

Transforming Industrial Downstreaming in Indonesia: Strengthening Value Creation within a Circular Economy Framework – A Literature Review

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Abstract: *Industrial downstreaming has become a strategic policy adopted by many resource-rich countries to increase value creation and strengthen industrial competitiveness. Countries that rely heavily on exporting raw materials often capture only a limited portion of economic value within global production networks. Therefore, downstream industrialization is considered an important strategy for transforming resource-based economies into value-added industrial economies. This study aims to analyze the role of industrial downstreaming in strengthening value creation and supporting the transition toward a circular economy framework. This research employs a qualitative approach using a literature-based analytical method supported by thematic analysis and the Miles and Huberman model. Data were collected from academic journals, policy reports, and institutional publications related to industrial development, value chain upgrading, and circular economy practices. The analysis focuses on identifying key themes that explain the relationship between industrial downstreaming, value creation, competitive advantage, and sustainable industrial transformation. The findings indicate that industrial downstreaming significantly contributes to expanding domestic value chains, strengthening industrial competitiveness, and increasing economic value creation. Furthermore, the integration of circular economy principles into downstream industries improves resource efficiency and reduces environmental impact. However, successful implementation requires strong industrial policies, technological capability, and integrated industrial ecosystems.*

INTRODUCTION

In recent decades, the global economic landscape has undergone significant transformation, driven by technological advancement, industrial restructuring, and increasing

competition among nations. Countries rich in natural resources are increasingly encouraged to shift from exporting raw materials toward developing value-added industries in order to strengthen their economic resilience and competitiveness (Naude, 2023; Gao et.al.,). One of the strategic approaches widely adopted to achieve this transformation is industrial downstreaming, which refers to the process of converting raw natural resources into higher value-added products through domestic industrial processing and manufacturing activities. Through downstream industrialization, countries can capture a larger share of economic value within global value chains, create employment opportunities, and reduce vulnerability to fluctuations in international commodity prices (Białowas & Budzyńska, 2022).

For many years, Indonesia's economic structure has relied heavily on the export of primary commodities such as minerals, coal, crude palm oil, and other natural resources. While this model has generated substantial export revenues, it has also resulted in relatively low domestic value creation and a high dependence on global commodity markets. As global demand patterns shift toward advanced industrial products and sustainable technologies, reliance on raw material exports is increasingly viewed as a structural limitation for long-term economic development (Amador & di Mauro, 2022). Consequently, the Indonesian government has prioritized industrial downstreaming as a key policy strategy to transform the national economy from a resource-based model into a value-added industrial economy (Wuri et al., 2025).

The importance of downstream industrialization in Indonesia is reflected in its significant economic potential across various resource-based sectors. According to data from the Ministry of Investment and Downstreaming, Indonesia possesses substantial downstream potential across 28 strategic commodities with an estimated total economic value of USD 556 billion. The distribution of potential downstream value across major sectors is presented in Table 1.

**Table 1. The Distribution of Potential Downstream Value
cross Major Sectors**

Resources	Number of Commodities	Downstream Value (USD Billion)
Mineral & Coal	12	498.4
Oil & Gas	2	6.3
Plantation & Marine	14	51.3
Total	28 Commodities	556.0

Source: Ministry of Investment and Downstreaming/BPKM (2023).

The table shows that mineral-based industries dominate Indonesia's downstream potential, accounting for nearly 90 percent of the total estimated value. This reflects the growing importance of strategic minerals such as nickel and bauxite, particularly in the context of the global energy transition and the development of electric vehicle industries.

Alongside economic transformation, industrial development strategies increasingly emphasize sustainability. The concept of the circular economy has emerged as an important framework for promoting efficient resource utilization and reducing industrial waste. Integrating circular economy principles into downstream industrialization enables industries to maximize resource productivity while minimizing environmental impacts.

Recent research indicates that global value chains have become the primary structure of the global economy and determine the distribution of value added among countries (World Bank,

2020; UNCTAD, 2019). Developing countries tend to occupy positions with low value added, necessitating industrial upgrading strategies through downstream processing (Naudé, 2021; Ponte, 2019). On the other hand, the concept of the circular economy has emerged as an approach to enhance resource efficiency and industrial sustainability (Geissdoerfer et al., 2017). However, most studies still examine the aspects of global value chains and the circular economy separately. Therefore, this study addresses this gap by integrating industrial downstreaming, value creation, and the circular economy into a single analytical framework to support sustainable industrial transformation in Indonesia.

Based on these considerations, this study aims to analyze how industrial downstreaming contributes to value creation and how circular economy principles can be integrated into downstream industrial systems to support sustainable industrial development.

LITERATURE REVIEW

1. Industrial Downstreaming and Value-Added Transformation Theory

Industrial downstreaming refers to efforts to increase the value added of natural resources through further processing activities within domestic industries. Instead of exporting raw materials directly to international markets, downstream industrialization enables countries to transform primary commodities into intermediate or finished products that generate higher economic value. This strategy allows resource-rich countries to strengthen their industrial base, increase employment opportunities, and improve participation in global production networks.

According to the Ministry of Industry (2023), industrial downstreaming should not only be understood as an increase in production activities but also as a structural transformation that creates a more integrated and competitive industrial system. Through downstream industrial development, natural resource processing can stimulate the growth of supporting industries and strengthen domestic supply chains. Therefore, downstream industrialization is considered an essential foundation for sustainable economic development and industrial transformation in resource-based economies.

2. Circular Economy Theory

The circular economy is a concept that emphasizes sustainable resource utilization through waste reduction, recycling, and the reuse of materials within production systems. Unlike the traditional linear economic model that follows the pattern of “take, make, and dispose,” the circular economy promotes a closed-loop system in which resources remain within the economic cycle for as long as possible. This approach aims to improve resource efficiency while minimizing environmental impacts.

According to the Ellen MacArthur Foundation (2013), the circular economy focuses on maintaining the value of materials and products through continuous reuse, recycling, and regeneration of natural systems. Geissdoerfer et al. (2017) further explain that circular economy practices integrate economic growth with environmental sustainability by improving resource productivity and reducing industrial waste. In the context of industrial downstreaming, circular economy principles can support sustainable industrial development by maximizing the utilization of raw materials and minimizing production waste.

3. Competitive Advantage Theory

The concept of competitive advantage refers to the ability of a firm, industry, or nation to create greater economic value compared to its competitors through superior efficiency, innovation, or differentiation. The theory of competitive advantage was extensively

developed by Porter (1985), who argued that sustainable competitiveness can be achieved when organizations are able to create value through strategic activities that either reduce production costs or differentiate products and services in the marketplace.

According to Porter (1985), competitive advantage is primarily derived from two fundamental strategies: cost leadership and differentiation. Cost leadership focuses on achieving efficiency and minimizing production costs, while differentiation emphasizes creating unique products or services that provide additional value to consumers. In industrial sectors, the successful implementation of these strategies often depends on the effective management of resources, technological capability, and innovation in production processes.

At the national level, the concept of competitive advantage extends beyond individual firms and encompasses the overall productivity and innovation capacity of a country's industrial system. Porter (1990) further emphasized that national competitiveness is not solely determined by comparative advantage based on natural resources, but also by the ability to transform these resources into high-value industrial products through technological advancement, industrial capability, and institutional support. This perspective highlights the importance of industrial transformation in enhancing national competitiveness.

In the context of industrial downstreaming, competitive advantage can be achieved by transforming raw natural resources into processed and manufactured products with higher economic value. When countries rely primarily on exporting raw materials, their position within global value chains remains limited, and they capture only a small portion of the total value generated in the production process. By developing downstream industries, countries can expand their participation in higher stages of production, thereby capturing a larger share of economic value and strengthening their position in global markets.

4. Industrial Development Theory

Industrial development theory explains how industrialization contributes to economic transformation and long-term growth. According to Todaro and Smith (2015), industrialization is an important stage in economic development because it enables countries to shift from traditional resource-based activities toward modern manufacturing sectors with higher productivity. Industrial development also promotes economic diversification and strengthens domestic production capabilities.

Hirschman (1958) further explains that industrialization generates economic growth through the creation of backward and forward linkages. Backward linkages stimulate the development of supporting industries that provide inputs for production, while forward linkages encourage the growth of downstream industries that process intermediate goods into final products. In this context, industrial downstreaming can be viewed as an important mechanism for strengthening industrial linkages and promoting structural economic transformation.

5. Industrial Policy Theory.

Industrial policy theory highlights the role of government in guiding industrial development and promoting strategic sectors within the economy. Johnson (1982) defines industrial policy as a set of government interventions designed to influence the structure of the economy and support the growth of key industries. These policies may include investment incentives, trade regulations, technological development programs, and infrastructure support aimed at strengthening domestic industrial capacity.

Chang (2002) and Rodrik (2004) argue that industrial policy plays a crucial role in helping developing countries build competitive industrial sectors. Through targeted policy

interventions, governments can support industrial upgrading, encourage technological innovation, and promote value-added production. Industrial policy is therefore not only about protecting domestic industries but also about facilitating learning processes, technological diffusion, and the development of productive capabilities that enable industries to compete in global markets.

In the context of industrial downstreaming, industrial policy becomes particularly important for ensuring that natural resources are processed domestically rather than exported in raw form. Governments can implement policies such as export restrictions on raw materials, fiscal incentives for processing industries, and the development of industrial clusters to encourage investment in downstream sectors. By providing a supportive policy environment, governments can accelerate industrial transformation, strengthen domestic value chains, and increase the economic value generated from natural resources.

Table 2. Summary of Literature Review

No	Author / Source	Theory	Key Concepts	Relevance to Industrial Downstreaming
1	Ministry of Industry (2023)	Industrial Downstreaming and Value-Added Transformation	Industrial downstreaming is not merely an increase in production processes but a structural transformation that creates a more integrated and competitive industrial base.	Provides the conceptual foundation that downstreaming strengthens domestic industrial structures and increases value added from natural resources.
2	Porter (1985)	Value Chain Theory	Competitive advantage is achieved through value creation across multiple stages of production including procurement, production, distribution, and marketing.	Downstream industrialization extends domestic value chains and allows countries to capture greater economic value from natural resources.
3	Kim & Mauborgne (2015)	Value Innovation Theory	Value innovation emphasizes creating new market space through product differentiation and innovation rather than competing solely on cost.	Downstream industries can create new derivative products and open new markets through innovation in processing technologies.
4	Prahalad & Krishnan (2008)	Strategic Resource and Innovation Capability	Organizational success depends on the ability to leverage strategic resources and technological collaboration.	Technological capability and collaboration between government, industry, and research institutions are essential for successful downstream industrialization.
5	Ellen MacArthur	Circular Economy Theory	Circular economy promotes resource efficiency, waste	Industrial downstreaming can support circular

No	Author / Source	Theory	Key Concepts	Relevance to Industrial Downstreaming
	Foundation (2013)		reduction, and the reuse of materials within a closed-loop production system.	production by utilizing industrial by-products and extending the lifecycle of natural resources.
6	Geissdoerfer et al. (2017)	Sustainable Industrial Systems	Circular economy integrates economic growth with environmental sustainability through efficient resource use and innovation.	Supports sustainable downstream industrialization by reducing environmental impact and improving resource productivity.
7	Porter (1990)	Competitive Advantage of Nations	National competitiveness depends on innovation, productivity, and technological capability rather than only natural resources.	Downstream industries strengthen national competitiveness by transforming raw materials into high value-added industrial products.
8	Todaro & Smith (2015)	Industrial Development Theory	Industrialization drives economic transformation by shifting from primary sectors toward manufacturing and high-value industries.	Downstream industrialization promotes structural transformation from resource-based economies to industrial economies.
9	Hirschman (1958)	Industrial Linkage Theory	Industrial development creates backward and forward linkages that stimulate economic growth across sectors.	Downstream industries generate industrial ecosystems through integrated upstream and downstream production networks.
10	Johnson (1982); Chang (2002); Rodrik (2004)	Industrial Policy Theory	Government intervention is necessary to support industrial development through policy incentives, infrastructure, and technological upgrading.	Industrial policies such as export restrictions, investment incentives, and industrial clusters encourage downstream industrial growth.

RESEARCH GAP

Previous studies have extensively discussed the role of industrial downstreaming in increasing value added and strengthening national industrial competitiveness. Several scholars highlight that downstream industrialization can extend domestic value chains and enable countries to capture greater economic value from natural resources (Porter, 1985; Porter, 1990). In addition, industrial development literature emphasizes that the transformation from a resource-based economy toward a manufacturing-based economy is an important stage in achieving

sustainable economic growth (Todaro & Smith, 2015). These studies underline the importance of industrial upgrading and value chain integration in promoting structural economic transformation.

Furthermore, recent research has also examined the role of circular economy principles in promoting sustainable industrial systems. The circular economy emphasizes resource efficiency, waste reduction, and the reuse of materials within production systems to support environmentally sustainable development (Ellen MacArthur Foundation, 2013; Geissdoerfer et al., 2017). Several studies suggest that integrating circular economy practices into industrial systems can improve resource productivity and reduce environmental impacts while maintaining economic growth.

However, despite the growing body of literature on industrial downstreaming and circular economy, most previous studies tend to analyze these concepts separately. Research on downstream industrialization generally focuses on value chain upgrading, industrial competitiveness, and economic value creation, while circular economy studies primarily concentrate on environmental sustainability and resource efficiency. As a result, limited attention has been given to examining how downstream industrialization can simultaneously contribute to value creation and the transition toward a circular economy framework, particularly in resource-rich developing countries.

In the Indonesian context, the implementation of industrial downstreaming has become a key national strategy to increase domestic value added and strengthen the national industrial base. Nevertheless, empirical and conceptual studies that integrate the perspectives of value chain upgrading, competitive advantage, and circular economy within the framework of industrial downstreaming remain relatively limited. Most existing discussions focus on sectoral case studies, such as mineral processing or palm oil downstream industries, without providing a comprehensive analytical framework that connects downstream industrialization with sustainable industrial transformation.

Therefore, this study attempts to fill this research gap by analyzing industrial downstreaming as a strategic mechanism for strengthening value creation while simultaneously supporting the transition toward a circular economy framework in Indonesia. By integrating perspectives from value chain theory, competitive advantage theory, and circular economy principles, this research seeks to provide a more comprehensive understanding of how downstream industrialization can contribute to sustainable industrial development and long-term national competitiveness.

CONCEPTUAL FRAMEWORK

Industrial downstreaming is widely recognized as a strategic mechanism for increasing the value added of natural resources and strengthening the competitiveness of national industries. In resource-based economies, downstream industrialization enables countries to move beyond the extraction and export of raw materials toward higher value-added processing and manufacturing activities. This transformation is closely related to the concept of value chain upgrading, which emphasizes the importance of extending industrial activities across multiple stages of production in order to capture greater economic value (Porter, 1985).

Within this framework, industrial downstreaming functions as a catalyst for expanding domestic value chains by integrating upstream resource extraction with downstream processing and manufacturing sectors. Through this integration, industries can increase productivity, improve resource utilization, and generate new derivative products that contribute to economic growth and industrial diversification.

Furthermore, the development of downstream industries can enhance competitive

advantage by enabling industries to create differentiated products and improve technological capabilities. According to Porter (1990), national competitiveness depends not only on the availability of natural resources but also on the ability to transform those resources into high-value industrial products through innovation and industrial capability. In this sense, industrial downstreaming can strengthen a country's competitive position within global production networks.

In addition to economic competitiveness, the integration of circular economy principles is increasingly recognized as an important factor in sustainable industrial development. The circular economy emphasizes efficient resource utilization, waste reduction, and the reuse of industrial materials in order to create a closed-loop production system (Ellen MacArthur Foundation, 2013). By incorporating circular economy practices into downstream industrialization strategies, industries can maximize resource productivity while minimizing environmental impact.

Therefore, the conceptual framework of this study proposes that industrial downstreaming serves as the primary driver of value creation, which subsequently contributes to value chain upgrading, enhanced competitive advantage, and the development of circular industrial systems. The integration of these elements can support sustainable industrial transformation and strengthen national economic resilience.

Based on this theoretical perspective, the conceptual framework of this study can be illustrated as follows:

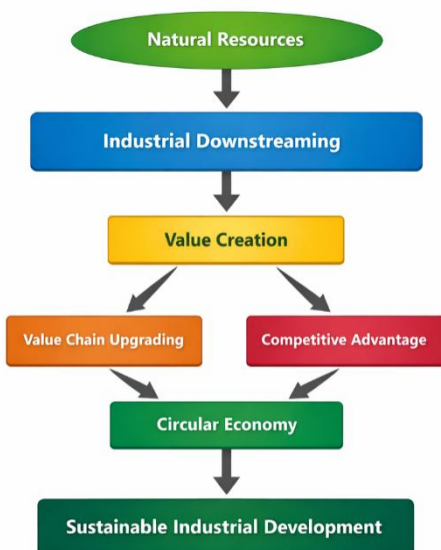


Figure 1. Conceptual Framework

METHOD

Research Design

This study employs a qualitative research approach using a literature-based analytical method to examine the role of industrial downstreaming in strengthening value creation and supporting the transition toward a circular economy framework. The qualitative approach is considered appropriate because the study aims to explore conceptual relationships between

industrial downstreaming, value chain upgrading, competitive advantage, and circular economy integration. Rather than relying on statistical measurements, this study focuses on interpreting theoretical perspectives, policy frameworks, and empirical insights derived from existing literature.

The research adopts a thematic analysis approach to identify recurring patterns, concepts, and strategic themes related to industrial downstreaming and sustainable industrial transformation. Thematic analysis allows researchers to systematically organize and interpret qualitative data derived from academic publications, policy reports, and institutional documents.

Data Sources

The data used in this study consist of secondary data collected from various scholarly and institutional sources, including:

1. peer-reviewed journal articles related to industrial development, value chain upgrading, and circular economy
2. academic books discussing industrial policy and economic transformation
3. government policy reports related to downstream industrialization in Indonesia
4. publications from international organizations such as the OECD, World Bank, and industry reports

These sources were selected to provide comprehensive theoretical and empirical insights into the development of downstream industries and their implications for economic transformation.

Data Collection

1. Data Analysis Technique

The analysis of qualitative data in this study follows the framework proposed by Miles and Huberman (2020), which consists of three main stages: data reduction, data display, and conclusion drawing/verification. This analytical model allows researchers to systematically organize qualitative information and identify meaningful patterns across different sources.

2. Data Reduction

In the first stage, the collected literature was reviewed and filtered to identify key themes related to industrial downstreaming and value creation. Irrelevant or repetitive information was eliminated, while significant insights were categorized into several thematic areas, including industrial value creation, value chain upgrading, technological capability, and circular economy integration.

3. Data Display

After the reduction process, the categorized data were organized into structured formats such as thematic matrices, conceptual diagrams, and comparative tables. This step allowed the researcher to visualize the relationships between different concepts and identify patterns across theoretical perspectives and empirical findings.

4. Conclusion Drawing and Verification

The final stage involved interpreting the thematic patterns identified during the analysis process. The researcher examined how industrial downstreaming contributes to value chain upgrading, competitive advantage, and sustainable industrial development. The conclusions were verified by comparing insights across different sources and ensuring consistency with established theoretical frameworks.

Research Model Using Thematic Analysis

Through the thematic analysis process, several key themes emerged that explain the relationship between industrial downstreaming and sustainable industrial development. These

themes include value creation, value chain upgrading, competitive advantage, and circular economy integration. These elements form the conceptual structure of the research model used in this study.

The research model proposes that industrial downstreaming acts as a strategic driver that generates value creation, which subsequently strengthens value chain upgrading and competitive advantage, while simultaneously supporting circular economy integration as part of sustainable industrial transformation.

Analytical Model Based on Thematic Analysis

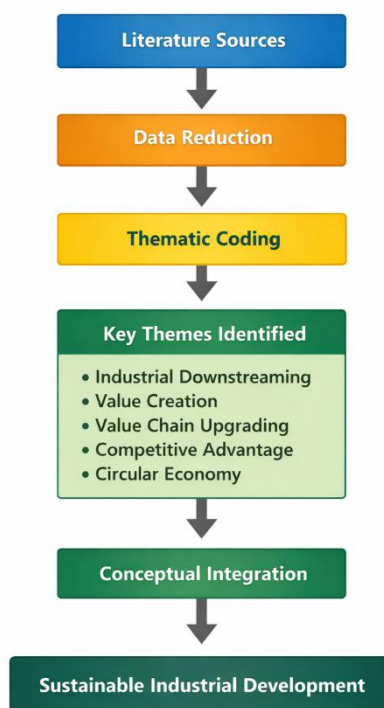


Figure 2. Analytical Model Based on Thematic Analysis

RESULT AND DISCUSSION

1. Industrial Downstreaming as a Strategy for Value Creation

The thematic analysis of the literature reveals that industrial downstreaming plays a crucial role in enhancing the economic value of natural resources. Countries that rely primarily on exporting raw commodities often capture only a small portion of the total value generated within global value chains. By developing downstream processing industries, countries are able to transform raw materials into intermediate and final products with higher economic value.

In the context of Indonesia, downstream industrialization has been implemented in several strategic sectors, particularly in mineral resources such as nickel, bauxite, and copper. The development of domestic processing facilities such as smelters has enabled Indonesia to shift from exporting raw mineral ores to producing processed materials used in various industrial applications. This transformation contributes to higher export value, increased industrial investment, and the creation of employment opportunities.

Moreover, industrial downstreaming also stimulates the development of supporting industries, including logistics, infrastructure, and manufacturing services. These developments strengthen the domestic industrial ecosystem and promote broader economic growth.

2. Value Chain Upgrading through Industrial Integration

Another key theme identified in the literature is the role of industrial downstreaming in promoting value chain upgrading. According to Porter's value chain framework, economic value is created through multiple interconnected activities across production stages. When countries expand industrial activities beyond raw material extraction toward processing and manufacturing, they can capture a larger share of value within the global production network.

Thematic findings suggest that downstream industrialization encourages vertical integration between upstream resource extraction and downstream manufacturing sectors. This integration enhances industrial productivity and reduces dependence on external suppliers for intermediate products. In addition, value chain upgrading enables countries to diversify their industrial outputs and reduce economic vulnerability associated with commodity price fluctuations.

For example, Indonesia's downstream development in the nickel industry has expanded beyond basic smelting activities toward the production of materials used in electric vehicle batteries. This shift demonstrates how value chain upgrading can transform a resource-based economy into a more technologically advanced industrial system.

3. Industrial Downstreaming and Competitive Advantage

The literature also highlights that industrial downstreaming contributes significantly to the development of competitive advantage. While natural resource availability provides a comparative advantage, long-term competitiveness depends on the ability to transform those resources into high value-added industrial products.

Through downstream industrialization, industries can improve technological capability, develop specialized expertise, and create differentiated products that strengthen their position in global markets. This process allows countries to move from commodity-based competition toward innovation-driven industrial competitiveness.

Furthermore, industrial clusters and integrated industrial zones often emerge as a result of downstream industrial policies. These clusters facilitate knowledge exchange, technological transfer, and collaboration between firms, research institutions, and government agencies. As a result, downstream industries become more productive and competitive within international markets.

4. Integration of Circular Economy Principles

The thematic analysis also identifies the increasing relevance of circular economy principles in downstream industrial development. Circular economy practices focus on improving resource efficiency by minimizing waste, promoting recycling, and extending the lifecycle of materials within production systems.

Industrial downstreaming provides opportunities to integrate circular production systems by utilizing by-products and residual materials from processing activities. For instance, waste materials from mining operations can be reused in construction materials or other industrial processes. Similarly, agricultural by-products from plantation industries can be converted into bioenergy or other value-added products.

By incorporating circular economy practices into downstream industries, countries can

achieve dual objectives: increasing economic value while simultaneously reducing environmental impacts. This integration supports the development of more sustainable industrial systems and aligns with global sustainability goals.

5. Structural Challenges in Industrial Downstreaming

Despite the significant potential of industrial downstreaming, the literature also identifies several structural challenges that may hinder its implementation. One major challenge is the limited technological capability required for advanced processing industries. Many developing countries still rely on imported technologies and foreign investment to develop downstream industries. Another challenge involves infrastructure limitations, including transportation networks, energy supply, and industrial facilities necessary for large-scale processing activities. Insufficient infrastructure can increase production costs and reduce the competitiveness of downstream industries.

Additionally, institutional and regulatory factors play a crucial role in determining the success of downstream industrial policies. Effective policy coordination, investment incentives, and industrial governance are necessary to support the long-term development of downstream industries. Addressing these challenges requires coordinated efforts between government, industry, and research institutions to strengthen technological capacity, improve infrastructure, and foster innovation within the industrial sector.

POLICY IMPLICATIONS

The findings of this study highlight the strategic importance of industrial downstreaming as a mechanism for increasing value creation, strengthening industrial competitiveness, and supporting sustainable economic development. Based on the thematic analysis of the literature, several policy implications can be identified for governments, industry stakeholders, and policymakers seeking to promote effective downstream industrialization.

First, governments should prioritize the development of integrated industrial ecosystems that connect upstream resource extraction with downstream processing and manufacturing industries. Establishing industrial clusters and special economic zones can facilitate collaboration among firms, research institutions, and government agencies, thereby encouraging knowledge transfer, innovation, and technological upgrading. Such integrated industrial ecosystems can strengthen domestic value chains and improve industrial productivity.

Second, strengthening technological capability and innovation capacity is essential for the success of downstream industrialization. Governments should encourage investment in research and development (R&D), technological training, and industrial innovation programs to support the development of advanced processing technologies. Collaboration between universities, research institutions, and industries can accelerate technological diffusion and enhance domestic industrial capabilities.

Third, policy frameworks should support the development of circular economy practices within downstream industries. By encouraging resource efficiency, waste recycling, and the reuse of industrial by-products, governments can promote environmentally sustainable industrial systems. Incentives for green technologies and sustainable production processes can further support the integration of circular economy principles into industrial development strategies.

Fourth, improving industrial infrastructure and logistics systems is necessary to ensure the efficiency and competitiveness of downstream industries. Adequate transportation networks, reliable energy supply, and modern industrial facilities are essential for supporting large-scale

processing industries. Infrastructure investment can reduce production costs and improve the overall competitiveness of domestic industries in global markets.

Finally, effective industrial policy coordination is required to ensure the long-term success of downstream industrialization strategies. Governments must implement consistent and well-coordinated policies that encourage investment, strengthen industrial capabilities, and support the development of value-added industries. Through strategic policy interventions, countries can transform their resource-based economies into competitive industrial economies capable of generating sustainable growth.

LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

Despite providing valuable insights into the relationship between industrial downstreaming, value creation, and circular economy integration, this study has several limitations that should be acknowledged. First, this research is primarily based on a qualitative literature review, which relies on existing academic publications, policy reports, and secondary data sources. Although this approach allows for a comprehensive theoretical analysis, it does not include empirical data collected directly from industries or stakeholders involved in downstream industrial development. As a result, the findings of this study are conceptual and interpretative rather than empirically tested.

Second, this study focuses mainly on the conceptual relationships between industrial downstreaming and sustainable industrial development, without examining detailed sector-specific cases. In practice, the implementation of downstream industrialization may vary significantly across different industries such as mining, agriculture, energy, and manufacturing. Each sector may face unique technological, economic, and institutional challenges that influence the effectiveness of downstream industrial policies.

Third, the scope of this study is limited to a general discussion of industrial downstreaming within the context of resource-based economies, particularly Indonesia. While the findings provide useful theoretical insights, the results may not fully represent the conditions of other countries with different industrial structures or policy environments. Therefore, caution should be exercised when generalizing the conclusions of this research to other economic contexts.

Based on these limitations, several directions for future research can be proposed. Future studies could employ empirical research methods, such as case studies, surveys, or quantitative analysis, to examine the actual impact of industrial downstreaming on economic performance, industrial competitiveness, and environmental sustainability. Empirical studies would provide stronger evidence regarding the effectiveness of downstream industrial policies in different sectors.

Additionally, future research may explore sector-specific downstream development, particularly in strategic industries such as critical minerals, renewable energy materials, or agro-based industries. Investigating these sectors in greater depth could provide practical insights into how value chain upgrading and circular economy principles can be implemented more effectively.

Finally, further research could examine the role of technological innovation, industrial clusters, and international collaboration in supporting downstream industrialization. Understanding how technological capabilities and global partnerships influence industrial transformation would contribute to a more comprehensive understanding of sustainable industrial development in resource-rich economies.

CONCLUSION

This study analyzes the role of industrial downstreaming in enhancing value creation and supporting the transition to a circular economy through a qualitative literature-based approach. The findings show that downstreaming increases the economic value of natural resources by expanding domestic value chains and shifting production from raw commodity exports to higher value-added industrial goods, thereby improving competitiveness, economic diversification, and participation in global value chains. Integrating circular economy principles into downstream industries further enhances resource efficiency, reduces waste, and promotes sustainable development by utilizing by-products and environmentally responsible practices. However, successful implementation depends on overcoming challenges such as technological limitations, infrastructure gaps, and weak policy coordination, which require collaboration among governments, industries, and research institutions. Overall, industrial downstreaming is not merely a production strategy but a broader economic transformation that combines value creation, competitiveness, and sustainable resource management to build resilient and sustainable industrial systems.

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