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

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Abstract- ***The various challenges have been from such other major concerns like decreased voice revenues, changing regulatory regimes, and the fast pace of technological advancement, all of which call for strategic responses in order to keep competitiveness in the telecommunications industry in Kenya. The study sought to look at product development strategies as a source of competitive advantage by telecommunications firms in Kenya with the moderating influence of ICT regulatory policy. Key respondents in the industry were purposively selected for the study. Data collection was done using structured questionnaires. The analysis was done in three steps that included descriptive statistics, bivariate analysis, and regression analysis. Findings indicate that product development strategies are a major competitive advantage for the telecommunications companies in Kenya. Furthermore, the regulatory ICT policy is among the main driving factors for that relationship. In a few cases, firms that developed products according to the regulations have benefited from better market positioning and more operational efficiency, which translate into their improved competitive advantage. This observation implies that taking regulatory compliance into account while devising innovation-led strategies will consolidate the market leadership of the telecommunications industry in this respect. The conclusion of the study is that product development must go hand in hand in hand with ICT regulatory engagement for telecommunications firms in Kenya to compete. The above elaborates the strategic and compliance frameworks for the sector players and policy makers for innovation and sustainable development. This study focused exclusively on telecommunication firms, the future research should expand to include analysis of other related areas such as media and digital communications for better understanding of competitive advantage dynamics.***

Indexed Terms- ***Product Development, Competitive Advantage, Telecommunication Industry, ICT Regulatory Policy, Market Positioning, Innovation Strategies, Regulatory Compliance, Technological Advancements, Strategic Management, Kenya Telecom Sector.***

I. INTRODUCTION

To comprehend how Product Development Strategies drive competitive advantage in the telecommunications industry, particularly in dynamic markets such as Kenya, makes such a firm house to innovation in product development strategies to match its pace in ceaseless and turbulent changes (Mwilu & Njuguna, 2020). Technology usually advances very fast; consumer needs are ever-changing, and changes in regulations create a constant need for firms in the telecommunication industry to have innovative product development strategies in order to remain competitive. Business growth strategies or product development strategies depict a trend in which the organizations are influencing improvements in their defining market positions, tapping financial resources, and improving operational capability, as asserted by (Katzaman 2018).

Transformative innovations characterize the telecommunication industry in Kenya since close to the end of the 19th century when it started laying down the branches for the first telephone systems (Wasiams & Kwofie, 2022). The decade of the 1990s saw a rapid increase in the sector due to mobile telephony. The establishment of a cell phone in the year 1993 made Kenya one of the pioneer African countries to have this kind of communication. It was called the Nairobi Cellular Telephone System, which marked the start of a revolution in mobile communication (Wasiams & Kwofie, 2022). This growth has also brought out the essence of continuous innovation in products that

maintain competitive advantage.

Research has found that good product development strategies improve customer satisfaction, fasten service delivery and improve competitiveness of firms (Gatobu & Maende, 2019). Thus, most of the time, strategic decisions regarding introduction of new products or modification of existing ones translate into intangible benefits such as loyalty from customers and brand recognition, all of which come with a competitive advantage in the companies. The effect of these strategies on competitive advantage will depend on several aspects including the ability of firms to meet the product offerings with market needs and regulatory requirements.

It has grown, yet the Kenyan telecommunications sector still experiences some of the challenges, such as very high operational costs, regulatory complexities, and now changing consumer needs (Mugo & Macharia, 2020). New entrants and disruptive technologies also enhance competition, which drives the reduction in traditional revenue streams such as voice services. Developmental strategies for products are those by which institutions would diversify and innovate ways to meet emerging segments of their offerings in the market.

Different scholars have variously attempted to define competitive advantages in contrast to what sets organizations apart. In Barney (1991), competitive advantage is viewed as: "the advantage of an organization to implement a strategy which creates a value for the organization and which is not being simultaneously implemented by any current or likely competitor." To this, Dewit and Meyer stress that competitive advantage is likely to involve:

1.1 Statement of the Problem

In Kenya, technological advancement and product development trends have led to competition in the telecommunication industry. Services that offered voice were losing revenue due to many other service offering like SMS, data etc. According to the 2022 Communication Authority of Kenya (CA) report, the usage of VoIP services in homes of towns has led to a sharp reduction in total outgoing mobile voice traffic. According to all that has been stated so far, all companies that deal with telecommunications must put their product development strategies under challenges if they are to stay relevant and meet market demand. Although product development strategies and their impact on firm performance have been looked at in much of the existing literature, the follow-up literature on these parameters in the Kenyan telecommunication sector is scanty. Also, the investigations looking at the impact of ICT regulatory policy in the broad sense to moderate the product development strategy and competitive edge nexus in the telecommunication sector in Kenya have not been sufficient. Most of the research works that packed enough empirical evidence are from developed markets which offered little understanding on how the functioning of the strategies will take place in the peculiarities of the emerging economies like Kenya. The telecommunication sector in Kenya is a catalyst for economic growth through enabling digital transformation. In a fiercely competitive atmosphere, it is extremely critical for firms to apply product development strategies which will allow for better differentiation of their offers without losing their competitive advantage. It is essential to undertake further investigations into specific product development strategies to boost the competitive advantage of telecommunication firms in Kenya, after the earlier study of diversification and market penetration.

In addition, the industry experiences a quick change in technology and laws which require strategies to respond. There is limited empirical research on how product development strategies affect the competitive advantage of firms in the Kenyan telecommunications industry, particularly as moderated by ICT regulatory policy. This study analyses how product development strategies affect the competitive advantage of telecommunication firms in Kenya and moderating effect of ICT regulatory policy. This research will contribute to the existing knowledge while offering valuable inputs to the stakeholders in the industry, like policy-makers, business leaders and investors, to design the strategies and policies that can enhance the long-term growth and competitiveness of telecommunication firms in Kenya.

1.2 Objectives of the Study

1) To evaluate the impact of innovation strategy on the competitive advantage of Kenya's

telecommunications companies.
2) To assess the moderation effects of ICT regulations on the relationship between product development strategy and competitive advantage of telecommunication firms in Kenya.

1.3 Study Hypotheses

H01: The product development strategy does not significantly influence the competitive edge of telecommunications firms in Kenya.

H02: Kenya's telecommunication firms do not experience any impact of ICT regulatory political relations with the product development strategy on that competitive advantage.

1.4 Justification of Study

Product development strategies help telecommunication firms to widen the range of products offered, acquire additional market share, and attain sustainable growth (Kuka, 2018). However, using these techniques is not easy, because other players in the industry will take competitive actions which can disturb a firm's position in the industry (Akram, 2018). Formulating business- level strategies revolving around product development is necessary to anticipate competitor moves, but industry-wide rules such as ICT regulatory policies can either help or hinder a firm's ability to procure competitive advantage (Kuka, 2018). Many customers possess a preference for technology and efficient services which are not changing but remain the same type due to rapidly changing technologies and services offered in Kenya.According to the findings of this study, time and other telecommunication firms should be able to develop useful knowledge to use product development strategies for achieving competitiveness. This is even as tough conditions set by the regulations provided. Due to potential conflict over regulatory problems, businesses need to look beyond their strategy and proactively engage with government regulators (Correa, 2020). This study will therefore be useful for telecommunication firms in aligning their product development activities with the existing ICT regulatory policies in order to enhance their potential to obtain and sustain competitive advantage. Through studying product development strategies and ICT regulatory policies, this research builds on the existing literature and aids telecommunication firms in designing holistic strategies that can help them address challenges in the Kenyan telecommunications market.

1.5 Scope of Study

The study is concerned mainly with the Kenyan telecommunications industry and its survey of the effect of product development strategies on the competitive advantage of firms operating in this market. The ICT regulatory policies meted out by the Kenyan government are particularly taken into account as they act as an influencer on these strategies. Data and insights were obtained from managers of telecommunications firms in Kenya, indicative of the context-specific nature of the competitive dynamics of the industry.

The research studies how these strategies confer competitive advantage in the Kenyan telecommunications sector and how the firms exploit opportunities and navigate constraints imposed by regulations. Findings from the study, though mainly centered on Kenya's telecommunications market, are expected to contribute toward a general understanding of product development strategies and the resultant effect on competitiveness. The results could provide useful tips for other telecommunication markets that are facing similar regulatory challenges and competitive pressures.

1.1 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.

II. LITERATURE REVIEW

The strategies used for product development were studied for their effect on the competitive advantage of telecommunications firms in Kenya. In this case, competitive advantage is the dependent variable, which means the firm's ability to outdo its rivals. An independent variable of the product development strategy was the developing innovative products and diversifying services and technological improvements to make the market more competitive. The ICT regulatory policy was seen to be a moderating variable that has an effect on the product development-competitive advantage relationship. As shown in Figure 1, the interaction of dependent and independent variables indicates how the regulatory policy could enhance or impede the attainment of competitive advantage through effective product development strategies.

Conceptual Framework

Independent Variables Moderating Variable Dependent Variable

2.1 Product Development Strategy

Product development strategy is a very vital aspect in Porter's Five Forces portico that helps firms to create competitive advantage. Companies would therefore establish strong product development strategies that will have products from the competition to be able to avoid the threat of substitutes in the market so that they can have features differences and customer prices that are more favorable to customers (Kahn 2004). This strategy, therefore, has close ties with competitive advantage theory, which emphasizes that product differentiation improves both quality and trustworthiness of products (Mose, 2010). The measures relevant to this research under product development are new product development (NPD), modifications to already existing products, and diversifying product use.

Shortened product life cycles due to the rapid advances in science and technology necessitate innovative behavior from an organization, appropriate valuation of the new products, and therefore sustains sustainable competitiveness (Trott, 2021). This is because innovation is the element that helps organizations to prosper in growing their business functions, ensuring that the right kinds of products are produced, investing in appropriate technologies, and adapting to changes in consumer requirements while countering competitive threats. It becomes important for organizations intending to do well by offering new value propositions that can guarantee sustainability in the highly contested markets (Liu et al., 2005).

(Zhang, Di Benedetto, and Hoenig 2009) studied the relationship between product development strategy, knowledge use, and performance in product innovation within Chinese subsidiaries of multinational companies. The results revealed that companies that develop very innovative products had a U-shaped relationship between resource allocation and subsequent product innovation performance. However, when these companies aimed to strengthen moderately innovative products, an increase in resource allocation could reflect a positive correlation with product innovation performance. Knowledge utilization emerged as a predictor of the benefits from developing both highly and moderately innovative products, highlighting its function in balancing the adjustment to challenges regarding 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.

The existence of a model, formed by integrating the effectiveness-enhancing outcomes and the organizational inputs for eco-friendly strategies for product development, was developed by Katsikeas, Leonidou, and Zeriti. From a cross-sectional study that covered different industries, the authors found a positive relationship between top management commitment, corporate environmental support, and eco-friendly strategy adoption by the company, which then positively influenced product development effectiveness during favorable business conditions.

(Albino, Balice, and Dangelico 2009) studied the effectiveness of environmentally friendly strategic approaches for green product development in companies with sustainability orientations. Their study involved comparing green product developers to their non-developer counterparts, thus placing greater emphasis on strategic alignment as an important issue in pushing sustainability in product development. (Mbithi et al. 2015) focused on how the development of market segments, expansion into new geographical territories, and business development impact growth in business. Findings showed that while geographical expansion and new market segment development do not directly give profit, however, they contributed significantly to increasing market share. Therefore, this finding demonstrates the need to target geographical extensions and new market segments when formulating business strategy, especially in the telecommunications industry, improving performance in the long run without compromising on profitability. This study thus operationalizes the product development strategy through new product development, modification of existing products, and diversification of product usage. These same operationalization measures have been used in a large number of past studies to study growth strategies and performance in various industries (Ojokwa & Deya, 2018; Gecheo et al., 2016; Osei et al., 2020).

2.2 ICT regulatory policy

Policy is defined as an action or plan made by governments, political parties, or businesses to sway and determine actions, decisions, and other matters (Misigo, 2021). The regulator's task in the industry-specific regulatory regimes is complicated. The regulator is accountable for aligning a complicated market system that has multiple actors with different strategic and operational agendas (Davies, Howell, and Mabin, 2009).

(Perkins 2014), offered an exhaustive structure to analyze and evaluate industry regulation the world overICT regulatory policy ("the ICT regulatory policy") lays down the fundamentals of competition to be followed in the European telecommunication sector and is currently under review by the European Commission. The framework addressed issues under two broad categories (Friederiszick, 2008). Regulation has various ways in which it influences innovation. It will affect the risk of the innovation projects, profitability of innovations, and mostly restrict the available scope for innovation activities. They used an empirical approach to test several conjectures regarding the effects of regulation on ICT innovation (Bauer & Shim, 2012). Communications links use fiber optics and their associated electronics, satellites orbiting earth, and the internet. A modern telecommunications industry equips itself with making communication devices and a kind of voice, data, and broadband service over a wired or wired collection of cables, networks, servers, computers, and satellites (Tanwar, 2013).

It was under the Kenya Communications Act of 1998, promulgated into law through Presidential Assent on 1st October 1998, that a modernized regulatory regime would be deemed appropriate for the purposes of a multi-operator environment necessary for the revitalization of telecommunications and postal sectors in that area. It laid down rights and obligations of both licensees and consumers of services. The principles established on interconnection, public service obligations, and fair competition ensured the protection of rights of consumers and investors.

2.3 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).

III. RESEARCH METHODOLOGY

3.1 Research Design

This research was carried on a positivist philosophical approach that accorded priority to objective methods vis-a-vis subjective interpretations based on personal experiences, reflections, or intuitions (Easterby, Thorpe, & Lowe, 2002). A descriptive cross-sectional survey design was adopted to investigate product development strategy and competitive advantage in the Kenyan telecommunication sector. In (Bougie and Sekaran's 2019) description, descriptive research investigates the what, the when, and the how much of a phenomenon at a specific moment in time. (Zikmund 2003) also suggests that cross-sectional studies, which collect data at one point in time, are effective for descriptive research. This design enabled a deeper assessment of industry trends, thereby giving insights into the present effects of product development strategies on competitive advantage in the Kenyan telecommunication industry.

3.2 Target Population

The target population points to a particular group of individuals, events, or objects to whom the outcomes of a research study are meant to apply (Johnson & Duberly, 2014). A similar definition of a population is given by (Mugenda and Mugenda 2012) as being the entire group under study- sharing common characteristics. In this research, the target population consists of the Mobile Network Operators (MNOs) in Kenya, as identified by the Communication Authority (see Table 3.1). This research specifically targets 196 senior and middle-level managers who operate within the purview of these companies because their insights will inform the investigation of the nexus between product development strategy and competitive advantage among the telecommunications firms of Kenya. Data required concerning the number of managers in each firm have been obtained from the Human Resource Departments and records of the respective companies.

Distribution of Manager-Level Employees

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

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

3.3 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;

$$S = \frac{Z2NP\ (1-P)}{d2(N-1) + Z2P\ (1-P)}$$

$$S = \frac{1.962 \text{ x } 196 \text{ x } 0.5(1-0.5)}{0.052(196-1) + 1.962\text{x}0.5\ (1-0.5)} = 130$$

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

IV. RESEARCH FINDINGS AND DISCUSSION

Table 4.1 Response rate

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

This 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	0.932
Modifies features of existing products to meet ever-changing customers	0.9%	7%	12.2%	50.4%	29.6%	4.01	0.884
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

These 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 acknowledged the importance of modifying features of existing products to adapt to evolving customer needs, getting a mean score of 4.01 (standard deviation 0.884) with a response range of 0.9% to 50.4%. This indicates that firms must always be agile and responsive to dynamic market conditions. This view is supported by Cooper (2011), who stated that continuous improvement would be the very best way to further enhance customer satisfaction and loyalty.

The count of research and innovation used in product development gave a mean score of 3.97 (standard deviation 1.116), with responses ranging from 3.5% to 38.3%. This establishes the critical role of R&D in new product creation, satisfying the emerging needs of consumers, which is further supported by the observation made by (Chesbrough 2003) that an effective R&D can be a major factor for the advancement of a market.

In addition, they scored the diversification of existing products into a range of contextual applications at 3.99 on average (the standard deviation of 1.022), with responses ranging from 1.7% to 39.1%. This indicates that it is essential for firms to open up new markets and applications to bring more utility and value to their products, as referred to by (Porter 1996).

Score in creating stronger offerings by integrating features from existing products and services returned a mean of 4.03 (standard deviation 1.038), with responses ranging from 2.6% to 40%. This finding shows a trend of holistic solutions in enhancing customer satisfaction and creating competitive advantages, as advocated by (Kotler and Keller 2016). The overall lesson is that the findings do indeed affirm a great deal of influence exerted by product development strategies toward the competitive advantage, espousing that the telecommunication firms in Kenya must consider innovation and adaptability in the first place. The insights correspond with literary work that cites product development as key to a 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	7%	3.5%	9.6%	40.9%	39.1%	4.02	1.124

provision licenses in our communication sector							
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 8.7% 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

The findings presented here concern ICT regulatory policy in Kenya's telecommunication industry. It shows that the respondents view the government as very critical in issuing licenses, on time, for service provision and scored it with a mean of 4.02 (standard deviation 1.124) and a response range from 3.5% to 40.9%. Hence, this emphasizes the need for regulatory efficiency in facilitating market entry and keeping services available.

The strong agreement among consumers and suppliers, particularly regarding the regulation of service price tariffs, especially call tariffs (mean score: 4.24; 1.081 standard deviation; responses: 4.3% to 54.8%), highlights the importance of price regulation as an instrument for consumer protection and fair competition.

Establishing a structure for aspects of new entry into the market by the government received strong support, obtaining a mean score of 4.21 (standard deviation 1.055, range of responses 2.6% to 52.2%). This suggests that regulatory oversight is viewed by respondents as being necessary for ensuring market balance and preventing monopolistic conduct.

Even though the mean score of the regulatory authority's role in protecting consumers and consumer rights was a lower 3.77 (standard deviation 1.172, range of responses 7%-34.8%), it does stress the need for consumer support in the telecommunications market. The findings indicate that the government also effectively enforces antitrust laws, rated at a mean score of 4.06 (standard deviation 1.157, response ranges from 4.3% to 44.3%). Hence, this would therefore reaffirm the recognition of the need for regulatory frameworks concerned with competitive integrity.

Support for government responsibility in the authorization of mergers and acquisitions appeared high, evident through a mean score of 4.18 (standard deviation 1.261) with response percentages ranging from 3.5% to 58.3%. This marks the importance of regulatory approvals in ensuring that consolidation within the industry does not have adverse effects on competition or consumer welfare.

That means government regulations tend to have great influence upon competitive advantage in the telecommunications industry in Kenya. This view is shared by Monsreal-Barrera et al. (2019), who posit that sound regulatory regimes must therefore guard against the exploitation of customers by rival incumbents, with competitive advantage being enhanced through regulatory fairness and good implementation of policies. (Wanjiru and George 2015) add that an environment regulated is conducive for fair competition, leading to benefits for consumers and good market performance. (Okello and Tineo 2020) go ahead to mention that the regulatory frameworks greatly determine the competitive dynamics in the telecommunications sector, stating that good regulation will lead to improved service delivery and higher consumer satisfaction. Emphasis should thus be put on the ICT regulatory policy to favour competitiveness to the benefit of both the company and the 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

Here are the answers manifesting their competitive advantage concerning telecommunications firms in Kenya. The results indicated that they believe their companies would have experienced significant growth dimensions in the past five years. The mean score on customer loyalty is 4.11 (standard deviation 1.276), with responses going from 5.2% to 55.7%. This strong perception of enhanced customer relationships is confirmed by research that has already established customer loyalty as a central aspect in driving competitive advantage in the telecommunications industry (Kumar & Shah, 2004; Aydin & Ozer, 2005).

Regarding the expansion of the market, the average score was 3.98 (SD 1.263) with the range of responses as low as 7% and as high as 45.2%. Therefore, a positive appraisal was recorded in the company's efforts to penetrate new markets. Earlier studies have established that successful strategies of market expansion enhance competitive positioning and overall firm performance (Olsen et al., 2013; Weerawardena, 2003). Additionally, growth in the number of subscribers elicited a mean value of 3.78 (SD 1.283) against responses that ranged from 7.8% up 39.1%. This slight increase in the customer base vindicates evidence that subscriber growth is among the key performance measures within the business (García-Murillo & Gabel, 2009).

The respondents indicated significant progress in the count of money subscribers, with mean score 4.12 (standard deviation 1.171) and range of responses between 7.8% - 49.6%. The finding also shows the increasing relevance of mobile financial services, as recent literature claims that such services enhance customer retention and brand loyalty (Seyal et al. 2015; Chawla et al., 2020). Market differentiation, on average, rates at 3.83 (SD 1.177), with responses varying from 4.3 to 35.7%. This indicates that strategic focus is on unparalleled offerings which are critical in maintaining a competitive edge in saturated markets (Porter, 1985; Chen et al., 2011).

As for growth in market focus, it obtained a mean score of 4.09 (SD 1.121) but with responses ranging from potential values of 3.5% to 42.6%. Thus, it anticipates aligning the strategic views of companies towards specific market segments, thus supporting the collective view that a focused approach within a market leads to superior performance and an even higher edge over the competition (Baker & Sinkula, 2005; Narver & Slater, 1990).

In brief, competitive advantage proves a strong dimension for any organization involved in the telecommunications sector. Again, as the findings corroborate much of the earlier literature, which underscores and reasserts the importance of customer loyalty, market expansion, growth in subscribers, differentiation, and market focus for competitive advantage to be sustained over time.

H01: Product development strategies have no significant effect on the competitive advantage of telecommunication firms in Kenya

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

These show the fitted model statistics which depict a good performance on the variation of the dependent variable. The coefficient of correlation (R) is 0.787 which signals a strong linear correlation between the independent and dependent variables. The R-Squared figure is 0.620 and the Adjusted R-Squared value is 0.617, meaning that around or approximately more than half the variance in the dependent variable is accounted through the independent variables in the model.

These statistics have a sound base on the degree of explanation, validating the efficacy of the model in illustrating relationships among the variables. Moreover, the great F-change statistic of 184.343 combined with a p-value of 0.000 supports the overall acceptability of the model. This significant result strongly indicates that the independent variables explain a meaningful portion of the variance observed in competitive advantage, thus confirming the validity of the model in Kenyan telecommunication firms' contexts.

Table 4.6 Analysis of variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.427	1	81.427	184.343	0.000[b]
	Residual	49.914	113	.442		
	Total	131.342	114			

These pages report the results of an analysis of variance (ANOVA) on the influence of product development strategies on competitive advantage through telecommunication firms in Kenya. The analyses show that there existed among these units an F-statistic of 184.343 with the corresponding value, p=0.000.

These results imply that product development strategy has significant statistics toward competitive advantage at a p-value below the conventional norm of 0.05. This indicates that product development strategy plays an important part in boosting the competitive advantage in the Kenya telecommunication sector by ensuring improved product development strategies, thus giving a greater important role in attracting a better competitive position and success overall within the company.

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

The regression analysis results on the influence of product development strategy on competitive advantage are presented here. The analysis shows that the beta coefficient of the product development strategy equals 1.026. This suggests that an increase of one unit in the product development strategy entails an increase in competitive advantage by 1.026 units. This relationship holds statistically as supported by the t-statistic of 13.577 and a p-value of 0.000.

Relying on the significance of these results, the null hypothesis was rejected. The null hypothesis states that there is no relationship between product development strategies and competitive advantage. Thus, it indicates the effectiveness of the employment of product development strategies in improving competitive positioning within a telecommunication firm.

New-product development, or product development, takes opportunities and technological assumptions that can be converted into products that are to be put out on the market (Chang & Taylor, 2016). It forms part of activities dedicated to the introduction within the market of new products needed in response to market demand (Iheanachor et al., 2021). Moreover, Product Development Practices (PDPs) include well-defined tasks, steps, and phases for converting innovative ideas to market products or services that follow company standards (Kahn, 2004). Such practices are core

pathways for success for new product development programs (Troy et al., 2008). H02: 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	184.341	1	113	.000
.931[b]	.766	.764	.39588	.146	206.481	1	112	.000
.931[c]	.866	.863	.39763	.100	.017	1	111	.008

Thus, presenting the results of the comparative statistics based on the model fitness. As the presented results based on the coefficient of correlation, the R-Square rose from 76.6 to 86.6 % and the associated F-statistics was also significant for this. Hence, this implies model have very high explanation power. Therefore, the hierarchy model was significantly statistical.

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			

The impact of the moderation effect of ICT regulatory policy into the relationship between product development strategies and competitive advantage has been presented here. The analyses have indicated that all the three models produced statistically significant F-test statistics, for which the associated p-values, invariably, have remained less than 0.05. To be specific, the first model produced an F-statistic of 184.343 with a p-value of 0.000b, the second model produced an F- statistic of 363.020 with a p-value of 0.000c, and the third model produced an F-statistic of 239.895 with a p-value of 0.000d. These strong findings provide adequate support for the presence of a moderation effect, whereby ICT regulatory policy is deemed to be a major conditioning factor in the product development strategies and competitive advantage nexus 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

The analysis reveals the regression coefficients after including ICT regulatory policy as a moderator. The results indicate a statistically significant negative effect of product development strategies on competitive advantage. The coefficient of the interaction term of product development strategies and ICT regulatory policy revealed a value of -0.237 with a standard error of 0.036, a t-statistic of -6.539, and a p-value of 0.0000.

These conclusions support some researchers' views, notably Monsreal-Barrera et al. (2019), who contend that government regulation in some cases can become a real source of advantage that protects consumers from the possible exploitation attempts of competing firms. In the same manner, Moshi and Mwakatumbula (2017) highlight the equally adverse impact of government legislation and regulations on fair competition among firms. The evidence potentially suggests that while product development strategies do serve to create a competitive advantage, they might well be restrained by the regulatory environment in a manner that works to defeat such very well- meaning efforts.

V. FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Findings

The first objective of the study was to assess the relationship between product development strategy and competitive advantage among telecommunication firms in Kenya. It sought to determine whether a significant causal effect existed between the two, using various different measures to operationalize this objective and get responses from research participants.

In their analysis, hypothesis testing revealed a significant statistical association between product development strategy and competitive advantage as the results from an ANOVA show that product development strategies significantly influenced competitive positioning, which is in line with existing literature affirming that valid product development strategies positively enhance competitive positioning and, in turn, influence firm performance (Kotler & Keller, 2016; Porter, 1985). Furthermore, the significance in the regression coefficients for the various models estimated substantiates the strong interaction between the two: product development strategy and competitive advantage.

Together, these results imply that the telecommunications manager should aggressively work on enhancing the link between product development strategies and competitive advantage as a means of enhancing their firm's position in the market. Mwaura and Oduor (2020) assert that firms that successfully innovate and develop products tend to build a stronger competitive advantage; hence, a strategic focus on this area is much-needed.

The second objective looked at the effect of ICT regulatory policy as a moderator on the relationship between product development strategies and competitive advantage in telecommunication firms in Kenya. This part of the study aimed to explore the relationship between ICT regulatory policy, business growth strategies, and competitive advantage. In this instance, different measures were applied to operationalize this variable and capture responses from participants.

Hypothesis testing resoundingly concurred that ICT regulatory policy significantly moderated the relationship between product development strategies and competitive advantage. The interaction terms coefficient, therefore, grabbing attention to statically showing the magnitude of effect of ICT regulatory policy as a moderator. The F-statistics results gave credence to a combined linear causation of ICT regulatory policy on the relationship between business growth strategies and competitive advantage. Also, regression coefficient results lend credence to signifying the moderating role of ICT regulatory policy in the said association.

These findings provide evidence about regulatory frameworks influencing competitive dynamics in the telecommunications sector. Effective regulation can provide an environment that encourages innovation and sustains competitive advantage, as shown by numerous recent studies (Okello & Tineo, 2020). Managers and policy makers should hence consider such effects in their strategic decision-making processes about the ICT regulatory policies so that the end outcome is a regulatory environment that encourages growth and, consequently, better performance for the industry.

Some researchers argue that competition policy is an important tool to create an environment where innovation flourishes and where a competitive advantage is achieved, evidenced by many recent studies (Okello & Tineo, 2020). As a result, managers and policymakers should involve such effects in their strategic decision-making processes regarding the ICT regulatory policies to yield an outcome that augurs

well for a regulatory environment enabling growth performance and, consequently, better performance for the industry.

5.2 Recommendations

The study's findings have far-reaching implications for regulators and policy-makers making decisions towards the telecommunications sector in Kenya. This becomes evident when it engenders an understanding of the rivalry between product development strategy and competitive advantage, bringing forth informed policy notions. Such polices must be targeted toward creating new ones and amending the existing ones to accommodate growth and high operational efficiency within the industry. They must go hand in hand with the competitive strategies taken by telecommunications firms so that they coexist to provide an enabling environment for the sustainable product development and consequently competitive advantage. The study's findings would also form a very key component of the inevitable academic research component in the area of product development strategy and competitive advantage. It would only be an interaction and encouragement for subsequent studies into the impacts of product development strategies on the performance of firms. All studies would identify gaps in research and formulate prospective designs addressing various dimensions of the topic to give a broader based understanding of the telecommunications environment. The research findings would also go hand in hand with improved ways to encourage students and future researchers interested in business growth strategies in the telecommunications industry. This research helps understand the advantages of efficient business operations. This is also applicable to telecommunications strategists, who would use such insights to improve their understanding of how product development strategies affect competitive advantage and, subsequently, performance both for the firms and the industry. Prioritize product development strategies as such managers would have proven impacts on proper efficient operations and competitive success.

5.3 Suggestions for further research

The limited scope of this study pertains only to telecommunication companies, leaving gaps for other areas of communication to be researched. Future research should explore all communication- sensitive industries, including radio stations, television networks, and social media platforms. It would also be interesting to incorporate broader variables in business growth strategy, thereby strengthening the researched outcome. Such research may also unpack other interesting in-depth analysis of competitive advantage in diverse sectors and thus enhance a more comprehensive understanding of effective growth strategy within the larger communication context.

CONCLUSION

It has been concluded by the study that there is a causal relationship which is statistically significant between the product development strategy and competitive advantage in the telecommunication firms in Kenya. These argue very strongly about the need for firms within the telecommunications sector to focus the much-necessary scope of product development strategy. This analysis supports a very strong positive relationship between product development strategy and competitive advantage meaning effective product innovation leads to better market positioning.

Factor analysis, including principal component, correlation analysis, and regression results, further confirmed a strong association between product development strategy and competitive advantage in the telecomm services. These findings are in line with existing literature significantly associating such an effective product development strategy with a much-enhanced competitive position. Kotler & Keller, 2016; Mwaura & Oduor, 2020:

In addition, the study assessed ICT regulatory policy as a factor that moderates the relationship between product development strategies and competitive advantage. Hypothesis testing revealed significant moderation effects, thus reflecting that the environmental regulation of ICT shapes the competitive advantage rules among telecommunication firms. The correlation and regression results, too, confirmed the significant link between ICT regulatory policy and competitive advantage as they underscore the importance of such regulatory frameworks in the promotion of innovation as well as competitive success.

Thus, the study results underscore the importance of innovating with regard to product development strategies and more importantly working with the regulatory agents in the environment by all telecommunications firms. Managers and policymakers should also be guided with regard to the implications of such ICT regulatory policies on strategic decision-making in the sector, given that it strengthens one's competitive advantage.

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