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Original Article

Achieving Sustained Competitive Advantage in Indonesia's Construction Sector: An Integrated Decarbonization Strategy

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Abstract

Indonesia's construction sector significantly contributes to national economic growth but also poses environmental challenges due to high carbon emissions. This study explores how PT Wijaya Karya (Persero) Tbk (WIKA) can develop a sustained competitive advantage through decarbonization strategies. Employing an exploratory qualitative approach, the research integrates the Flourishing Business Model Canvas (FBMC) to assess WIKA's current business model, the Sustainability Balanced Scorecard (SBSC) to evaluate its sustainability strategy, and the Natural Resource-Based View (NRBV) with Dynamic Capabilities (DC) to recommend future strategies. Data were collected through in-depth interviews with board members and analysis of annual and sustainability reports. Findings reveal WIKA's commitment to ESG implementation, yet highlight gaps in carbon performance and strategic alignment. The study proposes a roadmap emphasizing emission efficiency, circular innovation, and ESG-driven leadership as pillars of long-term competitiveness in green construction. The insights contribute to practical and academic discourse on sustainable transformation in state-owned enterprises.

Keywords: Business Model, Competitive Strategy, Decarbonization, ESG, Sustainable Construction.

1. Introduction

The construction sector plays a pivotal role in Indonesia's economic development, contributing consistently to national GDP and infrastructure growth. However, with rising urbanization and infrastructure demands, the industry has also become a major emitter of carbon and a heavy consumer of natural resources (Wartono et al., 2024). Globally, buildings account for over one-third of energy use and nearly 40% of greenhouse gas emissions, making sustainable construction a pressing necessity (Mahendra et al., 2024). Indonesia has responded to these environmental challenges through regulatory frameworks such as Law No. 16/2016 (ratifying the Paris Agreement), Presidential Regulation No. 98/2021 on carbon economic value, and a series of ministerial decrees that push for ESG adoption across state-owned enterprises (SOEs).

PT Wijaya Karya (Persero) Tbk, one of Indonesia's leading SOEs in construction, has declared its commitment to low-carbon development by initiating sustainability governance structures, ESG roadmaps, and internal training. Yet, significant gaps remain between policy declarations and actual operational outcomes. Despite the company's grand roadmap, limitations in carbon reduction measurement, underperformance in project delivery, and weak integration of ESG into core business decisions persist. These challenges are compounded by external pressures such as stricter environmental regulations, the green transition agenda in the 2025–2029 National Medium-Term Development Plan (RPJMN) (Prameswari et al., 2024), and investor expectations toward decarbonized operations .

This study focuses on how a major state-owned construction enterprise navigates the dual challenge of enhancing competitive advantage while aligning with national decarbonization targets. Specifically, the research explores the current business model of PT Wijaya Karya, assesses its sustainability strategies, and formulates competitive recommendations that reinforce long-term strategic positioning in the green economy era. The scope of analysis centers on corporate-level strategies from 2020 to 2024, aiming to produce mid-term policy insights for sustainable business transformation in Indonesia's construction sector.

2. Literature Review

2.1. Sustained Competitive Advantage

The concept of sustainability competitive advantage combines economic efficiency with social and environmental responsibility (Munawaroh et al., 2024), allowing businesses to thrive long-term while maintaining ecological balance (Hart & Milstein, 2003). Competitive advantage, as initially described by Porter (2008), refers to an organization's unique capabilities to create superior value that competitors cannot easily replicate. Eccles et al. (2012) further emphasize that a sustainability-oriented competitive advantage integrates economic performance and environmental management, notably in reducing carbon emissions and promoting green technology innovations. According to Werbach (2009), sustainability-driven strategies are not merely symbolic; rather, they offer transformative frameworks for long-term competitiveness, including enhanced energy efficiency, proactive climate risk management, and differentiation in increasingly environmentally-conscious markets (Linnenluecke & Griffiths, 2010; Nidumolu et al., 2009). Thus, sustainability competitive advantage becomes both a defensive mechanism and a strategic tool to capture new market opportunities and establish leadership in the green economy.

2.2. Regulatory Standards and Sustainability Measurement

Effective implementation of sustainability strategies in Indonesia requires robust regulatory frameworks, particularly in the context of decarbonization. Indonesia’s ratification of the Paris Agreement through Law No. 16 of 2016 serves as the primary legal basis for the country’s climate action commitments. Further guidance is detailed within the Enhanced Nationally Determined Contribution (NDC) 2022, outlining explicit targets and indicators for emissions reduction, renewable energy adoption, and sustainable development across sectors, including construction. Additionally, Presidential Regulation No. 98 of 2021 establishes a national carbon economic value mechanism, promoting carbon trading and offset strategies. Complementing this, the Ministry of Public Works Regulation No. 21 of 2021 provides specific performance criteria for green building projects. To operationalize these regulations, the Sustainability Balanced Scorecard (SBSC), originally introduced by Figge et al. (2002), has become instrumental in translating national targets into measurable and actionable corporate strategies. SBSC integrates economic, social, environmental, and innovation performance indicators into a cohesive evaluation framework, enabling systematic tracking and accountability toward national sustainability targets (Kaplan & Norton, 1996; Figge et al., 2002).

2.3. Flourishing Business Model Canvas (FBMC)

The Flourishing Business Model Canvas (FBMC), developed by Upward and Jones (2016), extends the traditional Business Model Canvas by explicitly incorporating environmental and social dimensions alongside economic factors. FBMC provides a comprehensive tool for identifying and assessing the sustainability of business models through four interconnected domains: value, people, processes, and outcomes. Distinctively, FBMC includes additional elements such as Biophysical Stocks, Ecosystem Services, Value Co-creation, and Value Co-destruction, emphasizing interactions among organizations, communities, and ecosystems (Lüdeke-Freund, 2010). Empirical studies by Hoveskog et al. (2018) demonstrate FBMC's effectiveness in revealing sustainability gaps and potential opportunities in diverse organizational contexts, underscoring its utility in guiding businesses towards sustainable transformation and innovation.

2.4. Sustainability Balanced Scorecard (SBSC)

The Sustainability Balanced Scorecard (SBSC), evolved from Kaplan and Norton (1996) Balanced Scorecard, integrates sustainability dimensions into strategic performance evaluation frameworks. SBSC addresses the shortcomings of purely financial-based metrics by incorporating indicators of social responsibility, environmental stewardship, and innovation into organizational performance evaluations. As demonstrated in empirical studies by Arora and Rahman (2020), SBSC effectively highlights priority sustainability actions and areas needing strategic improvement, making it a practical tool for companies transitioning to sustainable business practices. The integration of SBSC with frameworks such as the Global Reporting Initiative (GRI) further enhances its relevance and comprehensiveness in assessing long-term sustainability performance (Figge et al., 2002).

2.5. NRBV and Dynamic Capabilities Framework

Hart's (1995) Natural Resource-Based View (NRBV) extends traditional Resource-Based View theories by emphasizing environmentally oriented strategic resources such as pollution prevention, product stewardship, and sustainable development. NRBV positions sustainability as a source of differentiation and competitive advantage, especially critical in industries like construction, which face heightened environmental scrutiny (Hart & Dowell, 2011). Complementing NRBV, the Dynamic Capabilities Framework by Teece et al. (1997) offers a model for organizations to adaptively manage internal resources and capabilities to external environmental changes through sensing, seizing, and transforming processes (Ambrosini & Bowman, 2009). Integrating NRBV and Dynamic Capabilities provides a comprehensive strategic approach, enabling companies to effectively respond to sustainability challenges and leverage environmental resources for long-term competitive advantage in a decarbonized market (Campbell et al., 2012; McDougall, 2018).

2.6. Exploratory Multiphase Design

The exploratory multiphase qualitative design, as articulated by Creswell and Creswell (2023) and Creswell and Clark (2023), enables researchers to explore complex phenomena progressively across distinct but interconnected phases. Each exploratory phase contributes insights that refine subsequent phases, allowing a deeper understanding and practical application of findings. This design is particularly suitable for strategic and policy-oriented research, where the goal is not only to explore and describe but also to recommend empirically grounded strategic solutions. Through iterative exploration, validation, and synthesis, the exploratory multiphase approach systematically develops comprehensive insights and

practical strategies for complex issues such as corporate decarbonization and sustainable competitiveness.

2.7. Previous Research

Previous studies have consistently highlighted the relevance of integrating sustainability frameworks for achieving sustained competitive advantage in the construction industry. Koprivica et al. (2021) demonstrated SBSC's efficacy in aligning construction companies' strategic objectives with sustainability performance metrics. Research by Hoveskog et al. (2018) underscored the value of FBMC in identifying sustainability opportunities and challenges in diverse business contexts. Furthermore, McDougall et al. (2018), emphasized the strategic utility of NRBV combined with Dynamic Capabilities in enabling organizations to respond adaptively to sustainability pressures and market dynamics. These foundational studies provide robust theoretical and empirical support for the current research, highlighting gaps and opportunities in Indonesia's state-owned construction enterprises and their strategic alignment with national and global sustainability mandates.

3. Methods

3.1. Research Setting and Timeline

This study was conducted at the headquarters of PT Wijaya Karya (Persero) Tbk, located at Jl. D.I. Panjaitan Kavling 9-10, Jatinegara, East Jakarta, Indonesia. Data collection was conducted from August 2024 to March 2025.

3.2. Data Collection

This research utilized both primary and secondary data. Primary data were gathered through semi-structured interviews conducted with three purposively selected directors at PT Wijaya Karya, specifically the Director of Human Resource Management and Transformation, Director of Risk Management and Legal, and Director of Finance. Interviews were designed based on the Flourishing Business Model Canvas (FBMC) framework and validated through expert judgment using Aiken's V, with a validity threshold set at 0.85 (Azwar, 2012). Secondary data comprised PT Wijaya Karya's Annual Report 2024, Sustainability Report 2024, and Indonesia's Enhanced Nationally Determined Contribution (NDC) 2022 document, collected through systematic document reviews.

3.3. Validation Procedures

Validation was conducted iteratively at each phase of the research to ensure reliability and accuracy of findings. For the initial phase (business model identification using FBMC), the validation involved expert reviews, triangulation of interview results with corporate reports (Annual Report and Sustainability Report 2024), and member-checking with the three directors interviewed. In the second phase (evaluation of sustainability strategy using SBSC), validation was performed through triangulation between corporate documents (Annual and Sustainability Reports 2024) and the NDC Indonesia 2022, followed by member-checking. The third phase (formulating strategic recommendations) utilized triangulation by integrating findings from FBMC, SBSC, and literature studies to enhance validity and practical relevance.

3.4. Sampling and Participants

Participants for this study were purposively selected based on their strategic positions and expertise in corporate sustainability and decarbonization initiatives. Three senior directors from PT Wijaya Karya were selected: Hadjar Seti Adji (Director of Human Resources

and Transformation), Sumadi (Director of Risk Management and Legal), and Adityo Kusumo (Director of Finance). These directors were chosen due to their authoritative insights and involvement in strategic decision-making processes, ensuring the data collected were both credible and comprehensive (Tongco, 2007).

3.5. Data Analysis Methods

This research applied an exploratory multiphase qualitative design (Creswell & Clark, 20123), structured into three interconnected analytical stages, each aligned with distinct research objectives:

1) Phase 1 (Business Model Identification): Interview transcripts and corporate reports were analyzed thematically using the Flourishing Business Model Canvas (FBMC), with cross-validation through data triangulation and member checking (Upward & Jones, 2016; Hoveskog et al., 2018).
2) Phase 2 (Sustainability Strategy Evaluation): Secondary data from corporate reports and the NDC document were systematically analyzed using the Sustainability Balanced Scorecard (SBSC) framework. A gap analysis was conducted comparing actual company performance against NDC targets, using a color-coded assessment scale: green (above 100%), yellow (75–99%), and red (below 75%) to clearly indicate performance levels (Figge et al., 2002; Kaplan & Norton, 1996).
3) Phase 3 (Strategic Recommendations Formulation): Results from FBMC and SBSC analyses were synthesized and critically evaluated using Natural Resource-Based View (NRBV) and Dynamic Capabilities Framework (DCF). Strategies were formulated, prioritized, and verified through comprehensive literature reviews (Hart, 1995; Teece et al., 1997; Ambrosini & Bowman, 2009; McDougall et al., 2021).

4. Results and Discussion

4.1. Research Results

4.1.1. Identification of PT Wijaya Karya's Sustainable Business Model Using FBMC

The identification of PT Wijaya Karya's (WIKA) sustainable business model was conducted using the Flourishing Business Model Canvas (FBMC). This comprehensive approach revealed the company's systematic integration of sustainability across internal and external dimensions. The results, derived from structured interviews and triangulated with corporate reports, demonstrated that WIKA has effectively embedded environmental, social, and governance (ESG) principles into its strategic and operational processes. A summary of key findings from the primary FBMC elements—Process, Value, People, and Outcome—is presented in Table 1 below:

Table 1. Summary of WIKA's Business Model Identification

FBMC Main Elements	Key Findings
Process	Efficient resource management and digitalized monitoring systems, emphasizing zero waste and sustainable practices.
Value	Creation of shared economic, social, and environmental value through collaborative partnerships and robust governance structures.
People	Strong internal human resource capabilities supported by ongoing training, knowledge sharing, and external stakeholder engagement.
Outcome	Focused on achieving sustainable profitability, enhanced stakeholder trust, and measurable contributions to sustainability goals (SDGs).

As shown in Table 1, the findings indicate that WIKA's business model aligns closely with the FBMC framework proposed by Upward and Jones (2016), emphasizing interconnected environmental, societal, and economic dimensions as fundamental to sustainable strategic decision-making. The proactive approach to managing biophysical stocks and ecosystem services ensures both resource efficiency and minimized environmental impact. Additionally, the extensive use of digital technologies and partnerships highlights the company's commitment to maintaining competitiveness through innovation and collaboration.

The governance structure of WIKA supports comprehensive sustainability management, involving multiple stakeholders both internally and externally, fostering accountability, transparency, and proactive risk management. Thus, WIKA's adoption of FBMC reflects a significant strategic orientation towards a flourishing, sustainable business model capable of balancing profitability with socio-environmental responsibility, thereby ensuring long-term competitive advantage and resilience against market and regulatory changes.

4.1.2. Evaluation of PT Wijaya Karya's Suistainability Strategy

To comprehensively evaluate PT Wijaya Karya's (WIKA) sustainability strategy, data from the Annual Report 2024, Sustainability Report 2024, and Enhanced NDC Indonesia 2022 were systematically analyzed using the Sustainable Balanced Scorecard (SBSC) framework. This evaluation focuses on financial, customer, internal processes, learning and growth, social, and environmental perspectives, highlighting key gaps relative to national targets.

Table 2. Evaluation of WIKA Sustainability Strategy 2024 Based on SBSC

SBSC Perspective	NDC/National Target (2022)	WIKA Achievement (2024)	Result
Finance	Total green investment: USD 322.86 billion (2018–2030)	Green finance framework prepared, but no reported green bond/loan	Needs Improvement
Internal Process	Emission reduction 31.89–43.2% from BAU 2030	Strategic roadmap and ESG integration, but no quantitative emission data	Needs Improvement
Learning & Growth	Capacity building for all HR; technology transfer	Regular training for 2,085 staff, no data on "green" certifications	Needs Improvement
Governance	Implementation of ESG, MRV, and sustainable governance	ESG structures and committees in place, but reporting not fully aligned with MRV standards	Needs Improvement
Social-Environment	Community involvement, gender equality, emission reduction	Various CSR and social programs, limited quantitative impact reporting	Needs Improvement

Overall, while the company's sustainability transformation is progressing in the right direction, there is a need for further acceleration and improvement in measurable outcomes, particularly in aligning with national and international decarbonization standards. Strengthening MRV systems, green finance mobilization, and quantitative reporting across all SBSC perspectives are recommended for WIKA to realize its sustainability objectives and contribute significantly to Indonesia's low-carbon development agenda.

4.1.3. Strategic Recommendations for Sustained Competitive Advantage in Decarbonization

Based on integrated analysis using the Flourishing Business Model Canvas (FBMC) and Sustainable Balanced Scorecard (SBSC), PT Wijaya Karya (Persero) Tbk (WIKA) has embedded sustainability into its business processes. However, measurable gaps remain in green investment realization, quantification of environmental and social impacts, green human resource development, and MRV (Measurement, Reporting, Verification) integration. To achieve sustained competitive advantage and support Indonesia's decarbonization targets, WIKA should implement the following key strategies, grounded in the Natural Resource-Based View (NRBV) and Dynamic Capabilities (DC) frameworks:

Table 3. Strategic Recommendations for WIKA's Decarbonization Agenda

NRBV Focus	Dynamic Capability	Key Gaps Identified	Actionable Recommendations
Pollution Prevention	Sensing	Incomplete emission/waste data monitoring	Implement digital monitoring for emissions & waste in ≥90% projects; schedule regular supplier environmental audits
	Seizing	Early-stage circular economy initiatives	Launch at least 2 pilot waste-to-energy/circular projects per year, report outcomes to national NDC platforms
	Reconfiguring	Fragmented environmental reporting systems	Integrate all reporting into the national digital MRV platform (SRN/GRK) by 2025
Product Stewardship	Sensing	Lack of community & gender impact measurement	Start social & environmental impact assessment on 100% new projects from 2025, with clear KPIs
	Seizing	No mandatory green supplier certification	Require ISO 14001 (or equivalent) for all key suppliers; annual community needs assessment for ≥50% large projects
	Reconfiguring	Limited multi-stakeholder partnerships	Establish at least 5 new green partnerships/year; publish annual impact reports involving community organizations
Sustainable Dev.	Sensing	Green bond & innovation roadmaps still nascent	Register ≥5 green bond/sukuk-ready projects annually; periodic tech benchmarking
	Seizing	Green bond issuance & SDM training still low	Fast-track green bond issuance (≥5% of annual portfolio); train ≥75% technical staff in green skills by 2025
	Reconfiguring	Weak knowledge mgmt. & reward for innovation	Launch internal green innovation rewards; document ≥10 new eco-innovations each year

These targeted recommendations directly address critical weaknesses revealed by the FBMC and SBSC analyses. By prioritizing digitalization, measurable impact, robust partnerships, and capacity building, WIKA can accelerate its transformation into a resilient, competitive leader in sustainable and low-carbon construction, fully aligned with Indonesia's NDC targets and international ESG standards.

4.1.4. Managerial Implications

The findings of this research have significant managerial implications for PT Wijaya Karya (Persero) Tbk (WIKA), especially in its pursuit to become a pioneer of sustainable development and decarbonization in Indonesia's construction sector. Implementation of strategies rooted in the Natural Resource-Based View (NRBV) and Dynamic Capability (DC)—in accordance with Law No. 16/2016 and the Enhanced NDC 2022—is essential for successful business transformation. Top management and all organizational levels must internalize that sustainability is not only an external demand but a fundamental pathway for building long-term competitive advantage. Empirical studies (Bocken et al., 2014; Lozano, 2015) confirm that managerial commitment, strategic prioritization, and strengthened MRV/reporting and green HR capabilities are the most critical drivers of green transformation in construction firms.

Table 4. Strategic Priorities and Managerial Implications

Strategic Priority	Urgency	Risk if Not Implemented	Benefit if Implemented	References
Digital MRV Monitoring & Reporting	Very High (2024–25)	Regulatory and ESG credibility risk	NDC compliance, stronger ESG reputation, market access	Kamil and Mol (2013)
Green Procurement & Supplier Certification	High (2024–26)	Supply chain and audit risk	Cost efficiency, stronger partnerships, competitiveness	Gualandris and Kalchschmidt (2016)
Green Project Portfolio & Circular Economy	High (2024–27)	Innovation and market stagnation	Access to green finance, new markets, emission cuts	Lozano, (2015); Bocken et al. (2014)
Green HR Innovation & Training Center	Medium (2024–28)	Low SDM capacity, slow digital adoption	Enhanced innovation, digital readiness, green culture	Figge et al., (2002)
Multi-Stakeholder Partnership & Impact Metrics	Medium (2025–28)	Low social legitimacy, conflict risk	Stronger project acceptance, measurable SDG impact	Eweje et al., (2021); Upward and Jones (2016)

Managerial implications by priority:

1) Mandatory Digital MRV: Ensure all major project emissions and waste streams are digitally monitored and reported to national MRV platforms to maintain regulatory compliance and ESG reputation.
2) Green Procurement: Institutionalize green procurement and mandatory environmental certification for key suppliers, which enhances supply chain transparency, cost-efficiency, and access to global markets.
3) Green Project Portfolio: Accelerate green and circular economy project development to seize new financing and innovation opportunities and to fulfill national and international climate targets.
4) Green HR Development: Invest in dedicated innovation centers and systematic green training to build future-ready talent and accelerate internal transformation.
5) Multi-Stakeholder Collaboration: Expand stakeholder partnerships and develop social impact metrics to increase project legitimacy, mitigate conflict, and align with SDG and just transition mandates.

By prioritizing these strategies, WIKA will be better positioned not only to comply with national decarbonization regulations but also to serve as a benchmark for sustainable construction practices in Indonesia and the region. This approach strengthens long-term competitive advantage and secures access to ESG-focused funding and global partnerships.

4.2. Discussion

This study demonstrates that the integration of sustainability frameworks—ranging from the Flourishing Business Model Canvas (FBMC) and Sustainable Balanced Scorecard (SBSC) to the Natural Resource-Based View (NRBV) and Dynamic Capabilities—is essential for companies like PT Wijaya Karya (Persero) Tbk (WIKA) as they navigate the demands of decarbonization in the construction sector. The evidence shows that WIKA has made significant strides in embedding environmental, social, and governance (ESG) principles across its business operations and governance structures. However, several critical challenges remain, particularly in measuring tangible outcomes related to green investment, environmental and social impact, and the effective implementation of digital MRV (Measurement, Reporting, Verification) systems. These results reinforce the arguments made by Bocken et al. (2014) and Upward and Jones (2016), who emphasize that real, measurable progress in sustainability is key to securing long-term resilience and competitiveness, especially as regulatory and investor pressures for transparency continue to grow.

Importantly, this research highlights that successful decarbonization is not merely a technical achievement, but hinges on leadership, strategic clarity, and organizational adaptability. The commitment of top management to prioritize digital monitoring, green supply chain management, innovation in green human resources, and partnership-building with external stakeholders has a direct influence on the company's ability to achieve meaningful progress. As discussed by Lozano (2015) and Figge et al. (2002), the process of institutionalizing sustainability which moving beyond compliance to create real, lasting value, requires an ongoing investment in talent development, robust internal systems, and a willingness to adapt to evolving expectations. In this way, WIKA is not only meeting national and global sustainability targets, but is also laying the foundation to serve as a benchmark for sustainable construction, signaling credibility and leadership in Indonesia's transition toward a low-carbon economy.

5. Conclusion

This research shows that PT Wijaya Karya (Persero) Tbk (WIKA) has made meaningful strides in embedding sustainability and decarbonization strategies across its business model and operations. Through the application of the Flourishing Business Model Canvas (FBMC), Sustainable Balanced Scorecard (SBSC), and integration of the Natural Resource-Based View (NRBV) and Dynamic Capabilities frameworks, the study highlights both the strengths and remaining gaps in WIKA's journey toward sustained competitive advantage in green construction. The company's initiatives in digital monitoring, collaborative partnerships, and ESG-driven leadership serve as an important foundation for long-term transformation. Nevertheless, tangible progress in areas such as green investment realization, quantitative measurement of environmental and social impacts, and full implementation of digital MRV systems still needs to be accelerated.

Despite these contributions, this study is not without limitations. The analysis primarily focuses on corporate-level strategy using qualitative data from selected board members and official documents within a specific period, which may not fully capture the diversity of operational challenges or rapid regulatory changes in Indonesia's construction sector.

Moreover, the measurement of actual impacts, especially in terms of emission reductions and green finance mobilization was limited by the availability of quantitative data and standardized reporting. These constraints suggest that future research could benefit from broader data sources, longitudinal analysis, or the integration of more robust quantitative methods to track progress and identify barriers more precisely.

For practitioners and scholars, the findings provide both practical and theoretical implications. Management at WIKA and similar firms are encouraged to prioritize the institutionalization of digital MRV, enhance green procurement standards, and strengthen capacity-building for sustainable innovation. Future studies should expand the empirical scope to multiple state-owned and private construction enterprises, evaluate the long-term effectiveness of implemented strategies, and explore how policy shifts and technological advancements continue to shape sustainability pathways in the sector. As Indonesia accelerates its low-carbon transition, ongoing commitment to transparency, continuous learning, and innovation will be essential for realizing both national sustainability targets and long-term business competitiveness.

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