



# Influence of Technology on Business Sustainability in Petroleum Firms in Nairobi, Kenya

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**Purpose:** Sustainability is gaining more interest among several strategic management scholars. Technology provides a disruptive competitive advantage that is essential for businesses to thrive in a difficult environment where rules and strategies change from time to time. There is little competition among the oil marketers in Kenya because the government controls pricing strategy. The study's main aim was to determine the influence of technology on business sustainability in petroleum firms in Nairobi, Kenya. The study was underpinned by dynamic capability theory. This study adopted a descriptive research design in its investigation.

**Study design/methodology/approach:** The study's total population was 60 oil marketing companies in Nairobi. The study selected heads of business development units from each oil marketing company. Since the population was small, a census was adopted because it was the most appropriate approach. The primary data was collected using questionnaires, where standard questionnaires with closed-ended questions were administered to capture important information about the respondents. Simple linear regression was employed to determine the effect of technology on business sustainability in petroleum firms in Nairobi.

**Findings:** Technology had a positive and significant effect on the business sustainability of oil marketing companies. The study concluded that strengthening technology enhances competitiveness and thus results in business sustainability among oil marketing companies.

**Originality/value:** The study recommends adopting improvised technology for all the processes and services of oil marketing companies.

## Introduction

Sustainability is gaining more interest among several strategic management scholars despite it being a term with an elusive meaning (Bansal & DesJardine, 2014). There has been no consensus on the exact definition of the term sustainability in business; for instance, some scholars restrict it to matters related to the environment, while different opinions use it interchangeably with social corporate responsibility (Dyllick & Muff, 2016). Development economists view sustainability as a continuous process of satisfying the needs of current people as much as the protection of future groups of people is assured or well-safeguarded (Borowy, 2013).

Business sustainability has continually evolved like many other aspects of social life. According to Duque-Grisales and Aguilera-Caracuel (2021), the concept of business sustainability has reengineered itself over time from focusing on a limited scope to now focusing on a wider scope. Initially, all efforts were directed at the environmental aspect. However, this has shifted to a more multifaceted system that considers all matters of governance, especially the economic and social aspects. Rodgers (2015) alludes that investors utilise information on business sustainability performance to look beyond current financial performance to make investment and business decisions. The creation of a sustainable business environment requires paradigm shifts in how businesses operate. In particular, businesses bear responsibility for many social and environmental challenges. Every business has a strategic management model geared to sustain its activities.

Rapid business environment change has resulted in many businesses adopting different business models. Businesses have embraced new models by integrating them with the existing ones to remain competitive in the market, thus reinventing themselves (Volberda et al., 2018). One key ingredient in the pursuit of business sustainability has been the integration of technology into organisational business processes (Reeves & Deimler, 2012). According to Habtay (2011), businesses are faced with various challenges that include change that is continuous or discontinuous, complex and multi-dimension of uncertainty, businesses that are at the tipping point, and businesses that are in transition, among others, require Innovation for it to reinvent and sustain their activities in the future. Innovation is regarded as a mature and hypercompetitive element essential to creating competitive advantage and business sustainability (Giulian et al., 2018).

Several researchers have focused on the creation of technological innovations. However, De Martino et al. (2012) observed that half of the innovations in business are non-technological. Non-technological innovations are entirely related to business management. Business innovation introduces new thoughts, creative ideas and unique solutions that have overreaching consequences and sustainability through upgrading technology and improving how business is done (Von Stamm, 2008). Pisano (2015) opined that Innovation is the only practical remedy to current problems that shift how business are done. Business innovation tends to satisfy customer needs that are proving sophisticated over time and market demands.

The emergence of technology has changed how businesses operate; technology influences customer experience, operational processes and business models. Hess et al. (2016) observed that businesses only remain competitive because they are aided by technology. Technology is a critical tool in creating value for a firm by enhancing the efficiency and effectiveness of a business. Technology has improved business ability by doing more with less and getting more results (Fitzgerald et al., 2008). Technology has revolutionised business transactions ranging from making orders to payments and delivery.

In Kenya, oil exploration began in the 1950s until 2012, when an oil deposit was discovered in Turkana County, and more experiments are still ongoing to establish the product's commercial viability. Kenya has no oil production plant, and all the oil used in Kenya is imported from other countries, both in raw and finished form. The petroleum refinery plant on the coast has been declared an uneconomical facility. Kitimo (2022) alludes that it had failed to live to its status as East Africa's only oil refinery. Oil companies in Kenya operate in an oligopolistic market structure that entails more independence, homogeneity of products and high capital requirements. This nature of market structure has seen a rise in competition that declined profit margins and subsequent losses. The state controls and regulates the oil price in Kenya, reducing the urge for reinvention among oil marketers in Kenya because there is little competition in the market.

In Kenya, the oil marketing structure is oligopolistic and fully guided by the government. There is little competition among the oil marketers in Kenya because the government controls pricing strategy. Lack of reasonable competition, in addition to more government control of pricing, has seen many oil marketers not reinvent themselves. Literature indicates that less than 20 per cent of oil marketers have initiated the process of selling clean energy, thus justifying that many of the oil marketers have not reinvented themselves (Majimbo & Namusonge, 2020).

The reluctance of oil marketers to reinvent themselves has far-reaching implications, given the ever-growing debate on mitigating climate change. The desire by oil companies to reinvent business operations by refocusing on the environment, society, and governance has become an alternative to remaining competitive. Kenyan oil firms' continuous adoption of a similar strategy without reconfiguring might harm their existence. The oil marketers will likely lose

market competitiveness if they do not reinvent themselves. One of the critical factors that can sustain business in the market is adopting a reinvention strategy. This study sought to evaluate the influence of technology on business sustainability for oil firms in Nairobi, Kenya.

## Literature Review

### *Business Sustainability*

The concept of business sustainability has different meanings depending on the context being defined or studied, which is seen as a collective responsibility by several organisations to have a feasible definition. Sambhanthan, Potdar and Chang (2017) defined business sustainability as the process of persuading organisational goals and objectives and ensuring operational sustenance anchored on social, economic, and environmental aspects. According to Mahajan and Bose (2018), managing an organisation involves looking into three key economic, social and environmental perspectives that deserve proper management. Similarly, Chungyalpa (2019) defined business sustainability as the ability of the organisation to undertake its mandate anchored on three dimensions: economics, environment, and society. It is evident from the scholarly definitions that business is the process of undertaking organisational objectives and goals by considering its three different aspects, which include economic, environmental, and social.

Hart and Milstein (2003) proposed a framework guiding business sustainability where the creation of stakeholders' value was seen as a strategy for addressing sustainability challenges. The framework had four major components: preventing pollution, clean technology, product stewardship and pyramid base. This eventually resulted in the actualisation of corporate social responsibility that is heavily involved in tackling environmental and social issues (Porter & Kramer, 2006). Businesses should conceptualise new ideas for exploring markets and producing new products, reorganising various value chain processes for environmental and economic prosperity.

Several studies have viewed business sustainability as strategic thinking inclined towards the long term rather than the short term (Davis, 1991; McWilliams & Siegal, 2000; Hess & Warren, 2008; Porter & Kramer, 2019; Gupta, 2017). It is now imperative to argue that leaders with a business sustainability mindset will not only focus on financial performance but also appreciate the need for environmental consciousness, thus breathing a paradigm shift.

The current competitive market environment requires businesses to be integrated with society, driven by Innovation and inequity by companies across the sector. This shift in approach encourages business leaders to use knowledge and research findings to address and solve real-world problems (Bratianu et al., 2020). Future generations are likely to face problems that affect the sustainability of business and the shape of the business landscape. Society's expectations of various businesses have shifted towards environmental and social. On the other hand, the stakeholders expect businesses to be self-reliant and offer practical solutions to societal problems (Chmielewski et al., 2020). The change outside should not overtake change inside the organisation because that will mean the business will not survive.

Scholars have been debating on the importance of business sustainability. Chungyalpa (2019) opined that sustainable business practices require the collaborative effort of all stakeholders in the business. Businesses ought to shift from the traditional way of focusing on profit-taking and social corporate responsibility to embracing sustainable values and practices. According to Mahajan and Bose (2018), most organisations have not developed a road map towards sustainable practices, and several have limited themselves to corporate social responsibility, especially philanthropic on education and health. Naudé (2011) noted that leadership is

supposed to borrow from their expertise and experiences in addressing challenges by offering solutions. Challenges are constantly evolving, and businesses must stay competitive to overcome them by recognising the importance of environmental and social responsibilities. Though important, measuring sustainability is a major concern for organisations. This is because it involves internal processes that involve meticulous picking of crucial sustainability parameters and those deemed effective in improving the processes. This helped organisations avert challenges associated with environmental degradation.

Business sustainability has been measured using different parameters by different authors. Medel-González, et al. (2013) measured business sustainability using three key dimensions. The dimensions, according to González, et al. (2013), are environmental, economic and social aspects. Similarly, Ngwakwe and Ambe (2016) and Almasarwah et al. (2019) measured business sustainability by looking at environmental, economic and social parameters. Furthermore, the Green Business Bureau (2021) measured business sustainability using environmental, social, and economic metrics. The environmental aspect entails the environmental impacts of business activity on the environment, such as pollution, waste generation, and environmental protection. The economic aspect of business sustainability defines the economic gains of the business activity, like profits, while social aspects include the impacts of the business on people's way of life.

### ***Technology and Business Sustainability***

The paper was based on dynamic capability theory by Teece, Pisano and Shuen in 1994. The theory analyses dynamic capability as the organisation's position to integrate reconfigure and strategies on various competencies, including technology, to adapt to changes that occur within the market. According to Abel (1980), technology adds dynamic character to assignments and tasks in business. Porter (1983) argued that technology is one of the critical factors determining a business's competitiveness. One of the main goals of technology is to acknowledge technological resources at both internal and external levels by identifying basics that create distinction (Zahra, 2006). From another perspective, Carroll (2017) noted that an artificial system uses knowledge in an organisation to develop techniques and objects that aid the product process, process, and service delivery. Wahab et al. (2019) observed technology as a complex application of scientific and systemic knowledge in handling tasks practically, where players in an organisation actively participate, aided by machines. Santa et al. (2022) viewed technology as the application of new and innovative processes, software systems and hardware systems to aid the efficient and effective delivery of tasks. Technological capacity building through the usage of appropriate means is a long-term strategy that sustains the success of an organisation. The technology used in business operations affects the environment, society and the economy (Jakšić et al., 2018).

Technology has assisted people's lives to become better now and then and supports global business (Mgunda, 2019). In addition, technology has disrupted how communication is conducted in business, ranging from initial information creation to dissemination (Apulu & Latham, 2011). Technology is instrumental in initiating change in different aspects of the project cycle, especially business. The changes in the business environment have been occasioned by technological advancement. Technology has been a critical tool in networking for businesses in populous areas (Brewer, 2005). Connection through internet platforms has seen businesses reach broader coverage quickly using limited resources.

Automation brought by technology has enhanced efficiency and reduced labour costs significantly. Incorporating robots in strengthening efficiencies processes amounts to decreased costs and is less labour intensive (Nahavandi, 2019). Businesses need to change their mode of operations, starting with how they allocate tasks and integrate technology for seamless

operation. (Enholm, et al., 2022). Information communication technology has revolutionised business. According to Mugunda (2019), the disruptive nature of IT and the internet has occasioned change that has improved the performance of several sectors of the economy—exchanging information by using the internet as increased accessibility. Wilburn and Wilburn (2018) argued that adopting technology has increased efficiency by lessening production and product delivery time.

Barnard and Barringer (2022) also emphasised the importance of measuring the impact of technology. They indicated it goes a long way in addressing and supporting operational excellence within the technology function. Baryol (2022) proposes a four-step methodology of measuring technology, which involves first understanding what a business needs to evaluate, taking the assessment, evaluating the results and finally creating a roadmap and implementing the plan. Fitzpatrick and Strovink (2021) identified five parameters of measuring technology on a metric scale that include a portion of expenditure on developing technology, resources channelled to various bold digital initiatives in percentages, duration taken to complete a technological innovation, portion of leaders involved in the process and number of technical talents involved in the entire process. According to Barnard and Barringer (2022), the impact of technology in business should involve determining the business value of technology, conducting digital value assessment, and determining IT efficiency and effectiveness.

### Conceptual Framework

Technology is the independent variable, while the sustainability of petroleum firms in Kenya is the dependent variable. Government policy moderates the specific influence of technology on the sustainability of petroleum firms in Kenya since businesses must make decisions that are aligned with the relevant business policies. This is diagrammatically represented in Figure 1.

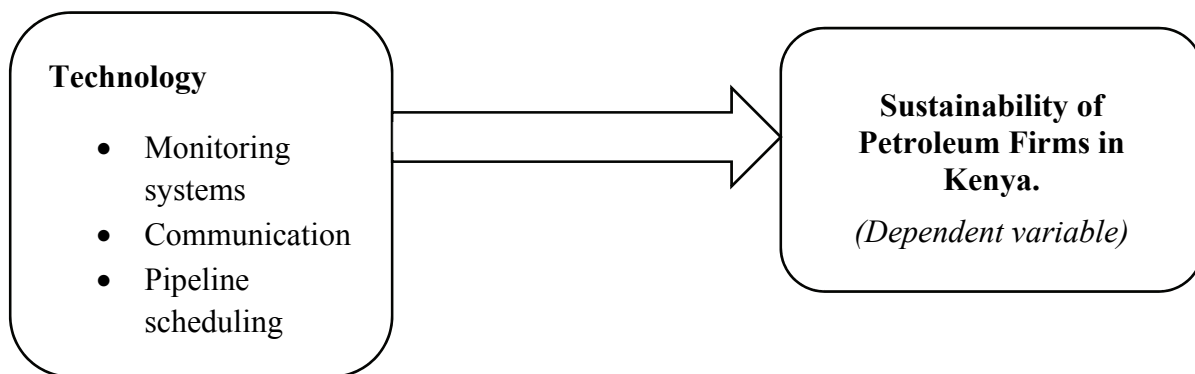


Figure 1: Conceptual Framework

### Research Methodology

This study adopted a descriptive research design to assess the influence of technology on business sustainability in petroleum firms in Kenya. The choice of this design is informed by its flexibility, which accommodates multifaceted aspects within the management discipline. It attempts to examine how a situation has occurred under what scenario and who participated. It elucidates how occurrences happen in an organised setting in a given duration.

### Population and Sample

The study targeted respondents from the 60 registered oil marketers in Nairobi. Nairobi was selected because most oil marketing companies have offices in the area. A census of the 60 oil marketing companies in Nairobi was conducted. Therefore, the census was the appropriate



sampling method and thus was adopted. Censuses are preferred because the size of the population is small and can be studied in its entirety.

**Method of Collecting Data**

The researcher interviewed the head of the business development unit from each oil marketing company. The head of the business development unit is the technical officer who advises the company on the overall strategy of reinventing the business. The primary data were obtained using a standardised research tool made up of questions with closed choices in the form of a questionnaire. Questionnaires were administered to heads of business development units of the oil marketing companies. The questionnaires incorporated two sections: the first section contained the respondents' background information, and the second section contained the study questions. A 5-point Likert scale was used in asking the questions.

**Data Analysis**

The descriptive statistics used in the study included the mean, standard deviation, frequencies and percentages. The data were presented in tables, and explanations were done in prose. A simple linear regression model was then used to determine the effect of technology on the sustainability of petroleum firms in Kenya:

$$Y = \alpha + \beta_1 X_1 + \epsilon$$

Where:

*Y* – Business Sustainability is the dependent variable,  $\alpha$  – the constant (intercept). It is the value of *Y* when the independent variables (*X<sub>1</sub>*) are equal to zero,  $\beta_1$  – beta coefficient of technology, *X<sub>1</sub>* – Technology and  $\epsilon$  – error term of the model.

**Results**

Interpretation and discussion of the research findings from inferential analysis are presented in this part of the study. The study sought to analyse the influence of technology on business sustainability in petroleum firms in Nairobi, Kenya. The inferential statistics enabled the study to predict the relationship of study variables. A thematic approach was employed to analyse the study data based on the four specific objectives. The relationship between technology and business sustainability was analysed using correlation and regression statistics. Regression was used to test the study hypotheses upon which the conclusion was drawn.

**Correlation between technology and business sustainability for Oil Firms**

**Table 1: Production of Cars**

		<b>Business sustainability of Technology petroleum firms</b>	
Business sustainability petroleum firms	Pearson Correlation	1	.451**
	Sig. (2-tailed)		.000
	N	52	52
Technology	Pearson Correlation	.451**	1
	Sig. (2-tailed)	.000	
	N	52	52

\*\* . Correlation is significant at the 0.05 level (2-tailed).

There was a moderate positive correlation between technology use and business sustainability in petroleum firms. Technology is known to be the driver of efficiency in an organisation. Technology improves an organisation's competitiveness through the diversification of products,

the production of high-quality products, and cost reduction, thus giving a firm superiority over competitors. Adopting technology in the industry has eased operational costs and provided an enabling environment. Automating the production and distribution process has increased efficiency in terms of cost and time wastage. According to Enholm et al. (2022), businesses adopt technology to allocate tasks, allowing seamless operation that guarantees business sustainability.

### ***Regression Coefficient between technology and business sustainability for the oil firms***

Simple linear regression was employed to determine the effect of technology on business sustainability for petroleum firms. The model results output comprised the model summary, ANOVA test, and coefficient regression. Table 2 presents the model summary results.

**Table 2: Summary of Model Results of technology and business sustainability for the oil firms**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
	.451 <sup>a</sup>	.203	.187	5.21511

a. Predictors: (Constant), Technology

The study conducted a correlation coefficient (R) and coefficient of determination ( $R^2$ ). The coefficient determination was (20.3%), and the adjusted (R) square was (18.7%). This means that technology explains the 20.3% of business sustainability for petroleum firms. The study analysed variance to establish the significance of the model, and the findings are presented in Table 3.

**Table 3: ANOVA Results of technology and business sustainability for the oil firms**

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	347.207	1	347.207	12.766	.001 <sup>b</sup>
	Residual	1359.870	50	27.197		
	Total	1707.077	51			

a. Dependent Variable: Business sustainability

b. Predictors: (Constant), Technology

As indicated in Table 3, the F-critical 12.766 and a p-value  $< 0.05$  translate significantly between the variables. This indicates that the model significantly predicted the independent and dependent variables. The regression model was sufficient in studying the effect of technology on business sustainability. Moreover, specific regression coefficient findings are examined in Table 4.

**Table 4: Coefficient Results of technology and business sustainability for the oil firms**

<b>Model</b>	<b>Unstandardised Coefficients</b>		<b>Standardised Coefficients</b>	<b>t</b>	<b>Sig.</b>
	<b>B</b>	<b>Std. Error</b>	<b>Beta</b>		
(Constant)	7.318	3.160		2.316	.025
Technology	.590	.165	.451	3.573	.001

a. Dependent Variable: Business sustainability

The model regression coefficients explain the effect of technology on the business sustainability of oil marketing companies in Kenya.

$$Y = 7.318 + .590X_2$$

Where:

$Y$  is the Business sustainability of oil marketing companies in Kenya, while  $X_2$  is the technology used among the oil marketing companies

Technology was found to have a positive and statistically significant effect on the business sustainability of petroleum companies ( $\beta = .590$ ,  $p\text{-value} > 0.05$ ). This implies that one unit change in technological deployment by oil companies results in a 0.590 unit increase in business sustainability. The coefficient of 0.590 indicates that fostering technology enhances the business sustainability of oil marketing companies. Adoption of technology is likely to create efficiency in the operation of these companies by 0.590 for every new technological practice implemented. This was supported by descriptive analysis and correlation findings.

The finding of this study agreed with a study by Santa *et al.* (2022) and Li-Hua and Lu (2013), which observed that technology positively affected business sustainability by creating a competitive advantage. It also concurred with a study by Mugunda (2019), which established that adopting technology has increased efficiency through less time in production and product delivery. It also concurred with a study by Barnard and Barringer (2022), which concluded that technology is a tool that has a long way to go in addressing and supporting operational excellence within the technology function.

## Results

It can be inferred that strengthening technology enhances competitiveness and thus results in business sustainability among oil marketing companies. Technology has been critical in enhancing efficiency. The study recommends full automation of all oil marketing companies' processes and services.

## Declaration of competing interest

The author(s) declare no conflict of interest.

## Ethics statement

Not applicable because this work does not involve animal or human subjects.

## Acknowledgements

This article is an output of a research project implemented in the Research Program at Mount Kenya University Kenya.

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