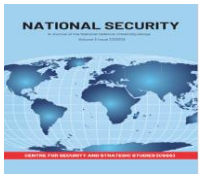

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Proliferation of Drone Technology and Its Implications on National Security Management in Kenya

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Abstract

The development of drone technology, typically used in national security management, is both a challenge and an opportunity for Kenya. This study examines this intersection and the dynamic relationship between drone technology, legal framework and local security infrastructure through the lens of systems theory. A pragmatic paradigm was used in the research, and it involved the use of a convergent parallel design. Key informant interviews and questionnaires were used to collect data from 155 respondents and conduct data analysis with the help of descriptive statistics and content analysis. Discussing the availability of drones, 58.3% of the answers indicated that drones were available in the market to serve diverse purposes, be it civilian or in connection with security. Research data revealed lapses in the enforcement of the rules as the drones were being used to conduct surveillance and drug delivery. Furthermore, 96.8% of the respondents said that government security organizations employed drones in their operations, underlining the dual nature of this technology. Given the dual-use nature of drone technology, this paper calls for the need to develop an all-inclusive national drone policy for Kenya to guide the acquisition and utilization of drones. It also calls for the need for better coordination among the stakeholders and capacity building in the security agencies to better control the use of technology, especially by the public, to contribute to the improvement of national security. The results highlight the importance of adaptive governance for responding to the changing problems that technology presents to national security.

Keywords: *air power, drone, dual-use technology, security management, Unmanned Aerial Vehicles (UAVs)*

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Introduction

The rapid development and spread of drone technology over the past 20 years have raised concerns about its effect on national security in many parts of the world, including Kenya (Schulzke, 2019). Drones have become more accessible and versatile because of the ongoing miniaturisation of components, low prices and the increasing number of commercial uses (Shermon & Moeen, 2022). As drones have been developed to play a positive role in multiple aspects of life, such as security, humanitarian aid and civilian operations, the dual-use aspect and the fact that the technology may be employed by both the state and non-state actors are obstacles to national security management (Schulzke, 2019).

The Kenyan government has been applying drone technology as a force multiplier in terms of security (Bergenas et al., 2013). Nevertheless, the ubiquity of drones dispersed at such an alarming rate has resulted in the transfer of drone capabilities to non-state actors, so that the monopoly of the government on aerial surveillance and air power projection is no longer so strong. This situation has complicated the management of national security (law enforcement, border security, the security of important installations and privacy). Those who support the use of drones argue that drones are very advantageous to current warfare, including the fact that drones save human life by not having to be directly involved in combat. Drones are inexpensive, have a greater range and can provide vital intelligence, surveillance and reconnaissance (ISR) (Dorafshan & Maguire, 2018). Unmanned Combat Aerial Vehicles (UCAVs) are armed drones that are accurate in strikes and cause minimal collateral damage.

Nevertheless, the issue of the spread of drones has been cited, especially the access of drones to Violent Non-State Actors (VNSAs) and rogue states. Remote warfare ethical concerns, desensitisation potential and the absence of distinction between the combatants and civilians in the war-torn areas are significant. Drone warfare has also been condemned for promoting extrajudicial murders and violating the principle of territorial integrity. The use of kamikaze drones or loitering munitions is an emerging and dangerous weapon in contemporary warfare. These drones are programmed to fly into their targets (and usually hit them using explosives) and have been used extensively in wars, including the Russia-Ukraine war. Kamikaze drones are not very expensive to produce and would pose a very big challenge to national security since they are difficult to detect and intercept. The development of kamikaze drones is especially dangerous to such states as Kenya, where VNSAs like Al-Shabaab may obtain them and use them to attack the world (Dorafshan & Maguire, 2018).

Drones are useful for surveillance and attacking key infrastructure and this is why they are a powerful weapon against state and non-state actors. Moreover, drones have provided VNSAs with the possibility to make cheap but high-profile assaults on both military and civilian targets. The lack of explicit international regulations on drone operations has also increased these difficulties, because of the possibility of drones violating state sovereignty and international peace (Nasong'o, 2020). Although there are legal and regulatory provisions that have been implemented by the Kenya Civil Aviation Authority, there is still illegal use of drones by criminal elements (Daily Nation, 2020). There are no investigations that covered the effects of the drone spread on the Kenyan national security comprehensively (Nasong'o, 2020). Hence, this study aimed at finding out the extent of proliferation of drones and their effects on the management of national security in Kenya.

Theoretical Framework

The systems theory, which is multidisciplinary is employed in the study to examine the complex systems as a whole, where parts are not separate, but rather interrelated. The current systems theory was developed by Alexander Bogdanov with his work on universal organisational principles under the title Tektology in 1913/1980; Ludwig von Bertalanffy with his General System Theory in 1968; and Bela Heinrich Banathy who expanded systems thinking to social and human systems in 1996; and Talcott Parsons with his structural-functional analysis which highlighted interdependence in a social system in 1951. Combining these scholars, it is essential to note that the analysis of complex phenomena would be useful in analysing interactions as opposed to single variables.

Through the systems theory of drone proliferation and national security management in Kenya, the study delineated the clear boundaries of the systems, which comprised drone technology, legal and regulatory frameworks and agencies within the scope of which, as well as the field of socioeconomic and political discussion (KCAA, 2020; UNODC, 2021). This approach allows the research to examine the interrelations and interdependencies among these factors, including the necessity of coordination between drone activities and the current security tasks, information exchange among authorities and possible threats and weaknesses of heightened dependency on drone technology (Weiss & Brehm, 2021). An example is that the use of drones is compliant with the requirements of the Kenya Civil Aviation Authority (KCAA), the Kenya Defence Forces (KDF), the National Intelligence Service (NIS) and emergency response services, all of which require the use of interoperable systems to facilitate the achievement of viable national security results.

The multi-level and hierarchical nature of systems theory also significantly enables research to examine the integration of drones into Kenya's overall security framework at local, regional, and national levels of governance (Banaathy, 1996; Bertalanffy, 1968). This foundation is crucial because Kenya has a complex security landscape that includes county and police structures, regional collaborating systems such as the East African Community (EAC) and IGAD, as well as national governing and strategic systems. This approach allows for a more interconnected analysis of the opportunities and challenges associated with integrating drone technology into the country's security system amid rapid technological advancements and evolving security threats (Skylogic Research, 2019; UNODC, 2021). In turn, systems theory provides a consistent analytical perspective that can help understand how the proliferation of drones is affecting security coordination, identify gaps in infrastructure, and suggest ways to improve the management of national security in Kenya.

Methodology

The research employed a mixed method approach, whereby the descriptive research design was integrated into document analysis. Primary qualitative and quantitative data were obtained through questionnaires and key informant interviews from a sample of 155 respondents, which was drawn from various segments of people from the target population of 801 using stratified sampling. The target population included government stakeholders in regulatory, defence and security sectors, as well as non-state actors, including drone owner-operators and vendors. The sources of secondary data were published content analysis. Quantitative data were analysed with the help of descriptive statistics, and qualitative data through content and thematic analysis. The study followed ethical principles such as informed consent, anonymity, confidentiality and the principle of non-harm.

Findings and Discussion

Accessibility of the Drone Market

The respondents were asked to rate the accessibility of the drone market in Kenya for individuals and organisations, and the results are presented in Table 1. The results reveal that there is a significant number of respondents (37.8%) for whom the drone market is highly accessible in Kenya, and 58.3% the market is somewhat accessible. This implies an appreciable level of confidence and ease of access to drones for various purposes by individuals and organisations.

Table 1

Drone Accessibility in the Market

Statement	HA (3) %	SA (2) %	NA (1) %	Mean	SD	Median
How accessible are drones in the Kenyan market	37.8	58.3	3.8	2.34	0.55	2

Key: HA (Highly Accessible), SA (Somewhat Accessible), NA (Not Accessible at all)

n=148

Source: Field Data, (2024)

The fact that most (58.3%) of the findings have discovered that the drone market is somehow accessible depicts that there would be some barrier in terms of costs, regulation, or even ignorance that would make the market not fully accessible. This observation indicates that, although the drones exist, the market might still be at the stage of its development, as there are certain issues that should be resolved to make the drones even more accessible. There is also a small group (3.8%) of respondents who consider the drone market unavailable. This category can include individuals or organizations that are in serious struggle, including high prices, complicated policies, or a lack of technological skills, which make it difficult to use drone technology.

The average of 2.34 means that the overall perception was moderately positive; nonetheless, it also shows that it could be improved. It implies that the market is relatively accessible to many, but there are struggles to be made to make it more accessible. The standard deviation of 0.55 means that there is a moderate variance in the opinions of respondents. This implies that the majority of the respondents are concentrated on the "Somewhat accessible" category, but still, there are both divergent views: some people consider the market to be quite accessible, and some people find it a lot less accessible. This difference could be a result of factors such as the geographical location, the financial ability, or being well conversant with technology.

The median of the answers as being somewhat accessible (2) correlates with the mean and supports the idea that the central tendency of views expressed by the respondents is towards moderate accessibility. Such uniformity between the mean and the median indicates that the market has a relatively homogenous perception. The consistency between the results implies that the majority of Kenyan people view the drone market as being accessible, but a great number of people view it as somewhat accessible. The statistics thus show that there is a definite correlation between the progress in technology and the development of drones. The obstacles to procuring drone technology in Kenya are comparatively not that high, and it may result in more applications in different sectors, including by participants who may pose a security threat.

Results of the key informant interviews on the availability of the drone market in Kenya to individuals and organisations are in line with the survey findings, but further details on the factors affecting the accessibility

of the market are needed. Among the factors that the interviewees attribute as the driving forces behind the availability of the drone market in Kenya include technological advancements, low cost and increasing consumer interest. A key informant (KII001) noted thus:

> *The demand for drones has grown tremendously during the last several years. Drones are now available to many people and small businesses since they have been regarded as high-end and costly in the past. The availability of drones has increased due to falling prices and the products offered in the marketplace and on online marketplaces. Drones can be easily identified and bought by anybody having access to the internet, and they can be of simple types or more sophisticated ones.*

This emphasizes the diversified prospect of drones, including both price-effectiveness and choice, as well as Internet availability. These findings are aligned with some of the current literature (Njuki, 2021; Muriithi & Koome, 2020), which observed that online marketplaces, declining costs and the advancement of drone technology had led to increased availability of drones to people and organisations in Kenya. Even though the study did not focus on the level of accessibility between the rural and urban populations, Ochieng (2019) believes that there exists a substantial gap, with the population of cities, including in Nairobi, having a much higher exposure to drones than the rural population. This questions the outcome of the survey in the study that showed moderate differences in opinions (SD = 0.55). Also, even though the results of the survey and the interview indicate that drones are widely available, Mutua (2022) assumes that regulatory and awareness challenges are important factors that restrict the access of many potential users. According to the study, the existing rules are complicated and not well-informed, which hinders access. This argument is the opposite of the majority of the findings of drones being available.

Drone Acquisition

Questions raised on whether their organisations had been acquiring drones for any reason brought about a broad answer to the question, with various reasons why organisations acquire drones. Surveillance and intelligence collection were also cited as one of the most frequent reasons. Largely, many respondents reported that drones are used in their organisations to survey expansive regions of land, including farmland, construction projects, or secured locations. Cameras on drones and sensors allow effective aerial surveillance and can provide worthwhile real-time data. Reconnaissance was another reason that was often mentioned, closely associated with surveillance. Organisations, especially those that are related to security or military operations, are using drones to explore the unknown lands, determine the possible danger and collect the necessary information and tactics without endangering the lives of their staff. Within the environmental conservation sector, the respondents mentioned the use of drones in anti-poaching activities. Drones are utilized by park rangers and other wildlife protection agencies to surveil large areas of reserves, detect illegal poaching practices and monitor the movements of endangered species. Drones have been a game-changer in the struggle against poaching.

On the creative side, a good number of respondents purchased drones for photography and film. Drones are used by media organisations, production companies and individual photographers to shoot breathtaking aerial shots and images that are used to report on the news, in documentaries, in movies and in other creative projects. The drones are an inexpensive method of attaining picturesque aerial shots. Many of the respondents, particularly those who belonged to government agencies or privately owned security firms, reported that their organisations bought the drones for military and defence purposes. Drones are utilized in many military applications such as border defence, combat support and precision strike. The military industry has been at the forefront of using drone technology. Other applications cited by the respondents are aerial mapping, inspection of infrastructure, agricultural surveillance and delivery services. The flexibility of drones has seen a wide range of industries and applications purchase them. The results highlight the disruptive nature of drones in industries and how they are becoming a part of many operations and capabilities in Kenya.

These survey findings are backed and elaborated by the key informant interviews. The issues of public acquisition and use of drones were questioned and when asked to give an instance of the common purpose of

the majority of people to acquire and use drones, the interviewees provided answers that were congruent with the findings of the survey.

One interviewee (KII004) stated:

> *Individuals and businesses have increased the number of drones that they are buying. A large percentage of the buyers can be photographers seeking to shoot aerial shots of a wedding, real estate, or landscape photography. We also receive a large number of farmers willing to utilize drones to keep an eye on their produce and livestock.*

This corroborates the survey results on the use of drones in photography and agricultural monitoring as popular reasons to acquire drones. The interviews with key informants reinforce and confirm the findings of the survey on the various reasons why the drones are being acquired in Kenya. The direct quotes provide real-life examples and personal views that add some depth to our knowledge about ways drones are utilized in different industries, whether it be photography and agriculture or security and conservation. Interviewees noticed that the number of people and companies buying drones has increased dramatically, especially in areas like photography when conducting weddings, real estate and landscape photography. Another widespread use of drones by farmers is crop and livestock monitoring, which also corresponds to the survey findings of farm use.

Drones have become important in surveillance and intelligence gathering in the security sector. Drones are applicable in law enforcement, corporate and private security firms to survey assets and operations cost-effectively. This helps in validating survey data, one of the purposes of which is surveillance. Another field where drones are producing a significant impact is environmental conservation. Drones assist in combating poaching in the park since the rangers can trace the perpetrators at a farther distance and monitor their activities, which allows easier interception. This is in line with the survey findings, which highlight anti-poaching as a major factor in the application of drones. The available literature on the use of drone acquisition in Kenya is closely related to the survey and interview results. In terms of spy activities and intelligence collection, Munyua (2019) mentions that Kenyan security agencies and private firms are considering drones to gather intelligence data because they are cost-effective and do not require much time to cover a wide territory. Wambua (2021) gives an example of the Kenya Wildlife Service using drones to address the issue of poaching in national parks, which has proven to be effective in the context of anti-poaching. The paper observes that drones have made ranger patrols much more effective and contributed to more poachers being arrested.

Drones are extensively documented in the literature as a tool of photography and filming. Ochieng (2020) discusses the increased trend in the use of drones by Kenyan photographers and videographers, especially in weddings, documentaries and promotional videos. The article identifies the novel potentials and financial cost-effectiveness of the drone technology. The available literature on the military and defence drone usage in Kenya is also very limited due to the sensitivity of the topic. However, Njoroge (2018) provides a general overview of the adoption of drone use by the Kenyan military in reconnaissance, surveillance and combat support by stating that it can help the military to enhance its activities. Kimani (2022) gives an overview of the introduction of drones to manage crops and livestock in Kenya. Moreover, the paper concludes that with the help of sensors and cameras, drones can help farmers monitor the stress of crops, optimize the irrigation system and monitor the well-being of animals more effectively. Other uses of the drone that were in the survey and interviews are also covered in the literature. Mwangi (2019) speaks about the application of drones in aerial mapping and inspection of infrastructure in Kenya, stating that there are advantages of this approach (safety, speed and accuracy) in comparison with the traditional ones.

Illegal Use of Drones

A large percentage of those interviewed on the question of whether they had witnessed or heard about any cases related to illegal uses of drones in Kenya reported that they were aware of such cases. A great number

of respondents have testified about unauthorised surveillance of private homes or sensitive government plants. A member shared an experience when a drone was noticed to hover over a military facility that had high security and it brought up the issue of the drone being used to spy and be a threat to national security. The second theme that was prevalent was the use of drones in illegal operations like drug transportation and smuggling. According to the respondents, they had heard of cases where the drones were employed to smuggle contrabands across the borders or over the restricted zones, bypassing the traditional security controls.

The respondents in the wildlife conservation industry have reported incidents where poachers have employed drones to detect animals and avoid detection by the rangers. This activity of illicit use of drones hinders the anti-poaching operation and presents a great danger to the threatened species. There were also other cases of invasion of personal space that other respondents reported, like drones being used to capture people without their consent or when they are about to make love. Such instances demonstrate the need to have stringent regulations and enforcement mechanisms to ensure the privacy of citizens.

The results of the survey regarding illegal drone accidents show the ugly side of drone proliferation, as the same technology development has been utilized that made the drones more accessible and approachable, which has also been applied to the drones in illegal activities in a malicious manner. These incidents underscore the reason why security agencies and policymakers are struggling to cope with the risks of a high rate of proliferation of drone technology. The reasons why the drone regulations should be fully enforced, detection and interdiction plans should be strengthened and people should be informed about the security threats of the misuse of this technology, including illegal surveillance, espionage, smuggling, poaching and violations of privacy that it causes.

The available literature on illegal drone incidents in Kenya is mostly dependent on the survey results, which further support the fact that the security problem with the misuse of drone technology is quite real. Wanjala (2020) explores how drones are used to smuggle goods across borders, which proves the information provided by the respondents in the survey that drones are utilized in transporting drugs and other illegal goods. The report notes that there should be increased border patrol and counter-drone strategies to curb such attacks. On the same note, Omondi (2021) analyzes the danger posed by drones to the conservation of wildlife in Kenya, which validates the survey results on the utilization of drones by poachers to survey the wild animals and avoid detection by the rangers. The article explains why conservation agencies should be given counter-drone capabilities and training as a reaction to this novel threat. Regarding the question of privacy, Muthoni (2019) discusses both the legal and ethical issues of the privacy of individuals attacked by drones in Kenya. The outcome of the research in relation to the usage of drones for capturing people without their consent emphasizes the urgent requirement for definite policies and implementation mechanisms that would protect citizens' privacy rights.

On the other hand, the prevailing literature does not completely agree with the survey's results, as a number of studies point out the positive usage of drones in Kenya. For example, Kioko (2018) gives special attention to the use of drones in disaster management and humanitarian activities, claiming that their potential to deliver aid and save lives must be utilized. Though this research does not study illegal drone use, it does point out the need for taking drone technology out of the box and positing it for socially useful roles. In the same manner, Wafula (2022) looks into the adoption of drones for the inspection and maintenance of infrastructure in Kenya, and he points out the benefits of improved safety, efficiency, and reduced costs. This study does not touch upon wrongful acts, however, it shows that in some instances, the advantages of drones might be more than the risks related to security.

The discrepancy between the two research studies and the survey results on illegal drone cases can be explained by their different focus areas and research focus. Although the purpose of the survey was to reveal the security issues that drone misuse causes, some of the articles in the literature give more importance to the positive uses of drones in Kenya. However, the presence of positive drone applications cannot take away the security risks identified in the survey. Instead, it emphasizes the necessity of balanced regulation and management of drones, a form that would encourage responsible usage of drones, but also mitigate the threat of drones being abused.

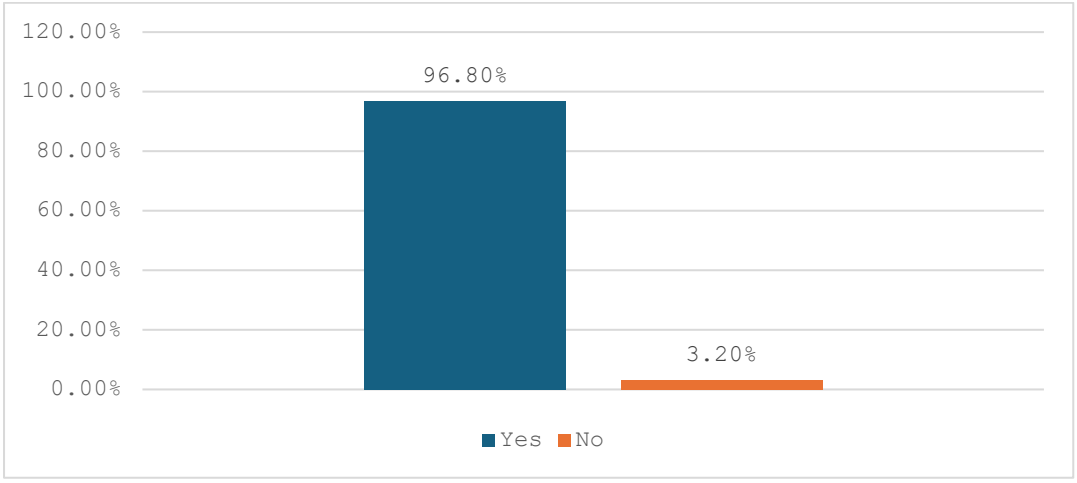
Drones in National Security

Drones are becoming a useful tool in handling national security matters for government agencies. The question presented to the respondents was whether national security and surveillance in Kenya are carried out by the use of drones by government agencies. According to Figure 1 findings, the Yes (96.8%) and No (3.2%) scores indicate that the overwhelming majority of the respondents (96.8%) think that government agencies in Kenya are using drones in national security and surveillance, with only a small proportion (3.2%) of respondents not agreeing. This percentage of positive approval is an indicator that most people are well-informed and familiar with the use of drones by government agencies to conduct security and surveillance. It reveals that the Kenyan government has proactively adopted the use of drone technology to regulate the threat to national security and surveillance on possible risks.

The proliferation of drones among government agencies is also in line with the international tendency of the integration of unmanned aerial systems in national security systems. Drones have some benefits over conventional surveillance technologies and they are cost-effective, flexible and can be used to access areas that are difficult to reach. In Kenya, security and surveillance involving the deployment of drones is also an issue of particular concern, considering the current issues of terrorism, border control and sea security the nation is facing. Drones can help in the collection of intelligence, border patrol and monitoring of the high-risk zone, which will enable the government to detect and respond to security threats without putting the operator at risk.

Figure 1

Government Use of Drones for National Security



n=148

Source: Field Data, (2024)

Nevertheless, the mass use of drones for security and surveillance also raises concerns about their privacy, civil liberties and what may be applied to abuse them. The results of the survey reveal that there is a necessity to establish proper regulations, monitoring systems and openness in the use of drones by the government, so as to ensure that the use of drones does not violate the rights of citizens and their confidence.

The large percentage of respondents who answered affirmatively to the government use of drones to maintain security and monitor the population highlights the need to engage the population and create awareness in terms of the implications of drone technology. It demands transparent communication between the government, the civil society and the citizens to create a balance between the need for national security and the safeguarding

of individual rights. The inferences about the application of drones by the government to conduct security and surveillance show how the Kenyan government has utilized the fast technological growth and development of drones to control the issue of national security. The popularity of the practice among the general populace implies that drone technology has been internalized into the national security policy in Kenya.

Nevertheless, the results also show that the governance structures and citizen control should be strong because the deployment of drones by the government to provide security and other surveillance functions must not violate the law, but must safeguard the rights of the citizens. With drone technology ever evolving and gaining more availability, it will play a major role in achieving this balance that will ensure proper management of national security and maintenance of democratic values and principles. The literature reviewed largely upholds the findings of the survey on the utilisation of drones by government agencies in Kenya for national security and surveillance purposes. Mwangi (2019) discusses the process of implementation of drones in Kenya by military and intelligence agencies, noting that the military uses drones to monitor the border, counter-terrorism and maritime security. This research study correlates with the reality that the percentage of affirmative answers in the survey was overwhelming, which confirms the widespread application of drones by government agencies to maintain security. Still on the same subject and under the same name, Otieno (2021) explores how drones are to be used by the Kenyan police in crime prevention and public safety. The study substantiates the reactions of the survey, according to which the application of drones in the policing strategy is connected with the increase in the quality of situational awareness, response time and evidence gathering.

However, there are academic arguments regarding how drones can be abused by the state and their impact on civil rights. Wanjiku (2018) talks about the privacy risks of utilizing drone surveillance, asserting that the technology can violate the rights of citizens unless adequate measures are taken to curb the privacy issue. This point of view is slightly different in comparison to the results of the survey, in which the main issue is the recognition of the population on the use of drones by the government and not its potential dangers. Ochieng (2022) laments the absence of transparency and openness in the introduction of drones by the government in the name of security. This paper contends that the lack of transparency in such initiatives might undermine civil confidence and make democracy accountable. Although this criticism does not directly refute the results of the survey, it brings an interesting point in the fact that the survey does not definitely touch upon this point.

This situation can be explained by the fact that the two critical views and the survey results diverge due to the different focus of the studies. Although the main goal of the survey is to define the level of national awareness and recognition of the utilisation of the drone by the government, the critical literature examines the possible threats and issues of the given practice. However, the apprehension that has been voiced in the literature does not nullify the research results shown in the survey. Rather, they underscore the multidimensionality of the problem as well as the necessity of a compromise solution that addresses the advantages of the use of drones, as well as the possible risks of such use by governmental agencies.

ISR Drones Monopoly by the Government

The respondents provided their views on the degree to which the government has monopolized the ISR operations through drones in Kenya. The survey results show mixed views among the respondents on the level of monopoly on the drone-based ISR operations in Kenya by the government. A small majority of the respondents held that there is moderate power of monopoly by the government, which implies that though the government is a big player in this field, there are other players in the field, such as the role of private companies and individuals that use drones in ISR activities. This fact is a sign that the government does not have total control on the employment of drones in the ISR activities, despite its domination. On the contrary, a smaller percentage of respondents view the monopoly of the government as high. This community regards the government as the key player in undertaking the drone-based ISR operations, meaning that there is a high degree of state control and influence in these fields. Nevertheless, a significant minority of the respondents feel that the government is too restrictive in power to carry out drone-surveillance operations. According to this view, the presence of non-governmental actors, including private security agencies, media organisations and individuals, is high in this area, and they can perform drone surveillance without much restriction.

The various perceptions of respondents' point to the convoluted nature of drone surveillance in Kenya. It may also depend on the perception of a moderate monopoly of government because drone technologies are becoming more accessible and more affordable, commercial drone services are being promoted and individuals can potentially buy the drones and use them to perform different functions, including surveillance. One must take into consideration that the results of the conducted survey are purely based on the general perception of society and may not give a full picture of the real monopoly of the government in regard to the actual drone-based ISR operations. Issues of classified government programs, the extent of participation in the private sector and the efficacy of regulatory implementations may have an impact on the factual development of this issue.

The available literature on the monopoly of the government on the use of drone-based ISR operations in Kenya is in line with the survey data that depict mixed perceptions of the respondents. Kamau (2019) posits that the Kenyan government has a high monopoly on the ISR operations through drones, mainly because of the stringent regulatory regime and its monopoly on the highly sophisticated drone technology. The paper argues that non-state actors have high barriers to entry in this sphere and can be restricted in their ability to carry out ISR operations with the help of drones. This attitude is at odds with the results of the survey, which display a less radical level of the monopolizing capability of the government and the high degree of non-state participation in the drone-based ISR processes.

Mutua (2021) writes about the potential of drones in ensuring that humanitarian organisations track and assess the situation in Kenya in case of crisis and disasters. The study indicates the importance of the government and non-state actors collaborating in harnessing drone technology to the benefit of society. This opinion suggests a more collaborative practice between the government and the non-state in the practice of applying the drones to the ISR operations, rather than the government monopoly, which is evident among some of the respondents surveyed. Onyango (2020) explores the importance of drones in Kenya, being embraced by the domestic companies within the nation in a commercial manner, namely, the inspection of the infrastructure, surveying of farms and aerial photography. He argues that the commercial drone market is growing in a comparatively autonomous setting but is constrained by the rules and regulations of the government. This observation contradicts the fact that there is a strong government monopoly in the provision of drone-based ISR operations, hence demonstrating that the private companies in the sector enjoy a high level of freedom.

Gitonga (2018) analyzes the risks that are posed by non-state actors who can utilize drones to cause malicious activities that fall under the national security concerns of Kenya and reflects on the kinds of threats that drone technology may bring about, such as terrorism or espionage. Gitonga's article indicates that the government needs to increase its control over the use of drone-based ISR operations to reduce such threats. This opinion is contrary to the outcomes of this study, which has revealed a moderate monopoly of the government and the presence of non-state actors in this industry. Waithaka (2023) looks at the role that academia and research institutions can play in advancing drone technology in Kenya, with special emphasis on the conservation of the environment and scientific research. The paper identifies the importance of the collaboration of the government, academia and civil society to use the potential of drones to the benefit of society. This school of thought has argued that drone-based surveillance ought to be more participative and participatory and not a government monopoly.

Conclusion

The study concludes that the emergent technological advances and the proliferation of drones in Kenya have rendered these drones far more available and affordable and as a result, they are used in many different activities, such as surveillance, the gathering of intelligence and business operations. This propagation has, however, permitted other unauthorised uses like unauthorised surveillance, drug trafficking and privacy infringement, which have also made it even harder to control national security. The findings point to the need to take a complex approach to address the duality of the implications of drone technologies and ensure that they are used responsibly and that the security risks involved with the misuse of privacy are minimized.

Recommendations

The following are the recommendations of the study:

A multi-stakeholder team should be headed by the State Departments of Interior and Defence to craft an elaborate national strategy on drones that encourages their positive use and at the same time curbs the security threats.

The national intelligence machinery should work on enhancing and deploying sophisticated drone-tracking and neutralisation systems to mitigate the risk of the kamikaze drones.

To regulate the manner in which Violent Non-State Actors (VNSAs) like the Al-Shabaab obtain and utilize drone technology, parliament must put in place sound regulatory mechanisms.

The national security organs are encouraged to engage in international cooperation and provide intelligence in the surveillance and prevention of the illegal use of drones by non-state actors.

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