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Product Development Strategies and Competitive Advantage of the Telecommunication Firms in Kenya

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Abstract

The telecommunication industry in Kenya has faced challenges such as declining voice revenues, regulatory changes, and risks from technological advancements, necessitating a strategic response to maintain competitive advantage. This study aimed to investigate the effect of product development strategies on the competitive advantage of telecommunication firms in Kenya, focusing on how ICT regulatory policy moderates this relationship. The study employed a purposive sampling method to select respondents from key industry players and gathered data using structured questionnaires. Data analysis was carried out in three stages: descriptive statistics, bivariate analysis, and regression analysis.

The findings revealed that product development strategies have a statistically significant influence on the competitive advantage of telecommunication firms in Kenya. The study also established that ICT regulatory policy plays a critical role in moderating the relationship between product development strategies and competitive advantage. Specifically, firms that aligned their product development initiatives with regulatory policies experienced improved market positioning and operational efficiency, thereby achieving a higher competitive advantage. The study concludes that adopting robust product development strategies, coupled with compliance and engagement with ICT regulatory policies, is essential for the sustained competitiveness of telecommunication firms in Kenya. These findings have implications for strategic planning and regulatory compliance in the industry, offering insights

for management and policymakers to foster growth and innovation. The research is limited to telecommunication firms and recommends further studies in related communication sectors, including media to provide a more comprehensive understanding of competitive advantage dynamics.
Keywords: Product Development Strategy, Competitive Advantage, Telecommunication

Introduction

Product development strategies play a critical role in influencing the competitive advantage of firms in the telecommunications industry, especially in dynamic markets like Kenya. The telecommunication sector has experienced rapid transformations due to technological advancements, evolving customer preferences, and regulatory changes (Mwilu & Njuguna, 2020). These changes have compelled firms to adopt innovative product development strategies to remain competitive. As highlighted by Katzaman (2018), business growth strategies, including product development, enable firms to strengthen their market position, increase financial resources, and enhance operational capabilities.

The telecommunications industry in Kenya has undergone significant evolution since the installation of the first telephone lines in the late 19th century (Wasiams & Kwofie, 2022). With the introduction of mobile telephony in the 1990s, the sector experienced exponential growth. Kenya became one of the first African nations to embrace mobile phones with the establishment of the Nairobi Cellular Telephone System in 1993, marking the onset of a mobile communication revolution (Wasiams & Kwofie, 2022). This growth underscored the importance of continuous product innovation in sustaining competitive advantage.

Effective product development strategies have been shown to improve customer satisfaction, streamline service delivery, and enhance firm competitiveness (Gatobu & Maende, 2019). Strategic decisions, such as introducing new products and improving existing ones, can result in intangible benefits, such as increased customer loyalty and brand recognition, thereby giving firms a competitive edge. However, the effectiveness of these strategies in influencing competitive advantage depends on several factors, including the firm's ability to align its product offerings with market needs and regulatory requirements.

The Kenyan telecommunications sector, despite its growth, faces significant challenges, including high operational costs, regulatory complexities, and changing consumer needs (Mugo & Macharia, 2020). Additionally, the entry of new players and disruptive technologies has intensified competition, causing traditional revenue streams, such as voice services, to decline. Product development strategies offer a way for firms to diversify their services, introduce innovative solutions, and cater to emerging market segments, thereby addressing these challenges.

Several scholars have attempted to define competitive advantage, emphasizing its role in distinguishing firms from their rivals. Barney (1991) defined competitive advantage as an organization's ability to implement a strategy that creates value and is not easily replicable by competitors. Dewit and Meyer (2010) argued that competitive advantage results from a firm’s capacity to outperform competitors and achieve customer loyalty. Porter (1980) suggested that firms could achieve a competitive advantage by positioning themselves in a way that

enables them to defend against competitive forces and maintain profitability. In the telecommunications context, product development strategies, such as the introduction of new service offerings and technological innovations, are critical for sustaining this advantage. In Kenya, Safaricom has long maintained its position as the market leader due to its superior product offerings and innovative strategies compared to rivals like Airtel and Telkom (Milao, 2014). However, increasing regulatory interventions, the entry of banks into the mobile money space, and rapid technological changes have eroded some of Safaricom's traditional competitive advantages, resulting in declining growth in traditional services. To navigate these challenges, telecommunications firms must continually refine their product development strategies, exploring new products and services that meet evolving customer expectations while complying with regulatory requirements.

Overall, understanding the relationship between product development strategies and competitive advantage in the Kenyan telecommunications industry is critical. This study aims to examine how these strategies influence the competitiveness of firms, considering the moderating effect of ICT regulatory policies, and provide insights into ways firms can leverage product innovation to achieve sustainable growth in this highly competitive sector.

Statement of the Problem

The competitive landscape of the telecommunications industry in Kenya has been significantly influenced by innovations in product development, changing customer expectations, and technological advancements (Mugo & Macharia, 2021). Despite these developments, the industry continues to face several challenges, including declining revenues from traditional voice services, dynamic regulatory requirements, and increasing demand for data and digital services (Maithya, 2021). According to the Communication Authority of Kenya (CA), there was a noticeable decline in total outgoing mobile voice traffic in 2022, mainly due to the growing adoption of Voice over Internet Protocol (VoIP) services, particularly in urban areas (CA, 2022). These changes have created the need for telecommunication firms to innovate through product development strategies to sustain their competitive advantage and respond effectively to market demands.

Existing research has examined product development strategies and their influence on firm performance, but studies specifically focusing on the Kenyan telecommunication industry are scarce. Moreover, while the role of ICT regulatory policy as a moderating variable in the relationship between product development strategies and competitive advantage has been acknowledged in broader contexts (Moen, 1999; Ismail *et al*., 2010; Çetinkaya, Niavand & Rashid, 2019), there is limited research investigating its impact in the Kenyan telecommunication sector. The majority of existing studies have been conducted in developed markets, thereby creating a gap in understanding how these strategies function in the unique environment of emerging economies like Kenya (Wan & Bullard, 2008; Hosseini, Soltani & Mehdizadeh, 2018).

The telecommunication sector in Kenya is critical for economic growth, serving as a backbone for digital transformation and connectivity. However, the sector is characterized by intense competition, making it imperative for firms to leverage product development strategies to differentiate themselves and gain a competitive edge. While prior research has focused on growth strategies such as market penetration and diversification, there is a need to examine

how specific product development strategies can enhance the competitive advantage of telecommunication firms in Kenya.

Furthermore, the industry faces rapid changes in technology and fluctuating regulatory environments that require strategic responses. The lack of empirical research on how product development strategies influence competitive advantage within the Kenyan telecommunication industry, especially under the moderating influence of ICT regulatory policy, limits the understanding of how firms can strategically navigate these challenges.
This study, therefore, seeks to bridge this gap by analyzing the effect of product development strategies on the competitive advantage of telecommunication firms in Kenya, while considering the moderating role of ICT regulatory policy. By doing so, the research not only enriches the existing body of knowledge but also provides valuable insights for industry stakeholders, including policymakers, business leaders, and investors, to inform strategic decisions and policy formulation aimed at enhancing the long-term growth and competitiveness of telecommunication firms in Kenya.

Objectives of the Study

i. To assess the influence of product development strategy on the competitive advantage of telecommunication firms in Kenya.
ii. To examine the moderating effect of ICT regulatory policy on the relationship between product development strategy and the competitive advantage of telecommunication firms in Kenya.

Study Hypotheses

H_{01}: Product development strategy has no significant effects on the competitive advantage of telecommunication firms in Kenya.
H_{02}: ICT regulatory policy has no significant effect on the relationship between Product development strategy and the competitive advantage of telecommunication firms in Kenya.

Justification of Study

Product development strategies play a vital role in enabling telecommunication firms to expand their product portfolios, increase market share, and achieve sustainable growth (Kuka, 2018). However, implementing these strategies is not always straightforward, as the competitive actions of other industry players can disrupt a firm's position in the market (Akram, 2018). Developing business-level strategies that focus on product development is essential for anticipating competitors' moves, but industry-wide regulations—such as ICT regulatory policies—can either facilitate or hinder a firm's ability to achieve a competitive advantage (Kuka, 2018).

Given the rapid technological advancements and changing consumer preferences in the Kenyan telecommunications industry, this research emphasizes the need for telecommunication firms to prioritize continuous innovation to meet market demands and remain competitive. The findings of this study are expected to provide actionable insights for telecommunication companies on how to effectively utilize product development strategies to enhance competitiveness, even in the face of stringent regulatory conditions.

Moreover, potential conflicts arising from regulatory challenges indicate that businesses must look beyond their internal strategies and engage proactively with government regulators to foster a conducive operating environment (Correa, 2020). This study, therefore, serves as a strategic guide for telecommunication firms to align their product development efforts with existing ICT regulatory policies, enhancing their ability to gain and sustain competitive advantage. By examining the interplay between product development strategies and ICT regulatory policies, the research contributes to the existing body of knowledge and supports telecommunication firms in developing comprehensive approaches to navigate the complexities of the Kenyan telecommunications market.

Scope of Study

The study focuses on the Kenyan telecommunication industry, examining the impact of product development strategies on the competitive advantage of firms operating within this market. It specifically considers ICT regulatory policies implemented by the Kenyan government and their influence on these strategies. Data and insights are drawn from managers of telecommunication firms in Kenya, reflecting the context-specific nature of competitive dynamics in the industry.

The research assesses how these strategies contribute to competitive advantage within the Kenyan telecommunications sector and how firms navigate regulatory constraints and opportunities. Although the study is concentrated on Kenya's telecommunication market, its findings are expected to contribute to a broader understanding of product development strategies and their influence on competitiveness. The outcomes may offer valuable lessons for other telecommunication markets facing similar regulatory challenges and competitive pressures.

Limitations of Study

Despite successfully collecting responses for this research, some participants expressed reluctance to share information due to suspicions regarding the true intent of the study. To address these concerns, the researcher emphasized informed consent and educated respondents about the confidentiality, privacy standards, and academic purpose behind the research, which ultimately helped in securing their participation.

Furthermore, the generalizability of the findings is constrained by the specific context of Kenya's telecommunication industry, limiting their applicability to other regions or countries with different market conditions. Additionally, time constraints inherent to the study's timeframe restricted the ability to capture long-term trends and the sustained effects of growth strategies, thereby affecting the study's temporal validity. These limitations suggest that while the findings provide valuable insights into the Kenyan context, caution should be exercised when applying them to other settings.

Literature Review

The study focused on the effect of the product development strategy on the competitive advantage of the telecommunication firms in Kenya, with the competitive advantage forming the dependent variable while the product development strategy formed the independent variable and the ICT regulatory policy the moderating variable as presented in Figure 1

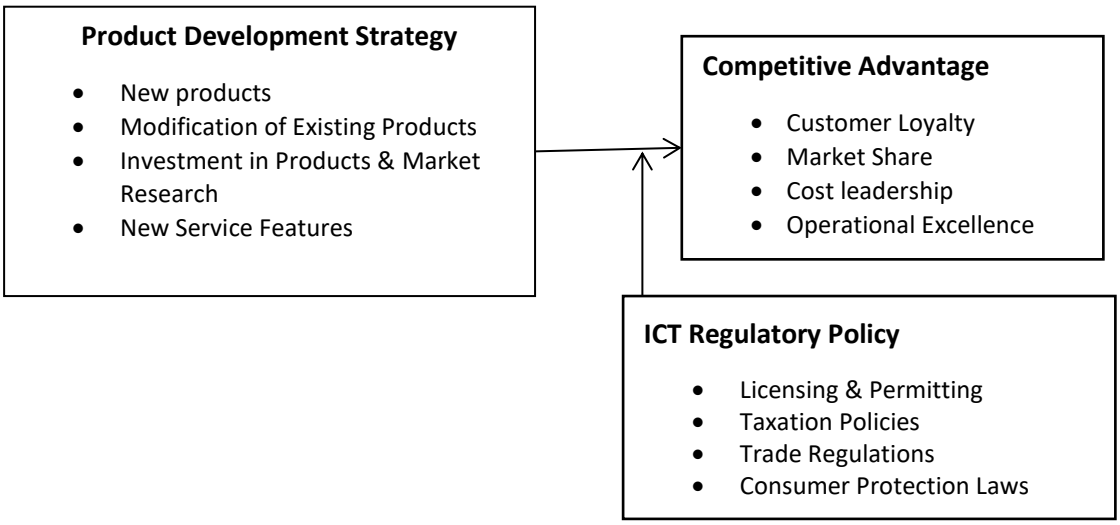

Figure 2.1: Conceptual Framework

Product Development Strategy

Product development strategy is a critical component of Porter's Five Forces framework that enables companies to gain a competitive advantage. To mitigate the threat of substitutes in the market, businesses implement robust product development strategies aimed at differentiating their offerings and providing better pricing for customers (Kahn, 2004). This strategy is closely linked to competitive advantage theory, which posits that product differentiation enhances the quality and reliability of products (Mose, 2010). Measures applied in this research related to product development include new product development (NPD), modification of existing products, and diversification of product usage.

The rapid advances in science and technology have resulted in shorter product life cycles, compelling businesses to innovate continuously and establish the value of new products to maintain competitiveness (Trott, 2021). Innovation plays a crucial role in driving business growth, enabling companies to select appropriate products, invest in the right technologies, and meet evolving customer demands while countering competitive threats. NPD is essential for organizations aiming to thrive in highly competitive markets by proposing new value propositions that ensure sustainability (Liu *et al*., 2005).

Zhang, Di Benedetto, and Hoenig (2009) examined the interplay between product development strategy, knowledge utilization, and product innovation performance in Chinese subsidiaries of multinational companies. They found that firms focusing on developing highly innovative products demonstrated a U-shaped relationship between resource allocation and subsequent product innovation performance. Conversely, when firms aimed to reinforce moderately innovative products, increased resource allocation positively correlated with product innovation performance. Knowledge utilization emerged as a critical predictor for the benefits derived from developing highly and moderately innovative products, highlighting its role in balancing the challenges of breakthrough innovations.

Hosseini, Soltani, and Mehdizadeh (2018) conducted a study to identify and assess competitive advantage factors in new product development at Toos Niroo technical firm.

Their research utilized a descriptive survey methodology, collecting data from 50 participants and analyzing it using SPSS software. The findings revealed that factors such as quality, efficiency, innovation, and accountability were positively correlated with new product development success.

Katsikeas, Leonidou, and Zeriti (2016) developed a model integrating effectiveness-enhancing outcomes and organizational inputs for eco-friendly product development strategies. Their study, which involved responses from multiple industries, concluded that top management commitment and corporate environmental support facilitated the adoption of eco-friendly strategies, which, in turn, positively affected product development effectiveness, particularly in favorable business conditions.

Albino, Balice, and Dangelico (2009) investigated the support of environmental strategic approaches for green product development among sustainability-driven companies. Their research indicated that green product developers exhibited higher levels of adoption of environmental strategies compared to their non-developer counterparts, emphasizing the importance of strategic alignment in promoting sustainability within product development.
Mbithi *et al*. (2015) explored how the development of new market segments and geographical expansions influenced business growth. Their research highlighted that while geographical expansion and new market segment development did not directly increase profits, they significantly contributed to enhanced market share. This finding underscores the importance of structuring business strategies around geographical extensions and new market segments, particularly in the telecommunications sector, to improve long-term performance without compromising profitability.

In this research, the specific measures of product development strategy include new product development, modification of existing products, and diversification of product usage. Previous studies have effectively employed these measures to explore growth strategies and performance across various industries (Ojokwa & Deya, 2018; Gecheo *et al*., 2016; Osei *et al*., 2020).

ICT Regulatory Policy
A policy is a plan or course of action, of a government, political party or business, intended to influence and determine decisions, actions, and other matters (Misigo, 2021). The task of the regulator in industry-specific regulatory regimes is complex. The regulator is typically charged with calibrating a complex market system comprising multiple participants, each with separate strategic and operational agendas (Davies, Howell and Mabin, 2009).

Perkins (2014), provided a comprehensive framework to assess and evaluate industry regulation across nations. The ICT regulatory policy ("the ICT regulatory policy") defines the fundamentals of competition for the European telecommunication sector and is currently under review by the European Commission. The issues addressed by the framework were separated into two broad groups (Friederiszick, 2008). Regulation influences innovation in multiple ways: it affects the risk of innovation projects, influences the profitability of innovations, and often constrains the scope of available innovation activities. They therefore develop an empirical approach to test major conjectures regarding the effects of regulation on ICT innovation (Bauer & Shim, 2012). Communication channels make use of fibre optics

and their associated electronics, orbiting satellites and the internet. Modern telecommunications industry players produce communication equipment and deliver a set of voice, data, and broadband services using wireline or wired infrastructure of cables, networks, servers, computers, and satellites (Tanwar, 2013).

The Kenya Communications Act of 1998, which received Presidential Assent on 1st October 1998, provided a modern regulatory regime suitable for a multi-operator environment necessary to support the revitalization of the telecommunications and postal sectors at the time. The Act provided for the rights and obligations of licensees and service consumers. The act set out principles on interconnection, public service obligations and fair competition which ensured the protection of consumers' and investors' interests.

Competitive Advantage

Competitive advantage plays a crucial role in a telecommunications firm's ability to navigate threats from rivals within the industry. According to Bandaranayake and Pushpakumari (2021), competitive advantage can be evaluated through various indicators, including innovation, operational capabilities, resource characteristics, product attributes, financial metrics, and market indicators. These indicators are integral to understanding a firm's competitive positioning.

The significance of sustainable competitive advantage (SCA) has prompted extensive scholarly inquiry into its origins, sources, and strategies for attainment. Early contributions to this field established theoretical foundations for SCA, particularly in relation to marketing strategies. Hoffman (2000) discussed potential sources of SCA and proposed a conceptual framework for its understanding. Despite the application of strategic management theories to elucidate firm performance, empirical validation of the competitive advantage concept remains insufficient. Powell (2001) notes that the assumption linking competitive advantage to superior performance lacks rigorous formal justification.

Various definitions of competitive advantage exist, reflecting the dynamic nature of markets. The resource-based view posits that an abundance of resources and competencies underpins competitive advantage, highlighting a hierarchy of sources based on sustainability (Zaridis, 2009). Cegliński (2016), addresses the complexities surrounding competitive advantages in contemporary organizational environments, which complicate the relationships between sources of advantages and performance outcomes. Grahovac and Miller (2009) define competitive advantage as the differential spread in performance metrics, while Eloranta and Turunen (2015), analyze how service infusion contributes to competitive advantage within various strategic management frameworks.

Ambiguities surrounding the definition of competitive advantage persist, leading to questions about its relation to profit maximization, cost leadership, or value creation (Lieberman, 2021). Recent studies by Abd-Elrahman and Ahmed Kamal (2022), and Aldoghan *et al*. (2022) investigate key performance indicators in the telecommunications sector, demonstrating that factors such as customer satisfaction and delivery reliability significantly influence organizational performance. Dahal (2021) emphasizes the importance of non-financial customer performance measures in shaping organizational success in Nepal's telecommunications market.

Hajar *et al*. (2020) focus on value innovation in Malaysia's telecom sector, underscoring the shift towards value competition as a means to enhance customer loyalty and profitability. Despite the assumption that the telecommunications industry functions as a natural monopoly, achieving competitive advantage remains a challenge, especially in markets dominated by a few key players. For instance, the evolution of the telecommunications industry in regions such as Russia indicates that lower market concentration can lead to enhanced innovation, challenging the prevailing belief that concentration is essential for progress. Trubnikov (2020) notes that low levels of market concentration in the Russian telecommunications sector have fostered competition, resulting in higher quality services and greater variety at lower prices. He advocates for an open market process to enhance competitiveness within the telecommunications industry.

Agarwal, Sharma, and Ramanan (2021) analyze the indebtedness of telecom operators, highlighting how government regulations have facilitated intense competition, leading to pricing pressures. They attribute significant industry debt to high reserve prices in spectrum auctions and excessive taxation, resulting in a consolidation from over sixteen operators to just four. The current stability of the sector is viewed as fragile, necessitating careful regulation. Similarly, Hamzat (2020) examines competitive strategies within Nigeria's broadcasting industry, revealing that hybrid strategies significantly enhance market share and organizational performance. The findings suggest that firms emphasizing hybrid strategies tend to outperform those that do not.

Kilaba and Manasseh (2020), observe rapid growth in mobile subscribers and internet usage across Africa, emphasizing the need for improved broadband infrastructure and a supportive regulatory framework. They argue for balancing innovation with risk management to optimize opportunities presented by evolving technologies. Khan and Raj (2020) assess the financial health of India's telecom sector, revealing that most companies fall within the "Grey" zone of the Altman Z-score model, indicating financial instability. Their recommendations include improving liquidity and profitability to stabilize the sector.

Ochuba *et al*. (2024) propose that companies in the satellite telecommunications industry invest in advanced data analytics to enhance market positioning, advocating for customer-centric analytics to tailor offerings and drive sustainable growth. Clò, Florio, and Rentocchini (2020) find a positive correlation between public ownership and patenting activity in telecommunications, suggesting that institutional quality enhances innovation. Kobylko (2020) explores the dual nature of telecom operators as independent ecosystems and infrastructure providers, highlighting the importance of effective ecosystem management in shaping competitive strategies.

Adame (2021), identifies barriers to telecommunications service in Ethiopia, such as ineffective regulatory oversight and a lack of competition, advocating for liberalization and the establishment of Internet Exchange Points (IXPs) to improve connectivity. Jhamb, Mittal, and Sharma (2020) investigate the gap between customer expectations and perceptions regarding service quality, demonstrating a strong relationship between perceived service quality and customer behavioral intentions, thus emphasizing the importance of service quality in customer retention.

Quagraine, Ahakwa, and Quagraine (2021) explore the interplay between dynamic capabilities, innovation capabilities, and competitive advantage in Ghana's telecommunications sector, confirming that dynamic capabilities positively influence both innovation and competitive advantage. Mugo and Macharia (2020) examined the impact of technological innovation on competitive advantage within Kenyan telecommunications, identifying three key elements: the expansion of mobile communication networks, the integration of new technologies, and market partnerships. Their survey of 247 managers revealed that while technological innovation enhances competitive advantage, government regulation acts as a moderating factor. Notably, only the introduction of new software significantly impacted competitive advantage, indicating that regulatory clarity is vital for leveraging technological advancements.

Strategic leadership was identified by Wanaswa *et al*. (2019) as another moderating variable in the relationship between technological innovation and competitive advantage. Their study, which involved 83 large telecommunications firms, showed that effective strategic leadership positively influences innovation and competitive outcomes. Leaders who foster an innovative environment can drive sustainable business growth within the sector. Boudiaf, Djadli, and Chorfi (2022) emphasized the significance of continuous innovation, quality management, cost control, and flexible operations in maintaining competitive advantage. They assert that organizations must pay equal attention to their competitors while striving to understand the sources of their competitive edge.

Research by Ndirangu and Owino (2023) concluded that intellectual property plays a vital role in securing competitive advantage for large telecommunications firms in Kenya. By leveraging patents, copyrights, and trademarks, companies like Safaricom have effectively protected their innovations and enhanced their market positions. The study found that intellectual property protections significantly impact revenue, brand value, and overall asset performance. Furthermore, Rahman (2022) examined the effect of marketing innovation strategies on competitive advantage among Saudi telecom companies, finding a statistically significant relationship between marketing innovation and operational performance.

Nicodemus and Egwakhe (2019) highlighted the role of technology transfer in achieving competitive advantage. Their survey of 90 managers in Nigeria revealed a strong correlation between technology adoption, infrastructure, and innovation, reinforcing the significance of technological capabilities. Macharia (2021) focused on market innovations, discovering that innovative distribution channels drive competitive advantage in Kenyan telecommunications. The research indicated that firms must continually innovate to maintain market leadership.

Hajar *et al*. (2022) investigated the mediation effects of customer satisfaction and loyalty on company performance, affirming that value innovation is essential for achieving long-term growth in the telecommunications sector. Ahmed *et al*. (2018) analyzed the merger between Robi and Airtel in Bangladesh, noting that the consolidation enhanced market share and profitability, thereby establishing a sustainable competitive advantage. However, they cautioned that improvements in long-term financial performance remain to be realized.

Suji and Kaptur (2022) assessed the influence of strategic direction and human capital development on competitive advantage at Safaricom, finding a significant relationship that

indicates investments in human capital and clear strategic direction contribute to enhanced competitive positioning. Lastly, Ladipo *et al*. (2022) focused on the dimensions of market segmentation and their impact on competitive advantage in Nigeria's telecom sector. Their study highlighted key segmentation variables, such as measurability, accessibility, uniqueness, and size, emphasizing the need for strategic identification and attainment of these dimensions. They also suggested that integrating customer relationship management (CRM) could further enhance market segmentation efforts.

The measures of competitive advantage guiding this research include customer loyalty, market share, cost leadership, and operational excellence (Mugo, 2011).

Research Methodology

Research Design

The research adopted a positivist philosophical foundation, emphasizing objective methodologies rather than subjective interpretations based on feelings, reflections, or intuitions (Easterby, Thorpe, & Lowe, 2002). The study employed a descriptive cross-sectional survey design. According to Bougie and Sekaran (2019), a descriptive study aims to establish phenomena concerning what, when, and how much at a specific point in time. Cross-sectional studies involve collecting data at a single time point, making them particularly suitable for descriptive research (Zikmund, 2003). This design facilitated a comprehensive analysis of the relationship between product development strategy and competitive advantage among telecommunication firms in Kenya, enabling the gathering of relevant data that captures the current state of the industry.

Target Population

The target population refers to a specific group of individuals, events, or objects to which the findings of a research study are intended to be applied (Johnson & Duberly, 2014). Mugenda and Mugenda (2012) similarly define a population as the entire group of individuals or items being studied, sharing common characteristics.

In this study, the target population comprises all Mobile Network Operators (MNOs) in Kenya, as identified by the Communication Authority (refer to Table 3.1). The research focuses on 196 senior and middle-level managers working within these companies, as their insights are crucial for examining the relationship between product development strategy and competitive advantage among telecommunications firms in Kenya. The necessary data regarding the number of managers in each firm was obtained from the Human Resource Departments and the companies' records.

Table 3.1
Distribution of Manager-Level Employees

Mobile Network Operator	Target Population (Managers)
Safaricom PLC	116
Airtel Networks Kenya Limited	30
Telkom Kenya Limited	20
FinServe Kenya Limited	15
Jamii Telecommunications Limited	15
	196

Source: CA Report 22, Safaricom HR, Airtel HR, Telkom HR

Sample Size

The term "sample" refers to a segment of the population selected for research to represent the population as a whole (Chowdhury, 2016). A sample is a portion or part of the population of interest (Lind & Wathen, 2012). Further assertions by Shulka (2018) define a sample as a subset of a population intended to represent the population in a study. A sample design is a definite plan determined before any data is collected for obtaining a sample from a given population.

Sample designs are categorized as either probability or non-probability. In probability sampling, each element has a known chance of being included in the sample, while in non-probability sampling, researchers cannot determine this probability (Pandey & Pandey, 2015). This distinction is crucial, as it affects the generalizability of the research findings (Creswell, 2014).

The sample size was calculated using the formula:

For;

$$S = \frac{Z^2 NP(1-P)}{d^2(N-1) + Z^2 P(1-P)}$$

Where:

$$S = \frac{1.96^2 \times 196 \times 0.5(1-0.5)}{0.05^2(196-1) + 1.96^2 \times 0.5\,(1-0.5)}$$

$$= 130$$

This gives a total sample size of 130 individuals for the whole study

Z = Z-score at 95% confidence level (1.96)

N = Total population size (196 respondents)

P = The Population Proportion (Assumed to be 0.5 since this would provide maximum sample size)

d – The degree of accuracy expressed as a proportion (0.05)

This calculation yielded a total sample size of 130 individuals for the study. The 130 respondents were drawn from 196 senior and middle-level managers working in five telecommunication firms in Kenya. Yamane (1967) provides a simplified formula for calculating sample size, which is widely adopted in similar research contexts. The study assumed a 95% confidence level and a precision level of ±10%, which is standard in social science research (Cohen, 1988).

According to Ilker *et al.* (2016), data collection is a crucial part of research, as it enables researchers to develop an in-depth understanding of a theoretical framework. Therefore, selecting the right data sources ensures that a theoretical framework achieves its intended goals. This study considered various types of sampling techniques, including random, purposive, and stratified sampling (Rahman *et al.*, 2022).

For this research, a non-probabilistic purposive sampling technique was employed to select managers from the five telecommunication companies in Kenya. This approach aligns with the recommendations of Palinkas *et al.* (2015), who noted that purposive sampling allows researchers to select information-rich cases that can provide deeper insights into the phenomena under study. Table 3.2 below shows the calculation of the sample size based on the samples selected.

Table 3.2
Sample Size

Mobile Network Operator	Sample (Managers)	Sample Size
Safaricom PLC	116	76
Airtel Networks Kenya Limited	30	20
Telkom Kenya Limited	20	14
FinServe Kenya Limited	15	10
Jamii Telecommunications Limited	15	10
	196	**130**

Regression Models

$Y= \beta_0 + \beta_i X_i + \varepsilon$ (i=1, 2, 3, 4);

$Y= \beta_0 + \beta_i X_i + \beta X_2 + \varepsilon$;

$Y= \beta_0 + \beta_i X_i + \beta X_2 + \beta X_j * X_2 + \varepsilon$

Where: Y= is the dependent variable (Competitive Advantage)

$\{\beta_i ; i=1,2,3,4\}$ = The coefficients for the various independent variables

X_i for; X_1 = is product development strategy, X_2 = ICT regulatory policy (moderator); X1*X2= product development strategy * ICT regulatory policy are the interaction term; ε = Error term

Research Findings and Discussion

Table 4.1
Response rate

Response rate	Frequency	Percentage
Responded	115	88
Did not respond	15	12
Total	130	100

Table 4.1 presents the results regarding the response rate from the respondents. Out of the 130 questionnaires distributed, 115 were successfully recovered, while 15 were not returned. This indicates a response rate of 88%, demonstrating a strong engagement level among the participants, while 12% of the questionnaires remained unreturned. These findings reflect a satisfactory response rate, contributing to the reliability of the study's data.

Table 4.2
Product Development Strategy

Statement	**SD**	**D**	**MA**	**A**	**SA**	**Mean**	**Std. D**
Develops new products to appeal to the existing market	1.7%	4.3%	9.6%	33%	51.3%	4.28	.932
Modifies features of existing products to meet ever-changing customers	0.9%	7%	12.2%	50.4%	29.6%	4.01	.884
Use research and innovation to develop new products	3.5%	11.3%	8.7%	38.3%	38.3%	3.97	1.116
Diversify usage of existing products to provide more usage contexts	1.7%	9.6%	13%	39.1%	36.5%	3.99	1.022
Join features of existing products and services to develop stronger product and service packages	2.6%	7%	15.7%	34.8%	40%	4.03	1.038

Strongly disagree=SD, Disagree=D, Moderately agree=MA, Agree=A, Strongly Agree=SA

Table 4.2 presents the findings regarding product development strategies among telecommunications firms in Kenya. The results indicate a strong belief among respondents in the importance of developing new products tailored to the existing market, which received a mean score of 4.28 and a standard deviation of 0.932. The response distribution, ranging from 1.7% to 51.3%, highlights a significant consensus on the necessity of product innovation to remain competitive and meet consumer demands, aligning with the literature emphasizing the vital role of innovation in product offerings (Ulwick, 2005; Tidd & Bessant, 2014).

Respondents also recognized the importance of modifying features of existing products to adapt to evolving customer needs, achieving a mean score of 4.01 (standard deviation 0.884) and a response range of 0.9% to 50.4%. This finding underscores the necessity for firms to remain agile and responsive to dynamic market conditions, a viewpoint supported by Cooper (2011), who asserts that continuous improvement is essential for enhancing customer satisfaction and fostering loyalty.

The use of research and innovation in product development garnered a mean score of 3.97 (standard deviation 1.116), with responses spanning from 3.5% to 38.3%. This highlights the critical role of research and development (R&D) in creating innovative products that address emerging consumer needs, reinforcing Chesbrough's (2003) assertion that effective R&D can lead to significant market advancements.

Furthermore, diversifying the usage of existing products to offer more contextual applications achieved a mean score of 3.99 (standard deviation 1.022), with a response range of 1.7% to 39.1%. This emphasizes the necessity for firms to explore new markets and applications, thereby maximizing product utility and value, as suggested by Porter (1996).

Lastly, the integration of features from existing products and services to create stronger offerings scored a mean of 4.03 (standard deviation 1.038), with responses ranging from 2.6% to 40%. This finding illustrates the trend towards holistic solutions that enhance customer satisfaction and establish competitive advantages, as noted by Kotler and Keller (2016).

Overall, the findings indicate that product development strategies significantly contribute to competitive advantage, underscoring the need for telecommunications firms in Kenya to prioritize innovation and adaptability in their offerings. These insights align with broader literature, which highlights the essential role of effective product development in achieving sustained market success (Aaker, 1995; Christensen, 1997).

Table 4.3
ICT Regulatory Policy

ICT regulatory policy	SD	D	MA	A	SA	Mean	Std. D
The government has a role in timely issuance of service provision licenses in our communication sector	7%	3.5%	9.6%	40.9%	39.1%	4.02	1.124
The government is always interested in regulation of services prices such as call tariffs in our company	4.3%	5.2%	7%	28.7%	54.8%	4.24	1.081
The government is involved in determining the market structure by controlling new entries into the market	2.6%	7.8%	7.8%	29.6%	52.2%	4.21	1.055
The regulatory authority is involved in enforce consumer protection and their rights	7%	7%	20%	34.8%	31.3%	3.77	1.172
The government is involved in Enforcement of antitrust rules in the telecommunication industry	7%	4.3%	8.7%	35.7%	44.3%	4.06	1.157
The government is responsible for the Authorizing of mergers and acquisitions in the telecommunication industry	8.7%	5.2%	3.5%	24.3%	58.3%	4.18	1.261

Strongly disagree=SD, Disagree=D, Moderately agree=MA, Agree=A, Strongly Agree=SA

Table 4.3 presents the findings concerning ICT regulatory policy in Kenya's telecommunications sector. The results indicate that respondents recognize the government's critical role in the timely issuance of service provision licenses, evidenced by a

mean score of 4.02 (standard deviation 1.124) and a response range from 3.5% to 40.9%. This underscores the importance of regulatory efficiency in enabling market entry and sustaining service availability.

Additionally, there is strong agreement regarding the government's active interest in regulating service prices, particularly call tariffs, which received a mean score of 4.24 (standard deviation 1.081), with response percentages varying from 4.3% to 54.8%. This finding reflects the recognition of price regulation as a vital mechanism for protecting consumers and promoting fair competition.

The government's involvement in determining market structure by controlling new entries received robust support, achieving a mean score of 4.21 (standard deviation 1.055) and a response range from 2.6% to 52.2%. This suggests that respondents view regulatory oversight as essential for maintaining market equilibrium and preventing monopolistic practices.

Although the regulatory authority's role in enforcing consumer protection and rights received a lower mean score of 3.77 (standard deviation 1.172), with responses ranging from 7% to 34.8%, it still emphasizes the importance of advocacy for consumer interests in the telecommunications sector. Furthermore, the findings indicate that the government actively enforces antitrust rules, achieving a mean score of 4.06 (standard deviation 1.157) with a response range of 4.3% to 44.3%. This reinforces the significance of regulatory frameworks in maintaining competitive integrity.

Lastly, the government's responsibility for authorizing mergers and acquisitions garnered significant support, reflected in a mean score of 4.18 (standard deviation 1.261) with response percentages from 3.5% to 58.3%. This underscores the critical role of regulatory approvals in ensuring that consolidations within the industry do not adversely affect competition or consumer welfare.

These results imply that government regulation plays a significant role in influencing competitive advantage within Kenya's telecommunications sector. This perspective aligns with the assertions of Monsreal-Barrera *et al*. (2019), who argue that effective regulatory oversight is crucial for preventing customer exploitation by rival firms, thus enhancing competitive advantage through sound policy implementation. Similarly, Wanjiru and George (2015) emphasize that a well-regulated environment fosters fair competition, benefiting both consumers and market performance.

Additionally, Okello and Tineo (2020) highlight that regulatory frameworks significantly shape competitive dynamics within the telecommunications sector, suggesting that effective regulation can lead to improved service quality and heightened consumer satisfaction. Overall, these findings underscore the essential role of ICT regulatory policies in fostering a competitive landscape that benefits both firms and consumers.

Table 4.4
Competitive Advantage

Statement	SD	D	MA	A	SA	Mean	Std. D
My company has grown in terms of customer loyalty over the last five years	8.7%	5.2%	7.8%	22.6%	55.7%	4.11	1.276
My company has grown in terms of market expansion over the last five years	8.7%	7%	7%	32.2%	45.2%	3.98	1.263
My company has grown in terms of Subscribers over the last five years	10.4%	7.8%	8.7%	39.1%	33.9%	3.78	1.283
My company has grown in terms of Number of money subscribers over the last five years	7.8%	1.7%	10.4%	30.4%	49.6%	4.12	1.171
My company has grown in terms of Market differentiation over the last five years	7.8%	4.3%	18.3%	35.7%	33.9%	3.83	1.177
My company has grown in terms of market focus over the last five years	7%	3.5%	6.1%	40.9%	42.6%	4.09	1.121

Strongly disagree=SD, Disagree=D, Moderately Agree=MA, Agree=A, Strongly Agree=SA

Table 4.4 presents the responses regarding competitive advantage among telecommunications firms in Kenya. The findings reveal that respondents believe their companies have experienced significant growth across several dimensions over the past five years. The mean score for customer loyalty is 4.11 (standard deviation 1.276), with responses ranging from 5.2% to 55.7%. This strong perception of enhanced customer relationships aligns with research indicating that customer loyalty is a critical driver of competitive advantage in the telecommunications sector (Kumar & Shah, 2004; Aydin & Ozer, 2005).

In terms of market expansion, the mean score is 3.98 (standard deviation 1.263), with a response range of 7% to 45.2%. This reflects a positive assessment of the company's efforts to enter new markets. Prior studies have demonstrated that effective market expansion strategies significantly improve competitive positioning and overall firm performance (Olsen *et al*., 2013; Weerawardena, 2003). Additionally, the growth in subscriber numbers received a mean score of 3.78 (standard deviation 1.283), with responses ranging from 7.8% to 39.1%. This moderate increase in the customer base supports findings that subscriber growth is a key performance indicator within the telecommunications industry (García-Murillo & Gabel, 2009).

Respondents also reported notable growth in the number of money subscribers, with a mean score of 4.12 (standard deviation 1.171) and a response range of 7.8% to 49.6%. This highlights the increasing importance of mobile financial services, as recent research indicates that such services enhance customer retention and brand loyalty (Seyal *et al*., 2015; Chawla *et al*., 2020). Market differentiation scored a mean of 3.83 (standard deviation 1.177), with responses ranging from 4.3% to 35.7%. This suggests a strategic focus on unique offerings, which is essential for maintaining competitive advantage in saturated markets (Porter, 1985; Chen *et al*., 2011).

Finally, growth in market focus received a mean score of 4.09 (standard deviation 1.121), with responses between 3.5% and 42.6%. This emphasizes the strategic alignment of companies toward specific market segments, reinforcing the idea that a concentrated market focus can lead to enhanced performance and competitive edge (Baker & Sinkula, 2005; Narver & Slater, 1990).

In summary, these results illustrate that competitive advantage is a vital dimension for organizations in the telecommunications sector. The findings align with existing literature, highlighting the significance of customer loyalty, market expansion, subscriber growth, differentiation, and market focus in achieving sustained competitive advantage.
H_{01}: Product development strategies have no significant effect on the competitive advantage of telecommunication firms in Kenya

Table 4.5
Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
0.787[a]	0.620	0.617	0.66462	0.620	184.343	1	113	.000

Table 4.5 presents the model fitness statistics, demonstrating a strong performance in explaining the variability of the dependent variable. The coefficient of correlation (R) is reported at 0.787, indicating a robust linear relationship between the independent and dependent variables. The R-Squared value stands at 0.620, while the Adjusted R-Squared value is 0.617, suggesting that approximately 62% of the variability in the dependent variable can be explained by the independent variables included in the model.

These statistics reflect a substantial degree of explanatory power, reinforcing the model's effectiveness in capturing the relationships among the variables. Furthermore, the significant F-change statistic of 184.343, coupled with a p-value of 0.000, affirms the model's overall validity. This significant result indicates that the independent variables collectively contribute meaningfully to explaining variations in competitive advantage, thereby confirming the robustness of the model in the context of telecommunication firms in Kenya.

Table 4.6
Analysis of variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.427	1	81.427	184.343	.000[b]
	Residual	49.914	113	.442		
	Total	131.342	114			

Table 4.6 presents the results of the analysis of variance (ANOVA) concerning the effect of product development strategy on competitive advantage in telecommunication firms in Kenya. The findings indicate an F-statistic of 184.343, accompanied by a p-value of 0.000.
These results suggest a statistically significant effect of product development strategy on competitive advantage, as the p-value is well below the conventional threshold of 0.05. This

indicates that product development strategy plays a crucial role in enhancing competitive advantage within the telecommunications sector in Kenya. Consequently, effective product development strategies can significantly influence a firm's competitive positioning and overall success.

Table 4.7
Coefficients of Regression

Variables	Beta	Std. Error	t-statistics	p-values
(Constant)	-0.171	.312	-0.549	.584
Product development strategy	1.026	.076	13.577	.000

Table 4.7, presents the results of the regression analysis regarding the relationship between product development strategy and competitive advantage. The findings reveal that the beta coefficient for product development strategy is 1.026, indicating that a unit increase in product development strategy results in an increase in competitive advantage by 1.026 units. This relationship is statistically significant, as evidenced by the t-statistic of 13.577 and a p-value of 0.000.

The significance of these results leads to the rejection of the null hypothesis, which posits no association between product development strategies and competitive advantage. This underscores the importance of effectively employing product development strategies to enhance the competitive positioning of telecommunication firms.

Product development, also known as new product development, encompasses the process of transforming market opportunities and technological assumptions into products available in the marketplace (Chang & Taylor, 2016). This process involves a series of activities designed to introduce new products in response to market demands (Iheanachor *et al*., 2021). Furthermore, Product Development Practices (PDPs) consist of defined tasks, steps, and phases aimed at converting innovative ideas into marketable products or services, adhering to company standards (Kahn, 2004). These practices serve as crucial drivers of success for new product development initiatives (Troy *et al*., 2008).
H_{02}: There are no statistically significant effects of the ICT regulatory policy in the relationship between product development strategies and the competitive advantage of telecommunication firms in Kenya

Table 4.8
Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
.787[a]	.620	.617	.66462	.620	184.343	1	113	.000
.931[b]	.766	.764	.39588	.146	206.483	1	112	.000
.931[c]	.866	.863	.39763	.100	.017	1	111	.008

Table 4.10 present the results on the model fitness statistics. From the results coefficient of correlation, the R- Square increased from 76.6 to 86.6 % and the associated F-statistics was

also significant increased. This implies that the model has very high explanation power. This implies that the hierarchy model was statistically significant.

Table 4.9
Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.427	1	81.427	184.343	.000[b]
	Residual	49.914	113	.442		
	Total	131.342	114			
2	Regression	113.788	2	56.894	363.020	.000[c]
	Residual	17.553	112	.157		
	Total	131.342	114			
3	Regression	113.791	3	37.930	239.895	.000[d]
	Residual	17.550	111	.158		
	Total	131.342	114			

Table 4.9 presents the results concerning the moderation effect of ICT regulatory policy on the relationship between product development strategies and competitive advantage. The analysis reveals that all three models demonstrated statistically significant F-test statistics, with associated p-values consistently less than 0.05. Specifically, the first model yielded an F-statistic of 184.343 with a p-value of 0.000b, the second model recorded an F-statistic of 363.020 with a p-value of 0.000c, and the third model showed an F-statistic of 239.895 with a p-value of 0.000d. These findings provide strong support for the existence of a moderation effect, suggesting that ICT regulatory policy significantly influences the relationship between product development strategies and competitive advantage among telecommunications firms in Kenya.

Table 4.10
Coefficients of Regression

Variables		Beta	Std. Error	t-statistics	p-value
1	(Constant)	-0.171	0.312	-0.549	0.584
	Product Development strategy	1.026	0.076	13.577	0.000
2	(Constant)	-0.677	0.189	-3.574	0.001
	Product Development strategy	0.400	0.063	6.387	0.000
	ICT regulatory policy	0.746	0.052	14.370	0.000
3	(Constant)	-0.614	0.513	-1.197	0.234
	Product Development strategy	1.237	0.133	9.303	0.000
	ICT regulatory policy	1.552	0.140	11.078	0.000
	Product Development strategy* ICT regulatory policy	-0.237	0.036	-6.539	0.000

Table 4.10 presents the regression coefficients after incorporating ICT regulatory policy as a moderator. The results indicate a statistically significant negative association between product development strategies and competitive advantage. Specifically, the coefficient for the interaction term, representing product development strategies and ICT regulatory policy,

was found to be -0.237, with a standard error of 0.036, a t-statistic of -6.539, and a p-value of 0.0000.

These findings align with the perspectives of researchers such as Monsreal-Barrera *et al*. (2019), who argue that government regulation can serve as a crucial advantage, protecting customers from potential exploitation by competing firms. Similarly, Moshi and Mwakatumbula (2017) emphasize the detrimental effects of government laws and regulations on fair competition among firms. The evidence suggests that while product development strategies can enhance competitive advantage, the regulatory environment may impose constraints that could undermine these efforts.

Findings, Conclusion and Recommendations

Findings

The first objective of the study focused on evaluating the relationship between product development strategy and the competitive advantage of telecommunication firms in Kenya. The research aimed to determine whether a significant causal effect exists between these two variables, utilizing various measures to operationalize this objective and capture the responses of the research participants.

Hypothesis testing conducted as part of the analysis revealed a statistically significant relationship between product development strategy and competitive advantage. The findings from the analysis of variance indicated that product development strategies significantly influenced competitive positioning, consistent with existing literature that asserts effective product development strategies can enhance competitive positioning and drive firm performance (Kotler & Keller, 2016; Porter, 1985). Additionally, the regression coefficients for the different models estimated were statistically significant, reinforcing the substantial interaction between product development strategy and competitive advantage.

Consequently, these results suggest that managers in the telecommunications sector should prioritize strengthening the association between product development strategies and competitive advantage to improve their firms' market positions. Mwaura and Oduor (2020) highlight that firms that effectively innovate and develop products tend to achieve a more robust competitive edge, emphasizing the need for strategic focus in this area.

The second objective examined the effect of ICT regulatory policy as a moderator on the relationship between product development strategies and the competitive advantage of telecommunication firms in Kenya. This part of the study aimed to investigate the association between ICT regulatory policy, business growth strategies, and competitive advantage. Various measures were employed to operationalize this variable and capture participant responses.

Hypothesis testing indicated that ICT regulatory policy significantly moderates the relationship between product development strategies and competitive advantage. The results demonstrated that the coefficient on interaction terms indicated a statistically significant effect of ICT regulatory policy as a moderator. The F-statistics results further validated a collective linear causation of ICT regulatory policy on the relationship between business growth strategies and competitive advantage. Additionally, the regression

coefficient results were statistically significant, confirming the moderating role of ICT regulatory policy in this relationship.

These findings underscore the importance of regulatory frameworks in shaping competitive dynamics within the telecommunications sector. Effective regulation can create an environment conducive to innovation and competitive advantage, as emphasized by recent studies (Okello & Tineo, 2020). Therefore, both managers and policymakers should consider the implications of ICT regulatory policies in their strategic decision-making processes, ensuring that regulatory environments support growth and enhance industry performance.

Conclusions

The study concludes that there is a statistically significant causal effect of product development strategy on the competitive advantage of telecommunication firms in Kenya. This finding emphasizes the necessity for firms within the telecommunications sector to focus on key dimensions of product development strategy. The analysis supports a strong positive relationship between product development strategy and competitive advantage, indicating that effective product innovation is crucial for enhancing market positioning.

Factor analysis, including principal component analysis, correlation analysis, and regression results, further substantiated the robust association between product development strategy and competitive advantage in the telecommunications industry. These findings align with existing literature, which suggests that a well-executed product development strategy can significantly enhance competitive positioning (Kotler & Keller, 2016; Mwaura & Oduor, 2020). Additionally, the study assessed the moderating effect of ICT regulatory policy on the relationship between product development strategies and competitive advantage. The hypothesis testing revealed a significant moderation effect, indicating that the ICT regulatory environment plays a critical role in shaping the dynamics of competitive advantage among telecommunication firms. The correlation and regression results confirm a significant relationship between ICT regulatory policy and competitive advantage, highlighting the importance of regulatory frameworks in fostering innovation and competitive success.

In conclusion, the findings underscore the necessity for telecommunications firms to not only innovate through product development strategies but also to navigate the regulatory landscape effectively. Both managers and policymakers must consider the implications of ICT regulatory policies to enhance strategic decision-making and strengthen competitive advantage in the sector.

Recommendations

The findings of this study hold significant implications for regulators and policymakers within the Kenyan telecommunications sector. Understanding the relationship between product development strategy and competitive advantage emphasizes the need for informed policy decisions. Regulators should focus on creating and revising policies that foster growth and operational efficiency within the industry. These efforts should align with the competitive strategies adopted by telecommunications firms, promoting a synergistic environment that supports sustainable product development and enhances competitive advantage.

Additionally, this study serves as a crucial resource for academic and research pursuits in the realm of product development strategy and competitive advantage. Researchers are

encouraged to build on these findings to explore further the impacts of product development strategies on firm performance. There exists an opportunity to identify research gaps and design studies that address various dimensions of this topic, thereby contributing to a more comprehensive understanding of the telecommunications landscape.

Moreover, the results provide valuable insights for students and aspiring researchers interested in business growth strategies within the telecommunications industry. This research aids management in grasping the dynamics of improving business operations to achieve a competitive edge. Telecommunications strategists should leverage these insights to enhance their understanding of how product development strategies influence competitive advantage, ultimately leading to improved performance for both firms and the industry as a whole. It is imperative for managers to prioritize product development strategies, given their proven impact on achieving operational efficiency and fostering competitive success.

Suggestions for Further Research

This study focused exclusively on telecommunication firms, highlighting the need for further research across other sectors that contribute to communication. Future studies should explore communication-sensitive industries, including radio stations, television networks, and social media platforms. Additionally, incorporating a wider range of variables in business growth strategies would enhance the robustness of the findings. Such research could provide deeper insights into the dynamics of competitive advantage across various sectors, ultimately contributing to a more comprehensive understanding of effective growth strategies in the broader communication landscape.

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