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Original Research Article

Intellectual Property Strategies and Innovation Ecosystems in ICT Industry in Kenya

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Abstract: This study endeavors to investigate the effect of intellectual property (IP) strategies on the innovation ecosystem within Kenya's Information and Communication Technology (ICT) sector. Despite concerted efforts to promote IP strategies in the ICT industry, significant challenges persist in their implementation and effectiveness in Kenya. The study pursues three primary objectives: firstly, to ascertain the prevailing IP methodologies employed by ICT companies in Kenya; secondly, to evaluate the state of the innovation ecosystem within the Kenyan ICT industry; and thirdly, to analyze the effect of IP strategies on innovation ecosystems within this sector. Employing a desktop research design, the study extensively reviewed secondary data sources such as reports, industry publications, literature reviews, and existing texts. Initial findings indicate robust correlations between IP strategies and the dynamic Kenyan innovation ecosystem. The study underscores the pivotal roles of government agencies and organizational culture in shaping IP management practices, fostering innovation, and enhancing overall performance. Importantly, the findings align with Kenya's Vision 2030, advocating for enhancements to the legal framework to promote creativity and safeguard the rights of innovators and creators. Moreover, the study's outcomes are poised to inform strategic decisions concerning the establishment of innovation hubs, research and development initiatives, education and skills enhancement programs, technology transfer mechanisms, commercialization strategies, as well as collaboration and partnership endeavors. Additionally, these findings resonate with Sustainable Development Goals, particularly numbers eight, nine, and seventeen, thereby reinforcing their significance in advancing Kenya's socio-economic aspirations.

Keywords: Intellectual property strategies, innovation ecosystem, Information and Communication Technology (ICT) sector, Sustainable Development Goals (SDGs).

Introduction and Background of the Study

In the rapidly evolving global economy, innovation has emerged as a pivotal driver of economic advancement and competitiveness, particularly within the Information and Communication Technology (ICT) sector. Governments worldwide are increasingly leveraging digital technologies to spur growth and enhance productivity, underscoring the escalating significance of intellectual property (IP) strategies in shaping innovation ecosystems. Within this context, comprehending the nexus between IP strategy and innovation ecosystems holds paramount importance, notably within Kenya's ICT landscape. This publication endeavors to delve into and dissect the intricate interplay between intellectual property strategies and innovation ecosystems within Kenya's ICT sector, shedding light on the challenges, opportunities, and ramifications for industry stakeholders.

Kenya's ICT landscape has undergone remarkable growth and transformation in recent years, propelled by increased connectivity, digitalization, and a burgeoning entrepreneurial ethos (Mureithi, 2020). As ICT enterprises continue to innovate and pioneer new technologies, safeguarding and managing intellectual property assets has become imperative for sustaining

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competitive edge and fostering innovation-led growth (Kiplagat *et al*., 2019). Intellectual property strategies encompass an array of legal, regulatory, and corporate mechanisms aimed at safeguarding intangible assets such as patents, copyrights, trademarks, and trade secrets (Onditi *et al.*, 2018). Within the ICT realm, these strategies assume pivotal roles in nurturing innovation ecosystems by incentivizing research investment, advocating stakeholder involvement, facilitating technology transfer, and facilitating commercialization (Mutinda *et al*., 2021).

The adoption and effective implementation of robust IP policies can exert profound impacts on the innovation dynamics of the ICT industry, influencing the conduct of businesses, entrepreneurs, investors, and other ecosystem participants (Kamau *et al*., 2020). Companies leverage patents to erect entry barriers, deter competitors, and monetize intellectual assets through licensing and partnerships (Omondi & Otieno, 2019). Moreover, stringent intellectual property protection enhances the attractiveness of the ICT sector to investors and venture capitalists, augmenting investment inflows and catalyzing entrepreneurial endeavors (Kemei & Gitonga, 2017). Conversely, deficient or inefficient IP policies may impede innovation by diminishing incentives for research and development, exposing enterprises to IP infringement risks, and impeding technological diffusion and knowledge exchange (Odhiambo & Muchira, 2018).

In Kenya's ICT realm, the landscape of intellectual property management and enforcement presents both opportunities and challenges for entities navigating the innovation ecosystem (Nyambura et al., 2020). While notable strides have been made in bolstering the country's intellectual property legal framework and enhancing institutional capacity for IP governance and enforcement (Kiptoo, 2021), gaps and bottlenecks persist, particularly concerning patent registration, copyright enforcement, and accessibility to IP rights information (Korir *et al*., 2019). Moreover, the proliferation of digital technologies and online platforms has engendered novel complexities and vulnerabilities, necessitating innovative approaches to IP protection and enforcement in the digital milieu (Mutiso *et al*., 2020). Against this backdrop, grasping the dynamics of IP policies and their ramifications on innovation ecosystems assumes critical significance for policymakers, industry stakeholders, and researchers endeavoring to foster sustained growth and competitiveness within Kenya's ICT sphere.

STATEMENT OF THE PROBLEM

Despite concerted efforts to promote intellectual property (IP) strategies within the Information and Communication Technology (ICT) industry, significant challenges persist in their implementation and effectiveness in Kenya (Ampaire *et al*., 2020). While Kenya has made strides in developing its IP legislative framework and institutional capacity, lingering concerns and barriers impede the effective utilization of IP strategies to catalyze innovation and competition in the ICT sector (Kioko *et al*., 2019). A primary challenge stems from a lack of awareness and comprehension among ICT enterprises and entrepreneurs regarding the importance of IP protection and the available tools to safeguard their intellectual assets (Githaiga & Waema, 2018). This knowledge gap often results in underinvestment in IP protection, limiting these enterprises' ability to fully capitalize on their innovations and compete globally. Consequently, there is an imperative to enhance awareness and education on the significance of IP protection and its potential advantages for businesses in Kenya.

The intellectual property (IP) ecosystem in Kenya faces several daunting challenges, as elucidated by various studies. Kimathi (2021) underscores deficiencies in IP management and enforcement, rendering innovators susceptible to infringement and exploitation. Mugambi and Obadha (2020) further highlight the formidable costs and complexities associated with obtaining and maintaining IP rights such as patents and trademarks, erecting substantial entry barriers for small and medium-sized enterprises (SMEs) and startups in the ICT sector. Moreover, the fragmented nature of Kenya's IP ecosystem presents another obstacle to comprehensively addressing these concerns. Ware (2019) observes inadequate coordination and collaboration among government entities, industry associations, and academic institutions, leading to a lack of cohesive policies and strategies to safeguard and foster innovation, thereby impeding the growth of the IP ecosystem. Overall, tackling these challenges necessitates a concerted effort from all stakeholders to formulate and implement comprehensive policies, enhance institutional coordination and collaboration, and mitigate costs and barriers to entry for innovators and SMEs.

Furthermore, the evolving landscape of digital technology and online business models introduces new complexities for IP protection and enforcement, particularly in areas such as data privacy, cybersecurity, and digital content distribution (Mutai *et al*., 2020). The rapid pace of technological evolution, coupled with the global nature of the digital economy, exacerbates these challenges, warranting adaptive and forward-thinking approaches to intellectual property management and regulation.

Given these pressing challenges, there is an urgent need for empirical study and analysis to better comprehend the impact of intellectual property strategies on innovation ecosystems within Kenya's ICT industry (Okello *et al.*, 2021). By identifying and addressing the underlying difficulties and barriers hindering the effective utilization of IP strategies, governments, industry stakeholders, and scholars can collaboratively

foster an environment conducive to innovation-driven growth and sustainable development in the ICT sector (Maina & Wairimu, 2019).

Purpose of the Study

To establish the effect of intellectual property strategies on innovation ecosystems in the ICT industry in Kenya.

Objectives of the study

i. To find out the current intellectual property methods used by ICT companies in Kenya
ii. To assess the innovation ecosystem in the ICT industry in Kenya
iii. To examine the effect of intellectual property strategies on innovation ecosystems in the ICT industry in Kenya

EMPIRICAL LITERATURE

This segment will scrutinize existing research, data, and pertinent literature concerning the influence of intellectual property (IP) strategies on innovation ecosystems within Kenya's Information and Communication Technology (ICT) industry. The IP ecosystem furnishes legal safeguards for innovative enterprises across the innovation continuum (Reis *et al*., 2023). In the Kenyan context, ICT innovators must grasp IP fundamentals and the available legal frameworks to shield their innovations. Intellectual property (IP) law assumes a pivotal role in fostering innovation and creativity by endowing creators and inventors with legal mechanisms to protect their ideas and creations, thereby enabling them to capitalize on their endeavors (Deel, 2023). Moreover, the impact of IP laws extends to consumer awareness, as these laws facilitate the introduction of unique and innovative products, enriching consumer choices and ensuring product quality.

Intellectual Property Strategies

Intellectual property rights (IP rights) serve as legal safeguards that incentivize the development and commercialization of creative works. Absent these protections, once innovations are divulged to the public domain, they become susceptible to replication or imitation, diminishing potential returns and disincentivizing innovators. Kenya boasts a repertoire of IP rights mechanisms, including patents, industrial designs, utility models, trademarks, copyrights, and plant breeders' rights, aimed at safeguarding creative endeavors (Gitonga & Kieyah, 2011). Initially anchored in Kenya's colonial past, the country's IP laws were subsequently tailored to align with its economic milieu, technological capacities, and national priorities post-independence (Sikoyo *et al*., 2006). The principal IP rights recognized in Kenya encompass trademarks, service marks, patents, utility models, industrial designs, copyrights, and plant breeders' rights, governed by legislative frameworks such as the Industrial Property Act, Trademark Act, Copyright Act, and Seeds and Plant Varieties Act. Oversight of these rights is vested in institutions like the Kenya Industrial Property Institute (KIPI), Kenya Copyright Board, and Kenya Plant Health Inspectorate Services (KEPHIS).

In the contemporary digital landscape, databases and data assets have emerged as invaluable intangible assets for businesses. IP protections, such as copyright and database rights, serve to shield these assets from unauthorized exploitation and usage. Incorporating IP ownership clauses in contractual agreements can delineate data ownership and associated IP rights, including provisions to restrict data usage, replication, or dissemination, thereby furnishing remedies for unauthorized usage or infringement. Patents, as a form of legal protection, confer upon owners the prerogative to preclude others from exploiting, selling, or importing an invention for a designated period, thus safeguarding novel and utilitarian processes, machines, manufactures, and compositions of matter, with significant applications across the technology, agricultural, manufacturing, and creative sectors.

Innovation Ecosystems in the ICT Industry in Kenya

The ICT innovation ecosystem, building upon innovation theory, acknowledges the ICT sector's central role in driving contemporary innovation. This ecosystem underscores the pivotal contributions of a network of stakeholders in nurturing potential innovators throughout the innovation continuum, with ICT innovation extending its ramifications across diverse industries and facets of daily life (Bogdan-Martin & Mucheru, 2019). Kenya's innovation landscape has burgeoned in recent years, buoyed by enhancements like the proliferation of innovation hubs, improved internet accessibility, augmented funding for startups, and concerted efforts by the public and private sectors to decentralize and fortify local capabilities. Kenya's prominence in innovation is underscored by its consistent ranking as an innovation achiever, exemplified by its 4th position in Sub-Saharan Africa in the 2022 Global Innovation Index (Ngororano, 2022). However, the absence of a dedicated vision for the Kenyan innovation ecosystem necessitates the formulation of a bespoke Innovation Policy and Strategy to bolster the ecosystem further. Notably, gender and regional disparities persist within Kenya's innovation ecosystem, with urban areas and men disproportionately benefiting from innovation activities due to disparities in internet access, infrastructure, digital literacy, and poverty levels (UDPN & KoTDA, 2022).

Intellectual Property Strategies on Innovation

Intellectual property serves as a linchpin for fostering economic progress and technological advancement by incentivizing innovation, attracting investment, creating job opportunities, and propelling technological breakthroughs (CGI, 2024). IP rights play a seminal role in spurring innovation within the ICT industry by furnishing legal protection and exclusive rights to creators, thus stimulating investment, job

creation, and technological advancements. However, challenges persist in Kenya's innovation landscape, including the absence of established IP laws and the intricate process of launching a company, underscoring the imperative for the government to engage actively with the tech community and promulgate an Innovation Policy and Strategy to elevate Kenya's innovation ecosystem to global eminence (Marchant, 2015). Heightened awareness regarding the benefits of IP rights among innovators is crucial for safeguarding their creations and propelling innovation-driven growth.

THEORETICAL FRAMEWORK

Knowledge-Based View (KBV) Theory

First introduced by Grant in 1996, the Knowledge-Based View (KBV) theory regards knowledge as a strategic asset for firms. This theory, stemming from the resource-based view and organizational learning theory, posits that organizations amalgamate diverse forms of knowledge to enhance their output (Pereira & Bamel, 2021; Tamirat & Amentie, 2023). Proponents of KBV view heterogeneous knowledge and capabilities as pivotal determinants of organizational performance in a knowledge-based economy (Stoian et al., 2024). KBV's relevance to the research problem lies in its emphasis on a firm's knowledge assets, capabilities, and competencies in attaining competitive advantage and organizational excellence (Hamilton & Philbin, 2020). Within the scope of this study, KBV offers a valuable framework for analyzing the role of intellectual property strategies in knowledge creation, utilization, and accumulation within Kenya's ICT innovation ecosystem. Moreover, it underscores the dynamic nature of knowledge creation and innovation, accentuates the significance of collaboration and knowledge transfer among organizations, and acknowledges the role of dynamic capabilities and multiple actors in the broader ecosystem. Despite its relevance, KBV has limitations, including its narrow focus on non-knowledge resources, challenges in measuring and valuing knowledge, limited attention to external factors, and a static perception of knowledge (Hamilton & Philbin, 2020; Tamirat & Amentie, 2023). To address these shortcomings, alternative models like the Chocolate Model could be considered.

Chocolate Model Theory

Proposed by Diane Dormant in 2011, the Chocolate Model Theory centers on innovation adoption and organizational change. The model revolves around four components: change, adopters, change agents, and the organization (CACAO). It provides a structured approach for organizations, involving analyzing change, identifying adopters and change agents, and planning revisions based on analysis outcomes (Viskupic *et al*., 2022). Dormant (2011) delineates five characteristics of change: relative advantage, simplicity, compatibility, adaptability, and social impact. According to Marker *et al*., (2015), the CACAO model amalgamates Rogers' diffusion of innovation theory, which adopts a passive bottom-up approach, with Kotter's active model that scrutinizes change from a top-down perspective. The Chocolate Model facilitates innovation and change development by considering their benefits, target audience, stages of adoption, leadership support, relationships with change agents, and a proficient team. A notable gap in the literature pertains to the limited understanding of organizational factors, such as culture, in shaping IP management practices and innovation capabilities. While prior research predominantly focuses on external factors like regulatory frameworks, knowledge exchange, and industry dynamics, scant attention is devoted to organizational factors pivotal for driving or impeding IP strategies. Addressing this gap can furnish valuable insights into how organizations can cultivate an enabling environment for IP strategies and innovation. In contrast to Rogers' diffusion of innovation theory, the Chocolate Model presents a pragmatic framework for innovation adoption and organizational change. However, it is not without weaknesses, such as simplicity and compatibility issues that may impede the adoption of innovations.

Conceptual framework

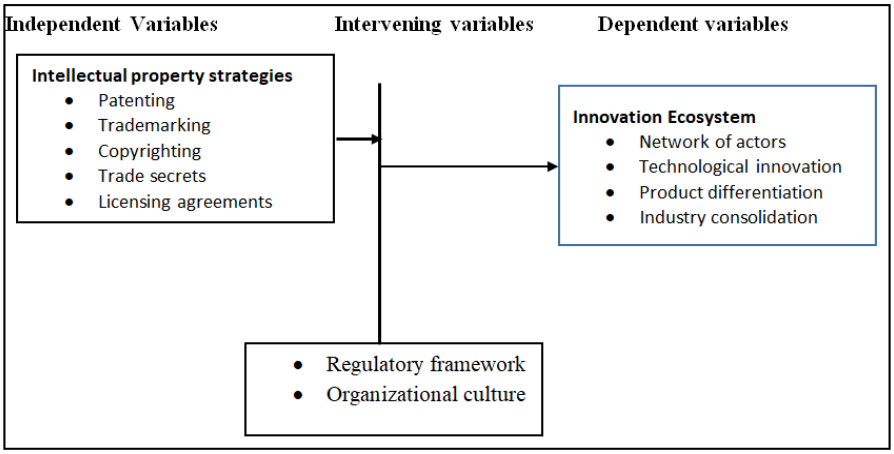

Figure 1: Conceptual framework
Source: Mwashumbe *et al*., (2024)

Empirical Gaps

While extant literature offers valuable insights into the nexus between intellectual property (IP) strategies and innovation within Kenya's IT industry, several empirical gaps necessitate further investigation to attain a more nuanced understanding. Firstly, Kenya lacks a comprehensive quantitative analysis of the utilization of patents, trademarks, copyrights, and other IP rights among IT professionals. Regular analyses could shed light on metrics such as the number of licenses granted to Kenyan IT entities or individuals, registered trademarks, and copyrighted materials. Empirical evidence in this domain is imperative to gauge the direct impact of IP laws on the development, safeguarding, and commercialization of products or services within Kenya's IT sector. Moreover, there is a dearth of comparative analyses juxtaposing Kenya's IP strategies and innovation ecosystem with those of analogous countries in sub-Saharan Africa or globally. Such comparative assessments can offer invaluable insights into best practices, challenges, and opportunities. Effective research endeavors should aim to catalyze innovation while assessing the long-term ramifications of IP strategies in fostering technological advancement and underpinning growth and economic development within Kenya's IT industry.

METHODOLOGY

This study employed a desktop research design to collect and analyze existing data from various sources. This approach is cost-effective and enables the acquisition of pertinent data from diverse outlets, including academic literature, industry reports, third-party data repositories, and online platforms (Bryman & Bell, 2018). The chosen design is well-suited for the study as it facilitates insights into trends, industry norms, user behaviors, and best practices concerning intellectual property strategies and innovation within the Kenyan ICT sector. Researchers adhered to a structured methodology encompassing several steps, beginning with defining the research topic, followed by the selection of relevant resources based on predetermined inclusion and exclusion criteria. Subsequently, the researchers scoured existing data, collated pertinent information, and conducted analyses while ensuring alignment with the research objectives (Martins *et al*., 2018; Wickham, 2019). This approach allows for a comprehensive understanding of the research problem, exploration of existing solutions, identification of trends in intellectual property strategies and innovation, and informed conclusions drawn from existing knowledge and research findings.

RESULTS AND DISCUSSION

This study delved into the impact of intellectual property (IP) strategies on the innovation ecosystem within Kenya's ICT industry. A thorough examination of secondary data sources was conducted, encompassing three research papers from the Strategic Journal of Business and Change Management, one article from the East African Scholars Journal of Economics, Business, and Management, as well as contributions from the East African Journal of Business and Economics and the World Intellectual Property Organization (WIPO), among others. These sources provided invaluable insights into the current IP landscape and its influence on innovation within Kenya's ICT sector. The findings, based on each objective, are outlined below.

Current Intellectual Property Methods Used by ICT Companies in Kenya

The study identified a diverse range of IP strategies employed by ICT companies in Kenya, including patenting, trademarking, trade secrets protection, copyrighting, licensing agreements, and open-source initiatives (Shirazi and Hajli, 2021; WIPO, 2013). While some companies opt to build comprehensive IP portfolios, others leverage collaborative IP strategies and open innovation models to safeguard their innovations and maintain a competitive edge.

Assessment of the Innovation Ecosystem in the Kenyan ICT Industry

The study revealed the presence of dynamic and interconnected networks comprising various actors, institutions, organizations, and resources that propel innovation within the Kenyan ICT sector. Key components of this ecosystem include universities, government agencies, research institutions, industry associations, startups, venture capitalists, and established ICT firms. Additionally, the study highlighted knowledge exchange, technology transfer, and collaboration as pivotal elements of the innovation ecosystem (Shirazi & Hajli, 2021; Beer *et al*., 2014). Notably, earlier studies (Pre-2010) underscored a general lack of awareness about IP protection among Kenyan ICT innovators. However, by the Mid-2000s to Mid-2010s, heightened awareness of IP's role in protecting innovations was observed, leading to regulatory measures such as the Anti-counterfeit (Recordation) Regulations 2021 aimed at preventing the importation of counterfeit goods, thus safeguarding brand owners and consumers.

Effect of Intellectual Property Strategies on the Innovation Ecosystem

The study found a positive association between the adoption of robust intellectual property strategies and the vibrancy of the innovation ecosystem within Kenya's ICT sector. Organizations with comprehensive IP portfolios were more inclined to engage in collaborative research partnerships, knowledge exchange networks, and technology transfer initiatives, contributing to a dynamic and interconnected innovation ecosystem (Shirazi & Hajli, 2021; Beer *et al*., 2014). While there was an observed increase in the utilization of trademarks and copyrights among ICT firms, barriers such as the complexity and cost associated with patenting,

particularly for software-based inventions, were identified as impediments for ICT innovators.

CONCLUSIONS AND RECOMMENDATIONS

The strategic utilization of intellectual property (IP) stands as a linchpin in Kenya's pursuit of Vision 2030, envisioning a knowledge-based economy, and contributes significantly to achieving Sustainable Development Goals (SDGs), particularly SDG 8: Decent Work and Economic Growth. By fostering innovation and commercialization of ICT solutions, IP can catalyze the generation of new employment opportunities and propel economic growth. SDG 9: Industry, Innovation, and Infrastructure are further bolstered by a robust IP framework that incentivizes investment in research and development (R&D), thereby driving technological advancements in ICT. Moreover, SDG 10: Reduced Inequalities underscores the strategic use of IP, particularly affordable patenting options, as a means to empower smaller ICT firms and bridge the innovation gap. Additionally, Kenya's launch of the African Continental Free Trade Area (AFCFT) implementation strategy 2022-2027 seeks to deepen integration within the AFCFT, facilitating trade and investment.

This study addressed the deficiencies identified in the theoretical framework by emphasizing the significance of external, social, and political factors, while acknowledging the fluidity of knowledge. Moreover, it nuanced the simplicity of the chocolate model by recognizing the roles of diverse stakeholders and the influence of the external environment. The study revealed that IP laws have significantly propelled IP strategies and innovation in Kenya's ICT sector, fostering the emergence of new startups and the growth of existing enterprises by safeguarding their inventions. Furthermore, it demonstrated that IP strategies promote sustainable development by ensuring organizations produce and commercialize products, thus creating a competitive advantage and aiding the realization of Vision 2030 milestones.

Although this study addressed gaps in the theoretical framework and empirical literature, further quantitative research is warranted to elucidate how IT professionals utilize IP strategies such as patents, copyrights, and trademarks.

The findings underscore the critical role of IP strategies in Kenya's innovative landscape and ICT sector. Nevertheless, concerted efforts are needed to enhance industry competitiveness. The government can augment IP awareness through public awareness campaigns and capacity-building programs on IP protection for ICT innovators and entrepreneurs. Streamlining IP processes, particularly for software inventions, and offering financial incentives for ICT-related patents can also bolster industry competitiveness. Additionally, fostering partnerships between universities and ICT firms to facilitate knowledge transfer and commercialization of university-developed innovations is paramount. In the educational sphere, integrating IP management courses into ICT curriculums equips students with the requisite knowledge to safeguard their innovations. Moreover, ICT firms can develop comprehensive IP strategies aligned with their innovation goals, while investors can prioritize IP-conscious firms when evaluating ICT ventures for investment. Lastly, research institutions can foster collaborative research projects between public and private entities, leveraging complementary expertise and resources for impactful ICT innovations.

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