FROM RESOURCE-BASED ECONOMY TO ECONOMIC DIVERSIFICATION: STRUCTURAL TRANSFORMATION AND SECTORAL DYNAMICS IN RIAU PROVINCE

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Abstract: This study examines regional economic development and structural transformation by identifying leading sectors, assessing growth prospects, and tracing shifts toward a more diversified, value-added economy. Using secondary data on Gross Regional Domestic Product by industry for Riau and Indonesia (2015–2025), the analysis applies Location Quotient (LQ), Dynamic Location Quotient (DLQ), and structural change analysis, interpreted through economic complexity and related variety. Results indicate that Agriculture, Forestry, and Fisheries; Mining and Quarrying; and Manufacturing remain Riau's economic base. However, Agriculture and Manufacturing demonstrate stronger prospects, with LQ and DLQ values above one, while Mining and Quarrying is losing relative competitiveness. Both Agriculture and Manufacturing also grow faster than their national counterparts. These findings suggest that Riau's transformation depends on strengthening linkages among agriculture, manufacturing, trade, and services through downstream industrialization to achieve more diversified and resilient growth.

Keywords: S*tructural Transformation; Regional Economic Development; Leading Economic Sectors; Economic Complexity; Downstream Industrialization*

Regional economic development is increasingly assessed not merely through economic growth rates but also through the capacity to establish productive, adaptive, and diversified economic structures. Structural transformation represents a fundamental dimension of this process, reflecting changes in sectoral contributions, productivity, and the emergence of new sources of growth. Traditionally, this transformation involves a gradual shift from primary activities toward industrial and service sectors characterized by higher productivity and economic complexity (Herrendorf et al., 2021; McMillan et al., 2019). However, achieving such transformation remains particularly challenging for resource-rich regions, where dependence on primary commodities can constrain diversification and long-term economic resilience.

The challenges facing resource-based economies extend beyond maintaining the performance of existing leading sectors. Although natural resource abundance can provide initial comparative advantages, excessive dependence on extractive activities may generate economic vulnerability when industrial linkages, value addition, and productive diversification remain limited. The resource curse literature emphasizes that natural resource abundance does not automatically translate into sustainable development, particularly when production remains concentrated in low-complexity extractive activities (Li et al., 2021; Chairul et al., 2025). Nevertheless, natural resources can become strategic

development assets when supported by downstream industrialization, innovation, and stronger productive capabilities. Chairul et al. (2025) further demonstrate that the relationship between natural resources and industrial development depends substantially on economic complexity and the capacity to develop industrial linkages.

Economic complexity provides an important analytical perspective for understanding these transformation processes. Rather than focusing exclusively on sectoral contributions, this approach emphasizes the accumulation of productive capabilities through knowledge, technology, production networks, and institutional capacity. Regions with greater economic complexity generally possess more diversified production structures and stronger capabilities to generate higher-value-added products (Hidalgo & Hausmann, 2009). Complementing this perspective, the concept of related variety in evolutionary economic geography suggests that diversification is more likely to succeed when emerging economic activities build upon existing knowledge, technologies, and production networks (Boschma, 2017; Content & Frenken, 2016). Nevertheless, sectoral diversity alone does not guarantee development, since the quality and complexity of productive activities also determine their contribution to regional economic advancement (Bathelt & Storper, 2024).

In Indonesia, structural transformation varies considerably across regions due to differences in natural resource endowments, industrialization, infrastructure, and institutional capacity. While some regions have expanded innovation-based manufacturing and service activities, others remain substantially dependent on primary sectors. Consequently, identifying leading sectors requires more than measuring their current economic contributions; it also requires examining their growth dynamics and potential to support long-term structural transformation. This consideration is particularly relevant for Riau Province, whose economy has historically relied on agriculture, forestry, fisheries, mining, and manufacturing. Although these sectors provide important comparative advantages, sustainable regional development requires stronger intersectoral linkages and the development of higher-value-added activities that can transform resource-based advantages into more complex productive capabilities.

Gross Regional Domestic Product (GRDP) data illustrates the continuing importance of manufacturing and resource-based activities in Riau's economy. Between 2015 and 2025, manufacturing value added increased from Rp126,882,608 million to Rp194,543,849 million, while Agriculture, Forestry, and Fisheries expanded from Rp108,969,037 million to Rp160,178,552 million. These developments indicate the strengthening contribution of manufacturing and the continued significance of primary production in the regional economy. However, substantial sectoral contributions do not necessarily indicate sustainable structural transformation. Mining and Quarrying, for instance, retains a comparative advantage, as reflected by a Location Quotient (LQ) above one, but its Dynamic Location Quotient (DLQ) below one indicates weakening relative competitiveness. This divergence highlights the need to move beyond extractive-sector dominance by strengthening productive activities capable of generating greater value added and more sustainable economic growth.

Existing regional economic studies in Indonesia have predominantly employed sectoral approaches, particularly Location Quotient (LQ) and Shift-Share analysis, to identify leading economic sectors. Although these methods provide valuable insights into sectoral specialization and competitive performance, many studies emphasize current sectoral positions without adequately integrating comparative

advantage, future development prospects, and long-term structural changes. Furthermore, empirical studies connecting resource-based regional economies with economic complexity and related variety remain relatively limited. Addressing this gap requires an integrated analytical framework capable of identifying not only economically specialized sectors but also their development trajectories and contributions to regional diversification.

Accordingly, this study combines Location Quotient (LQ), Dynamic Location Quotient (DLQ), and GRDP structural change analysis to examine regional economic development and structural transformation in Riau Province during 2015–2025. LQ identifies sectors with relative economic specialization, DLQ evaluates their future development prospects, and structural change analysis examines sectoral growth and shifts in Riau's economic structure relative to national developments. Interpreted through economic complexity and related variety, this integrated approach provides a broader understanding of how existing productive capabilities can support economic diversification. Rather than viewing transformation as a complete departure from resource-based activities, this study considers the potential to strengthen linkages among agriculture, manufacturing, trade, and services, particularly through downstream industrialization.

Furthermore, regional economic transformation depends not only on sectoral competitiveness but also on institutional and fiscal capacity. Local governments play an important role in facilitating infrastructure development, productive investment, and the expansion of leading sectors. In this regard, Azis et al. (2022) demonstrate the relationship between fiscal decentralization and regional economic growth in Riau Province, while Rineliana et al. (2025) highlight the contribution of regional revenue capacity and intergovernmental transfers to determining the financing capacity of regional development expenditure. These findings underscore the importance of integrating sectoral development strategies with institutional and fiscal policies to ensure that economic transformation is supported by adequate regional development capacity.

Based on these considerations, this study aims to analyze regional economic development and structural transformation in Riau Province during 2015–2025 by identifying leading sectors, assessing their development prospects, and examining changes in the sectoral composition of GRDP relative to the national economy. Its contribution lies in integrating LQ, DLQ, and structural change analysis within the perspectives of economic complexity and related variety to explain the dynamics of a resource-based regional economy. Ultimately, the study seeks to identify opportunities for strengthening existing productive capabilities, expanding intersectoral linkages, and advancing downstream industrialization as pathways toward a more diversified, higher-value-added, and resilient regional economic structure.

METHOD

Research Design and Data Sources

This study employs a descriptive quantitative approach to examine regional economic development and structural transformation in Riau Province. The analysis integrates sectoral specialization, growth dynamics, and structural changes to assess whether existing comparative advantages can support long-term economic diversification. Structural transformation is understood as a shift toward higher-productivity and value-added activities (Herrendorf et al., 2021; McMillan et al., 2019).

The study uses secondary data on Gross Regional Domestic Product (GRDP) of Riau Province and Gross Domestic Product (GDP) of Indonesia by 17 business sectors during 2015–2025, based on the Central Statistics Agency (BPS) classification. The analytical framework

combines three approaches: Location Quotient (LQ) to identify basic sectors, Dynamic Location Quotient (DLQ) to assess their development prospects, and structural change analysis to compare sectoral developments in Riau with national patterns.

Analytical Framework and Economic Transformation Perspective

The analytical framework connects resource-based economic development with economic complexity and structural transformation. Sustainable development in resource-rich regions depends on the capacity to convert existing comparative advantages into higher-value-added activities through diversification and stronger production linkages (Hidalgo & Hausmann, 2009; Boschma, 2017). Economic complexity emphasizes the role of knowledge, technology, and production networks in developing more sophisticated economic activities (Hidalgo & Hausmann, 2009), while related variety explains how diversification emerges through linkages between new sectors and existing regional capabilities (Boschma, 2017; Content & Frenken, 2016).

Accordingly, economic transformation is examined through three complementary dimensions: sectoral specialization (LQ), development prospects (DLQ), and structural changes in GRDP. Economic complexity and related variety serve as interpretive perspectives rather than directly measured indices.

Location Quotient (LQ) Analysis

Location Quotient (LQ) identifies sectors with greater economic specialization in Riau than in the national economy, using the following formula:

$LQ_i = (X_{iR} / X_R) / (X_{iN} / X_N)$

Where X_{iR} and X_R represent the GRDP of sector *i* and total GRDP in Riau, respectively, while X_{iN} and X_N represent the corresponding GDP values for Indonesia. An *LQ* above one indicates a basic sector with comparative advantage, an *LQ* equal to one indicates equivalent specialization, and an *LQ* below one identifies a non-basic sector. This approach is widely applied to measure regional economic specialization (Pereira et al., 2020).

Dynamic Location Quotient (DLQ) Analysis

Dynamic Location Quotient (DLQ) complements the static LQ by assessing sectoral growth prospects relative to national developments over time. The formula is:

$DLQ_i = [(Y_{iR,t} / Y_{iR,0}) / (Y_{R,t} / Y_{R,0})] / [(Y_{iN,t} / Y_{iN,0}) / (Y_{N,t} / Y_{N,0})]$

Where $Y_{iR,t}$ and $Y_{iR,0}$ denote the GRDP of sector *i* in Riau in the final and initial years, respectively; $Y_{R,t}$ and $Y_{R,0}$ represent total regional GRDP. The corresponding variables with subscript *N* represent sectoral and total national GDP. A DLQ above one indicates stronger relative sectoral growth prospects, whereas a value below one indicates weaker prospects compared with the national economy.

Structural Change Analysis and Sectoral Classification

Structural transformation is assessed using a GRDP index comparing sectoral values in 2025 with those in 2015:

$IP_i = (GRDP_{i,2025}/GRDP_{i,2015}) \times 100$

The index is calculated separately for Riau and Indonesia. Values above 100 indicate sectoral expansion, 100 indicates no change, and values below 100 indicate contraction relative to the base year. Comparing the two indices identifies whether Riau's sectoral growth exceeds or falls below national developments, while distinguishing general expansion from contraction.

Finally, LQ and DLQ results are combined to classify sectors into four categories: (1) basic and prospective (LQ above one and DLQ above one); (2) basic but weakening (LQ above one and DLQ below one); (3) developing toward a leading sector (LQ below one and DLQ above one); and (4) non-basic with limited

growth prospects (both values below one). These classifications are subsequently compared with structural changes in GRDP to evaluate whether sectoral advantages translate into broader economic transformation.

RESULTS

Economic Structure and Position of Leading Sectors in Riau Province

Regional economic transformation depends not only on sectoral contributions but also on comparative advantages, growth dynamics, and intersectoral linkages. The LQ and DLQ results indicate that Riau's economy remains resource-based while showing signs of diversification toward higher-value-added activities. In 2025, three sectors recorded LQ values above one: Agriculture, Forestry, and Fisheries; Mining and Quarrying; and Manufacturing, confirming their roles as regional economic base sectors (Table 1).

Table 1. Results of the Analysis of Location Quotient (LQ) and Dynamic Location Quotient (DLQ) of Riau Province, 2015–2025

Business Field	LQ 2015	LQ 2020	LQ 2025	DLQ 2015-2025	Classification
Agriculture, Forestry, and Fisheries	1.861	2.145	2.356	1,266	Base and Prospective
Mining and Quarrying	2.830	2.220	1.939	0.685	Base but Declining
Processing industry	1.312	1.546	1.601	1,220	Base and Prospective
Construction	0.784	0.847	0.944	1,204	Develop
Trading	0.643	0.673	0.794	1,234	Develop
Information and Communication	0.176	0.178	0.180	1,026	Develop

Source: Province's GRDP data and Indonesia's GDP by business sector, BPS (2015–2025).

Agriculture, Forestry, and Fisheries demonstrates the strongest and most consistent improvement among the basic sectors, with its LQ increasing from 1.861 in 2015 to 2.356 in 2025 and a DLQ of 1.266. These results indicate both comparative advantage and stronger growth prospects relative to the national economy. Nevertheless, its development potential extends beyond primary commodity production. Strengthening agro-industry, technological innovation, processing activities, and local value chains could transform existing resource advantages into more complex productive capabilities. From the economic complexity perspective, development depends on the capacity to combine knowledge, technology, and production networks to generate increasingly sophisticated economic activities (Hidalgo & Hausmann, 2009).

Manufacturing also exhibits a positive transformation trajectory, with its LQ rising from 1.312 in 2015 to 1.601 in 2025 and its DLQ reaching 1.220. Its increasing specialization indicates strengthening downstream industrialization and its strategic role in connecting natural resource production with higher-value-added activities. This development is reflected in manufacturing value added, which increased from Rp126,882,608 million in 2015 to Rp194,543,849 million in 2025. Accordingly, manufacturing represents an important driver of Riau's economic diversification through the expansion of resource-based processing and industrial value chains.

In contrast, Mining and Quarrying retains its basic-sector position, with an LQ of 1.939 in 2025, but its DLQ of 0.685 indicates weakening relative growth prospects compared with the national economy. This divergence highlights the limitations of extractive-sector dependence when economic linkages and productive diversification remain insufficient. The resource curse literature similarly emphasizes that natural resource abundance does not automatically generate sustainable development when economic structures remain concentrated in

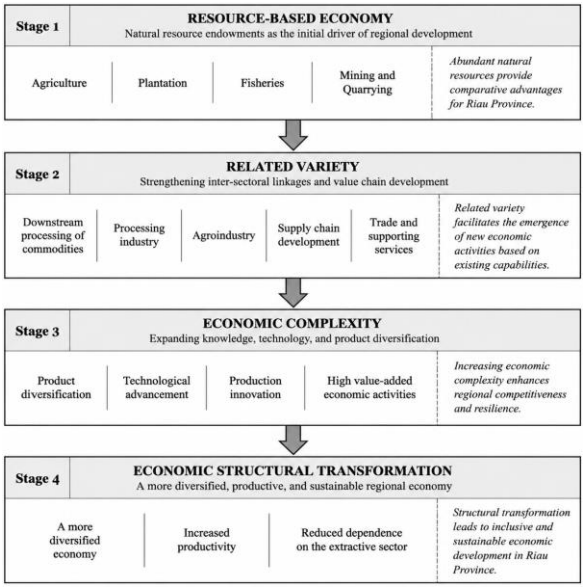
extraction activities with limited intersectoral linkages (Frankel, 2010; Bebbington et al., 2020).

Framework for Economic Transformation of Riau Province: from Resource-Based Economy to Economic Complexity

Based on the analysis of basic sectors and the dynamics of sector development, the economic transformation of Riau Province can be understood as a process of shifting from a resource-based economy to a more diverse and complex economic structure. In the initial stages, a resource-based economy provides a comparative advantage through the availability of superior commodities, plantations, agriculture, fisheries, and mineral resources. However, the sustainability of its development depends on the region's ability to build intersectoral linkages and increase economic added value.

This study understands Riau's economic transformation through four conceptual stages as illustrated in Figure 1.

Figure 1. Conceptual Framework of Transformation from Resource-Based Economy to Economic Complexity in Riau Province



Source: Developed based on Hidalgo and Hausmann (2009), Boschma (2017), and research analysis results.

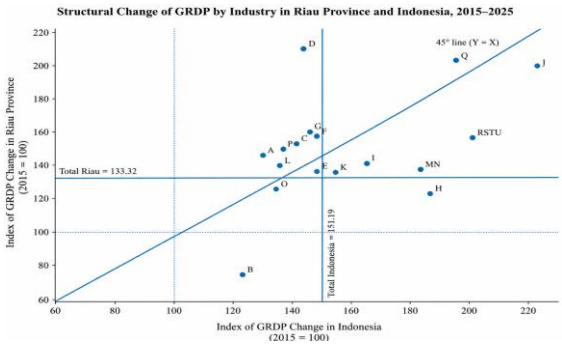
This framework demonstrates that economic transformation does not mean directly replacing old sectors with new ones, but rather enhancing existing economic capabilities through related diversification. Boschma (2017) explains that regions tend to diversify successfully when new sectors are connected to existing knowledge bases and production capabilities. In the context of Riau, the agricultural and processing sectors have significant potential to drive transformation because they have strong production links, the development of palm oil-based industries, processed food products, bioindustry, and natural resource-derived industries are concrete examples of how basic sectors can evolve into more complex economic activities.

DISCUSSION

Transformation of Riau's Economic Structure Based on Changes Relative to Indonesia

The LQ-DLQ analysis does depict the position of Riau's economic sectors, but it does not fully explain the direction of changes in its economic structure. This study therefore complements it with an analysis of changes in the structure of GRDP, comparing Riau's sectoral development with Indonesia's from 2015 to 2025, as visualized in Figure 2.

Figure 2. Structural Transformation Curve of GRDP by Business Sector in Riau Province Compared to Indonesia, 2015–2025



Source: GRDP/GDP data by industry, BPS (2015–2025).

Note: The letter codes on the curve refer to BPS's 17 standard industry categories; the complete legend is available in the research data file.

The curve shows the relative position of each sector based on changes in the GRDP index. Sectors located above the diagonal line (Y = X) grew faster in Riau than the same sectors nationally. The analysis shows that the Agriculture, Forestry, and Fisheries sector experienced relative strength, with a change index of 147.0, higher than Indonesia's 131.7. The Manufacturing Industry showed a similar pattern, with a change index of 153.3 for Riau compared to 142.5 for Indonesia.

These findings reinforce the LQ-DLQ findings that these two sectors are the main drivers of Riau's economic transformation. Their faster growth compared to the national average indicates stronger adaptation and development capabilities within the regional economic structure. Conversely, the Mining and Quarrying sector experienced a striking relative decline: its change index in Riau was only 74.7, well below the national average of 123.7, confirming that mining's role in Riau's economic structure is declining compared to the national trend.

Transformation Matrix of the Economic Structure of Riau Province

Integrating the results of LQ, DLQ, and changes in economic structure, Riau's economic sectors can be grouped based on their transformation positions, as presented in Table 2.

Table 2. Economic Sector Transformation Matrix of Riau Province Based on the Combination of LQ and DLQ

Category	Leading Sector	Declining Established Sector	Emerging Sector	Supporting Sector
Criteria	LQ > 1 and DLQ > 1	LQ > 1 and DLQ < 1	LQ < 1 and DLQ > 1	LQ < 1 and DLQ < 1
Sector	Agriculture, Forestry, and Fisheries; Processing Industry	Mining and Quarrying	Construction; Trade; Information and Communication	Transportation; Financial Services; Corporate Services
Implications of Transformation	The main driver of economic transformation	Requires transition and diversification strategies	Potential to be a new source of growth	Transformation supporting infrastructure

Source: Researcher's processed results based on Table 3 and classification criteria in Table 2.

This classification confirms that Riau's economic transformation is not solely determined by the sector with the largest contribution, but rather by the sector's ability to create broader economic linkages.

Implications of Economic Development Policy in the Riau Region

The findings suggest five policy priorities for Riau's economic development. First, policies should strengthen the downstreaming of agriculture and manufacturing through innovation, technology adoption, and value-added industrial development. Second, regional authorities need to reduce dependence on extractive activities by directing investment toward sectors with stronger growth prospects and greater potential to increase economic complexity. Third, strengthening intersectoral linkages among agriculture, manufacturing, trade, logistics, and services is essential for building a more productive and diversified regional economy.

Fourth, economic transformation requires adequate fiscal and institutional capacity. Effective decentralization depends on sound planning, budgeting, and public investment management. Azis et al. (2022) highlight the role of fiscal decentralization in Riau's economic growth, while Rineliana et al. (2025) demonstrate the influence of regional revenues and government transfers on capital expenditure capacity. Fifth, strengthening human capital, innovation, and technological capabilities is essential to meet the workforce requirements of manufacturing, information technology, and modern services. Overall, Riau's

development strategy should shift from resource exploitation toward value creation, innovation, and interconnected sectoral diversification.

CONCLUSION

This study examines regional economic development and structural transformation in Riau Province during 2015–2025 using Location Quotient (LQ), Dynamic Location Quotient (DLQ), and GRDP structural change analysis. The findings confirm that Riau's economy remains resource-based but is gradually shifting toward a more diversified, value-added structure. Agriculture, Forestry, and Fisheries; Mining and Quarrying; and Manufacturing constitute the economic base, although their development prospects differ. Agriculture and Manufacturing emerge as both leading and prospective sectors, with LQ and DLQ values above one, while Mining and Quarrying retains its basic-sector status but exhibits weakening relative competitiveness. Structural change analysis further confirms that Agriculture and Manufacturing grow faster than their national counterparts, indicating a gradual shift toward more productive activities.

From the perspectives of economic complexity and related variety, Riau's transformation requires strengthening existing productive capabilities rather than abandoning resource-based sectors. Agriculture and natural resources can support the expansion of manufacturing, agro-industry, trade, and services through stronger intersectoral linkages. The study contributes by demonstrating that regional development depends not merely on identifying leading sectors but also on transforming comparative advantages into more complex productive capabilities. Accordingly, downstream industrialization, innovation, and integrated sectoral, institutional, and fiscal policies are essential to achieving a more diversified, higher-value-added, and resilient regional economy.

This study has four limitations. First, sectoral GRDP data do not directly measure economic complexity, innovation, or production linkages; therefore, economic complexity serves as an interpretive framework rather than an empirical index. Second, LQ and DLQ do not fully capture input–output relationships, labor productivity, or multiplier effects. Future research could integrate Input–Output, Social Accounting Matrix (SAM), and Economic Complexity Index (ECI) approaches. Third, the 2015–2025 observation period may not adequately capture long-term influences such as commodity price fluctuations, energy policies, climate change, and international trade. Longer time series and district/city-level panel data would provide deeper insights. Fourth, treating Riau as an aggregate unit overlooks differences among coastal, urban, and plantation-based economies. Further analysis at the district/city level could generate more spatially specific policy recommendations. Despite these limitations, this study provides an integrated understanding of resource-based regional transformation and offers empirical insights for promoting diversification, higher value added, and sustainable economic development in Riau Province.

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