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Environment Innovation is a mechanism to achieve Sustainable Development for a better life, a Study of pioneering global experiences (Switzerland, USA and The United Arab of Emirates)

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Abstract:

This study aims to highlight the importance of green innovation in achieving the dimensions of sustainable development by innovating environmentally friendly products and production processes that save energy, prevent pollution and recycle waste to reduce environmental risks, by showcasing some of the successful experiences of Switzerland, USA and UAE.

The study found that there is considerable interest in these countries' green innovation to reduce pollution, improve environmental performance, improve resource productivity and rationalize use, and that they are moving positively towards green innovations to achieve economic, social and environmental balance.

Keywords: Green Innovation, Green Products, Green Processes, Sustainable Development, Switzerland, United Arab Emirates, United States Of America.

Introduction:

The issue of sustainable development is one of the topics that has received the attention of many researchers in all fields, as well as various national and international bodies and organizations. this is due to the economic and technological developments witnessed by the world, and the resulting negative effects on environmental life and the quality of human life due to the neglect of environmental aspects when practicing various economic activities.

Sustainable development is a rational and rational development pattern through achieving a balance between the optimal use of Natural Resources and meeting the needs of the present without compromising the abilities of future generations to meet their needs.

Sustainable development is not achieved randomly, but in a deliberate and controlled manner, taking into account the environmental aspect of institutions and adopting green innovations by providing environmentally friendly products and taking care to minimize their negative impacts resulting from their operations.

The problem of studying :

Proceeding from the above, the problem of the study arises in the following question: How green innovation contributes to sustainable development in Switzerland, USA and United Arab Emirates?

Sub-questions :

To familiarize themselves with all aspects involved in the problem of the study, the following sub-questions were asked:

-What is meant by green innovation What are its types and characteristics?

- The question is what is the reality of green innovation in both the state of Switzerland, USA and United Arab Emirates?

- How have these countries succeeded in adopting green innovation to support the achievement of sustainable development?

Study hypotheses :

-The aim of achieving the dimensions of sustainable development is mainly based on green innovations;

- Green innovation contributes to enhancing the economic dimension;

- Green innovation contributes to enhancing the social dimension;

- Green innovation has a role to play in achieving the environmental dimension.

The importance of the study:

The importance of the study lies in the topic it addressed, which is green innovation and sustainable development by presenting the experiences of some countries and trying to benefit from them. Green innovation is an important means of meeting environmental challenges, reducing pollution, depleting natural resources and saving or conserving energy for the benefit of future generations.

Objectives of the study :

It lies in the following:

-Learn about theoretical concepts about green innovation and sustainable development;

- The role of green innovation in promoting sustainable development;

- To highlight the experiences of both the state of Switzerland, USA and United Arab Emirates is in the field of green innovation and trying to benefit from it.

Curriculum of study:

In this study, the descriptive approach will be used to address the theoretical framework of the study variables, present the experiences of some leading countries in the field of green innovation and diagnose its reality in them, and the analytical approach to clarify the relationship between the variables and analyze the results of green innovation in the selected countries.

Study divisions:

To answer the problem and test the hypotheses, the study was divided into the following axes:

-The first axis: the conceptual framework for green innovation and sustainable development;

-The second axis: the role of green innovation in achieving sustainable development;

-The third axis: world-leading fights (Switzerland, USA and United Arab Emirates) and ways to benefit from them.

The first axis: **The Conceptual framework for green innovation and sustainable development**

1. green innovation

1.1. Definition of innovation:

The concept of innovation, like other modern management concepts for which there is no clear and specific definition, is one of the most prominent definitions given by Schumpeter, who believes that " innovation is the application and implementation of new elements to introduce new products or use new methods in production (Strecker, 2009, p. 13)

According to the organization for Economic Cooperation and development OCDE, innovation is "the application of a new product or service, a new or significantly improved process, a new marketing or organizational method in business practices, the organization of the workplace or external relations" (OCDE, 2005, p 01).

He also defined innovation as "a dynamic mental process that requires innovative thinking to be one of its inputs for developing new ideas or creating new uses for existing products with the emphasis that innovation should be something better (Refaai, 2012, p.03).

Through the above, innovation can be defined as the provision of new ideas that are translated in the form of productive, marketing, or administrative products or practices in a way that achieves a competitive advantage for the enterprise and allows its continuation and growth.

1.2. Definition of green innovation

Researchers have used many terms to express green innovation, including green innovation, ecological innovation, environmental technologies, and green technologies. Green innovation is the creation of a new green process or a new green product that is sustainable (Aboud nadjem, 2015, pp. 492-493).

It is also defined as the innovation of programs that are related to green products or processes, including innovation in technologies that are involved in energy saving, pollution prevention, waste recycling, green product designs, or environmental management of enterprises (Talabi, Ibrahim hocine, 2018, P.06). Ecological innovation is the development of a new product, business method or production process so that it is less harmful and environmentally friendly, and contributes to reducing environmental burdens, whether related to the depletion of non-renewable natural resources or related to how the waste of production and consumption processes is disposed of and recycled (borouba, Ben Mansour, 2019, P.647). Through the above, green innovation can be defined as the production of new or improved products or production processes that use the least possible amount of resources and are less harmful to the environment, so that the enterprise achieves competitive advantages and contributes to reducing environmental risks.

1.3. The importance of green innovation

The importance of green innovation lies in its interest in reducing pollution, improving environmental performance, improving resource productivity, increasing energy efficiency, reducing waste, as well as reducing the cost of materials produced.

The benefits of green innovation can be summarized in the following (Talabi, Ibrahim hocine, 2018, P. 357):

- Green innovation plays the role of mediator between environmental ethics and competitive returns;
- This is the key to improving competitive advantage in a world where concern for the environment is increasing;
- provides a great opportunity to meet customers ' requests without harming the environment;
- enables to improve the performance of the enterprise
- The task of achieving efficiency in the use of resources and energy;
-It enables organizations to reduce costs and increase revenues.

1.4 Goals of green innovation

Green innovation aims to develop products that meet the needs of customers in the most environmentally efficient way, and there are many goals that green innovation seeks to achieve (Abdel-Jabbar al-Samak, said el-Samak, 2019, pp. 18-19):

-**The aim of reducing pollution**: by improving production processes, making small changes to existing production lines and replacing inputs to prevent the direct spread of environmentally harmful substances;

-**The problem of pollution control**: treatment of pollution before its spread to the environment through special devices;

-**Method of cleaning technology:** treatment technologies, such as air and soil cleaning and the use of bioremediated agriculture employing specific plant species to remove toxic substances from contaminated soil, examples of which are contaminated soil treatment, water and air drainage treatment;

Cleaner technology: investing and employing modern technology by making integrated practical changes in production technology that reduce the amount of pollutants generated during production;

-**Environmentally improved products**: product features of material use, energy use and reuse;

-**Closing the loop**: sourcing, product design, incubator or current of new facilities;

- **Proper environmental management systems**: making decisions to reduce the environmental impact of products and processes;

- **Waste management (waste):** collection, transportation, processing, recycling, reuse and disposal of waste;

-**The optimal ecology of the production chain**: production chains as resource extraction, factory and final product, end-of-life use or care through design for recycling etc;

-**System innovation**: and new service systems for products (e.g. dedicated or private mobility and decentralized energy systems);

-**The recycling business**: reducing waste by reusing used materials through waste management ;

-**About clean products**: products that cause a low environmental impact during a full life cycle.

1.5. Areas of green innovation

Green innovation has three areas, namely green products, green processes, and organizational innovation, and they can be explained below (aichoush, tabakhi, 2020, pp. 94-95):

* **Innovation of green products:** these are products that use less resources in their production, have fewer impacts and risks on the environment and reduce the generation of waste during the product life cycle. This may include the introduction of new or significantly improved products in line with technological and environmental innovations; these improvements may include those in the basic characteristics, technical specifications or software to apply innovative ideas to the design, manufacture and marketing of new products in order to enhance the environmental improvement of these products, as well as the process of modifying the design of the existing product to minimize any negative impact on the environment at any stage of the product life cycle. And the characteristics of the product can be transferred.

The green product differs in essence from the traditional product by several characteristics, the most notable of which are (Al-Bakri, 2012, p. 253):

- Ensure that no harm occurs to the environment at various stages of its manufacture or production, even after the end of its use and disposal as waste;
-It should not be a source of danger or threat to human life in any way during the use or consumption process, but it should have a positive aspect on human health and safety;
-The process of its manufacture should be carried out with less energy and natural resources than in a conventional product;
-To reduce packaging materials as much as possible to reduce the volume of waste resulting from their disposal and reduce the consumption of natural resources from which packaging materials are made, specifically trees;
- To refrain as much as possible or minimize the use of exhaustible natural resources, and work on the use of alternative materials for them;
-The product must be recyclable at a later stage of its use, and rely on recycled materials in its manufacture as a whole or parts of it depending on the specificity of each product;
- The process of providing a green product by the company must achieve a logical balance between the characteristics that it must contain to meet the needs of the buyer on the one hand, and the actual contribution to achieving environmental sustainability on the other hand, because a breach on either side of the equation means failure to achieve the desired goal in providing a green product.

* **Green process innovation:** refers to the modification of manufacturing processes and systems to produce environmentally friendly products that achieve environmental goals, that is, adapting to the manufacturing process that reduces the negative impact on the environment during the purchase of materials, production and delivery.

green process innovation is the use of innovative ways to reduce the negative environmental impacts caused by production processes through the use of clean technology, new processes or technology that requires less raw materials and energy. it includes activities that reduce emissions and hazardous waste during manufacturing, recycling waste and emissions for reuse, reducing energy consumption and raw materials.

* **Organizational innovation**: it is the introduction of new concepts and their applications that improve the internal environment and then the overall performance of the organization, including its environmental performance. It is also defined as a long-term effort to improve the organization's ability to solve problems and renew its operations, provided that this is done

through a comprehensive development in the prevailing climate in the organization, with a special focus on increasing the effectiveness of its work groups with the help of a consultant or an expert in change who convinces the organization members of new ideas, through the successful exploitation of new ideas, ideas may be completely new in the market or incorporate those ideas in production, operations or management and involves finding new designs, concepts and ways of doing things (Talabi, Ibrahim hocine, 2018, P.359).

1.6Green Innovation Indicators

Green innovations are measured through the Green Innovation Index, which is a composite indicator obtained by taking an unweighted average of 16 indicators included in the framework of measuring green innovation inputs, activities, outputs, socio-economic results and resource efficiency results, which are as follows (boumrifek, zallag, 2023, pp. 179, 180):

* **Green innovation inputs**: Green innovation inputs include financial or human resource investments aimed at stimulating green innovation activities. It includes the following sub-indicators:

-Government allocations for research and development in the field of Environment and energy (%of GDP);

-The number of total employees and researchers in the field of research and development (%of total employment);

-Is the total value of green early stage investments(USD/ per capita).

* **Green innovation activities**: This indicator focuses on efforts and activities rather than the actual results of green innovation activity, and includes the following sub-indicators:

-The task of implementing resource efficiency measures among small and medium-sized enterprises(class);

-The implementation of sustainable products among small and medium-sized enterprises (%of the total companies surveyed);

- The number of ISO certificates is 14001(per million of the population).

*** Green innovation outputs**: Green innovation outputs describe the immediate results of green innovation activities, its sub-indicators are used to measure the extent to which the knowledge outputs generated by companies and researchers are related to green innovation, namely:

-Number of patents related to Green Innovation (per million population);

-Academic publications related to green innovation;

-Global coverage of green innovation(per million population).

*** Social and economic consequences of green innovation**: This indicator describes the broader impacts of green innovation activities on society and the economy, including, for example, changes in employment... Which can be associated with widely understood green innovation activities, featuring the following indicators:

- Exports of products from environmental industries (%of total exports);

-Employment in Environmental Protection and resource management activities (%of the workforce);

- The value added in Environmental Protection and resource management activities (%of GDP).

* **Green innovation resource efficiency results**: This indicator is related to the broader effects of green innovation on improved resource productivity, and green innovation produces a double positive effect on resource efficiency as it can increase the economic value generated, while at the same time reducing pressures on the environment, and includes the following sub-indicators:

-The ratio of material productivity (GDP/ consumption of domestic materials);
-Water productivity factor (GDP / total freshwater extraction);
-Calculation of energy productivity (GDP/ total internal energy consumption;
- Calculate the intensity of greenhouse gas emissions (carbon dioxide equivalent / GDP).

2. Theoretical framework for Sustainable Development:

2.1. The concept of sustainable development:

The term sustainable development is an international term used in the late eighties of the last century, and it was officially referred to in the report on our common future or the so-called Brundtland report issued by the committee on Environment and development of the United Nations in 1987.

Sustainable development has been defined in this report as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, this definition contains within it two main concepts:

-Define the concept of the needs, especially the basic needs of the world's poor, to which the highest priority should be given.
- The concept of limitations on the ability of the environment to meet current and future needs under the state of technology and social organization (Ben-Mahdi, toubal, 2020, pp. 301-302).

Sustainable development involves many challenges. How can we improve people's living and preserve our natural resources in a world with a growing population, accompanied by an increasing demand for food, water, shelter, sanitation, energy, health services and Economic Security, countries must reconsider their consumption and production patterns, commit to responsible and environmentally sound economic growth, and together significantly expand cross-border cooperation for the exchange of experience, technology and resources, and these changes can and should be achieved for the prosperity of our planet and its inhabitants (schra, 2010, p.42).

Sustainable development is an attempt to create a model of development, integrating both the economy, social progress and Environmental Protection (Diplasio Brochard, 2011, p 07).

Sustainable development is development that meets current needs without compromising the ability of future generations to meet their needs.

2.2 Sustainable Development Goals

The Sustainable Development Goals are :

-The goal is to reduce the depletion of Natural Resources and use them rationally because they are relatively limited;
-To establish environmentally friendly projects based on modern methods of development in order to improve the quality of life and control the risks and environmental problems caused by the use of technology;

- To achieve social development by getting rid of poverty and achieving equality through a fair distribution of wealth and resources, a fair tax system, strengthening health and education, in addition to providing job opportunities and living in a clean environment;
-The purpose of increasing national income, improving the standard of living of the population and the quality of life of individuals;
- The goal is to achieve sustainable economic growth by preserving natural capital for future generations.

2.3. Dimensions of sustainable development

The dimensions of sustainable development are as follows :

* **Environmental dimension**: the environmental dimension of sustainable development means setting limits in dealing with the natural environment when practicing economic activity in order to ensure the optimal management of the living or inanimate natural components surrounding humans through rationalizing the use of natural capital instead of wasting and depleting it, employing waste treatment technologies and adopting the cleaner production method using environmentally friendly technologies and the sustainability of natural resources for future generations.

* **Economic dimension:** Economic sustainability was the new perspective and project for global peace and security, and it is the alternative to capitalist and socialist ideologies, through which there can be acceptable rates of development and at the same time preserving the environment and its wealth within the rights of future generations, and to achieve these aspirations together, it is necessary to search for alternative methods and approaches and to replace this sustainability in raising the awareness and earning of individuals and communities Ethics and behaviors that are fairer and more respectful of the environment around them and other people around them (al-Kubaisi, 2015, p.24).

*** Technological dimension**: it means transferring society to the era of clean industries through the use of clean technology in industrial facilities that recycles materials and reduces waste, reusing them to reduce pollution and consume less energy in a way that leads to the conservation of Natural Resources, finding other sources of clean energy instead of using traditional sources such as fuels and also reducing the emission of heat-trapping carbon dioxide harmful to the ozone layer through its sequestration and storage (Chaib, 2018, P.36).

*** Social dimension**: sustainable development at the social level seeks to stabilize the population growth rate as well as stop the flow of people to cities through the development of levels of Health and educational services in villages, poverty eradication and the construction of a strong infrastructure.

The second axis: the role of green innovation in achieving sustainable development

Achieving sustainable development through its environmental dimension is through green innovations and the environmentally friendly and effective products and production methods it provides to improve the quality of the environment, protect natural resources for future generations and provide appropriate solutions to reduce polluting gases and greenhouse gases and climate change and reduce environmental damage.

green innovation is also considered one of the important means to achieve the economic dimension of sustainable development by changing production and consumption patterns and making them more sustainable and adapting them to environmental conditions and requirements, which leads to increased productive efficiency as a result of using clean energies and materials, which reflects positively on its profitability In addition to the above, it is possible to infer the impact of green innovation on the social dimension of sustainable development, through the Human Development Index and the extent of providing appropriate conditions of a clean environment, which affects the improvement of Education Services, Health and standard of living as a whole and thus improving the quality of life of individuals .

The third axis: world-leading fights (Switzerland, USA and United Arab Emirates) and ways to benefit from them

1. The Switzerland experience

1.1Analysis of the results of the Green Innovation Index for Switzerland

Switzerland ranks first globally in terms of innovation among 139 countries, according to the global innovation ranking for the year 2024, and has maintained this rank for 12 years in a row, and also occupies advanced ranks according to the Green Innovation Index, as it ranked fourth in the list of green innovation results of the European Union for the year 2018 and achieved the best result at the level of the green innovation ability index, the indicators of green innovation for Switzerland for the year 2018 can be illustrated through the following table:

Table 01: Swiss Green Innovation Indicators for 2018

The index	Percentage ratio
The ability to green innovation	**0.79**
An environment that supports green innovation	**0.51**
Green innovation activity	**0.51**
Green innovation performance	**0.65**

Source: ASEM, Eco-Innovation Center, Korea, December 2018, PP 16-23.

Most of the Green Innovation Indicators for Switzerland are higher than the average result achieved by the European Union countries. they are the first in the first pillar of the Green Innovation Index. the green innovation capability index includes competitiveness, the general ability to innovate in the country, awareness of sustainability management. the innovation-supporting environment index indicates the extent of regulatory implementation and ranked fifth, the green innovation activity index also includes the extent of participation of enterprises in the Environmental Management System, green patents, the effectiveness of renewable energy use ranked fifth according to this indicator, but Also ranked fifth, this indicator indicates the extent of environmental impact on society, the intensity of carbon monoxide emissions, the level of energy sustainability of the country, the size of the green industry market.

Switzerland has a high capacity for green innovation and achieves above-average performance in all pillars of the Green Innovation Index, but not at the same level as its

achievement of innovation in general. it is the first champion and innovation leader in the world for several consecutive years.

Switzerland has provided the greatest success in the field of high applied value innovations such as Empa, a Swiss research company working in the field of technical science and technology that focuses on developing practical solutions to a variety of challenges such as renewable energy technologies and environmental conservation technologies.

1.2 Development plans based on green innovation

Switzerland has pursued a set of policies and tools to achieve green innovation, created a key vision of the green technology plan in order to reduce resource consumption and created the green economy Action Plan in order to create a sustainable development plan and transition to a green economy. The green economy Plan 2010 was implemented using the Energy Strategy 2050 as a basis, where the Energy Strategy 2050 determined that there is no other solution than a green economy in order to achieve environmentally and socially sustainable development that preserves the environment while at the same time increasing well-being and in response to climate change and the systematic elimination of nuclear reactors, according to which Resource Use Efficiency was reformed, information on the use of resources and polluting products (environmental classification) was provided, and the correctness of the environmental tax audit was assessed.

This was modified in the Swiss clean technology master plan 2012_2014 (SCPM) which focused on increasing the resource efficiency of both products and consumers, the replacement and recycling of raw materials, the involvement of relevant personnel, and the strengthening of monitoring.

The government of Switzerland also supports the knowledge platform for green growth; the federal parliament approved an action plan in March 2013 consisting of 4 areas namely consumption/production, waste/raw materials, taxation and performance assessment(goal setting - monitoring - information provision - report) and 27 strategic plans.

2. The experience of the United States of America:

The most important areas of research and investment in the United States in the framework of clean technology are focused on a number of technologies, including the following (Si Nasser, 2014, pp. 131-133):

* **Energy from hydrogen**: the development of next-generation energy technology such as hydrogen will significantly reduce the dependence of the United States on energy imports, especially in the transport sector, where it is possible to produce hydrogen from all primary energy sources (fossil, nuclear, renewable) hydrogen can drive clean internal combustion engines, where it will reduce emissions from cars by 99%.Hydrogen fuel can be used in stationary installations such as providing electricity to homes, offices and other buildings.

Currently, natural gas is being relied on to obtain hydrogen, and in this context, the US government has been keen to develop this resource as an energy source through cooperation with the European Union in this area, where it is expected that many technologies will achieve fuel savings where the US states encourage fuel by 11 million barrels / day by 2040.

* **Energy efficiency**: the importance of this type of innovation is reflected in many programs that deal with energy efficiency, the most prominent of which are: The freedom car program, automotive technologies, hybrid technology and lightweight technology, where many technologies are expected to achieve fuel savings where the USA promotes electrical appliances, in buildings and in the transmission and distribution of electricity.

* **Nanotechnology:** the United States of America is increasingly interested in this type of technology, which will revolutionize the production and consumption of energy, as it is used in the production of solar cells, as the next new generation of catalysts and membranes that will be used in hydrogen fuel cells, and microtubules are currently being studied, this can provide high-performance power transmission lines, which allows raising the efficiency of electricity networks and reducing energy losses.

* **Dual generation system:** the United States has recently adopted the dual generation system in addition to integrated energy systems as one of the best ways to improve energy efficiency and reduce energy costs and reduce its environmental impact.the application of these systems in buildings and industrial facilities contributes to converting from 80 percent to 85 percent of the fuel energy content into usable energy compared to conventional thermal power plants that convert only 50 percent of fuel energy, the adoption of improved energy efficiency contributes to reducing emissions by 45 percent in conventional power plants.

* **Biofuels:** corn - generated biofuels play a prominent role in reducing dependence on oil imports, especially in the transport sector, besides being one of the clean sources that do not generate negative environmental effects from the burning process, as it can be produced at the level of each state compared to other renewable sources, where ethanol is the dominant source among other sources of fossil fuels in the states, and with Brazil produces about 90 percent of the total world production of inathol.

* **The American orientation towards productive behavior or green consumption** (Abdelbaki, 2019, P. 409): Many organizations have realized that green behavior constitutes a market opportunity that may give the organization a competitive advantage, especially with the growing environmental awareness among consumers, and their gradual transformation into green consumers.

one of the advantages of this strategic orientation is that official and unofficial bodies promote environmental orientations, through various media, and in this free assistance and support from these bodies for the promotion efforts of organizations that adopt the green marketing approach, and therefore the green orientation will be convenient, especially in the long term, and the feasibility of moving towards this behavior is the growing awareness of people towards the threats faced by the environment, represented by:

-The reason for the decrease in raw materials in nature, especially non-renewable;

-Due to the constant rise in energy costs , and the imminent expiration of the life span of existing energy sources ;

-The increasing rates of environmental pollution, which may constitute a destruction of the natural environment;

-The role of governments is changing and increasing their environmental awareness, which is represented in the enactment of laws and legislation to protect the environment.

By stimulating investment in sustainable production, net welfare gains from economic activities and sustainable production practices will increase, reducing resource depletion and producing less pollution .similarly, stimulating demand for more sustainable products through the promotion of sustainable consumption can create new markets for businesses that pursue sustainable production practices, leading to increased revenue flows and new jobs. The volume of global trade in green products has currently reached almost 50 billion dollars.

3.

4. The experience of the United Arab Emirates:

Initiatives and incentive projects to reach green innovation in the UAE include the following (Thari, 2020):

*__Dubai Green Fund worth 27 billion dollars__: With the aim of encouraging green investment and green growth, the emirate of Dubai established the"Dubai Green Fund"in November 2015 with a value of 27 billion dollars as part of the Dubai Clean Energy Strategy 2050, which aims to provide 7% of Dubai's energy from clean energy sources by 2020, 25% by 2030 and 75% by 2050, making it the city with the lowest carbon footprint in the world by 2050.DEWA has also established the company "Etihad Energy Services" to provide investment opportunities for companies specialized in energy efficiency performance contracts, financial institutions and suppliers of green technological equipment, and work is underway to rehabilitate more than 30,000 buildings in the emirate of Dubai to ensure efficient use of Energy is in the first phase of this project .In addition to an energy demand management program, the project costs AED 30 billion and the project promises a total net savings of AED 52 billion and an economic return.

•__Establishment of a sustainable energy house in the emirate of Dubai__: in November 2016, the Mohammed bin Rashid Space Center announced a sustainable and autonomous House on the electricity grid in Dubai. a model of the house was developed, a house adaptable to the hot and humid climate in the UAE, to promote the use of green and smart technologies. the internal temperature of the independent house ranges between 22-25 degrees Celsius in all seasons and times so that it does not require any traditional cooling device and facilitates the reduction of energy consumption by 75%. the house applies smart solutions, including cooling technology based on chilled water, thermal insulation techniques and clean air spread in the house constantly by means of a ventilation system The mechanical House also includes an intelligent management and control system that reacts to external heat and humidity, the construction of this model took only 100days, preceded by more than a year of study, comparison and application .The center aims to spread this type of house throughout the UAE, where it plans to establish a laboratory specializing in conducting independent experiments and tests to verify the efficiency of devices, systems and resources.

*__Promoting sustainable consumption through eco-labels and purchases__: mainly focused on encouraging the UAE industry to better respond to the requirements of

greener consumers and invest in providing and obtaining sustainable products and services, in addition to national environmental standards with regard to the efficiency of water and energy appliances and organic food, the Emirates Authority for Standardization and Metrology (ESMA) has developed the UAE system of environmental labeling for systems, indoor products, outdoor construction products, indoor furniture, electrical and mechanical tools, packaging products, household cleaning, steel products, cement and office supplies.

Conclusion:

Environmental pollution has become a phenomenon facing many countries and companies, which forces them to adopt the concept of environmental responsibility within their strategies by looking for mechanisms to reduce the use of polluting resources of the ocean and the depletion of extracted raw materials, which is what the United States of America, the United Arab Emirates and Spain are working for by integrating the environmental dimension in:

- Switzerland occupies advanced positions in terms of green innovations, but not to the same extent as its progress in innovation, it ranks first globally for 12 years in a row ;
- The adoption of the dual generation system by the United States of America to improve energy efficiency and reduce its impact on the environment;
- The importance of the United States of America's dependence on natural gas to obtain hydrogen as an energy source to reduce emissions harmful to the environment;
- The growing interest of the USA in technology for the production of solar cells and fuel saving;
- The aim of increasing environmental awareness on the part of consumers and turning them into green consumers is to stimulate enterprises to move towards green productive behavior;
- The UAE has worked to promote green investment and growth through the Dubai Green Fund to provide energy from clean sources ;
- To promote the use of green and smart technologies by creating a sustainable energy house in the emirate of Dubai ;
- To encourage the UAE industry to better respond to the demands of greener consumers and invest in the provision of sustainable products and services.

Recommendations:

- The need to rely on green processes to provide energy and exploit renewable energies as an alternative to fossil energies;
- To support research and development in the field of green innovation through the allocation of financial resources, especially in developing countries;
- To facilitate the transfer of expertise and successful experiences to developing countries in the field of sustainable and clean technology innovation.

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