 and a percentage of (35.2%), and this can be clarified Through Table IV.8 and Figure IV.8:

Table (4.8): Frequency distribution of the study sample according to To which extent you agree with that employing renewable energy will benefit the world financially and environmentally?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	11.3	11.3	11.3
	Disagree	7	9.9	9.9	21.1
	Neutral	15	21.1	21.1	42.3
	Agree	25	35.2	35.2	77.5
	Strongly Agree	16	22.5	22.5	100.0
	Total	71	100.0	100.0	

- **Distribution of the sample members according to Fossil fuel market is greatly influenced by external factors such like Corona pandemic and Russian-Ukrainian war.:**

The findings demonstrated that exogenous events like the Russian-Ukrainian war and the Corona pandemic have a significant impact on the highest share of the fossil fuel industry. with a rate of 27

and a percentage of (38%), followed by Neutral with a rate of 24 and a percentage of (33.8%), was in favor of agreement, and this can be clarified Through Table IV.9 and Figure IV.9:

Table (4.9): Frequency distribution of the study sample according to Fossil fuel market is greatly influenced by external factors such like Corona pandemic and Russian-Ukrainian war.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	7.0	7.0	7.0
	Disagree	6	8.5	8.5	15.5
	Neutral	24	33.8	33.8	49.3
	Agree	27	38.0	38.0	87.3
	Strongly Agree	9	12.7	12.7	100.0
	Total	71	100.0	100.0	

The findings showed that samples are not clearly see the effect of the war and Corona Pandemic.

- **Distribution of the sample members according to Do you feel that there is an advantage for businesses that use renewable energy over traditional methods? :**

Do you believe that using renewable energy has an advantage over using conventional techniques for businesses? the findings indicated that the highest percentage did. Having a rate of 58 and a percentage of (81.7%) in favour, followed by a rate of 13 and a percentage of (18.3%) No, and this can be clarified Through Table IV.10 and Figure IV.10:

Table (4.10): Frequency distribution of the study sample according to Do you feel that there is an advantage for businesses that use renewable energy over traditional methods?

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes		58	81.7	81.7	81.7
	No		13	18.3	18.3	100.0
	Total		71	100.0	100.0	

4.2 The stability of the study tool (Questionnaire)

The concept of stability means the degree to which the scale used provides consistent outcomes under various and independent conditions for multiple questions, but to measure the same characteristic or topic of interest, using the same group of respondents, and accordingly the researcher calculated the reliability coefficient Cronbach Alpha, ranging Cronbach's alpha values are between zero and the correct one, and the higher the stability coefficient values and closer to the correct one, this indicates an increase in the stability of the data. Table IV.11 shows the stability coefficients using Cronbach's alpha for the thesis's hypotheses.

Table (4.11): stability coefficients using Cronbach's alpha method

Hypothesis	The number of paragraphs	Cronbach's alpha
Hypothesis 1: There is a significant relationship between adoption of new trends of renewable energy and the global energy sector.	**19**	**0.904**
Hypothesis 2: There is a significant relationship between adoption of new trends of renewable energy and the development of countries' energy sector.	**8**	**0.79**

Hypothesis 3: There is a significant relationship between adoption of new trends of renewable energy and the companies' energy planning.	**8**	**0.845**

It is clear from the previous table that the stability coefficient of Cro-Nabach's alpha for the resolution ranged from (0.790) as a minimum, to (0.904) as a maximum, which is a high value for Crew-Nabach's alpha, which indicates the stability and truthfulness of the statements and the possibility of relying on them.

5. Summary and Conclusions

The influence of renewables on the energy business was analyzed from the perspectives of the entire globe, the country, and the company. The researcher used a survey (questionnaire) to test the hypotheses that were established. The results from a global viewpoint showed that the Russian-Ukrainian war and the corona pandemic had a considerable influence on the world's energy markets. Renewable energy sources are stated to lessen pressure on energy prices, improve the ability of the world's energy system to cope with the unavoidable impacts of global warming, and minimize costs existed by pollution produced by fossil fuels. Additionally, the utilization of renewable energy and energy efficiency are closely related. From a national perspective, there is an obvious connection between the utilization of renewable energy and the construction and transportation industries. Additionally, switching to renewable energy might save money on expenses incurred during disaster relief and post-disaster reconstruction due to the use of fossil fuels. The availability of jobs will also rise with the use of renewable energy. The results showed a strong connection between the use of renewable energy and the companies' energy plans from the perspective of the company. Additionally, it is claimed that adopting renewable energy has a high upfront cost. Organizations gain a marketing edge by implementing sustainable business practices and using renewable energy. Because renewable energy provides a quick return on investment (ROI), can reduce energy prices, and can draw in new customers, it can also help businesses indirectly enhance productivity and income.

This study could be a good motivation for some future studies. The study of the impact of each renewable energy resource on the three perspectives could be conducted. Also, the impact of using renewables on companies' economics could be further studied. Moreover, the impact of renewables' adoption on the energy prices is a good field of study.

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