

# Sustainability Awareness in Saudi Arabia



Leenah Al Sabban and Tomayess Issa

**Abstract** The individuals' impact on the environment has caused a need to study and evaluate why these humans act in non-sustainable ways. Nowadays, many researchers study how to change these non-sustainable behaviors. Colleges and universities (higher education sector) have been called on to increase awareness and knowledge of environmental problems in order to change these non-sustainable actions. This study has been done in Saudi Arabia. Saudi Arabia is a semi-developed country that has a low level of sustainable development awareness. The researchers have reviewed several articles describing such awareness initiatives. However, few studies have been done in Saudi Arabia. The purpose of this study is to examine the advantages and disadvantages of sustainability awareness in Saudi Arabia in the higher education sector. An online survey was created, and one hundred and ten participants completed the survey questions, and the researchers analyzed the results to reach the research objective. The results of the online survey showed that the Saudis believe that sustainable development can increase their job advantages, and reduce their carbon footprint, gas emissions and pollution. Furthermore, some Saudis believe that some organizations and businesses will be damaged if they did not implement the sustainable development. Thus, this study's findings support further sustainability research, which is needed to see other apparent causes of the low level of sustainability awareness in Saudi Arabia. In addition, the researchers have proposed a number of sustainability advantages and disadvantages factors. Finally, there are number of limitations to this research. First, the participants were restricted to Saudis from a higher education sector. Second, most of the survey participants did not complete their surveys. Third, the survey participants took a long time to respond which is time-consuming to the researchers. Indeed, further suggestions and recommendations were delivered at the end of the research.

**Keywords** Sustainability · Awareness · Saudi Arabia

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## 1 Introduction

In the last 25 years, the world has realized the devastating effects of the industrial revolution. Some of these problems include air pollution from energy production, high natural resources consumption, and transportation. This causes global warming, acid rain, and ozone depletion. Nowadays, the world leaders and governments have recognized these environmental problems are linked to economic development issues that are going to affect the future generations negatively.

Consequently, the concept of sustainable development has become the major goal for most businesses. There are many definitions of sustainable development. First, sustainability could be defined as economic development or as an ability or capacity which meets the present generation's needs without compromising the ability of the next generations to meet their own needs (Hopkins et al. 2009). Second, it has been established as development encompassing three main dimensions, which are economic, social, and environmental. Also, it is a common and important term currently used worldwide (Lele 1991).

Saudi Arabia is an important country because it has a high level of international petroleum production. So, sustainable development practices are a major consideration among private and public sectors in Saudi Arabia (Hashmi et al. 2015). Saudi Arabia contributes to sustainable development through its enterprise operations, governmental regulations, human rights, education, etc. On the other hand, there are many issues caused by different organizations or uneducated individuals due to their low level of sustainability awareness, which can affect the country's sustainable development. As sustainable development has become very essential these days, the main objective of this dissertation is to examine the advantages and disadvantages of sustainability awareness in Saudi Arabia in the higher education sector.

In brief, this study will define the sustainable development concept, provide a brief history of the concept, and discuss its different goals. It will also examine and explore the current progress level towards sustainable development and identify the advantages and disadvantages of sustainability awareness in Saudi Arabia. In addition, the findings of this project can inform Saudi Arabian leadership or policymakers of the universities (higher education) to increase their student, staff, and faculty sustainability awareness and to achieve the country's sustainability goals in the future.

## 2 What Is Sustainability?

The word sustainability has become very popular in many different research studies such as policy-oriented research in terms of what public policies should achieve. This research paper will focus on the general definition of sustainability. Sustainability is an inspiration originated from the Brundtland Report of 1987 (Kuhlman

and Farrington 2010). Moreover, one of the sustainability pathways is sustainable development. The Brundtland Report of the World Commission on Environment and Development defined sustainability or sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Kohn et al. 2010, 286). Sustainability is one of the newest subjects that tries to connect civic engineering with social science and environmental science with future technology. Furthermore, sustainability is concerned with the future generations’ well-being and access to irreplaceable and rare natural resources (Kuhlman and Farrington 2010).

The term sustainability is very broad and a complex discipline. There are many researchers attempting to define the sustainability concept. Kuhlman and Farrington (2010) defined sustainability as a relationship between mankind moving towards a better life and the limitation forced by the nature. Mainly, there are three dimensions under the concept of sustainability, which are environmental, economic and social. Moreover, Matthew Mason defined sustainability as the study of how natural systems work, stay diverse and produce everything required for the ecology to stay in balance. In brief, sustainability looks to safeguard our health, both human and natural environment (Mason 2017). Sheehan (2009), and Mason (2017) stated that sustainable development or sustainability concentrates on balancing competing requirements: society requirements to move forward economically and technologically, and all other requirements which protect our environments.

However, sustainability is not just about the environment. Running a successful and sustainable development involves three factors which are: environmental and energy stewardship; organizational stewardship and human resources; and reaching financial and operational goals and objectives (Sheehan 2009). Despite the various definitions of sustainability, there are three major principles or dimensions that will be discuss in detail in the following section.

## ***2.1 Environmental Sustainability***

The environmental sustainability concept is the ability to maintain qualities and things which are valued in the physical environment. For instance, people want to maintain (Sutton 2004):

- the different capabilities by which the natural environment sustains the people’s living conditions, such as clean air and water and a suitable climate,
- human life,
- environmental aspects which produce renewable resources (e.g. water, solar energy, fish, timber),
- life quality for all people, beauty and liveability of the environment.

This dimension (Environmental Sustainability) concerns environmental problems and solutions. In our world, there are many different environmental problems that people should be worried about including threats to water resources, climate change,

high energy usage, and high population level (White 2009). To reduce these environmental problems now and in the future, people have to protect their environment by reducing power consumption, recycling, and using all resources at a sustainable rate (Mason 2017). Another solution is that the businesses should be regulated and controlled to prevent pollution and to keep carbon emission levels low. It is important to install renewable power sources in our businesses and homes (Mason 2017).

## ***2.2 Economic Sustainability***

Economic sustainability refers to the ability to support a defined economic production level for an unspecified period (indefinitely). It is the most elusive element of the triple bottom line approach (Doane and Macgillivray 2001) which will be discussed in detail in the coming sections. This dimension concentrates on how the businesses and organizations should be focused on profits, efficiency, and the influence of production processes and resources extractions (Coca-Prados 2013). So, most of the businesses should manage their economic performance in an efficient and effective way to stay in a sustainable position.

Moreover, the businesses' managers must be aware of production costs, and consumer costs in their businesses. Production costs come from labor, manufacturing, energy and maintenance costs. Consumer costs include purchase prices, usage costs, maintenance costs and energy costs (Neugebauer et al. 2015). For that reason, there are different tested, affordable, available and accepted management systems and tools for use by the developing 'economic sustainability Manager' (Doane and Macgillivray 2001).

## ***2.3 Social Sustainability***

The most important part of the third dimension is the society. There are various social issues that are affecting the level of social sustainability. These issues are related to fair wages, society health (including health effects on consumers, communities and workers), working conditions (including working hours and labor laws), human rights, safety (i.e. workplace safety) and education (i.e. literacy rate, university degrees, etc.) (Neugebauer et al. 2015). It is essential for every government and business manager to discover different ways to provide good levels of education to society, provide basic requirements and needs, improve working conditions, take care of their health, etc. These activities concentrate on sustaining beneficial relationships with community, customers and the employees as well as they have benefits in terms of positive consumer and profile and community support (Manufacturing Skills Australia 2017).

Sustainability and sustainable development are notions that have appeared in many facets of life whether it has been through books, internet, television shows, social

media or newspapers. The human impact on the environment in terms of deforestation, natural resources depletion, overconsumption, pollution and possible climate changes has caused the global community to create large sustainability awareness campaigns and environmental policy changes (Hutcherson 2013). These awareness campaigns and environmental policy changes are essential to reach effective sustainable development and to avoid negative impacts on the environment. These negative impacts cause various issues which can damage world environments, natural resources and population in the long-term because the earth's resources are limited and could not support the future generations. Awareness and conservation must be concerned whenever people use the earth's natural resources. In that context, sustainable development has become essential for most countries. Many governments have established rules, regulations, policies and practices regarding the use of the country's resources. Rogers and Hudson (2011) stated that several organizations, both universities and businesses, are being responsible by changing rules and practices to meet the future environmental challenges.

Sustainable development is about protecting and keeping our planet and its natural resources for a long time. In brief, it is an effective plan which usually helps in resolving several environmental issues that may occur. Lele (1991), Kuhlman and Farrington (2010) discussed the three major pillars of sustainable development which they must balance when planning activities. These pillars are economic, social and environmental. In the last 25 years, the world has realized the devastating effects of the industrial revolution. Some of these problems include air pollution from energy production, high natural resources consumption, and transportation. This causes global warming, acid rain, and ozone depletion. Nowadays, the world leaders and governments have recognized these environmental problems are linked to economic development issues that are going to affect the future generations negatively. Consequently, the concept of sustainable development has become the major goal for most businesses. There are many definitions of sustainable development. First, sustainability could be defined as economic development or as an ability or capacity which meets the present generation's needs without compromising the ability of the next generations to meet their own needs (Hopkins et al. 2009). Second, it has been established as development encompassing three main dimensions, which are economic, social, and environmental. Also, it is a common and important term currently used worldwide (Lele 1991).

### **3 Corporate Social Responsibility (CSR)**

Many consumers are aware of environmental challenges and the ethical operations of different organizations, and these consumers expect organizations to perform as good corporate citizens. In that context, organizations have been addressing their consumer requirements in the Corporate Social Responsibility form (Albus and Ro 2017). Corporate social responsibility is a business approach which is strongly linked to the businesses' sustainable development by delivering environmental, economic

and social benefits for all the businesses' stakeholders. Additionally, CSR refers to an organization's voluntary activities such as adoption of human resource management practices, supporting local businesses and communities, and reducing environmental hazards (Barnett 2007; McWilliams and Siegel 2001). CSR is a crucial component of strategic planning and business models in organizations that aim to be competitive (Franklin 2008).

### ***3.1 The Benefits of Corporate Social Responsibility***

Corporate Social Responsibility positively affects several areas of an organization's competitiveness. Sen et al. (2006), and Forte (2013) clarified that most of the businesses' stakeholders who are aware of their organization's CSR initiatives usually exhibit many positive concepts and various benefits such as increase the organization's investment, maximize the organization's profit, benefit their communities by providing them with different activities, increase sales volume, enhance financial performance, enhance organization's reputation, and endorse organization's long-term profits, than the other persons who are unaware of the CSR significance. In addition, CSR usually improves relationships between communities as it aims to benefit the organization's stakeholders as well as society (Sen et al. 2006). CSR enhances the business ethics inside the organization as well as among their business partners and their competitors (Forte 2013).

Corporate Social Responsibility (CSR) addresses five major dimensions: product and service quality, environmental challenges, diversity problems, employee relationships, and community relationships. Inoue and Lee (2011) examined the effect of acting on these five dimensions on the financial performance of several industries. They found that each CSR dimension has a different influence on both future and short-term profitability, but has a positive effect on the organization's financial performance (Dwyer et al. 2009; Lee and Park 2009). Likewise, Luo and Bhattacharya (2006) stated that CSR practices have a great and positive impact on customer satisfaction and consequently on an organization's market value.

### ***3.2 Types of Corporate Social Responsibility***

The major idea behind Corporate Social Responsibility (CSR) is that organizations have several responsibilities to sustain. These responsibilities start from the lower-level responsibilities which can meet the basic business needs (making business profits), up to higher level responsibilities which support and benefit society as whole (benefiting society). Scilly (2016) has categorized Corporate Social Responsibility into four types:

**Economic Responsibilities:** a basic business responsibility. Every business exists to generate profits for its stakeholders. If the business fails, it will not be able to pay for business taxes, employees' wages and many other obligations (Scilly 2016).

**Legal Responsibilities:** as a foundation of Corporate Social Responsibility, it is crucial for every business to follow industry laws and regulations. This is important to the business by generating more profit as well as to benefit society by adhering to tax and labor laws (Bisk 2015).

**Ethical Responsibilities:** this type of responsibility should be examined once an organization is profitable and meets its industry laws and regulations (legal responsibilities). Activities that meet this responsibility might include providing for employees welfare and better benefits, providing jobs to individuals who have difficulty finding jobs, or paying higher wages. (Scilly 2016).

**Philanthropic Responsibilities:** the organizations should consider this responsibility type once they meet their economic, legal and ethical responsibilities. CSR ranges in scope, and can involve everything from building elderly hospital to donating time to a charity (Bisk 2015).

### ***3.3 Roles of Corporate Social Responsibility***

All business stakeholders and all the individuals in any organizations must be involved in the CSR plan. Every individual in the organization has a CSR role. These roles are (Rangan et al. 2012):

- Corporate responsibilities to the investors or business' stakeholders are the business must disclose all important and necessary information to investors and stakeholders, respect them, provide them a high level of security, and protect the confidentiality of corporate information.
- Corporate responsibilities to the business' managers and directors are improve corporate managing systems, and periodically provide an accurate corporate financial report.
- Corporate responsibilities to the business' employees are provide them with welfare and security as stated in the labor protection laws, pay their wages, and improve their skills by offering training programs or workshops.
- Corporate responsibilities to consumers are provide high quality products and services, provide sufficient information about the business and its products and services, and respond quickly to their enquiries and complaints.
- Corporate responsibilities to the business' partners are provide good offers and fair contracts, and do not accept any types of bribery or corruption.
- Corporate responsibilities to the environment and society are set rules, regulations and practices to protect the environment, gain more knowledge about the local culture, help and support local workers and society as whole.
- Corporate responsibilities to the business' competitors are engage in and encourage fair competition.

CSR can take many different forms based on the type of the organization, business, culture, or traditions in different countries (Sen et al. 2006).

### ***3.4 Advantages and Disadvantages of Corporate Social Responsibility***

The advantages of CSR can be obtained by applying its policies and practices. The rewards and advantages gained from CSR motivates and encourages businesses or organizations to commit to its activities (Swanson 1995).

Swanson (1995), and Forte (2013) reported the advantages of CSR are that it: improves an organization's profit and encourages long-term profit, increases returns on investments, enhances an organization's image, improves an organization's reputation, increases employee retention and attraction, raises sales volumes, and attracts new investors from several sources. Dedication and commitment to CSR improves stakeholder relationships and community relations as whole. Forte (2013) stated that CSR contributes to a satisfactory public image. Public image is a significant element in the organization's success. Furthermore, organizations, which adopt CSR, can support a healthy environment, a better quality of life, and a friendly community (Maignan et al. 1999).

## **4 Sustainability in Developing Countries**

A developing country refers to a poor, agricultural country that is looking to be more advanced socially and economically. Also, it is a term given to the underdeveloped or less developed countries compared with other countries worldwide. Due to the poor understanding of sustainable development and its impact in the developing countries, there are several significant projects, particularly those in the sanitation and water sector, that fail to bring benefits to society over a long period (Carter et al. 1999). These developing countries usually depend on assistance and support from developed countries and they implement the developed countries' management concepts and philosophies (Punnett 2013). There are 139 countries that are listed in the United Nations Statics Divisions as developing countries around the world. Examples of these countries are: Ghana, Eritrea, Niger, Mali, Pakistan, Indonesia, Mexico, Cuba, Brazil, Libya, Algeria, Afghanistan (UNSD 2015).

The developing countries can be recognized by a number of characteristics: (1) general poverty disrupting every aspect of life, (2) lack of businesses and industries, (3) lack of capital and technology, (4) lack of basic infrastructure, (5) over-population, (6) a high level of unemployment, (7) low levels of education, (8) lack of basic services such as health services, (9) dependence on agriculture as a main source of income, and (10) underutilizing the countries' natural resources (Jeevan 2010).



Punnett (2013) states that developing countries need to develop basic infrastructure such as transport infrastructure, education levels and standards, improve industries, businesses and basic services, utilize their natural resources beside their agriculture sources, to improve their life-style and to follow the track of developed countries.

As Cobbinah et al. (2011) indicate sustainable development can balance the economic, social and environmental dimensions both currently and in the future. Also, sustainable development can protect and improve economic and social environments, ensure equality between societies, reduce the poverty percentage, and seek to resolve various economic, social or environmental conflicts. Thus, sustainability and sustainable development can help developing countries tackle challenges or issues that they may face in present or in the future (Adenle et al. 2013). Furthermore, different programs in the United Nations (UN) such as the UN Environment Program as well as the UN Human Settlements Program aim to support developing countries to engage in sustainable development (Cobbinah et al. 2011). Nevertheless, it is quite hard for some developing countries to begin sustainable development due to the lack of plans and strategies as well as the absence of human capital to support new and imported technologies (Alkire and Santos 2010).

## 5 Sustainable Development Advantages

In order to thrive for future generations, societies must know how to balance environmental, social and economic concerns. Mainly, sustainability is about having the proper interaction and balance between the following (Weybrecht 2010):

- **Social Equity (People)** e.g.: human rights, gender equality, people security, justice, and cultural diversity).
- **Environmental Protection (Planet)** e.g.: agriculture, energy, water, forests, deserts, air and fish.
- **Economic Development (Profit)** e.g.: economic growth and limits, waste management, education, employment, corporate responsibility and poverty reduction.

As Weybrecht (2010) stated, creating an appropriate balance between the three elements, and adopting sustainability in businesses, will generate many advantages to these businesses. First, it can reduce business costs because sustainability offers the mechanism to reduce costs by concentrating on using fewer resources such as energy, people, raw materials or water. Also, sustainability drives businesses to make their processes more efficient and eliminate or reduce waste. Second, it can preserve raw materials and resources. Sustainable development can differentiate businesses, maximize business income, attract new customers, and increase market share. Third, sustainable development can attract quality employees, satisfy consumer needs, meet stakeholder expectations, attract capital investment, capitalize on new advantages,

enhance corporate social responsibility, enhance human rights and community investment, minimize business risk management, etc. (Pearce et al. 2013; Weybrecht 2010). Finally, there are several environmental advantages. Sustainability can decrease carbon footprints and emissions, reduce pollution as well as reduce health hazards (Weybrecht 2010).

## 6 Sustainable Development Disadvantages

Several disadvantages are associated with sustainability adoption in businesses. These disadvantages normally affect the business' performance and business' cost. First, it is more expensive to create services and products in a sustainable environment than in a non-sustainable manner. Second, sustainable development usually maximizes businesses' interest rates, can increase competition between businesses, and the cost of sustainable raw materials can be higher (Weybrecht 2010). In addition, adoption of sustainability in businesses will encourage governments to generate new environmental and economic regulations.

In fact, it can be very difficult to start a company with sustainable development in a developing country due to issues such as transportation or resource limitations, which can cause the company's downfall (Robberts 2016).

Moreover, another disadvantage to sustainable development is increased business fraud, governance failure and compliance breaches. Also, sustainability can maximize the business's transaction and system failure. Other disadvantages of sustainability adoption are: increased chance of marketing failure, supply chain crises as well as it can increase business's scandals (Weybrecht 2010).

## 7 Sustainability in Saudi Arabia

The Saudi government and many public and private institutions are becoming aware of sustainable development. Several Saudi sectors have applied Corporate Social Responsibility (CSR) and sustainable development in their corporations.

Belloumi and Alshehry (2015) have reviewed Saudi Arabian sustainable energy development. They have also studied the role of Saudi energy consumption in economic growth from 1971 to 2012 by using specific procedures and principles such as the autoregressive distributed lag cointegration technique and energy-led growth hypothesis to examine the relationship between real Gross Domestic Product (GDP) and energy consumption, human capital, and employment.

The result of their study shows the importance of energy utilization on many different economic activities through several production, investment and consumption channels in Saudi Arabia. Moreover, Belloumi and Alshehry (2015) confirm that energy is not neutral to economic growth, but the relationship between them is very

important. This can help decision makers make the best energy management decisions, which are crucial in responding to climate change and the environment. They also mention the importance of energy efficiency and the investment in renewable energy resources such as wind and solar because these can save more money, reduce the business' carbon footprint, and decrease greenhouse gas emissions to meet the global commitment on climate change (Belloumi and Alshehry 2015). Utilization of natural renewable energy resources in Saudi Arabia will provide a healthy environment for long-term sustainable development (Elhadidy and Shaahid 2009). All these activities can lead Saudi Arabia to a great future with sustainable development.

Saudi Arabia has a plan and vision for sustainable development in 2030. This vision is based on two pillars. The first pillar is the Saudi determination to be a global investment capital. The second one is transforming the unique location of Saudi Arabia into an international hub connecting three continents, Africa, Europe and Asia (Alarabiya 2017).

As Saudi Arabia is very rich in its natural resources, it can depend on different resources for energy needs. There are different objectives under the 2030 vision: Saudi government will convert the public investment fund into the largest wealth fund worldwide, it will encourage its major organizations and businesses to expand and take their place in different markets globally, save the country's resources, and create more job advantages for Saudi's citizens (Hassan 2016).

The three themes behind the Saudi 2030 vision are: a vibrant Saudi society, an ambitious nation, and a flourishing economy. Moreover, there are several goals behind these themes, which are: having a healthy society, reaching environmental sustainability, offering equal advantages, increasing the Saudi investment capabilities, developing a great business environment, and maximizing the energy sector competitiveness (Alarabiya 2017; Hassan 2016).

## 8 Research Methodology and Research Question

The primary focus of this research is to consider sustainability awareness in Saudi Arabia. More specifically, this research investigates the different advantages and disadvantages of the Saudis' attitude toward sustainability. In order to work within the context described above, this research question for this chapter is as follow: "What are the advantages and disadvantages of sustainability awareness in Saudi Arabia?" "The research method is the process that the researchers use to gather and analyze data, information and knowledge for various purposes such as making a business or a management decision. In principle, there are two research methods that can be utilized in research: a quantitative, a qualitative, or, in some cases, a mixture of the two.

### ***8.1 Qualitative Research Methods***

Qualitative research is frequently associated with an interpretive philosophy (Denzin and Lincoln 1994). Various techniques are used in qualitative research to collect and analyze the data as well as to produce accurate conclusions; they include in-depth interviews, case studies, etc. (Saunders et al. 2012). These techniques provide comprehensive understanding and insight for specific research phenomena. The presentation of the research results and conclusions are delivered as detailed descriptions, not in statistical format, which helps the researcher gain enough understanding of the participants' perspectives, experiences, etc.

### ***8.2 Quantitative Research Methods***

The quantitative method emphasizes the mathematical, numerical, and/or statistical analyses of collected data through various techniques such as surveys, questionnaires, etc. Quantitative research is often associated with the deductive research approach by using collected data to test the proposed theory. At times, it is associated with the inductive approach, where collected data are utilized to evolve the theory (Saunders 2016). This method concentrates on fact findings to achieve a quantitative conclusion, which should be supported by statistical and numerical indications (Saunders et al. 2012).

In the process of choosing a research methodology that suits the research, the researcher should identify the kind of data required to answer the research question. The purpose of this research project is to examine the advantages and disadvantages of sustainability awareness in Saudi Arabia in the higher education sector as well as the related risks and opportunities when businesses adopt sustainable development. This requires appropriate investigation and analysis to deliver the research outcome. So, the study was concerned with gathering data that provides enough understanding and frequency of the phenomena, and in order to do so, a quantitative research methodology was adopted for this research.

### ***8.3 The Chosen Research Method and Approach***

In the process of choosing a research methodology that suits the research, the researcher should identify the kind of data required to answer the research question. The purpose of this research project is to examine the advantages and disadvantages of sustainability awareness in Saudi Arabia in the higher education sector as well as the related disadvantages and advantages when businesses adopt sustainable development. This requires appropriate investigation and analysis to deliver the research outcome. So, the study was concerned with gathering data that provides enough

understanding and frequency of the phenomena, and in order to do so, a quantitative research methodology was adopted for this research.

The current research will be conducted using a deductive research design. A deductive research approach is usually associated with quantitative research where the researcher can concentrate on using quantitative data to test a specific theory (Saunders 2016). After testing the theories in question, reliable results can then be produced, and research conclusions are drawn clearly (Saunders et al. 2012). Eventually, the research outcomes will be delivered as quantitative data, statistical analyses, and/or mathematical calculations (Trochim and Donnelly 2001). In brief, the research outcomes will have more information across many cases.

## ***8.4 Research Design***

This section talks about the research processes details (design), which includes the survey design, unit of analysis, and target sample and population. The main objective of this research is to examine the advantages and disadvantages of sustainability awareness in Saudi Arabia in the higher education sector as well as the related disadvantages and advantages when businesses adopt sustainable development.

## ***8.5 Unit of Analysis***

The unit of analysis is the main entity, which is being evaluated, studied and analyzed in a research or study. The unit refers to ‘who’ or ‘what’ that is being analyzed or studied such as groups, individuals, social interactions (i.e. divorces, arrests, or dyadic relationships), artifacts (i.e. newspapers, books, magazines, or photos), and geographical units (i.e. state, country, or town). In terms of this research, the unit of analysis is a group of people in Saudi Arabia to test their sustainability awareness level. Moreover, the survey constructed for this study uses the Likert scale approach to scale the Saudi participants’ response towards sustainable development in Saudi Arabia. Also, it evaluates the Saudis’ attitudes towards sustainability adoption by businesses. The survey’s Likert scale includes five points which are: strongly agree, agree, neutral, disagree, and strongly disagree.

## ***8.6 Target Population and Target Sample***

When the study is looking at more than one case, the sample in this research design may be one or more locations, one or more businesses, one or more individuals, or one or more occasions (Bryman and Bell 2015). One of the difficulties faced when conducting this research was the lengthy approval processes that the researcher

needed to distribute the survey to certain groups in order to gather the required data. It is much better to have a big research sample, which will increase the accuracy of the research result as well as to minimize the error possibility that could exist (Burns 2000). Thus, for this research project, the researcher aimed to fill a reasonable number of the online surveys by Saudi participants within specific time constraints. In brief, the target population for this research is a group of Saudi individuals from different sectors (both educational and professional sectors).

## **8.7 Data Collection**

This section discusses the data collection methods (web-based survey) and the design of the research questions, and then covers all stages of the data collection process, this research data was collected through Qualtrics, which is a free online application. Qualtrics provides the researcher with an easy to use and clear survey platform. The sustainability awareness online survey was distributed to 276 Saudi participants through various methods, as follows:

- Social network (i.e. Facebook),
- Smartphone application (i.e. WhatsApp, Text Messages),
- Email,
- Dar AL-Hekma University Community (DAH) community, after getting the DAH Ethics Research Department Approval.

## **8.8 Data Analysis**

After the surveys were returned, the data and information were transcribed. The data were collected through Qualtrics online software as discussed in the previous (data collection) section.

Data analytic is another term for the data analysis, which refers to the process of applying logical and statistical tools to define, explain, clean, model and transform data with the goal of having useful results and conclusions (Galletto 2017). Several issues could be faced during this phase i.e. non-compliance data or missing data. However, the process of data analysis helps the researcher to present the research result in an easy, clear and understandable format (Haefele et al. 2014). As this research relied on a quantitative method, the research results are analyzed and presented in numerical format. In addition, the researcher has used specific software to analyze the collected data, which is the Statistical Package for the Social Sciences (SPSS) version 24.0.

## 8.9 Reliability and Validity

As this study utilized quantitative data only, reliability and validity will be discussed within the context of the philosophical and methodological approaches to this research. Reliability is a significant concept which is related to evaluating the research quality. It is commonly concerned with collected data accuracy and consistency (Gratton and Jones 2004). Similarly, several researchers such as Lacey and Luff (2001), and Gratton and Jones (2004) stated that when researchers think of the validity concept, they should consider the right method for their research to ensure that they are measuring what they want to measure as well as to ensure the research outcome is valid. (Lacey and Luff 2001).

In the context of reliability, this study used specific research tools and techniques to preserve the consistency of the collected data, and to minimize subject bias and research errors throughout this study. For instance, the researcher did not force participants to choose specific answers in the research. Also, the researcher told the participants that there are no right or wrong answers (Rubin and Babbie 2011). Therefore, these features assisted the researcher to ensure that reality has matched the research results and findings. Additionally, any reliable research should use a high-quality instrument. There are various instruments that are used worldwide, but for the purpose of this research, the Qualtrics survey instrument was used (Kumar 2011). In terms of validity, several categories of validity can be used in a quantitative research. The first is content validity, which is also known as textbook validity, logical validity or course validity. Content validity should cover all the content related to the research's observations to ensure that the research findings are valid (Heale and Twycross 2015). Second is construct validity, which is the development of related measurement and knowledge of the research construction (Kumar 2011). Third is predictive validity, which focuses on the instrument ability to check and predict the research's outcomes.

## 9 Study Results

The research questions in the online survey were created to reach the research objectives and gain more information about sustainability awareness in Saudi Arabia especially in the higher education sector. The online survey gathered various data from its respondents such as the participants' gender, their ages, the field of their studies and education levels, their daily internet usage, the types of devices used, and their perspectives about sustainability disadvantages and advantages. The researcher distributed the online survey to approximately 276 Saudi participants, but only 110 participants completed the full survey. The response rate of the online survey is 39.86%. Most of the participants were females by approximately 66.4% and only 33.6% were male.

The survey participants were between 25 years to 30 years of age. There were no participants under the age of 17, and there were no participants over 40 years old. Most of the participants were from the higher education sector (see Table 1). Moreover, there were a variety of occupations amongst the survey respondents such as: accountants, lawyers, engineers, a programmer, a business manager, a researcher, a chemical engineer, a HR representative, a geologist, a PHD student, a system analyst, a geophysicist, a CSR manager, an inventory controller, a legal counsel, and others.

Table 2 shows most of the survey participants (22.7%) were from the science and engineering field of study. The percentage range for other fields of study is 3–10%.

Table 3 shows that most (38.2%) of the online participants graduated from university with a bachelor degree, and 33.6% had a master's degree in different fields of study as discussed earlier. Also, there were 7.3% of the participants with a Ph.D.

There are different types of devices used by Saudi users while they are working or accessing the internet. This survey question allows every user to choose more than one option. The survey results show that the majority (89.22%) of Saudi users surveyed are accessing the internet through their smartphones (Table 4).

The following table (Table 5) illustrates that most of the Saudi users were introduced to the concept of Sustainability and Green Information Technology in their higher education (52.3%). Other users learned the concept from the internet (36%), their schools (21.6%), books, magazines, conferences and others.

A question in the online survey asks participants about the device brand they use. The majority (60.9%) of respondents are using Apple devices. The rest are divided between Dell, IBM, Google, and other (Table 6).

The Table 7 illustrates the number of Saudi participants who read the sustainability reports of a product before purchase. The survey has shown that most of the respondents do not read the sustainability reports before buying their products.

**Table 1** Range of the questionnaire participants' ages (prepared by the authors)

Age range	Frequency	Participants' percentage (%)
17 years and under	0	0
18–20	13	11.8
21–24	21	19.1
25–30	42	38.2
31–35	19	17.3
36–40	15	13.6
41–45	0	0
46–50	0	0
51–55	0	0
56–60	0	0
61–65	0	0
Over 65	0	0
Total	110	100



**Table 2** Participants' study fields (prepared by the authors)

The study fields	Frequency	Participants' percentage (%)
Accounting	10	9.1
Business law	9	8.2
Economics and Finance	4	3.6
Information systems	9	8.2
Information technology	4	3.6
Computer science	7	6.4
Management	10	9.1
Marketing	3	2.7
Health sciences	7	6.4
Humanities	2	1.8
Science and engineering	25	22.7
Art and design	4	3.6
Others	16	14.6
Total	110	100

**Table 3** Questionnaire participants' education level (prepared by the authors)

Student status	Frequency	Participants' percentage (%)
Primary education	2	1.8
Higher secondary/pre-university	5	4.5
Professional certificate	4	3.6
Diploma	4	3.6
Advances/higher/graduate diploma	0	0
Bachelor's degree	42	38.2
Post graduate diploma	4	3.6
Master's degree	37	33.6
Ph.D.	8	7.3
Others	4	3.6
Total	110	100

Table 8 shows that most of the Saudi users change their devices every eighteen months to two years.

The online survey results show that around 66% of Saudi users change their devices for better functionality, 48% of the users want to keep up with technology, and other reasons such as size and speed (see Table 9).

The online survey results illustrate the low level of sustainability awareness in Saudi Arabia. Only 41% of the survey participants believe that frequent device

**Table 4** Types of devices used by Saudi users (prepared by the authors)

Device types	Frequency	Participants' percentage (%)
PC	26	23.4
Desktop	28	25.2
Laptop	81	73
Netbook	5	4.5
PDA's	0	0
Workstation	7	6.3
Tablet	29	26.1
Smartphone	99	89.2
Others	2	1.8

**Table 5** Level at which sustainability was introduced to participants (prepared by the author)

Level	Frequency	Participants' percentage (%)
School	24	21.6
Higher education	58	52.3
Internet	40	36
Books	6	5.4
Magazine	9	8.1
News media	26	23.4
Conferences	21	18.9
Others	6	5.4

**Table 6** Participants' device brand (prepared by the authors)

Participants' device brand	Frequency	Participants' percentage (%)
Apple	67	60.9
Google	21	19.1
Dell	9	8.2
IBM	2	1.8
Others	11	10

**Table 7** Percentage of participants who read the sustainability Reports (prepared by the authors)

Do you read the company sustainability reports?	Frequency	Participants' percentage (%)
Yes	14	12.7
No	63	57.3
Maybe	24	21.8
Not at all	9	8.2

**Table 8** Frequency of device changes by Saudi users (prepared by the authors)

Frequency of device changes	Frequency	Participants' percentage (%)
Every 6 months	0	0
Every 12 months	18	16.4
Every 18 months	21	19.1
Every 24 months	34	30.9
Every 30 months	9	8.2
Every 36 months	13	11.8
Every 42 months	9	8.2
Others	6	5.5

**Table 9** Reasons behind device changes by Saudi users (prepared by the authors)

Reasons behind device changes	Frequency	Participants' percentage (%)
Size	22	19.8
Speed	48	43.2
Functionality	73	65.8
Keeping with technology	53	47.7
Other	4	3.6

changes will cause damage to the planet. On the other hand, 48% of the Saudi participants are unsure about its impact on the planet (see Table 10).

As it shows in Table 11, most of the Saudi users believe that awareness and social networking (82.9% and 71.2% respectively) can change designers' and users' mindsets regarding sustainability.

The data reliability usually presents in a table of Cronbach's Alpha. As the researcher used the Likert-type scales in the online survey questions to analyze the data reliability and the survey internal consistency, it is imperative to interpret, calculate and report Cronbach's Alpha (Gliem and Gliem 2003). Cronbach's Alpha is a common test for the researcher to test the accuracy and validity level in the online survey questions.

**Table 10** Percentage of Saudi users who believe that frequent device changing will cause damage to the planet (prepared by the authors)

Do you think changing your device frequently will have a negative impact to the planet?	Frequency	Participants' Percentage (%)
Yes	45	40.9
No	12	10.8
Maybe	53	47.7
Not at all	0	0

**Table 11** Proposed ways to change the mindset of users and designers regarding Sustainability (prepared by the authors)

Proposed ways to change the users' and designers' mindset regarding sustainability	Frequency	Participants' percentage (%)
Training	35	31.5
Education	62	55.9
Awareness	92	82.9
Workshop	32	28.8
Internet	44	39.6
T.V.	33	29.7
Social networking	79	71.2
Others	0	0

(George and Mallery 2003)

George and Mallery (2003, 231) provide the following rules of thumb:

- >0.9—Excellent,
- >0.8—Good,
- >0.7—Acceptable,
- >0.6—Questionable,
- >0.5—Poor, and
- <0.5—Unacceptable.

In this research, the researcher is testing the sustainability advantages and disadvantages in Saudi Arabia. The data reliability results are 0.918 for advantages (see Table 12), and 0.951 for disadvantages (Table 22). Both results are in an excellent range according to George and Mallery's rule (see Table 13).

Prior to the factors' extraction, there are many tests that should be done to evaluate the respondent data on sustainability for factor analysis. One of these tests is Kaiser-Meyer-Olkin (KMO) and Bartlett's Test. Usually the KMO index provides a value from zero to one. The KMO index ranges should be (0.5) or more to consider it

**Table 12** Advantages' Cronbach's alpha (prepared by the authors)

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.918	0.917	24

**Table 13** Disadvantages' Cronbach's alpha (prepared by the authors)

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.951	0.947	13

suitable for factor analysis. The significance of the Bartlett’s Test for Sphericity should be (Sig. <0.05) to be suitable for factor analysis (Williams et al. 2010). These two tests should be used by the researcher to assess the research data and prepare them for the factor analysis.

Index ranges for KMO (Fidel 2000, 647)

- Value range between (0.5–0.7) = Mediocre
- Value range between (0.7–0.8) = Good
- Value range between (0.8–0.9) = Great
- Value range >0.9 = Superb

As seen in Table 14, the result of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy for the advantages is equal to 0.819, which is mean that the respondent data are suitable and adequate for the factor analysis. Furthermore, the significance results for the Bartlett’s Test of Sphericity is equal to 0.000, which is mean that the variables’ correlation is sufficient and significant because it is less than 0.05.

As seen in Table 15, the result of Kaiser-Meyer-Olkin Measure of Sampling Adequacy for the disadvantages is equal to 0.934, which is mean that the respondent data are suitable and adequate for the factor analysis. Furthermore, the significance results for the Bartlett’s Test of Sphericity are equal to 0.000, which means that the variables’ correlation is useful, sufficient and significant because it is less than 0.05.

Factor analysis is a multivariate and common statistical approach, which is usually used for combining a number of correlated variables under one or more specific factors (Fidel 2000). These variables usually have a high correlation between each other. Other variables could have low correlation and not related to each other. Factor analysis is a very important technique that is commonly used in many fields such as Education, Social Science, Psychology, Information Systems and Technology, etc.

**Table 14** KMO and Bartlett’s test for the advantages (prepared by the authors)

KMO and Bartlett’s test		
Kaiser-Meyer-Olkin measure of sampling adequacy		0.819
Bartlett’s test of sphericity	Approx. Chi-square	1443.742
	Df	276
	Sig.	0.000

**Table 15** KMO and Bartlett’s test for the disadvantages (prepared by the authors)

KMO and Bartlett’s test		
Kaiser-Meyer-Olkin measure of sampling adequacy		0.934
Bartlett’s test of sphericity	Approx. Chi-square	1272.012
	Df	78
	Sig.	0.000

Also, it can be used in refinements, test evaluations, measures, scales, and developments. There are two types of factor analysis: confirmatory factor analysis (CFA), and exploratory factor analysis (EFA) (Gorsuch 2003). Nowadays, many researchers are using factor analysis techniques to examine the structure and the relationship between the variables.

There are several purposes of Exploratory Factor Analysis (EFA): reduce the variables' numbers, test the relationship and structure between variables, address the correlated variables and it is also used for theoretical construct development.

The Rotated Factor Matrix (see Table 16) produced three factors for advantages. There are nine variables for the first factor, five variables for the second factor, and four variables for the third factor. Starting with factor one, most of the values are between 0.630 and 0.760, which means that most of the Saudi users surveyed believe that the adoption of sustainability in an organization will improve human rights, satisfy customer needs, increase productivity, attract quality employees, reduce risk management, create new jobs, meet stakeholder expectations, improve community investment, and attract new advantages.

For the second factor, most of the values are greater than 0.620, which means that the respondents believe that the adoption of sustainability will reduce paper

**Table 16** Advantages factor matrix (prepared by the authors)

Rotated Component Matrix	Component		
	1	2	3
Satisfy customer needs	0.758	0.290	-0.111
Attract quality employees	0.757		
Increase productivity	0.751	0.241	0.121
Reduce risk management	0.698	0.269	
Improve human rights	0.687	0.210	
Create new jobs	0.677	0.153	0.194
Improve community investments	0.660	0.220	0.247
Meet stakeholder expectations	0.655	0.171	
Attract new advantages	0.632	-0.124	0.249
Improve social responsibility investing	0.518	0.396	-0.137
Improve corporate social responsibility	0.515	0.412	
Increase triple bottom line – People, Planet and Profit	0.477	0.378	0.252
Enhance reputation	0.476	0.449	0.117
Differentiate businesses	0.429		0.310
Reduce paper usage		0.700	0.298
Increase cost-effectiveness	0.302	0.679	
Reduce consumption of raw materials		0.669	0.301
Increase efficiency	0.321	0.657	
Reduce energy and water usage	0.225	0.629	0.248
Reduce health hazards	0.104	0.529	0.190
Reduce carbon footprint		0.148	0.885
Reduce pollution		0.248	0.875
Reduce emissions		0.336	0.815
Increase green strategy	0.209	0.129	0.745
<b>Extraction Method:</b> Principal Component Analysis.			
<b>Rotation Method:</b> Varimax with Kaiser Normalization.			
a. Rotation converged in 7 iterations.			

**Table 17** Factor one for research advantages (prepared by the authors)

Variable name	Factor loading	Label
Satisfy customer needs	0.758	New advantages
Attract quality employees	0.757	
Increase productivity	0.751	
Reduce risk management	0.698	
Improve human rights	0.687	
Create new jobs	0.677	
Improve community investments	0.660	
Meet stakeholder expectations	0.655	
Attract new advantages	0.632	

usage, increase cost-effectiveness, increase efficiency, reduce raw material consumption, and reduce energy and water usage. Finally, the values of the third factor are between 0.740 and 0.886, which means that the respondents believe that the adoption of sustainability will reduce carbon footprint, reduce pollution and emission, and increase green strategy.

Factor one includes customer satisfaction, human rights improvement, community investment improvements, attraction of quality employees, and the creation of new jobs. The researcher proposed the following name, New Advantages, for factor one variables as they provide advantages to organization, customers, stakeholders, and employees (see Table 17).

Factor two includes the five variables shown in Table 18. The researcher proposed the following name, Resources, for this factor because sustainability adoption will reduce resource consumptions.

Factor three includes the four variables shown in Table 30. The researcher proposed the following name, Green Environment, for this factor as sustainability adoption will reduce the pollution, carbon footprint, and emissions (see Table 19).

**Table 18** Factor two for research advantages (prepared by the authors)

Variable name	Factor loading	Label
Reduce paper usage	0.700	Sustainable resources
Increase cost-effectiveness	0.679	
Reduce consumption of raw materials	0.669	
Increase efficiency	0.657	
Reduce energy and water usage	0.629	

**Table 19** Factor three for research advantages (prepared by the authors)

Variable name	Factor loading	Label
Reduce carbon footprint	0.885	Green Environment
Reduce pollution	0.875	
Reduce emissions	0.815	
Increase green strategy	0.745	

Furthermore, the Rotated Factor Matrix (Table 20) produced two factors for disadvantages. There are ten variables for the first factor, and three variables for the second factor. The highest four values for the first factor are 0.918, 0.895, 0.886, and 0.879, which means that environmental irresponsibility can create and increase several failures. Furthermore, there are three variables in the second factor. The values of these variables are 0.751, 0.728, and 0.602, which discusses the adoption of sustainability disadvantages.

Factor one contains ten different variables as shown in Table 21. Some of these variables are: increased governance failure, increased transaction failure, increased scandals, etc. The researcher has named this factor Environmental Disadvantages because all the issues are related to the environment.

**Table 20** Disadvantages’ factor matrix (prepared by the authors)

<b>Rotated Component Matrix</b>		
	Component	
	1	2
Increase governance failure (including environmental actions and environmental compliance failures)	0.918	0.165
Increase transaction failure due to environmental liabilities	0.895	0.261
Increase litigation and compliance breaches (including environmental actions and environmental compliance failures)	0.886	0.123
Increase fraud (including environmental actions and environmental compliance failures)	0.879	0.219
Increase scandals by perceived environmental irresponsibility	0.867	0.263
Increase security and systems failures caused by environmental problems	0.854	0.259
Increase marketing failure by perceived environmental irresponsibility	0.833	0.315
Increase supply chain crises due to suppliers’ environmental problems	0.732	0.460
Increase insurance crises due to environmental disasters	0.667	0.413
Increase interest rates	0.610	0.358
Increase number of new regulations including environmental	0.158	0.751
Increase competition for and cost of raw materials	0.125	0.728
Inflate costs	0.469	0.602
<b>Extraction Method:</b> Principal Component Analysis.		
<b>Rotation Method:</b> Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		



**Table 21** Factor one for research disadvantages (prepared by the authors)

Variable name	Factor loading	Label
Increase governance failure (including environmental actions and environmental compliance failures)	0.918	Environmental disadvantages
Increase transaction failure due to environmental liabilities	0.895	
Increase litigation and compliance breaches (including environmental actions and environmental compliance failures)	0.886	
Increase fraud (including environmental actions and environmental compliance failures)	0.879	
Increase scandals by perceived environmental irresponsibility	0.867	
Increase security and systems failures caused by environmental problems	0.854	
Increase marketing failure by perceived environmental irresponsibility	0.833	
Increase supply chain crises due to suppliers' environmental problems	0.732	
Increase insurance crises due to environmental disasters	0.667	
Increase interest rates	0.610	

**Table 22** Factor two for research disadvantages (prepared by the authors)

Variable Name	Factor loading	Label
Increase number of new regulations including environmental	0.751	3Is
Increase competition for, and cost of, raw materials	0.728	
Inflate costs	0.602	

The researchers have named factor two as 3Is because it includes three disadvantages of sustainability adoption in an organization. These disadvantages are increased numbers of new regulation, increased competition for, and cost of, raw materials, and inflation in general costs (see Table 22).

## 10 Discussion and New Findings

Sustainability has become a popular concept meaning to preserve the earth’s natural resources for future generations. Also, it is important for all people to save the earth’s natural resources and to be aware of their future. In brief, sustainable development

is about protecting our planet and its natural resources for a long time. It is an effective plan which usually helps in resolving several environmental issues. As Lele (1991), Kuhlman and Farrington (2010) stated the three major sustainable development pillars, economic, social and environmental, must have a balance between activities. Several issues, such as excessive resource consumption and deforestation, and waste generation, can affect the sustainable development balance.

Moreover, the United Nation has seventeen sustainable development goals in order to reach sustainability. These goals are: *No Poverty, Zero Hunger, Good Health and Well-Being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Reduce Inequalities, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land, Peace, Justice and Strong Institutions, and Partnership for the Goals* (United Nations 2016).

Furthermore, many countries are starting to put policies and regulations in place to conserve the environment and their natural resources as well as to reach a sustainable future. One of these countries is Saudi Arabia. Saudi Arabia is a semi-developed country, which has an oil-based economy and is the largest crude producer and exporter in the world. Some of the Saudi's natural resources are gold, petroleum, natural gas, copper and iron ore. Also, gas and oil make up ninety percent of the Saudi government income (NRGI 2013; RTCC 2012).

Thus, the researchers selected the topic of Sustainability Awareness in Saudi Arabia to determine the Saudi population's sustainability awareness level, and to examine the advantages and disadvantages of sustainability awareness in the Saudi Arabia. The study research question was: *What are the advantages and disadvantages of sustainability awareness in the Saudi Arabia?*

The main objective of this question was to investigate the advantages and disadvantages of sustainability awareness in Saudi Arabia, which may impact the Saudis' attitude toward sustainable development. In addition, the research objective was: *To examine the advantages and disadvantages of sustainability awareness in Saudi Arabia in the higher education sector.*

In order to answer the research question and reach the research objective, an online survey was created and distributed to Saudi participants to discover the key factors related to sustainability awareness in Saudi Arabia, to identify the Saudis' attitudes toward sustainability, and to recognize the advantages and disadvantages associated with implementing sustainable development. Additionally, the researcher aimed to find several measures to increase sustainability awareness in Saudi Arabia. An online survey was distributed to 276 Saudi participants, but only 110 respondents completed the online survey. Females made up 66.4% of respondents and 33.6% were males. Also, most of the respondents were between 25 years to 30 years of age, and there were no respondents under the age of 17. Furthermore, the majority of the participants were from the higher education sector and from different fields of study such as Science and Engineering, Information Technology, Accounting, Information Systems, etc.

The results showed that Saudi users spend up to five hours daily on their computers, and they spend five to ten hours on the internet for various purposes such as working, studying, shopping, and checking emails and social networking. The users usually access the internet via several devices, but they are using the smart phone the most because they can use it everywhere. The analysis results have shown that most of the Saudi users were introduced to the concepts of sustainable development and green information technology during their higher education by approximately 52.3%. The rest of the users learned these concepts from their schools, internet, books, magazines, media, and conferences. The survey revealed that most of the respondents do not read the products' sustainability reports before buying them. Moreover, only 41% of the survey participants believe that frequent device changes will cause damage to the planet. On the other hand, 48% of the Saudi participants were unsure about its impact on the planet. To solve this issue, the majority of respondents believed that raising awareness and social networking can change designers' and users' mindsets regarding sustainable development.

The researcher used the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sampling Adequacy for the research advantages and disadvantages. The advantages' value was equal to 0.819, and the disadvantages' value was equal to 0.934, which meant that the respondent data were suitable and acceptable for the factor analysis. Additionally, the significance results for the Bartlett's Test of Sphericity (for both advantages and disadvantages) were equal to 0.000, which meant that the variables' correlation was useful, appropriate and significant because it was less than 0.05. The researchers named three advantages' factors, and two disadvantages' factors:

#### **Factors of Advantages:**

- New Advantages included nine variables: satisfy customer needs, attract quality employees, increase productivity, reduce risk management, improve human rights, create new jobs, improve community investments, meet stakeholder expectations, and attract new advantages.
- Resources included five variables: reduce paper usage, increase cost-effectiveness, reduce consumption of raw materials, increase efficiency, and reduce energy and water usage.
- Green Environment included four variables: reduce carbon footprint, reduce pollution, reduce emissions, and increase green strategy.

#### **Factors of Disadvantages:**

- Environmental Disadvantages included ten variables: increase governance failure, increase transaction failure due to environmental liabilities, increase litigation and compliance breaches, increase fraud, increase scandals by perceived environmental irresponsibility, increase security and systems failures caused by environmental problems, increase marketing failure by perceived environmental irresponsibility, increase supply chain crises due to suppliers' environmental problems, increase insurance crises due to environmental disasters, and increase interest rates.

- 3Is included three variables: increase number of new regulations including environmental, increase competition for, and cost of, raw materials, and inflate cost.

This research might face expected or unexpected limitations while conducting research. For this study, the researchers used a quantitative research method and collected the research data through an online survey. One of the research limitations was that the researcher faced some difficulties finding sustainability studies done in Saudi Arabia. Also, many researchers are using online surveys as a data collection method, but it has number of limitations. These limitations are time, incomplete surveys, and the small size of the sample.

Some of the research participants were not familiar with the topic of sustainability, and they took a long time to read and answer the online survey questions. Also, some of the participants did not complete their survey which is time-consuming for the researcher. For instance, the researcher sent the online survey to 276 Saudi participants but only 110 surveys were completed. The researcher received large number of incomplete surveys from the participants because they answered the surveys on their smart phones. There are different sections and questions are not displayed clearly enough on smart phones and the participants failed to move their phone's screen. This research has a small sample size because it was limited to Saudi users who were using technology and studying or working in organizations.

This study provides several recommendations to the Saudi users which could increase their awareness regarding sustainable development and green information technology. The recommendations are: Firstly, looking at the current Saudi curricula, it is important to add the sustainable development and green information technology concepts to these curricula. Secondly, educate all students and increase the sustainability awareness in the education sector. In addition, all the Saudi organizations must put regulations, policies and goals to increase the level of the sustainable development. It is essential for Saudi businesses to adopt sustainable development and increase awareness by developing sustainability conferences, workshops, campaigns, and seminars. Businesses and organizations must provide their employees with sustainability training programs and encourage them to be more sustainable. Moreover, it is a great idea to reward employees who make sustainable changes. Finally, creating a sustainable development organization can help the whole community -especially the students—to increase their sustainable activities.

Finally, the concepts of sustainable development and green information technology are very important. Some of the survey participants were not familiar with these concepts. So, it would be beneficial to provide a detailed description to these users about sustainability before they completed their online survey. In addition, it would be beneficial to increase the sample size in the future for more accurate results. Furthermore, another continuing study might use qualitative methodology in order to investigate and get detailed information about sustainable development attitudes. Indeed, examining this research finding—as a secondary data analysis—will help to get great outcomes in the future researches.

## 11 Conclusion

This chapter provides a summary of the research significance, and the research question and objective. Moreover, this paper presents the research methodology, research design, and the survey results analysis. The researcher faced some limitations in the sampling, and incomplete surveys. Also, there were two factors for this research, factors of opportunities and risks. In brief, there were three opportunities factors which were: *new opportunities, resources, and green environment*, and risks' factors, which were: *environmental risks, and 3is*. Following these factors, there were activities that can help the Saudi users to become greener and more sustainable.

## References

- Adenle, A. A., Haslam, G. E., & Lee, L. (2013). Global assessment of research and development for algae biofuel production and its potential role for sustainable development in developing countries. *Global assessment of research and development for algae biofuel production and its potential role for sustainable development in developing countries*, 61, 182–195.
- Alarabiya. (2017). *The Saudi cabinet has endorsed a sweeping set of programs and reforms to be implemented by 2030*. Available: <https://english.alarabiya.net/en/perspective/features/2016/04/26/Full-text-of-Saudi-Arabia-s-Vision-2030.html>. Accessed 27 March 2017.
- Albus, H., & Ro, H. (2017). Corporate social responsibility. *Journal of Hospitality & Tourism Research*, 41, 41–65.
- Alkire, S. & Santos, M. (2010). Acute multidimensional poverty: a new index for developing countries. *IDEAS working paper series from RePEc*.
- Barnett, M. L. (2007). Stakeholder influence capacity and the variability of financial returns to corporate social responsibility. *Academy of Management Review*, 32, 794–816.
- Belloumi, M., & Alshehry, A. (2015). Sustainable energy development in Saudi Arabia. *Sustainability*, 7, 5153–5170.
- Bisk. (2015). *Types of corporate social responsibility programs*. Available: <https://www.villanovau.com/resources/public-administration/types-corporate-social-responsibility-programs/#.WNNRLfmGPIU>. Accessed 23 March 2017.
- Bryman, A., & Bell, E. (2015). *Business research methods*. USA: Oxford University Press.
- Burns, R. B. (2000). *Introduction to research methods*. London Thousand Oaks, California, London. Thousand Oaks, Calif: SAGE.
- Carter, R. C., Tyrrel, S. F., & Howsam, P. (1999). The impact and sustainability of community water supply and sanitation programmes in developing countries. *Water and Environment Journal*, 13, 292–296.
- Cobbinah, P. B., Black, R., & Thwaites, R. (2011). Reflections on six decades of the concept of development: evaluation and future research. *Journal of Sustainable Development in Africa*, 13, 134–149.
- Coca-Prados, J. (2013). Economic sustainability and environmental protection in mediterranean countries through clean manufacturing methods. In J. Coca-Prados (ed) *Gemma Gutiérrez-Cervelló*. Dordrecht: Springer Netherlands: Imprint: Springer.
- Denzin, N. K., & Lincoln, Y. S. (1994). *Handbook of qualitative research*. Sage publications, Inc.
- Doane, D., & Macgillivray, A. (2001). Economic sustainability: the business of staying in business. *New Economics Foundation*, 1–52.

- Dwyer, R., Lamond, D., Molina-Azorín, J. F., Claver-Cortés, E., López-Gamero, M. D., & Tarí, J. J. (2009). Green management and financial performance: a literature review. *Management Decision*, 47, 1080–1100.
- Elhadidy, M. A., & Shaahid, S. M. (2009). Exploitation of renewable energy resources for environment-friendly sustainable development in Saudi Arabia. *International Journal of Sustainable Engineering*, 2, 56–66.
- Fidel, A. (2000). *Discovering statistics using SPSS for windows*. London, UK: Sage Publications.
- Forte, A. (2013). Corporate social responsibility in the United States and Europe: How important is it? The future of corporate social responsibility. *The International Business & Economics Research Journal (Online)*, 12, 815.
- Franklin, D. (2008). *Just good business: A special report on corporate social responsibility*. Economist Newspaper.
- Galetto, M. (2017). *What is data analysis?*. Available: <https://www.ngdata.com/what-is-data-analysis/>. Accessed 4 April 2017.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference, 11.0 atualização (4ª edição)*. Boston: Allyn & Bacon.
- Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales.
- Gorsuch, R. L. (2003). *Factor analysis handbook of psychology*.
- Gratton, C., & Jones, I. (2004). *Research methods for sport studies*. London, New York: Routledge.
- Haeffele, L. M., Gardner, D. C., Vogt, E. R., & Vogt, W. P. (2014). *Selecting the right analyses for your data*. The Guilford Press.
- Hashmi, M. A., Abdulghaffar, N., & Edinat, I. (2015). Sustainability commitment in Saudi Arabia and need for educational reforms for the jobs of the future. *The International Business & Economics Research Journal (Online)*, 14, 47.
- Hassan, R. (2016). *New Saudi plan is major step toward sustainable development*. Available: <http://www.arabnews.com/saudi-arabia/news/916371>. Accessed 27 March 2017.
- Heale, R., & Twycross, A. (2015). *Validity and reliability in quantitative research*. Available: [https://www.researchgate.net/publication/280840011\\_Validity\\_and\\_reliability\\_in\\_quantitative\\_research](https://www.researchgate.net/publication/280840011_Validity_and_reliability_in_quantitative_research). Accessed 3 April 2017.
- Hopkins, M. S., Townend, A., Khayat, Z., Balagopal, B., Reeves, M., & Berns, M. (2009). The business of sustainability: What it means to managers now. *MIT Sloan Management Review*, 51, 20.
- Hutcherson, J. (2013). Community college students' pro-environmental behaviors and their relationship to awareness of college sustainability strategy implementation. In M. Karvonen, P. Bricker & Hollis, M. (Eds.). ProQuest Dissertations Publishing.
- Inoue, Y., & Lee, S. (2011). Effects of different dimensions of corporate social responsibility on corporate financial performance in tourism-related industries. *Tourism Management*, 32(4), 790–804.
- Jeevan. (2010). *Characteristics of developing countries*.
- Kohn, M. M., Chang, E., Karduck, A. P., & Talevski, A. (2010, April). Smart camp: environmental sustainability through intelligent automation technologies. In: *2010 IEEE 24th international conference on advanced information networking and applications workshops* (pp. 286–292). IEEE.
- Kuhlman, T., & Farrington, J. (2010). What is sustainability? *Sustainability*, 2, 3436–3448.
- Lacey, A., & Luff, D. (2001). *Qualitative data analysis*. Trent Focus Sheffield.
- Lee, S., & Park, S.-Y. (2009). Financial impacts of socially responsible activities on airline companies. *Journal of Hospitality & Tourism Research*.
- Lele, S. M. (1991). Sustainable development: A critical review. *World Development*, 19, 607–621.
- Maignan, I., Ferrell, O. C., & Hult, G. T. M. (1999). Corporate citizenship: Cultural antecedents and business benefits. *Journal of the Academy of Marketing Science*, 27, 455–469.
- Manufacturing Skills Australia. (2017). *What is sustainability?*. Available: <http://sustainabilitykills.net.au/what-is-sustainability/>. Accessed 3 March 2017.

- Mar, R. (2011). *Research methodology: A step-by-step guide for beginners*. Los Angeles: SAGE.
- Mason, M. (2017). *What is sustainability and why is it important?*. environmentalscience.org. Available: <http://www.environmentalscience.org/sustainability>. Accessed 2 March 2017.
- McWilliams, A., & Siegel, D. (2001). Corporate social responsibility: A theory of the firm perspective. *Academy of Management Review*, 26, 117–127.
- Neugebauer, S., Martinez-Blanco, J., Scheumann, R., & Finkbeiner, M. (2015). Enhancing the practical implementation of life cycle sustainability assessment: Proposal of a Tiered approach. *Journal of Cleaner Production*, 102, 165–176.
- Nrgi, N. R. G. I. (2013). *Saudi Arabia*. Available: <http://www.resourcegovernance.org/our-work/country/saudi-arabia>. Accessed 14 March 2017.
- Pearce, D., Barbier, E., & Markandya, A. (2013). *Sustainable development: Economics and environment in the third world*. Routledge.
- Punnett, B. J. (2013). *Management: A developing country perspective*. Routledge.
- Rangan, K., Chase, L. A. & Karim, S. (2012). *Why every company needs a CSR strategy and how to build it*.
- Robberts, T. (2016). *What are disadvantages of sustainable development?*. Available: <https://www.reference.com/science/disadvantages-sustainable-development-aa5902a0b94f75ce#>. Accessed 8 April 2017.
- Rogers, K., & Hudson, B. (2011). The triple bottom line. *OD Practitioner*, 43(4), 4.
- RTCC. (2012). *Saudi Arabia: Protection of environment key to development*. Available: <http://www.climatechangenews.com/2012/02/27/saudi-arabian-official-energy-and-environment-key-to-sustainable-development/>. Accessed 14 March 2017.
- Rubin, A., & Babbie, E. R. (2011). *Research Methods for Social Work*. Belmont, CA: Brooks/Cole Cengage Learning.
- Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students*. Harlow, England New York: Pearson.
- Saunders, M. A. (2016). *Research methods for business students*. Harlow Pearson Education.
- Scilly, M. (2016). *Four types of corporate social responsibility*.
- Sen, S., Bhattacharya, C. B., & Korschun, D. (2006). The role of corporate social responsibility in strengthening multiple stakeholder relationships: A field experiment. *Journal of the Academy of Marketing Science*, 34, 158–166.
- Sheehan, B. (2009). What is sustainability? *Control Engineering*, 56, 12.
- Sutton, P. (2004). *A perspective on environmental sustainability? A paper for the Victorian commissioner for environmental sustainability*. Retrieved 12 April 2007.
- Swanson, D. L. (1995). Addressing a theoretical problem by reorienting the corporate social performance model. *Academy of Management Review*, 20, 43–64.
- Trochim, W. M., & Donnelly, J. P. (2001). *Research methods knowledge base*.
- United Nations. (2016). *Sustainable development goals*. Available: <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>. Accessed 4 March 2017.
- UNSD. (2015). *List of developing countries*. Available: <http://www.iugg2015prague.com/list-of-developing-countries.htm>. Accessed 20 March 2017.
- Weybrecht, G. (2010). *The sustainable MBA: The manager's guide to green business*. Wiley/newpage
- White, S. (2009). *Our top 10 environmental problems*. abc.net.au. Available: <http://www.abc.net.au/environment/articles/2009/12/07/2764044.htm>. Accessed 2 March 2017.
- Williams, B., Onsmann, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine*, 8.