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INFLUENCE OF ENERGY PROJECT INNOVATIONS ON THE GROWTH OF RENEWABLE ENERGY USE IN KISII COUNTY, KENYA

[1*] **Fredrick Shule Mokora**
fredrickmokora@gmail.com

[2**] **Dr. Wallace Nyakundi Atambo**
atambowa@yahoo.com

[1] *Student of Msc. Project Management*
[2] *Lecturer, Jomo Kenyatta University of Agriculture and Technology*

Abstract

Renewable energy for heating, cooling and transport fuels has grown steadily also the production of heat from renewable sources grew by 6% between 2005 and 2009, with the use of biomass being the dominant technology. However more "modern" heating technologies particularly solar heating, have seen an overall growth rate of nearly 12% between 2005 and 2009, but it is unclear the extent to which the innovations in this type of energy influence the growth of renewable energy use. The purpose of the study was to investigate the influence of energy project innovations on the growth of renewable energy use in Kisii County. Study established the influence of technological innovation on the growth of renewable energy use; the influence of service quality innovation on the growth of renewable energy use; the influence of marketing innovation on the growth of renewable energy use in Kisii County. The diffusion theory, The Technology Acceptance Model and the program theory directed the study. Descriptive survey research design was adopted in this study. The study targeted 314 households in Kisii County, Kenya. The study applied simple random sampling technique. Data was analysed using descriptive analysis and both correlation and Regression analysis. The results show that availability of technological innovation had an influence on renewable energy growth and use in Kisii; inadequate service quality had a negative influence on renewable energy growth and use; and lack of effective marketing innovation had a negative influence on renewable energy growth in Kisii County.

Keywords: *Renewable energy Use, Innovation, Growth, Fuels*

1.1 Introduction

The growth of any enterprise has been noted and considered to be influenced by exogenous aspects like technology, globalization of market, information, and embryonic approaches to value forcing them to continuously alter their methods to wealth creation (Stopford, 2011). Henceforth, the enterprise with higher innovation success compared to its competitor has a vital advantage (Barnett & Hansen 1996) that permits it to compete in local and international markets (Hill, Brierley & MacDougall, 2011).

How information technology (IT) institute a competitive advantage, its strategic influence, and its role in tempestuous environments (Carr, 2013; Devaraj & Kohli 2013; Overby, Markus & Chen, 2016) are key factors in Information System research. In the discussion on whether IT has an influence on a business competitive advantage (Carr, 2013), Ray, Fong and Amat, (2005) contend that the strategic advantage of IT may often be better exemplified via an analysis of their intermediates (indirect relationship with competitive advantage).

Under modern circumstances, innovation happenings are considered as the influencing energy behind enterprise success and general economic growth (Wolff & Pett 2016). It is for this reason that scholarly work often places interest on such happenings as the ones leading to enterprise advancement. Both large and small and medium-sized enterprises offer a robust boost to employment and economic progress surely due to their innovation activities (Keizer, Dijkstra & Halman, 2002).

Consequently, it is in the interest of both distinct enterprises and the economy as a complete construct to create satisfactory conditions for the implementation of a robust innovation services actions. Under these conditions customers can be dedicated to the organization not for the regard they have placed on the services but owing to the dictum that they have no other supplementary to change to.

It is vital then for business formations to institute a more principal and steady review of customer satisfaction to extract the elements of customer satisfaction and how to supplement them. Expanding these innovations in the establishment's service delivery would lead to customer loyalty and re-buying because of customer satisfaction and not solely due to customers being stuck in the organization (Cacciopo, 2010). One aspect that must be looked at is the phenomenon of technological innovations in the renewable sector in Kenya.

Globally, the climate change and the environmental conservation advocacy pressures have seen the immense adoption to the renewable energy consumption. Evidenced by this is the health concerns involved with the current energy sources that in the long run are hazardous to the communities. Renewable energy has been attributed with efficiency, cost effective in production and requiring minimal infrastructural input to cover the high magnitude energy concerns or demands from the populations. Countries have adopted the renewable energy in particular solar usage however in minimal means for household consumption, however, in the recent times there has been high demand for the same in the industrial and other high energy input consumption areas (Greenpeace, 2015).

The global deployment of renewable energy has taken off. The renewable energy electricity sector grew by 26% between 2005 and 2010. Today it provides about 20% of the world’s power. Hydro-electric power generates 84% of the world’s renewable electricity, while the other newer renewable energy electricity technologies have also grown rapidly, doubling their production between 2005 and 2010. Wind has grown most rapidly in absolute terms. Solar photovoltaic has grown at a rate of 50%, and installed capacity reached about 70 GW by the end of 2011. Renewable energy for heating, cooling and transport fuels is also steadily growing. The production of heat from renewable sources grew by 6% between 2005 and 2009, with the use of biomass (e.g.wood) still the dominant technology (Greenpeace, 2015). However more “modern” heating technologies-particularly solar heating, but also geothermal heating – have seen an overall growth rate of nearly 12% between 2005 and 2009. The production and use of biofuels for transport have also been growing rapidly, providing 3% of road transport fuels (2% of all transport fuels) in 2009. Biofuel production and consumption are still concentrated in Brazil and the United States (ethanol) and in the European Union (biodiesel).

South Africa, in Africa has one of the largest solar farms for 150 MW energy generation capacities. This is expected to cut the energy demands with more supply to households than the industrial usage. Smith (2015) on the solar farming in Africa, he opines that there is employability and increase in the supply of clean energy in the Rwanda villages and to the national power grid spreading to coverage of 10kms from the solar farm to aid the 110 megawatts produced by the Rwandan Power Company. The financial support and the resource availability with free solar/sun availability, there is the needfulness for the existence in the willingness to adapt to the alternative sources of energy (Greenpeace, 2015). Government support and external partnership will collude to achieve the renewable energy initiatives (World Bank, 2013).

The amount of energy generation varies from country to country. The usage is similar in the same unique. In cumulative capacity as at the end of 2014, there was 60% geothermal production in Kenya (IEA, 2014). In Kenya, M-Kopa Solar, a Canadian company has been making progress in their new initiative towards ensuring a solar power use rich society. It is estimated over 50,000 and 40,000 homes in Uganda and Tanzania respectively has been connected with solar energy (Lighting Africa Initiative, 2016). Another company Mobisol, a Germany company that offers a lease-to-own service has connected over 45,000 households and business enterprises in East Africa with coverage in Tanzania and Rwanda with intentions to spread investments into Kenya. What remains significantly un-investigated, and is the crux of the present investigation, is the influence of technological innovations on the growth of renewable energy in a robust and growing county like Kisii. This study thus hopes to fill this significant gap.

1.2 Statement of the Problem

Growth of any idea or project is pivotal to organizational, personal and country growth, development and general achievement but is also a construct that is most affected since it is mainly based on customer feelings and behaviour which is always fragile. While there are various reasons for such fragility, one central reason attributed by researchers like Damanpour, Devouroj and Kholi, (2009) is lack of proactive and sustainable technological innovation services but better yet lack of effective use. Ideally, a satisfied customer advances a project's profit and growth in numerous ways like as through loyalty and breeds positive word- of mouth that brings in new customers to the project which are important for the use of renewable energy in Kenya (Zeithaml and Bitner, 2013).

However, the extent to which innovation services in Kisii renewable services like the product quality innovation, technological innovation and marketing innovation influence growth of renewable energy remains significantly investigated. In fact, premised on the numerous customer complaints, the influence of these innovations need to be studied further. Various studies have been attentive to the idea of growth of a project and how customers perceive the said project and have tried to investigate the influence of innovation services on project growth. However, the studies conducted have mainly been case studies and others generalized. This study is a descriptive survey and considers customers using solar energy in Kisii as a major study.

Recent works by Kiarie (2014) on influence of innovation services on customer satisfaction which was geared to assess the innovation services deployed by Kenya Power and Lighting Company Ltd and determine the relationship between innovation services and customer satisfaction in Kenya Power & Lighting Company Limited show that there is still need to investigate the phenomenon in a rural set up like parts of Kisii county and look at growth of renewable energy this time. This is considering that the Kiarie study was done in Nairobi which is an urban centre and the idea that technology changes very rapidly and timeless skills that are relevant today and remain relevant in the future are therefore very desirable; being that the work was done about 3 years ago. Further, his study classified the constituent in a demographic angle by age, income, gender and the level of education which this study will not do. Finally, the study did not measure service quality using the SERVEQUAL measures which this study does.

Correspondingly, Omondi (2010) in his study of the influence of modern technology on growth of bank usage in renewable energy players contended that unceasing employment of technology boosts customer satisfaction. His study additionally suggested that Renewable energy players need to train customers to have satisfactory skills in the utilization and implementation of technology. The study however did not consider the target specific population that is unique to Kisii and its use of renewable energy.

1.3 Research Objectives

The study specific objectives;

i. To establish the influence of technological innovation on the growth of renewable energy use in Kisii County.

ii. To assess the influence of service quality innovation on the growth of renewable energy use in Kisii County.

iii. To explore the influence of marketing innovation on the growth of renewable energy use in Kisii County.

2.1 Theoretical Review

2.1.1 Diffusion of Innovation theory

The diffusion theory, also known as the diffusion of innovations theory, is a theory concerning the spread of innovation, ideas, and technology through a culture or cultures. Diffusion theory states that there are many qualities in different people that cause them to accept or not to accept an innovation. There are also many qualities of innovations that can cause people to readily accept them or to resist them. According to diffusion theory, there are five stages to the process of adopting an innovation. The first stage is knowledge, in which an individual becomes aware of an innovation but has no information about it. Next is persuasion, in which the individual becomes actively interested in seeking knowledge about the innovation. In the third stage, decision, the individual weighs the advantages and disadvantages of the innovation and decides whether or not to adopt it. After the decision comes implementation, in which the individual actually does adopt and use the innovation. After adopting the innovation, the individual makes a final decision about whether or not to continue using it based on his own personal experience with it. These same stages apply, to varying degrees, to groups of people in addition to individuals (Rogers, 1962). Looking at the renewable energy sector, adoption or uptake of financial innovation like agency banking by renewable energy requires knowledge by users, persuasion, decision making, implementation of both product and service innovations then a final decision based on both the perceived cost and perceived benefits.

2.1.2 Technology Acceptance Model

The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, notably. Perceived usefulness (PU) - This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job growth. The TAM has been continuously studied and expanded-the two major upgrades being the TAM 2 (Venkatesh & Davis 2000 & Venkatesh 2000) and the Unified Theory of Acceptance and Use of Technology (or UTAUT, Venkatesh *et al.,*. 2013). A TAM 3 has also been proposed (Venkatesh & Bala 2008).

TAM is one of the most influential extensions of Ajzen and Fishbein’s theory of reasoned action (TRA) in the literature. It was developed by Fred Davis and Richard Bagozzi (Davis 1989, Bagozzi, Davis & Warshaw 1992). TAM replaces many of TRA’s attitude measures with the two technology acceptance measures— ease of use, and usefulness. TRA and TAM, both of which have strong behavioural elements, assume that when someone forms an intention to act, that they will be free to act without limitation. In the real world there are constraints, like limited freedom (Bagozzi, Davis & Warshaw 1992). Earlier research on the diffusion of innovations also suggested a prominent role for perceived ease of use. Tornatzky and Klein (Tornatzky & Klein 1982) analyzed the adoption, finding that compatibility, relative advantage, and complexity had the most significant relationships with adoption across a broad range of innovation types. Eason studied perceived usefulness in terms of a fit between systems, tasks and job profiles, using the terms task fit to describe the metric (Stewart, 2009).

2.1.3 Program Theory

The program theory is essential in describing the management of projects or programmes instituted to deliver into a specified objective (Hosley, 2005). The theory describes the logical contents in a model type of algorithmic in nature. It provides that a project or programme is the definition on the particular observable unit or element operations and on how it seeks to achieve the purpose of the very programme or project running (Hosley, 2009). Further, the observations are in the context of periodic or continuous in nature with a possibility of change in the operational of some of the units in the programme or project. In application to the study, solar innovations are in implementation with drastic or progressive reduction in the use of old energy levels, the mode of implementation and allocation are subject to review by the administrators and too the opposite will serve to be true. It is evidenced with the review or halt in some of the programme activities with reallocations and too from the periodic monitoring and evaluation reporting, they are the guiding principles into the going concern of such programmes (Sethi & Philippines, 2012).

2.2 Renewable Energy Growth

Renewable energy growth has been proposed to be the only way to aid the progress of science and development in the area of renewable energy. There is needed funding for intensive basic science developments into the realization of a renewable energy society. The proposal is sustainable in the fact that any research and development push requires some financial backing for outcome success. Goldman (2007) notes that financing these sectors that are renewable energy motivated would require policies' address to realize the objective of clean energy. The adoption of credit funding models for the sector objectives or projects by the financial institutions should be encouraged to increase the innovations in the very sector that too will lead to high source in magnitude of the renewable energy (UNEP, 2008).

The need to improve in clean energies in the State is for the government to make the tax system flexible. The high taxation on renewable inputs should be reduced and substituted with the subsidies and impose the high tax on non-renewable energies. This will lead to high systems that are compliant with management of waste, innovative approaches to cleaner societies such as electric cars and charging stations, private sector improvement and in the long run lead to high sustainability in investments placed (Cohen, 2014). The sector is experiencing expansionary pressures with high adoption of the renewable energy use thus encouraging more investments in the area. Fiscal policy makers need to focus on realizing and promoting the interests through achievable tax considerations without encouraging leakages.

There is need for proper regulations into the land use and encouraging the conservations of the ecosystems (Cohen, 2014). By the regulations in place, they will progressively discourage the destruction of the environmental zones that are essential in management of the gas emissions that too lead to climate change. The mining cases and other chemical input that contribute to high carbon emissions in cyclic provide high heating societies and needless for such encouragement rather promote regulated chemicals for sustainability in realizing the renewable energy adoption in the globe and in particular the African continent (DOE, 2008).

The global push to have renewable energy sustainable rich technologies in place for continued developments and to ensure the world moves to reusable energies. This will require a metric measurement of the economic policy contribution towards the realization of the society's progress into the renewable energy adoption (Cohen, 2014). This is evident will trail tests in the developing world about the new solar innovations that are steadily picking with increasing demand from the individuals in the societies. The non-reusable input adoption by the developed countries that reduces drastic dependence on the old sources of energy and carbon emissions to the environment is resourcefully needful in sharing and transferable to the developing and less developed countries (UNEP, 2008).

2.3 Technological Innovation and Renewable Energy Growth

In the context of applying different policies to the various stages of technology development, the national system of innovation literature is also important. This provides a holistic picture of the role of institutions (market, research, education, and other sectors), incentive structures, networks in the innovation process, and technology characteristics (Edquist, 2016). Its approach is well suited for comparative studies because it provides information about the heterogeneity of drivers, barriers and policy frameworks and technologies (Coenen and Dìaz, 2010). Foxon *et al.,* (2005) applied a system of innovation approach to the UK and found that wind onshore technology development here lagged behind other countries due to less - 23 - favourable policies.

Technology-specific policies aim at increasing the specific demand for renewable energy technologies. Quantity-driven policies allow the market price to be determined by market transactions between actors while ensuring that utility operators generate or sell a predetermined amount of electricity from renewable energy sources (RES-E). The price is determined by the market and operating projects have a certain choice about which RET is used. Price-driven policies provide financial incentives for capacity expansion and direct generation. Additionally, voluntary programmes can be implemented which depend on the consumers' and producers' willingness-to-pay for or invest in renewable energy. Numerous qualitative and empirical studies show a positive influence of RES-E support schemes on deploying renewable energy technologies for electricity generation (among others: del Río González and Gual, 2007, Lipp, 2007, del Río González, 2008, Lesser and Su, 2008, Yin and Powers, 2010, Haas et al., 2011, Dong, 2012, Groba et al., 2012). Yet the literature on the innovative influence of RES-E policies remains ambiguous concerning the suitability of different renewable energy policy types for inducing innovation.

Building upon this work, Foxon and Pearson (2007) then analysed policy processes in the UK and found that renewable obligations failed to promote RET innovation because this instrument, among other things, does not account for the different stages of technology development and commercialisation. Similar contributions come from Bergek and Jacobson (2013), who analysed the wind industry in Germany, Denmark and Sweden; Marinova and Balaguer (2009) who looked at the photovoltaic industry in Australia, Germany and Japan; Negro *et al.,* (2007) who analysed the innovation system in Denmark focussing on biomass; and Hekkert *et al.,* (2007) who explained the rapid diffusion of cogeneration technology in the Netherlands. Del Rio and Bleda (2012) show that FITs are likely to be superior to other policy instruments such as quotas, tradable green certificates and tendering. However, they also highlight that complementary instruments, specifically R&D support, are also required and that the innovation effects depend strongly on specific policy design elements.

Feriol et al., (2009) argue that learning-by-doing may impact the overall costs of a technology, but that the effects of single component improvements that have not yet been studied in detail could better explain the aggregated form of learning. They also point out that cost reductions may not continue indefinitely and that resource constraints or market barriers can limit the scope of further cost improvements. Regarding market constraints, Van der Zwaan et al., (2012) look at the price fluctuations of raw materials, among other things, that might increase costs. When abstracting from raw material prices they find a price reduction over time for wind offshore technologies that could be explained by economies of scale and learning-by doing.

In the case of wind and solar power, Feriol et al., (2009) investigate the impact of diverse factors like single (technical) components, public R&D, trends over time, etc. on the learning rate. For example, only a few components of the technology might be driven by learning-by-doing while others are integrated in other technologies and depend on the respective rate there. They find that, in particular, the geographic coverage (international or national) has a significant influence on the learning rate. Overall, they conclude that empirical studies of energy technology learning rates provide hardly any uniform estimates about the magnitude of these rates.

Bilajana *et al.,* (2013) in a study "The role of governments in renewable energy: The importance of policy consistency Biomass and Bioenergy" with application of descriptive research design and stratified sampling method, focusing on the renewable energy in Canada's Ontario and Norway implementation frameworks, they opine that the nature of policies changes do impose negativity on the investments and too lead to uncertainty in the sector. Further, they note that there is a significant evidenced challenge in the players of the sector with one particular policy change leads to a high margin of non-attracted capital inflows.

In a study "Rewarding energy savings rather than energy efficiency: Exploring the concept of a feed-in tariff for energy savings" by Oikonomou *et al.,* (2013) with focus on the financial incentives provisions towards the renewable energy sector, the study applied descriptive research design and stratified sampling method to realize the savings founded on the usage of energy. The study made findings that for the power producers, there is a possibility of financial support as they supply controls and usability is realized with imposition of feed-in-tariffs.

In Ontario Canada, Stokes (2013) notes in the study "The politics of renewable energy policies: The case of feed-in tariffs in Ontario, Canada" that the nature and design of the policy regarding renewable energy does involve decision making from the sector players and the political case. The study focused on the feed in tariffs from 1997-2012 with application of descriptive research design and random sampling technique, it revealed evidenced information asymmetry into price setting which might lead to public unrest, conflict of innovations and jobs in cases of public application of polices in simultaneous manner and due to unaccepted public project, the government has to undergoes through some instabilities in the politics to realize the investments in place.

Simon *et al.,* (2013) in a study "An analysis of Australia's large scale renewable energy target: Restoring market confidence. Energy Policy" in Australia whereby a statute was in inducement for renewable energy to boost the electricity levels with a high support of 20% in 2009 to affect the Renewable Energy Target. The study applied stratified sampling method and the descriptive research design on the policy makers' views onto the implementation of the frameworks and the capital markets reception on the same. The findings indicated that with avoidance of renewable costs and large scale RETS is abandoned, Australia would experience in costs between $51 Million to a high of $119 Million.

In a study by Stefan (2000) entitled "Sustainable Tourism Development in Developing Countries: Some Aspects of Energy Use", with application of stratified sampling technique and the research design, the study finds that there is a positive significance in usage of tourist related fossil fuels that contribute to poor environmental changes that are destructive to the communities. The concept is noted that the tourists who arrive in richly industrialised zones which too remit high carbon gas emissions that are have an effect to the communities.

In a study "The impact of climate change on wind and solar resources in southern Africa" by Strzepek *et al.*, (2016) to offer contribution to the environmental changes brought about by the renewable energy adoptions, the study focused on the strategies applied on the reduction of Green House Gas emissions via deployment of the renewable energies. The study revealed that a long term means of the wind and the global horizontal irradiance as the indicators contributing to the changes in the production of electricity and a median of close to zero by nearly 2050.

Reid (2013) in his coherent, integrated and nationwide profile of the UK's renewable energy sector on technology and innovation (which covered 30 renewable energy centers) found that internal technological capability is important but v at the same time access technical information from a range of external sources, of which suppliers or customers are the most frequent. According to Ussman et al., (2011), renewable energy centers in Portugal do not just depend on internal sources but are also strongly influenced by the overall environment. Hoffman et al., (2008) based on a survey of studies pertaining to UK, found that on balance, internal factors are likely to be more important core determinants of whether innovation plays a key role in success or failure than are external factors. By and large, these studies underlined the importance of both internal and external factors as the driving forces of innovation.

2.4. Marketing Innovation and Renewable Energy Growth

Vonortas and Xue (2007), while studying the process innovations of small projects in Sub-Saharan countries, observed that economic incentives, internal resources, and technical and organizational competencies that a project has developed or accumulated over time and a project's linkage to external sources of expertise for learning about new technological development were the major forces that influenced these projects in adopting a process innovation. Danneels and Kleinschmidt (2011) in the context of new product development argued that it consists of bringing together two main components: markets and technology. According to them, product innovation requires the project to have competences relating to technology (enabling the project to make the product) and relating to customers (enabling the project to serve certain customers). These studies strongly indicate that neither internal competence of the project nor customer requirements alone will drive a project to undertake innovations. Innovation will emerge only when a technically competent project is able to identify and respond to customer requirements by developing and/or improving products/processes.

Gaddefors (2005) found that market opportunity is based on corporate image and the development of innovation. Besides, effects of the creation of service innovation creates market opportunity and covers creative thinking in business operation on how to promote the understanding of values that the business creates to customers along with responding to customer behavior. This corresponds to a research by Omar and Williams (2009) indicating that in the future, the business market is moving forward to an international level, creating a new market. Therefore, current business strategy has to be improved to supply growing consumer demand.

Teece (2016) showed that profiting from innovation depends on the extent to which an enterprise has access to complementary skills, especially to marketing and distribution, crucial for commercializing an innovative idea. The marketing strategy thus features as an important component in deriving benefit from innovations. Projects that are willing to adjust their marketing strategies can expect to achieve better innovation results.

Further, literature on the impact of market orientation on project growth has revealed mixed discoveries in the developed and developing countries studies (Perry & Shao, 2002). Studies conducted in the United States have demonstrated the positive influence of market orientation on growth whereas a mixed blessing of market orientation is reported among UK and other developing countries studies (Pitt et al., 2016), however, even more little data is available in the Kenyan context and particularly the link between marketing as an innovation component and growth. There are also questions regarding the universal application of the market orientation construct by marketing scholars (Pitt et al., 2016).

2.5 Service Quality and Renewable Energy Growth

Many researchers argue that, given their frequent inability to judge technical quality of service functional service quality may be seen by the customer as the most important factor in a service transaction. On the other hand, much of the discussion about service quality measurement has revolved around the concept of dimensions of service quality where dimensions refer to a set of attributes which consumers use in evaluating the quality of service provided (Asubonteng at al., 2016). Similarly, many of the definitions of service quality revolve around the identification and satisfaction of customer needs and requirements (Parasuraman et al., 2016). Parasuraman at al. (2016) argue that service quality can be defined as the difference between predicted, or expected, service (customer expectations) and perceived service (customer perceptions). If expectations are greater than growth, then perceived quality is less than satisfactory and a service quality gap materializes. This does not necessarily mean that the service is of low quality but rather that customer expectations have not been met hence customer dissatisfaction occurs and opportunities arise for better meeting customer expectations.

SERVQUAL scale is a principal instrument in the services marketing literature for assessing quality (Parasuraman., 1988). This instrument has been widely utilized by both managers (Parasuraman vd., 1991) and academics (Carman, 2000) to assess customer perceptions of service quality for a variety of services (e.g. Renewable energy players, credit card companies, repair and maintenance companies). The results of the initial published application of the SERVQUAL instrument indicated five dimensions of service quality emerged across a variety of services. These dimensions include tangibles, reliability, responsiveness, assurance and empathy (Zeithaml at al, 1990). Tangibles are the physical evidence of service, reliability involves consistency of growth and dependability, responsiveness concerns the willingness or readiness of employees to provide services, assurance corresponds to the knowledge and courtesy of employees and their ability to inspire trust and confidence, and finally, empathy pertains to caring, individualized attention that a project provides its customers (Lassar at al., 20

3.1 Research Design

Descriptive survey research design was used in this study. According to Cooper and Schindler, (2000) descriptive research focuses on why and what questions. In answering the `why' questions, the study was involved in developing causal explanations. Causal explanations argue that phenomenon Y (growth of use of renewable energy) is affected by factor X (innovation). In answering what questions the study sought to describe the phenomena has it was happening or had been happening. This design was chosen because it applied closely to the research objectives of this study. The study targeted 314 households in Kisii County that used solar energy materials and products for energy supply. Each household consisted of one respondent thus making 314 respondents for the study. Sample size is essential in reflecting the target population characteristics otherwise in a pool estimation of the whole subject (Mugenda &Mugenda, 2008). The framing does help to uniquely pool the identifiable interest characteristics for the observation. The study applied simple random sampling technique for the collection of data where by 50% was picked representing a sample size of 157 respondents (King'oria, 2004). This type of technique is less money and time consuming and provides a precision over other techniques. King'oria (2004) notes a sub-group is a representation of the target population with which the attributes and the characteristics are defined by the derived inferences in the very population under focus. The target population of 304 persons representing households that used solar energy or materials for source of energy were suitable to pick 50% of the target population. This is to mean, the study considered 152 respondents for the purposes of analysis. This ensured accurate capture of the whole the target population with no bias viewed on the same. Due to the time, funding and energy involved that maybe in limited magnitude, the researcher used the 50% sample from the entire population (Wiersma, 2005).

Data was analysed using descriptive analysis. This was done with the aid of Statistical Package for social science (SPSS) software version 22. Statistical data was then presented by both correlation and Regression analysis which were used to test for relationship between the independent variables and the dependent variable.

Regression Model

$G = \beta_0 + \beta_1 (TI) + \beta_2 (S/PQ) + \beta_3 (MI) + e$

Where the variables are defined as:

G= Growth

TI= Technology innovation

S/PQ= Service/Product Quality

MI = Marketing innovation

e = Error term

4.1 Results and Discussion

4.1.1 Renewable energy' Growth

Part of the study was to get information on renewable energy growth. See results in Table 4.1

Table 4.1 Growth of Renewable Energy Use

	SA	A	N	D	SD	Mean	SD
It's my opinion that renewable energy use has grown	25 15.8%	64 40.5%	11 7.0%	49 31.0%	9 5.7%	3.79	.84
There is a high return on investment on solar energy	10 6.3%	65 41.1%	11 7.0%	54 34.2%	18 11.4%	3.06	.94
Solar energy has a high market share in Kisii and its environs	6 3.8%	38 24.1%	13 8.2%	80 50.6%	21 13.3%	3.89	.84
Renewable energy has a high reputation among users	3 1.9%	58 36.7%	6 3.8%	75 47.5%	16 10.1%	1.89	.92
The level of growth is high	10 6.3%	65 41.1%	11 7.0%	54 34.2%	18 11.4%	2.06	.84

From table 4.1 it is evident that majority of respondents at 56.3% agreed that it was their opinion that renewable energy use had grown. Only 36.7% disagreed and only 7.0% were neutral. This implies that users felt that renewable energy was growing particularly in its use. Growth here, is its capacity to achieve its sales targets. These targets are likely to be expressed in a variety of terms depending on the context (Atieno, 2009). Therefore, renewable energy growth in this regard is expected considering the need to meet sales targets and it seems users here felt it did. When the respondents were asked if their renewable energy usage had a high return on investment, 47.4% agreed, 45.6% disagreed and 7.0% were undecided. Although the result was significantly close, most users had gotten a high return a factor that implies heightening growth, competitiveness and growth. However, when the respondents were asked if renewable energy usage had a high market share in Kisii county and its environs, 63.9% disagreed, 27.9% and 8.2%. This is an indication that renewable energy usage growth while getting encouraging returns were hampered because of small market share. From an entrepreneurial perspective, a competitive project needs to survive in the market and to achieve market share and profitability. The success of a competitive project can be measured by both objective and subjective criteria. Objective criteria include return on investment, market share, profit and sales revenue, while subjective criteria include enhanced reputation with customers, suppliers, and competitors, and improve quality of delivered services (McPherson, 2005).

When respondents were asked if the renewable energy aspects like solar had a high reputation among users, 57.6% disagreed, 38.6% agreed and 3.8% were undecided. This is an indication that subjectively, renewable energy usage was not performing well and they needed to up their game. Reputation among users if poor creates a project that is competitively disadvantaged (Mead, 2008).

Finally, when asked if the level of growth was high, 47.4% agreed, 45.6% disagreed and 7.0% were undecided. Although the result was significantly close, most projects had a certain element of growth. This is agreed to by Meziou (2009) who noted that significantly, renewable energy sector players were competitive and better performers but often due to their significant numbers in a small location, their overall growth was not high.

4.1.2 Influence of Technological Innovation on Renewable Energy Growth

The first objective sought to establish the influence of technological innovation on renewable energy growth. The results are as seen in Table 4.2.

Table 4.2 Influence of Technological Innovation on Renewable Energy Growth

	SA	A	N	D	SD	Mean	StD
Our Solar systems have technically competent and innovative aspects	32 20.3%	90 57.0%	9 5.7%	22 13.9%	5 3.2%	3.18	.8134
Our Solar systems have technically skilled and innovative people to help when need be	22 13.9%	90 57.0%	11 7.0%	27 17.1%	8 5.1%	3.28	.8235
Our technology has been able to produce innovated products that adequately meets the customers' demands	35 22.2%	81 51.3%	12 7.6%	24 15.2%	6 3.8%	2.67	.8734
We depend mainly on external technological innovations than internal ones	28 17.7%	91 57.6%	10 6.3%	23 14.6%	6 3.8%	2.47	1.117
Our technology has so far adequately enabled the solar players to make new products	34 21.5%	92 58.2%	12 7.6%	15 9.5%	5 3.2%	2.65	.9282
Our technology has so far not adequately enabled the solar players to serve certain customers well	19 12.0%	80 50.6%	12 7.6%	29 18.4%	18 11.4%	2.77	.8421
Generally, our technology is adequate and has consequently helped improve our renewable energy growth	19 12.0%	78 49.4%	13 8.2%	32 20.3%	16 10.1%	2.06	.8542

From table 4.2 it is evident that majority at 77.5% were in agreement that their solar systems had technically competent and innovative aspects. Only 26.1% disagreed and 5.7% were neutral. This indicates that the solar systems had endeavoured to improve their technology attractiveness to remain highly competitive and performing. This is agreed to in literature. Technological innovation is unavoidable for projects which want to develop and maintain a competitive advantage and/or gain entry in to new markets (Becheikh et al., 2016). Among projects of different sizes, small renewable energy is generally more flexible, adapt themselves better, and are better placed to develop and implement new ideas.

When asked if the solar systems had technically skilled and innovative persons to help when need be, 70.9% agreed, 22.2% disagreed and 7.0% were undecided. This implies that there was existence of a good technically savvy staff based on the opinion of the renewable energy users themselves. Literature has numerous support for the benefits of a technologically savvy staff. The flexibility of renewable energy, their simple organizational structure, their low risk and receptivity and their significant levels of technological innovation are the essential features facilitating them to be innovative (Harrison and Watson 2008). Therefore, users for instance across the sector have the unrealized innovation potential once their staff have the technological know-how (Chaminade and Vang 2016). There is also substantial evidence to show that a number of renewable energy in a wide variety of sectors do engage in technological innovations, and that these innovations are likely to be an important determinant of their success (Hoffman et al., 2008).

On whether technology had been able to produce innovated products that adequately met the customers' demands, 75.5% agreed, 19.0% disagreed and 7.6% were undecided. This implies that the renewable energy players were very aware of the need to satisfy customers and give them a good service using technology. Organizations like renewable energy players should offer an attractive service to their customers on their product mix because high services led by technology as compared to competitors and unrealistic promises may result in dissatisfaction among customers. Customer satisfaction was an urgent challenge for Islamic renewable energy players in Australia as it was considered in case of conventional renewable energy players. Customer satisfaction became the center of organizational efforts (Acedo et al., 2016).

On whether the renewable energy players depended mainly on external technological innovations than internal ones, 75.3% disagreed, 18.4% agreed and 6.3% were neutral. This implies that the renewable energy players did not outsource their technology services but depended on internal staffers and available internal technology tools and infrastructure. If a project has to technologically innovate, it should have in-house technological competence in the form of technically qualified and motivated entrepreneurs or managers with innovative ideas and technically skilled employees (Burrone and Jaiya 2005). Similarly, there must be a market demand for the innovated products in the form of an explicit customer demand or implicit market opportunities. However, Mead (2008) on his part disagrees and notes that outsourced technology services works best for renewable energy players' growth as it allows the renewable energy players to focus on their core competencies and reduce costs apart from improving innovativeness.

When asked if technology had so far adequately enabled the users to enjoy new products, 79.7% agreed, 12.7% disagreed and 7.6% were undecided. This implies that there was a correlated relationship between technology and new product innovation by renewable energy. Reid (2013) in his coherent, integrated and nationwide profile of the UK's renewable energy sector on technology and innovation (which covered 30 renewable energy) found that internal technological capability is important for product innovations and consequent improved growth but renewable energy at the same time access technical information from a range of external sources, of which suppliers or customers are the most frequent.

When asked if technology had however so far not adequately enabled the bank to serve certain customers well, 62.2% agreed, 7.6% were undecided and 29.8% disagreed. This implies that while there was a robust technological innovation, the customers were still not served well due to other factors. Mead (2008) in agreement had noted that while renewable energy were improving significantly their technology, other important factors like service quality, marketing and organizational structure improvements were necessary to eventually significantly satisfy customers and improve overall growth.

Finally, however, when asked if generally, the technology was adequate and had consequently helped improve on growth, 61.4% agreed, 30.4% disagreed and 8.2% were undecided. This implies that technological innovations at the renewable energy were considered adequate for the time being and had improved growth. This is a positive indication and coupled with the mean and Standard deviation results, indicate a significant reliable result that technology played a significant role in improving renewable energy' growth in Kisii.

4.1.3 Influence of Service Quality innovation on Renewable Energy Growth

The second objective was measured using the SERVQUAL model to get expectations of respondents using a five-point Likert scale ranging from "strongly disagree=1" to "strongly agree=7" to measure the 22 items. Tables 4.3 and 4.4 show the results

Table 4.3 Average SERVQUAL Scores of Staff Expectations and Perceptions

Dimension of	Item	Perception	Expectation	SERVQUAL Score
Tangibility	1. Excellent renewable energy service has modern looking equipment	4.87	5.61	-.744
	2.Excellent renewable energy service's physical facilities are visually appealing	5.04	5.62	-.577
	3.Excellent renewable energy service's reception desk employees are neat in appearance	4.88	5.48	-.599
	4.An excellent renewable energy service's receipts, cheques and similar materials are visually appealing	5.56	5.57	-.013
Reliability	5. When an excellent renewable energy service promises to do something by a certain time, it does so	5.57	6.06	-.489
	6. When customers have problems employees in an excellent renewable energy service will be sympathetic and reassuring	5.42	6.02	-.621
	7. An excellent renewable energy service performs the service right the first time	5.45	6.15	-.692
	8. An excellent renewable energy service provides its services at the time it promises to do so	5.37	6.03	-.665
Responsiveness	9. An excellent renewable energy service insists on error-free records	5.63	6.27	-.634
	10. Employees in an excellent renewable energy service tell exactly when the services will be performed	5.45	5.98	-.533
	11. Employees in an excellent renewable energy service give prompt services.	5.26	5.88	-.612
	12. Employees in an excellent renewable energy service are always willing to help customers	5.04	5.63	-.590
	13. Employees in an excellent renewable energy service are never too busy to respond to Customers' questions	5.07	5.50	-.427

Assurance	14.Employees in an excellent renewable energy service instil confidence in customers	5.34	5.96	-.626
	15. Employees in an excellent renewable energy service provide sufficient trust to customers placing confidence in employees in this respect.	5.50	6.10	-.599
	16. Employees in an excellent renewable energy service always respect customers.	5.52	6.11	-.590
	17. Employees in an excellent renewable energy service have necessary knowledge to answer customers' questions.	5.21	5.91	-.699
Empathy	18. An excellent renewable energy service gives customers individual attention	4.87	5.73	-.859
	19. An excellent renewable energy service has working hours suitable for all customers	4.47	5.19	-.718
	20. An excellent renewable energy service has employees who give customers personal Attention	4.45	5.38	-.930
	21. An excellent renewable energy service has customer's best interest at heart	4.55	5.40	-.855
	22. The employees of an excellent renewable energy service understand customer specific Needs	4.53	5.35	-.824

The 22 sets(pairs) of statements are designed to fit into the five dimensions of service quality. A seven-point scale ranging from "strongly agree" (7) to "strongly disagree" (1) accompanies each statement. The "strongly agree" end of scale is designed to correlate with high expectations and high perceptions. Service quality occurs when expectations are met (or exceeded) and a service gap materializes if expectations are not met. The gap score for each statement is calculated as the perception score minus the expectation score. A positive gap score implies that expectations have been met or exceeded and a negative score implies that expectations are not being met. Gap scores can be analyzed for each individual statement and can be aggregated to give an overall gap score for each dimension (Parasuraman e*t al*., 1988).

From Table 4.3 it is clear that as shown in the table SERVQUAL scores for all items bear negative signs meaning that expectations are greater than growth, then perceived quality is less than satisfactory and a service quality gap materialized.

Research conducted, are of the sort that support SERVQUAL scale. Common result of the relevant researches can be summarized as such, that, perceived service quality is the result of comparison of service growth with customer expectations and the evaluation of service quality does not only depend on final output but also on the way of how the service is provided (Juran *et al*., 1988).This result further agrees with Heracleous, (2002) and Hardy (2005), who argued that service gaps was common and negative SERVQUAL scores were the order of the day particularly in the public service where the perceptions and expectations of both customers and staff, often similar, showed that there was no quality service delivery in the renewable energy service.

Table 4.4: SERVQUAL Scores of Quality Dimensions

Dimensions	SERVQUAL Scores (Average)	Sig. (p)	Relative Importance (Weights) of Quality Dimensions stated by Staff (%)	Weighted SERVQUAL Score
Tangibles	-.64000	.007	16.77290	-0.10734
Reliability	-.62020	.000	27.62948	-0.17135
Responsiveness	-.54050	.001	20.18326	-0.10909
Assurance	-.62850	.000	20.27490	-0.12742
Empathy	-.83720	.000	15.13944	-0.12674
Total un-weighted SERVQUAL score	-.65328			
Total weighted SERVQUAL score				-0.64197

Table 4.4 shows SERVQUAL scores presented in line with five dimensions. These dimensions include tangibles, reliability, responsiveness, assurance and empathy. The average scores were derived from table 4.3 based on the specific measures of Quality Service quality, the relative importance by staff were weighted using SPSS options, and together they presented the weighted SERVQUAL scores. The negative result again reflects the fact that the expectations were higher than the perceptions. Based on the quality dimensions, empathy has the highest negative SERVQUAL scores. In other words, compared with other factors, satisfactory level of empathic behaviour is lower.

Further, respondents' rating of quality dimensions is shown in Table 4.4. In regards to the quality improvement, the most important dimension to which highest rating (27.63 percent) is assigned is reliability. This dimension is followed by assurance and responsiveness respectively. In this respect, empathy having the highest negative SERVQUAL score is the least important dimension. When the relative importance of quality dimensions as weights are considered, highest negative SERVQUAL score passed from empathy to reliability. Furthermore, the difference between total weighted SERVQUAL score (-0.64197) and total unweighted SERVQUAL score (-.65328) do not seem noteworthy. Again this is agreed to in literature (Appelbaum *et al.*, 2008; Bennebroek-Gravenhorst *et al.*, 2016) who in their studies found that empathy had the lowest negative rating in the renewable energy service because they argued, empathy was characterized more by psychological and emotional needs to which renewable energy users were unwilling to engage with when it came to customer interaction.

4.1.5 Influence of Marketing Innovation on Renewable Energy Growth

The third objective sought to establish the influence of marketing innovation on renewable energy growth. The result is as seen in table 4.5

Table 4.5 Influence of Marketing Innovation on Renewable Energy Growth

	SA	A	N	D	SD	Mean	StD
Our Solar systems responds to the niche market effectively	19 12.0%	84 53.2%	7 4.4%	37 23.4%	11 7.0%	3.89	.8001
Our Solar systems has the capacity to reach targeted customers through branding and advertising and search for new ones effectively	10 6.3%	44 27.3%	11 7.0%	66 41.8%	27 17.1 %	2.78	.8543

Our Solar systems management and ownership think there is no enough money	11 7.0%	78 49.4%	11 7.0%	45 28.5%	13 8.2%	2.92	1.254
Our Solar systems has marketing and distribution complimentary skills	21 13.3%	80 50.6%	8 5.1%	38 24.1%	11 7.0%	1.99	.9341
Players are more reluctant to engage in robust marketing as opposed to the larger projects because of cost and time	21 13.3%	98 62.0%	4 2.5%	27 17.1%	8 5.1%	3.91	.8233
Our Solar systems conducts marketing research periodically for long-term market planning	18 11.4%	29 18.4%	12 7.6%	80 50.6%	19 12.0 %	2.86	.9001
Generally, Our Solar systems is not keen on marketing has it has not been known to significantly improve its overall growth.	19 12.0%	78 49.4%	13 8.2%	32 20.3%	16 10.1 %	2.55	.7742

From table 4.5 it is noted that majority at 65.2% agreed with the assertion that the solar systems responded to their niche market effectively. Only 30.4% disagreed and 4.4% were undecided. This is an indication of an appreciation of marketing innovation and its ability to target the actual market niche for continued growth. This is agreed to in literature. Kotler (2013) indicated that market opportunity is of customer interest in a particular item and the business could respond to that need. On whether, the solar systems had the capacity to reach targeted customers through branding and advertising and search for new ones effectively, 58.9% disagreed, 33.6% agreed and only 7.0% were undecided. This implies that renewable energy usage did not invest in continuous marketing. This corresponds to a research by Omar and Williams (2009) indicating that in the future, the business market is moving forward to an international level, creating a new market. Therefore, current business strategy has to be improved to supply growing consumer demand and through branding and advertising search for new ones effectively.

On whether the renewable energy management and ownership thought there was no enough money for branding and advertising, 56.4% agreed, 36.7% disagreed and 7.0% were undecided. This implies that there were semblance of negative attitude and lack of commitment on the management part to improve marketing innovation for better growth. In this regard, Teece (2016) showed that profiting from innovation depends on the extent to which an enterprise has access to complementary skills, especially to marketing and distribution, crucial for commercializing an innovative idea. The marketing strategy thus features as an important component in deriving benefit from innovations. Projects that are willing to adjust their marketing strategies can expect to achieve better innovation results.

When asked if the renewable energy players had marketing and distribution complimentary skills that had helped improve business growth, 63.9% agreed, 27.2% disagreed and only 2.5% were neutral. Teece (2016) showed that profiting from innovation depends on the extent to which an enterprise has access to complementary skills, especially to marketing and distribution, crucial for commercializing an innovative idea.

When asked if renewable energy players were more reluctant to engage in robust marketing as opposed to the larger projects because of cost and time, 75.3% agreed, 22.2% disagreed and 2.5% were neutral. This implies that the elements of costs and time were factors that hindered effective and robust marketing innovation among renewable energy players in Kisii. Market orientation or marketing as a business culture leads to business growth improvement, as proved by numerous studies (Hooley et al., 2000). However, Meziou (2009) notes that small renewable energy is more reluctant than larger projects to embrace the marketing concept in their strategy formulations. Apparently, renewable energy does not conduct market research, and do not have long-term market planning because of the high costs and long-time involved.

When asked if renewable energy players conducted marketing research periodically for long-term market planning 62.6% disagreed, 29.8% agreed and 7.6% were undecided. This implies that renewable energy players were not engaged in research to find out where there was need for marketing improvement. The position that market orientation has not been adopted by renewable energy may have been supported by Stokes and Blackburn (2009) who contended that whereas traditional marketing concept is conceived of as a deliberate planned process which proceeds from a careful identification of market needs by formal research and through purposeful development of new offerings to the market place, the small business deliberation involves informal, unplanned activity that relies on the intuition and energy of the owner/ manager to make things happen.

Finally, when asked if generally, the renewable energy players were not keen on marketing has it had not been known to significantly improve overall growth. 61.4% agreed, 30.4% disagreed and 8.2% were undecided. This implies that the renewable energy players considered marketing innovation as an unhelpful process. These is significantly disagreed to in literature. While researchers have found congruence between market orientation and business growth (Blankson & Stokes, 2002), there seems to be ambiguity as far as the appreciation as well as the adoption of the market orientation construct by renewable energy is concerned and as earlier said this also relates to Kenya (Harris, 2008). Adopting a market-orientated strategy is posited as a way of successfully managing the impact of changes in the renewable energy domain. However, the application of market-orientation and its research models, which were developed for large-scale projects, may have different meanings in a renewable energy context. This position is warranted given the fact that renewable energy faces peculiar problems including: deficiencies arising from their limited resources and range of technological competencies; influence of their owners/managers on the decision-making; dependence on small numbers of customers and suppliers; and focus on the efficiency of current operations, among others.

4.2 Correlation Analysis

As part of the analysis, Pearson's Correlation Analysis was done on the Independent Variables and the dependent variables. The results are as seen on Table 4.6

Table 4.6 Correlation Analysis

		Growth	Marketing	Technology	Service Quality
Growth	Pearson Correlation	1			
Marketing	Pearson Correlation	.655**	1		
	Sig. (2-tailed)	.000			
Technology	Pearson correlation	.578**	.410**	1	
	Sig. (2-tailed)	.000	.000		
Service Quality	Pearson Correlation	.710**	.205**	.557**	1
	Sig. (2-tailed)	.001	.005	.000	

Pearson correlation analysis was conducted to examine the relationship between the variables. The measures were constructed using summated scales from both the independent and dependent variables. As cited in Cooper and Schindler (2000) the correlation coefficient value *(r)* range from 0.10 to 0.29 is considered weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1.0 is considered strong. However, according to Field (2005), correlation coefficient should not go beyond 0.8, to avoid multicollinearity. Since the highest correlation coefficient is 0.710 which is less than 0.8, there is no multicollinearity problem in this research (Table 4.6).

All the independent variables had a positive correlation with the dependent variable with service quality having the highest correlation of (r=0.710, p< 0.01) followed by marketing innovations with a correlation of (r=0.655 p< 0.00) and then technological innovation had the least correlation of (r= 0.578 p< 0.00). This indicates that all the variables are statistically significant at the 99% confidence interval level 2-tailed. This shows that all the variables under consideration have a positive relationship with the dependent variable.

4.2.1 Regression Analysis

Table 4.7 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.882[a]	.748	.741	.176

a. Predictors: (Constant), technology, service quality, marketing

b. Dependent Variable: Growth
Source: Research Data (2017)

From table 4.7 it is clear that the R value was .882 showing a positive direction of the results. R is the correlation between the observed and predicted values of the dependent variable. The values of R range from -1 to 1 (Wong and Hiew, 2005). The sign of R indicates the direction of the relationship (positive or negative). The absolute value of R indicates the strength, with larger absolute values indicating stronger relationships. Thus the R value at .882 shows a stronger relationship between observed and predicted values in a positive direction. The coefficient of determination R^2 value was 0.741. This shows that 74.1 per cent of the variance in dependent variable (growth) was explained and predicted by independent variables (technology, service quality, marketing).

Table 4.8 ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	232.743	4	43.096	114.391	.000[a]
	Residual	12.878	227	.664		
	Total	244.511	231			

a. Predictors: (Constant), technology, service quality, marketing

b. Dependent Variable: Growth

Source: Research Data (2017)

The F-statistics produced (F = 114.391.) was significant at 5 per cent level (Sig. F< 0.05), thus explaining the fitness of the model and therefore, there is statistically significant relationship between technology, service quality, marketing, and growth.

Table 4.9 Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.767	.361	.287	7.668	.000
	Technology	.385	.078	.393	5.968	.000
	Service Quality	.168	.065	.193	2.593	.004
	Marketing	.329	.064	.352	5.129	.000

a. Dependent Variable: growth of renewable energy use

Source: Research Data (2017)

The t-value of constant produced (t = 7.668) was significant at .000 per cent level (Sig. F< 0.05), thus projecting the fitness of the model. Therefore, there is statistically significant relationship between technology, service quality, marketing and Growth.

Service quality with sig of .004 had a strong significance to renewable energy use growth and was thus statistically significant. This implies that service quality affected renewable energy growth. Technology with sig of .000 had a strong significance to renewable energy growth and was thus statistically significant. Generally, Information Technology (IT) plays a vital role in the sustained growth of a business. Valida et al., (2008) studied IT use in 230 business organizations, mainly in Malaysia, and concluded that IT use conferred a better renewable energy growth.

Lastly marketing innovations with sig of .000 had a strong significance to renewable energy growth and was thus statistically significant. Marketing is one of the major ways organization invests in the marketplace for greater return today and even in the foreseeable future and an organization that does not make it unique to maintain growth fails miserably (Bertz, 2002).

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