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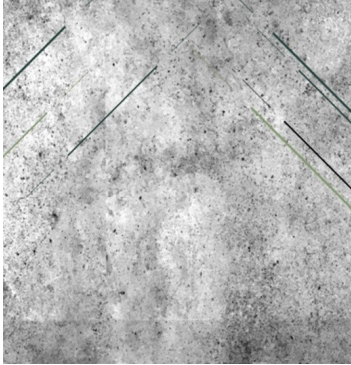
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Defense Infrastructure Development Strategy in the *Ibu Kota Nusantara* Area

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Abstract

This study explores the defense infrastructure development strategy in the Ibu Kota Nusantara (IKN) area, focusing on the current state, challenges, opportunities, and strategies for enhancement. The IKN area, strategically positioned amidst geopolitical tensions and technological advancements, presents a unique context for analyzing defense infrastructure. The research employs qualitative methods using secondary data, including policy documents, infrastructure reports, and scholarly articles. The findings reveal a well-distributed network of military installations and strategic assets in the IKN area, which enhances readiness but also exposes vulnerabilities such as geopolitical tensions and technological risks. Challenges include navigating complex geopolitical rivalries, integrating advanced technologies, and addressing environmental impacts. Opportunities exist in leveraging collaborative partnerships, adopting innovative technologies, and implementing sustainable practices. Strategies for enhancing resilience and effectiveness include adopting eco-friendly design principles, multi-layered defense planning, and capacity-building programs. The study concludes that a focused approach on resilience and adaptability is crucial for improving defense infrastructure and maintaining long-term security in the IKN area.

Keywords: Defense Infrastructure; Geopolitical Challenges; *Ibu Kota Nusantara*; Technological Innovation;

Introduction

The *Ibu Kota Nusantara* (IKN) area, poised at the nexus of geopolitical and strategic importance, demands meticulous planning and innovative strategies for defense infrastructure development. In light of evolving threats and geopolitical dynamics, understanding the state of the art in defense infrastructure research within the IKN area is paramount. This research delves into the current landscape of research, highlighting key factors, challenges, and emerging trends in defense infrastructure development strategies.

The strategic development of defense infrastructure is a critical component of national security, particularly in regions undergoing significant political and economic transformations. The *Ibu Kota Nusantara* (IKN), Indonesia's new capital city, represents a unique case for examining defense infrastructure due to its strategic geographical location and the comprehensive nature of its development plan. This research contributes to the existing literature by addressing a gap in research related to the specific defense infrastructure needs and strategies in the IKN area, a topic that has not been extensively covered in current defense studies.

Previous studies have focused broadly on defense infrastructure in various geopolitical contexts. For instance, Baker (2013) discusses the general principles of defense infrastructure and its impact on national security, while Keohane & Nye Jr (1973) examine the implications of power dynamics and interdependence in defense strategies. However, these studies do not specifically-

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address the unique challenges and opportunities presented by the development of a new capital city in a strategically significant region like the IKN. This research's novelty lies in its detailed exploration of the IKN's defense infrastructure within the specific context of Indonesia's geopolitical and technological landscape. By employing qualitative research methods using secondary data, this study provides an in-depth analysis of the strategic considerations, technological advancements, and environmental factors influencing defense infrastructure development in the IKN area. This approach fills a critical gap in the literature by offering a nuanced understanding of how these factors interplay to shape defense strategies in a newly established capital.

Furthermore, this research integrates insights from multiple sources, including government reports, policy documents, and academic literature, to present a comprehensive picture of the current state and future prospects of defense infrastructure in the IKN. The findings of this study not only enhance our understanding of defense infrastructure development in Indonesia but also contribute to broader discussions on how new capital cities can effectively integrate modern defense strategies and technologies. A myriad of factors influence defense infrastructure development in the IKN area. Geopolitical considerations stand at the forefront, with nations strategically positioning their defense assets to assert influence and safeguard their interests. Alfathimy et al. (2023) highlighted the crucial role that geopolitical dynamics play in influencing defense infrastructure decisions, with nations aligning their strategies to counter regional threats and assert their presence in the IKN area.

Technological advancements play a significant role in shaping defense infrastructure strategies. The integration of advanced technologies such as artificial intelligence (AI), cybersecurity systems, and unmanned aerial vehicles (UAVs) has transformed defense infrastructure planning and operations. According to Yogaswara et al. (2023), leveraging cutting-edge technologies enhances the effectiveness and efficiency of defense infrastructure within the IKN area, enabling better threat detection and response capabilities. Despite technological advancements, several challenges hinder effective defense infrastructure development in the IKN area. One such challenge is the complexity of interagency coordination and collaboration. According to Marcella (2008), said that successful infrastructure projects in the IKN area depend on achieving seamless coordination between military branches, governmental organizations, and private stakeholders. However, bureaucratic red tape and conflicting interests often impede coordination efforts, leading to delays and cost overruns.

Additionally, environmental sustainability poses a significant challenge to defense infrastructure development. The construction and expansion of military installations in ecologically sensitive areas within the IKN region can have adverse environmental impacts. According to Pratama (2021) talk about reconciling defense priorities with environmental conservation requires adopting sustainable practices and mitigating measures to minimize ecological damage. Amidst challenges, several emerging trends are shaping the future of defense infrastructure development in the IKN area. One such trend is the adoption of resilient and adaptive infrastructure design principles. In an era of hybrid warfare and cyber threats, resilient infrastructure capable of withstanding physical and cyber-attacks is imperative. As Sato (2022) emphasizes, incorporating redundancy measures and decentralized networks increases the resilience of defense infrastructure in the IKN area, ensuring continuity of operations even in challenging circumstances.

Furthermore, there is a growing emphasis on leveraging public-private partnerships (PPPs) to accelerate defense infrastructure projects. By harnessing the expertise and resources of the private sector, governments can expedite infrastructure development while optimizing costs. According to Wibowo (2023), PPPs offer a viable solution to address budgetary constraints and enhance efficiency in the construction and maintenance of defense infrastructure within the IKN area. The *Ibu Kota Nusantara* (IKN) area, strategically located near the South China Sea—a hotspot of territorial disputes involving major powers like China—faces significant challenges in developing its defense infrastructure. The region's crucial role in maintaining Indonesia's security and regional

necessitates a nuanced and flexible defense strategy to address evolving threats. The defense strategy must navigate complex geopolitical rivalries, such as those between the U.S. and China, and adapt to contemporary threats including cyber warfare and asymmetric attacks. Balancing traditional military preparedness with advanced technology and sustainable development is essential for an effective defense infrastructure in the IKN area.

Recognizing these imperatives, the research endeavors to undertake a comprehensive analysis of the existing state of defense infrastructure in the IKN area. By meticulously dissecting the current landscape, the aim is to uncover not only the challenges that impede progress but also the latent opportunities that lie within. Armed with this understanding, the research seeks to chart a course forward, proposing strategies that not only bolster the resilience of the defense infrastructure but also enhance its effectiveness in safeguarding national security interests. Through this concerted effort, the goal is to forge a defense infrastructure strategy that is not only robust in the face of adversity but also agile enough to adapt to the ever-changing contours of the geopolitical landscape.

As the geopolitical landscape undergoes rapid transformation and security threats develop, the importance of strong defense infrastructure cannot be denied, especially in strategic areas such as the Indonesian Capital Region (IKN). Located at the intersection of geopolitical tensions and strategic interests, the IKN region faces unique challenges and opportunities in ensuring the country's security and defense readiness. With this background, the research questions asked are:

What is the current state of defense infrastructure in the *Ibu Kota Nusantara* area, including the distribution, capabilities, and vulnerabilities of existing assets? This research question aims to provide a comprehensive understanding of the existing defense infrastructure landscape in the IKN area. By assessing factors such as the distribution, capabilities, and vulnerabilities of defense assets, researchers can identify gaps and areas for improvement in infrastructure planning and development.

What are the primary challenges and opportunities associated with defense infrastructure development in the *Ibu Kota Nusantara* area, considering geopolitical, technological, and environmental factors? This research question explores the multifaceted challenges and opportunities influencing defense infrastructure development in the IKN area. By examining geopolitical dynamics, technological advancements, and environmental considerations, researchers can identify key drivers and barriers to infrastructure development and formulate targeted strategies to address them.

What strategies can be implemented to enhance the resilience and effectiveness of defense infrastructure in the *Ibu Kota Nusantara* area, considering emerging threats and evolving security paradigms? This research question aims to propose actionable strategies for improving the resilience and effectiveness of defense infrastructure in the IKN area. By synthesizing insights from the preceding analyses, researchers can develop tailored recommendations to mitigate vulnerabilities, enhance infrastructure resilience, and strengthen national defense capabilities in response to emerging threats and evolving security challenges.

Method

Qualitative research methods offer a rich, contextual understanding of complex phenomena, making them particularly suitable for exploring the intricate dynamics of defense infrastructure development. According to Creswell (2014), qualitative research focuses on understanding the meaning individuals or groups ascribe to social or human problems. This essay discusses how secondary data can be utilized within Creswell's qualitative research framework to investigate defense infrastructure development strategies in the *Ibu Kota Nusantara* (IKN) area.

In understanding secondary data in qualitative research secondary data refers to data previously collected for different research purposes but is repurposed for a new study. Creswell (2014) emphasizes that secondary data can be a valuable resource in qualitative research, providing historical insights and contextual background that primary data may lack. For the -

research on defense infrastructure development in the IKN area, secondary data sources could include government reports, policy documents, academic articles, and media publications.

Furthermore, Creswell (2014) outlines several steps for conducting qualitative research, including data collection, data analysis, and interpretation. In the context of using secondary data, the collection process involves identifying and gathering relevant documents and reports. For instance, analyzing policy documents from the Indonesian Ministry of Defense, reports from international defense agencies, and strategic assessments published in academic journals can provide comprehensive insights into the existing infrastructure and strategic planning processes. Data analysis in qualitative research typically involves coding and categorizing data to identify patterns and themes (Creswell, 2014). Using thematic analysis, researchers can sift through the secondary data to identify recurring themes related to the strategic distribution of military installations, logistical challenges, technological advancements, and geopolitical considerations. This method allows for a systematic examination of how different factors influence defense infrastructure development.

Application to Defense Infrastructure in the IKN Area is applying Creswell's qualitative methods to the IKN area involves several key steps. First, researchers must clearly define the research questions, such as: What is the current state of defense infrastructure in the *Ibu Kota Nusantara* area, including the distribution, capabilities, and vulnerabilities of existing assets? What are the primary challenges and opportunities associated with defense infrastructure development in the *Ibu Kota Nusantara* area, considering geopolitical, technological, and environmental factors?, What strategies can be implemented to enhance the resilience and effectiveness of defense infrastructure in the *Ibu Kota Nusantara* area, considering emerging threats and evolving security paradigms ?

Once the research questions are established, researchers can proceed with collecting relevant secondary data. For example, analyzing government publications on defense policies, reports from defense think tanks, and scholarly articles on regional security issues can provide a robust data set for analysis. These sources offer insights into the strategic considerations driving infrastructure development, the distribution of defense assets, and the integration of new technologies. While secondary data is invaluable, researchers must be mindful of its limitations. Creswell (2014) cautions that secondary data may not always align perfectly with the new research questions, and there may be gaps or inconsistencies.

Additionally, the reliability and validity of secondary sources must be critically evaluated to ensure the credibility of the research findings. In conclusion, qualitative research methods using secondary data, as outlined by Creswell (2013), provide a robust framework for investigating the defense infrastructure development strategy in the *Ibu Kota Nusantara* area. By systematically collecting and analyzing secondary data, researchers can uncover rich, contextual insights into the strategic, technological, and geopolitical factors shaping defense infrastructure. Despite potential challenges, the qualitative approach offers a comprehensive understanding that can inform policy decisions and strategic planning in the defense sector.

Results

The defense infrastructure in the *Ibu Kota Nusantara* (IKN) area is a complex system strategically designed to optimize coverage and response capabilities. The distribution of military installations, including bases, naval ports, and airfields, ensures comprehensive coverage and readiness across critical locations (Sebastian et al., 2018; Sasongko et al., 2019). This strategic dispersion enhances the region's ability to address threats from land, sea, and air, and provides a robust deterrent against potential aggressors (Yogaswara et al., 2023). The capabilities of this infrastructure include advanced naval sensors and weaponry for maritime defense, sophisticated air defense systems, and command centers for effective coordination and decision-making (Barnett, 2014; McCarron, 2024). However, the infrastructure faces vulnerabilities such as physical weaknesses, technological gaps, and logistical challenges that must be addressed to improve resilience and effectiveness (Buzan, 2008; Laksmana, 2011).

Geopolitical dynamics play a significant role in shaping the defense infrastructure development in the IKN area. Territorial disputes and regional power struggles can impede the establishment of strategic defense positions, while geopolitical alliances offer opportunities for collaborative infrastructure development and enhanced regional security cooperation (Mackinder, 2004; Mahan, 1890; Pramono & Raharjo, 2023; Rahman et al., 2023; Sarjito et al., 2023). Technological advancements, including artificial intelligence and unmanned aerial vehicles, provide opportunities to enhance surveillance and response capabilities, though they also introduce new challenges such as cybersecurity risks (Christensen et al., 2019; Ismail et al., 2023; Pandey et al., 2022; Rogers et al., 2014; Yaseen, 2024). To address these challenges and leverage opportunities, continuous investment in technology and research, coupled with strategic collaboration and sustainable practices, is essential for maintaining and improving defense infrastructure in the IKN area.

Discussion

The assessment of the current state of defense infrastructure in the *Ibu Kota Nusantara* (IKN) area relies on several real-empirical indicators. These indicators provide a tangible understanding of how well the infrastructure supports national security and its capacity to respond to emerging threats. Distribution and density of defense assets are one crucial indicator is the distribution and density of defense assets, including military bases, airfields, and naval ports. The spatial arrangement of these assets impacts their effectiveness in responding to regional security challenges. For instance, studies show that the strategic dispersion of military facilities enhances operational flexibility and coverage (Baker, 2013). In the IKN area, the distribution of defense infrastructure has been a topic of debate due to the need for optimizing coverage while balancing regional security demands (Sebastian et al., 2018).

Capabilities and Technological Integration also play roles. The capabilities of defense infrastructure are another significant indicator. This includes the sophistication of surveillance systems, command and control centers, and the integration of advanced technologies such as unmanned aerial vehicles (UAVs) and cyber defense systems. The current state of these capabilities reflects the infrastructure's ability to handle modern threats and its readiness for various operational scenarios (Barnett, 2014). The IKN area's defense capabilities are evaluated based on the performance of these assets and their alignment with contemporary technological standards (McCarron, 2024). Furthermore, vulnerabilities within the defense infrastructure also provide important insights. These can be physical, such as outdated facilities or inadequate logistics, or technological, such as susceptibility to cyber-attacks. Risk assessments are conducted to identify weaknesses and potential points of failure, which are critical for improving infrastructure resilience (Buzan, 2008; Laksmana, 2011). For the IKN area, evaluating these vulnerabilities helps in understanding how current infrastructure might be compromised and what measures are necessary to address these gaps.

Next is budget allocation and resource management are key indicators of the defense infrastructure's adequacy. Effective allocation ensures that resources are distributed to areas of highest need and that infrastructure development aligns with strategic priorities. Analysis of defense budgets reveals how investments in infrastructure are managed and whether they meet the anticipated needs (Christensen et al., 2019). In the IKN area, budget allocations are scrutinized to assess whether they are sufficient to support both current and future defense requirements. Regional and Strategic Impact: Finally, the impact of the defense infrastructure on regional stability and strategic positioning is a significant indicator. This includes assessing how the infrastructure supports national security goals and contributes to regional stability (Sasongko et al., 2019). The strategic significance of the IKN area, given its proximity to critical maritime routes and geopolitical hotspots, underscores the importance of its defense infrastructure in maintaining broader regional stability (Yogaswara et al., 2023).

The examination of the current state of defense infrastructure in the *Ibu Kota Nusantara* (IKN) area, encompassing its distribution, capabilities, and vulnerabilities, is crucial for gaining insights -

into the existing landscape. This analysis provides a foundation for identifying areas for improvement and enhancing infrastructure planning and development strategies within the region. The distribution of defense assets within the IKN area reflects strategic considerations aimed at maximizing coverage and response capabilities across key geographical locations. Military bases, naval ports, airfields, and command centers are strategically positioned to ensure optimal coverage and readiness to respond to potential threats and contingencies (Sasongko et al., 2019). However, despite the strengths of the defense infrastructure in the IKN area, vulnerabilities exist that necessitate attention and mitigation measures. Vulnerabilities may arise from physical weaknesses in infrastructure, technological vulnerabilities such as cyber threats, or logistical challenges in resource allocation and deployment. Identifying and addressing these vulnerabilities is essential for enhancing the resilience and effectiveness of defense infrastructure in the IKN area (Laksmiana, 2011).

Talking about distribution of defense infrastructure is start when we need to know a lot about many things to examine the main problems and chances for building defense infrastructure in the Ibu Kota Nusantara (IKN) area. These things include political, technological, and environmental issues. integrity and ensure maritime security. Furthermore, defense infrastructure is dispersed across the archipelago to provide coverage and deterrence against potential threats from land, sea, and air (Yogaswara et al., 2023). The capabilities of existing defense assets in the IKN area encompass a wide range of military functions, including surveillance, deterrence, and response (Barnett, 2014). Naval assets, such as ships and submarines, are equipped with advanced sensors and weaponry to patrol territorial waters and defend against maritime incursions. Air defense systems, including fighter jets and missile batteries, provide aerial from various sources (Editha et al., 2023) protection and strategic deterrence. Additionally, command and control centers facilitate coordination and decision-making, enhancing overall defense effectiveness (McCarron, 2024).

Despite its capabilities, defense infrastructure in the IKN area faces vulnerabilities that stem (023). Geopolitical tensions, territorial disputes, and asymmetric threats pose challenges to security and stability. Moreover, technological vulnerabilities, such as cyber threats and electronic warfare, highlight the need for continuous adaptation and investment in defense capabilities. Additionally, environmental vulnerabilities, including natural disasters and climate change effects, can impact the readiness and resilience of defense infrastructure (Florescu & Glenn, 2015). Next step is the challenges and opportunities in defense infrastructure development in the *Ibu Kota Nusantara* Area. The *Ibu Kota Nusantara* (IKN) area, poised as Indonesia's new capital and strategically located, presents a complex landscape for defense infrastructure development. Understanding the real-empirical indicators in this debate sheds light on both the challenges and opportunities inherent in this crucial endeavor. These indicators encompass geopolitical tensions, technological advancements, logistical constraints, environmental considerations, and collaborative efforts, each of which plays a significant role in shaping the region's defense strategy. Geopolitical tensions is one of the foremost indicators is the geopolitical context of the IKN area. Situated adjacent to the South China Sea, a region characterized by intense territorial disputes and strategic competition among major powers such as China and the United States, the IKN area is inherently exposed to geopolitical pressures (Mahan, 1890). The South China Sea is a vital maritime corridor, with overlapping claims from several nations, making it a focal point of strategic military interest. These tensions necessitate robust defense infrastructure to safeguard Indonesia's sovereignty and secure critical maritime routes (Sebastian et al., 2018). The ongoing disputes and the presence of competing regional powers compel Indonesia to invest in advanced surveillance and defensive systems to maintain regional stability and deter potential threats.

Another important thing is technological advancements that required technological innovation represents both a challenge and an opportunity for defense infrastructure in the IKN area. Emerging technologies, such as artificial intelligence (AI) and unmanned aerial vehicles (UAVs), offer significant enhancements in surveillance, reconnaissance, and response capabilities (Christensen et al., 2019). For example, AI-powered systems can improve threat detection and -

decision-making processes, while UAVs can extend surveillance reach and operational flexibility. However, the rapid pace of technological development also introduces new vulnerabilities, particularly in cybersecurity. The integration of advanced technologies requires continuous investment in research and development to stay ahead of potential cyber threats and ensure the resilience of defense systems (Pandey et al., 2022). Thus, while technological advancements provide substantial opportunities for improving defense capabilities, they also pose challenges that must be managed effectively.

Meanwhile, the logistical constraints is the logistical aspects of defense infrastructure development are another critical empirical indicator. The IKN area's archipelagic nature necessitates complex logistical operations to support the distribution and maintenance of military assets (Laksmana, 2011). Efficient resource allocation, transportation, and infrastructure maintenance are essential for ensuring operational readiness. For instance, the distribution of military bases, naval ports, and airfields across the archipelago demands meticulous planning to optimize logistical support and ensure timely deployment of resources during crises (Buzan, 2008). Addressing these logistical challenges involves streamlining supply chains and improving infrastructure connectivity to enhance overall defense effectiveness.

Furthermore, the definition of environmental considerations is also matter. The environmental sustainability is increasingly recognized as a crucial factor in defense infrastructure development. The IKN area's diverse ecological landscape requires that defense projects integrate sustainable practices to minimize environmental impact (Adger, 2009). For example, incorporating eco-friendly design principles and renewable energy sources can reduce the ecological footprint of defense facilities while promoting long-term resilience. Sustainable infrastructure practices not only align with environmental conservation goals but also contribute to the overall robustness of defense systems by reducing dependency on finite resources and mitigating environmental vulnerabilities (Yogaswara et al., 2023).

Finally, collaborative partnerships with allied nations and international organizations are pivotal in addressing the challenges and leveraging opportunities in defense infrastructure development. Joint exercises, intelligence sharing, and strategic alliances can enhance defense capabilities and foster regional security cooperation (Keohane & Nye Jr, 1973). These collaborations provide access to advanced technologies, expertise, and resources, facilitating more effective and resilient defense systems. For instance, engaging in multinational defense initiatives can help overcome resource limitations and address complex security challenges more efficiently (Pramono & Raharjo, 2023).

We need to know a lot about many things to examine the main problems and chances for building defense infrastructure in the *Ibu Kota Nusantara* (IKN) area. These things include political, technological, and environmental issues. By examining these factors through the lenses of geopolitical theory and technological innovation theory, researchers can identify key drivers shaping defense infrastructure development and formulate targeted strategies to address challenges and capitalize on opportunities within the region. Geopolitical theory, as elucidated by Mackinder (2004) and Mahan (1890), provides valuable insights into the primary challenges and opportunities associated with defense infrastructure development in the IKN area. Geopolitical dynamics, including territorial disputes, alliances, and power struggles, significantly influence infrastructure planning and development within the region. Territorial disputes and geopolitical tensions can pose significant challenges to defense infrastructure development in the IKN area. Competing claims over maritime territories and strategic waterways heighten the need for robust defense infrastructure to safeguard national interests and assert sovereignty. Additionally, alliances and partnerships with neighboring countries and international organizations present opportunities for collaborative defense infrastructure projects, enhancing regional security and stability (Rahman et al., 2023).

By analyzing geopolitical factors, researchers can anticipate potential challenges such as political instability, diplomatic tensions, and resource constraints that may impact defense infrastructure development in the IKN area (Sarjito et al., 2023). Moreover, understanding-

geopolitical dynamics enables policymakers to identify strategic opportunities for enhancing defense cooperation, fostering regional integration, and leveraging shared resources to address common security challenges effectively (Pramono & Raharjo, 2023). Technological innovation theory, as advanced by Rogers et al. (2014) and Christensen et al. (2019) offers insights into the role of technological advancements in defense infrastructure development within the IKN area. Rapid advancements in technology, including artificial intelligence, cybersecurity, and unmanned aerial vehicles, present both challenges and opportunities for defense infrastructure planners and policymakers. Technological advancements enhance defense infrastructure capabilities by providing innovative solutions for surveillance, communication, and threat detection. However, these advancements also introduce new vulnerabilities, particularly in cybersecurity, where the proliferation of digital technologies increases the risk of cyber-attacks and data breaches (Pandey et al., 2022).

Understanding the diffusion of innovation within defense organizations is essential for leveraging technology to address infrastructure challenges effectively. By promoting a culture of innovation and adopting agile development methodologies, defense agencies can capitalize on emerging technologies to enhance infrastructure resilience, optimize resource allocation, and improve operational efficiency within the IKN area (Ismail et al., 2023). The development of defense infrastructure in the Ibu Kota Nusantara (IKN) Area is confronted with various challenges and opportunities arising from geopolitical, technological, and environmental factors. By exploring these multifaceted aspects, researchers can gain insights into the key drivers and barriers influencing defense infrastructure development and formulate targeted strategies to address them. Geopolitical dynamics, such as territorial disputes and power struggles, pose significant challenges to defense infrastructure development in the IKN area (Mackinder, 2004; Mahan, 1890). Territorial disputes over maritime boundaries can hinder the establishment of military installations and strategic defense positions. Conversely, geopolitical alliances and partnerships present opportunities for collaborative infrastructure development, fostering regional security cooperation. Understanding geopolitical factors enables policymakers to navigate diplomatic challenges and leverage strategic partnerships to facilitate infrastructure projects. However, political instability and changing alliances may introduce uncertainties, necessitating adaptive strategies to ensure the continuity of defense infrastructure development in the IKN area.

Technological challenges and opportunities is technological advancements play a pivotal role in shaping defense infrastructure capabilities and vulnerabilities (Christensen et al., 2019; Rogers et al., 2014). Emerging technologies, such as artificial intelligence and unmanned aerial vehicles, offer opportunities to enhance surveillance, reconnaissance, and response capabilities. However, rapid technological innovation also introduces new challenges, particularly in cybersecurity and information warfare. Ensuring the integration of cutting-edge technologies into defense infrastructure requires continuous investment in research and development. Moreover, managing the diffusion of innovation within defense organizations is essential to maximize the benefits of technological advancements while mitigating associated risks (Yaseen, 2024). Environmental Challenges and Opportunities can be seen in environmental considerations are increasingly influencing defense infrastructure development strategies (Adger, 2009; Folke et al., 2010). The ecological sensitivity of the IKN area necessitates sustainable infrastructure practices to minimize environmental impact and mitigate risks such as natural disasters and climate change effects. Integrating environmental sustainability principles into infrastructure planning enables the identification of opportunities to enhance resilience and reduce vulnerability. By incorporating eco-friendly design, renewable energy sources, and habitat conservation initiatives, defense infrastructure can contribute to broader environmental conservation goals while enhancing operational effectiveness (Staddon et al., 2018).

Enhancing the resilience and effectiveness of defense infrastructure in the *Ibu Kota Nusantara* (IKN) area is critical for ensuring national security and strategic stability in Indonesia. The region's unique geographical, technological, and collaborative context presents both challenges and opportunities. Real-empirical indicators such as strategic dispersion, technological innovation,-

and sustainable development practices offer valuable insights into how to strengthen defense capabilities in the IKN area. One of the most significant empirical indicators of enhancing defense infrastructure resilience is strategic dispersion. The distribution of military assets across multiple locations minimizes the risk of a single point of failure and enhances overall system resilience (Baker, 2013). In the IKN area, this involves the strategic placement of military bases, naval ports, and airfields across the archipelago. For example, diversifying the location of defense assets ensures that operations can continue even if one site is compromised or incapacitated (Barnett, 2014). This approach not only improves operational flexibility but also provides a robust defense framework capable of responding to various threats. The empirical evidence supporting this strategy highlights its effectiveness in maintaining operational continuity and enhancing defense readiness in the face of potential disruptions.

Technological innovation is another critical empirical indicator for enhancing defense infrastructure resilience. The integration of advanced technologies such as artificial intelligence (AI), unmanned aerial vehicles (UAVs), and cybersecurity measures significantly boosts defense capabilities (Christensen et al., 2019). AI can enhance threat detection and decision-making processes, while UAVs extend surveillance and operational reach. For instance, the deployment of AI-powered surveillance systems in the IKN area could improve the accuracy of threat assessments and response times. However, the rapid pace of technological advancement also introduces new challenges, particularly in cybersecurity. Effective defense infrastructure must continually adapt to emerging technological threats while leveraging innovations to strengthen overall defense capabilities (Pandey et al., 2022). This dual approach of embracing technological advancements while addressing associated vulnerabilities is crucial for maintaining a resilient defense posture.

On the other hand, incorporating environmental sustainability into defense infrastructure development is an increasingly important empirical indicator. Sustainable practices, such as using renewable energy sources, eco-friendly materials, and efficient resource management, contribute to the long-term resilience of defense infrastructure (Adger, 2009). For instance, integrating solar power into defense facilities can reduce dependency on traditional energy sources and lower operational costs. Additionally, sustainable design principles can mitigate the environmental impact of defense projects, enhancing overall infrastructure resilience by minimizing resource consumption and environmental degradation (Yogaswara et al., 2023). The empirical evidence supports that environmentally sustainable practices not only align with broader ecological goals but also contribute to the operational effectiveness and longevity of defense infrastructure. Finally, collaborative efforts with international partners and allied nations are vital for enhancing the resilience and effectiveness of defense infrastructure. Joint training exercises, intelligence sharing, and strategic partnerships can significantly improve defense capabilities and foster regional security cooperation (Keohane & Nye Jr, 1973). For example, participating in multinational defense initiatives can provide access to advanced technologies, expertise, and resources that may not be available domestically. Such collaborations can also facilitate more effective responses to complex security challenges by pooling resources and knowledge (Pramono & Raharjo, 2023). Empirical studies indicate that collaborative approaches enhance defense infrastructure resilience by leveraging global best practices and fostering mutual support among allies. In the face of emerging threats and evolving security paradigms, ensuring the resilience and effectiveness of defense infrastructure in the *Ibu Kota Nusantara* (IKN) area is imperative. By drawing insights from environmental sustainability theory and resilience theory, policymakers and defense planners can develop actionable strategies to mitigate vulnerabilities, enhance infrastructure resilience, and strengthen national defense capabilities within the region.

According to Folke et al. (2010) and Adger (2009) environmental sustainability theory emphasizes the significance of taking environmental factors into account when developing infrastructure. Given the ecological sensitivity of the IKN area, integrating environmental sustainability principles into defense infrastructure strategies is essential for minimizing the ecological footprint of projects and mitigating potential environmental risks. One strategy to-

enhance the resilience and effectiveness of defense infrastructure in the IKN area is to adopt eco-friendly design principles and sustainable construction practices. Incorporating green technologies, such as renewable energy sources and energy-efficient building materials, reduces environmental impact while enhancing infrastructure resilience to climate change and natural disasters (Singh et al., 2017). Additionally, promoting habitat conservation and ecosystem restoration initiatives within defense installations can mitigate habitat loss and preserve biodiversity, contributing to long-term environmental sustainability goals. By integrating environmental considerations into infrastructure planning and development processes, policymakers can enhance the resilience of defense infrastructure while minimizing adverse environmental impacts within the IKN area (Lawrence et al., 2015).

Resilience theory, as articulated by Holling (1973) and Walker et al. (2004) offers a framework for enhancing the resilience and effectiveness of defense infrastructure in the IKN area. Resilience theory emphasizes the ability of systems to absorb shocks, adapt to change, and maintain functionality in the face of adversity. One strategy to enhance infrastructure resilience is to adopt a multi-layered approach to defense planning and design. By diversifying defense assets and infrastructure across multiple locations and incorporating redundancy measures, such as backup systems and alternative supply routes, defense planners can minimize single points of failure and increase system resilience to disruptions and attacks (Alrumaih et al., 2023). Furthermore, investing in training and capacity-building programs for defense personnel enhances organizational resilience by empowering individuals to respond effectively to evolving threats and challenges. By fostering a culture of adaptability and innovation within defense organizations, policymakers can strengthen national defense capabilities and ensure readiness to address emerging security paradigms in the IKN area (Ruiz, 2010). Developing effective strategies to enhance the resilience and effectiveness of defense infrastructure in the *Ibu Kota Nusantara* (IKN) Area is imperative to address emerging threats and evolving security paradigms.

Drawing upon insights from various analyses, this discussion proposes actionable strategies to mitigate vulnerabilities, enhance infrastructure resilience, and strengthen national defense capabilities within the region. Diversifying defense assets across multiple locations can minimize single points of failure and increase system resilience (Baker, 2013). By dispersing military installations, naval ports, and airfields strategically, the impact of potential attacks or disruptions can be mitigated. Additionally, decentralization enables more flexible responses to emerging threats, enhancing overall defense effectiveness in the IKN area, also investing in technological innovation for enhancing defense infrastructure resilience and effectiveness (Rogers et al., 2014). The other one is embracing advancements in artificial intelligence, cybersecurity, and unmanned aerial vehicles can bolster defense capabilities and mitigate vulnerabilities. Moreover, adopting innovative solutions for surveillance, communication, and data analysis enables proactive threat detection and rapid response, strengthening national defense capabilities against evolving security challenges. Collaboration among defense agencies, allied nations, and international organizations fosters information sharing and mutual support (Keohane & Nye Jr, 1973). By establishing networks for intelligence sharing, joint training exercises, and coordinated responses, defense infrastructure resilience can be enhanced. Furthermore, collaborative efforts facilitate the pooling of resources and expertise, enabling more effective responses to complex security threats in the IKN area. Integrating environmental sustainability principles into defense infrastructure development promotes resilience and mitigates environmental risks (Adger, 2009) also utilizing eco-friendly design practices, renewable energy sources, and habitat conservation initiatives minimizes the ecological footprint of defense projects. Sustainable infrastructure enhances resilience by red-dependency on finite resources and mitigating environmental vulnerabilities, contributing to long-term defense effectiveness in the IKN area.

Conclusion

The application of systems theory offers valuable into the defense infrastructure in the *Ibu Kota Nusantara* area. By analyzing the distribution, capabilities, and vulnerabilities of existing asse-

ts, researchers can identify opportunities for improvement and formulate strategies for enhancing infrastructure planning and development. This comprehensive assessment helps policymakers address gaps, enhance infrastructure resilience, strengthen national defense capabilities, and ensure the security of the region. The study explores the challenges and opportunities in defense infrastructure development in the Ibu Kota Nusantara region using geopolitical theory and technological innovation theory. It identifies key drivers and trends in the region, allowing policymakers to develop targeted strategies to address challenges and capitalize on opportunities.

The analysis of geopolitical dynamics and technological trends helps policymakers navigate geopolitical complexities, harness technological advancements, and promote environmental sustainability, ultimately strengthening national defense capabilities in the IKN area. The *Ibu Kota Nusantara* area's defense infrastructure can be improved by integrating environmental sustainability and resilience theory into infrastructure planning. This approach can mitigate vulnerabilities, enhance resilience, and strengthen national defense capabilities. Strategies such as diversifying defense assets, investing in technological innovation, fostering collaboration, and promoting sustainable infrastructure development are crucial. By analyzing various analyses and adopting tailored recommendations, policymakers can mitigate threats, strengthen defense capabilities, and protect the region's security and prosperity. This approach is essential for addressing emerging threats and evolving security challenges.

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