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Original Article

The Rationality of West Sumatra RPJPD Targets 2025-2045: An Analysis of Science, Technology, Innovation, and Economic Productivity Goals

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Abstract

This study analyzes the rationality of development targets outlined in the West Sumatra RPJPD 2025-2045, focusing on goals in the fields of science and technology (IPTEK), innovation, and economics. The indicators examined include the manufacturing industry GDP ratio, tourism development, creative economy, MSME productivity, entrepreneurship, BUMD performance, formal job creation, female labor force participation, and regional innovation index. The analysis reveals that some targets, such as the non-agricultural MSME GDP proportion and female labor force participation, are considered realistic as they align with historical trends. However, other targets, such as the manufacturing industry GDP ratio, tourism development, and entrepreneurship, are deemed highly ambitious as they require growth rates far exceeding historical averages. Achieving these targets will require progressive policies, significant investments, and synergy between the government, society, and the private sector. This study provides critical insights for evaluating the realization of future development targets.

Keywords: West Sumatra RPJPD, Science and Technology, Innovation, Economic Productivity, MSMEs, Entrepreneurship, Tourism, Female Participation.

1. Introduction

The Regional Long-Term Development Plan (RPJPD) is a critical instrument for planning sustainable regional development (Keban, 2019). It serves as a guideline for regional governments in formulating integrated development policies and programs aligned with long-term development visions and missions. According to Law No. 25 of 2004 on the National Development Planning System, the RPJPD must be designed to achieve sustainable national and regional development goals. It not only lays the foundation for achieving economic, social, and cultural development objectives but also aims to improve overall quality of life, reduce inter-regional disparities, and accelerate equitable and sustainable development (Bappenas, 2020).

The West Sumatra RPJPD for the 2025-2045 period sets out 17 goals, one of which focuses on science and technology (IPTEK), innovation, and economic productivity. Its indicators include the manufacturing industry GDP ratio, tourism development, creative economy GDP proportion, MSME productivity, cooperatives, regional-owned enterprises (BUMD), decent job creation, female labor force participation rate, and regional innovation

index. Each of these indicators plays a vital role in enhancing West Sumatra's economic competitiveness, fostering the growth of emerging sectors, and empowering communities to drive the regional economy (Pemerintah Sumatera Barat, 2024).

One of the key challenges facing West Sumatra is the low level of application of science, technology, and innovation in the economic sector (Esti, 2021). Despite abundant natural resources, the region has yet to fully utilize technological advancements and innovations to boost economic productivity. Data from BPS Sumatera Barat (2023) indicates that the contribution of the industrial sector to West Sumatra's GDP remains relatively low compared to other provinces in Indonesia. For example, in the agricultural sector, the use of efficient technology is still limited, resulting in suboptimal production outcomes (Saraan & Rambe, 2023). Thus, achieving the IPTEK, innovation, and economic productivity targets in the RPJPD is essential for creating a more advanced and competitive economy.

West Sumatra holds a strategic position to enhance its competitiveness through the development of Science and Technology, innovation, and economic productivity. Its proximity to international trade routes, coupled with its rich natural resources and human capital, offers significant opportunities to advance technology-based economic sectors. According to a report by Bappeda Sumatera Barat (2023), the creative and tourism industries are two sectors that can be strengthened through technology and innovation. By leveraging technology and fostering a culture of innovation, West Sumatra can optimize economic productivity and improve community welfare.

This study employs a document content analysis approach, enabling an in-depth examination of regional development goals, indicators, and policy directions. Unlike previous studies that predominantly focus on macro-development aspects, this research emphasizes the integration of detailed performance indicators (Santoso, 2016). It also compares development target achievements in previous periods, providing a historical context to assess the effectiveness of RPJPD implementation in West Sumatra and identifying trends of progress or decline. By analyzing prior achievements, this study offers critical insights into the strengths and weaknesses of regional development policies while enriching existing analyses with concrete comparative data.

Focusing on goals in the fields of science and technology (IPTEK), innovation, and economics, this study analyzes the rationality of development targets outlined in the West Sumatra RPJPD 2025-2045. The findings of this research are expected to contribute significantly to the formulation of better development policies in West Sumatra and serve as a basis for designing strategic programs to achieve RPJPD targets.

2. Literature Review

2.1. The Concept of Development Planning

The Regional Long-Term Development Plan (RPJPD) plays a vital role in determining the direction of sustainable regional development by integrating economic, social, and cultural sectors. The RPJPD in West Sumatra is aligned with the National Long-Term Development Plan (RPJPN) to ensure consistency with national policies and to accelerate the utilization of regional potential through flagship programs (Bappeda Sumatera Barat, 2023).

A science and technology (IPTEK) and innovation-based approach is essential to enhance regional competitiveness. Research by Durmuşoğlu & Barczak (2011) indicates that the application of IPTEK can improve production efficiency and open new market opportunities, while Bappeda West Sumatra (2023) highlights that the development of IPTEK and innovation can strengthen the creative industry and tourism sectors.

2.2. Economic Productivity

Economic productivity is influenced by education, infrastructure, and technological adoption (Zen & Lestari, 2022). Kazaz et al. (2008) found that education and workforce skills significantly impact productivity, whereas BPS Sumatera Barat (2023) asserts that improved infrastructure can drive productivity in West Sumatra's key sectors.

Research by Hellegers et al. (2011) reveals that regions adopting technology tend to achieve higher productivity, and BPS Sumatera Barat (2023) notes that the industrial and tourism sectors in West Sumatra hold considerable potential for boosting economic productivity.

2.3. Innovation and Technological Development

Innovation plays a crucial role in creating regional competitive advantages. Shafaeddin (2016) argues that sustained innovation in key economic sectors enhances competitiveness, while Fundeanu and Badele (2014) demonstrate that innovation within the creative industry can improve regional competitiveness.

The success of innovation is measured by its contribution to competitiveness and GDP. Tödtling and Trippl (2005) emphasize that regions capable of adapting to technology and market demands can measure the success of their innovations. Additionally, Bappeda West Sumatra (2023) states that innovation in tourism and small and medium industries can strengthen regional competitiveness.

3. Methods

3.1. Research Approach

This study employs a qualitative approach to analyze the core objectives of science and technology (IPTEK), innovation, and economic productivity in the Regional Long-Term Development Plan (RPJPD) of West Sumatra 2025–2045. A qualitative approach was chosen because the primary aim of this research is to understand, explore, and delve into various aspects of the RPJPD related to achieving regional development targets. This approach also provides in-depth insights into the implementation of policies based on IPTEK, innovation, and economic productivity.

3.2. Data Sources

The study utilizes a qualitative approach with secondary data to analyze the core objectives of IPTEK, innovation, and economic productivity in the RPJPD of West Sumatra 2025–2045. This approach was chosen to identify and evaluate the successes and challenges in achieving regional development objectives by using available data sources, such as policy documents, annual reports, and other related publications.

3.3. Data Analysis

Three primary analytical techniques are employed in this study to evaluate the implementation of the core objectives of the RPJPD of West Sumatra 2025–2045 regarding IPTEK, innovation, and economic productivity:

1. Historical Data Analysis

Following the performance indicator analysis, historical data analysis is conducted to identify trends and patterns of change in the sectors related to IPTEK, innovation, and economic productivity over previous periods. The data used for this analysis are obtained from

annual reports by BPS, Bappeda, and other relevant institutions, covering information from the past ten years or more.

The objectives of historical data analysis are to:

a) Assess trends in the adoption of technology and innovation in related sectors.
b) Identify patterns in the growth of economic productivity and the contribution of high-technology sectors to GDP.
c) Develop an overview of the successes or failures of past policies in advancing these sectors.
d) Reveal factors contributing to changes or stagnation in these achievements.

2. Calculating Annual Growth Rate

To calculate the annual growth rate (AGR) over a period, the Compound Annual Growth Rate (CAGR) formula is utilized:

$$CAGR = \frac{A^{\frac{1}{n}}}{P} - 1$$

Where:
A = Final value (e.g., the value at the end of the period).
P = Initial value (e.g., the value at the start of the period).
n = Number of years or periods (the total duration).

3. Analysis of Potential and Challenges

The analysis of potential and challenges aims to evaluate the internal and external conditions that may influence the achievement of development targets in West Sumatra. This analysis encompasses the region's economic potential, such as natural resources, key sectors, as well as social, political, and infrastructure conditions that support the development of science and technology (IPTEK), innovation, and economic productivity.

4. Rationality of Targets

The rationality of targets represents the final step in this analysis, focusing on assessing the extent to which the targets set in the RPJPD 2025-2045 related to IPTEK, innovation, and economic productivity are realistic and achievable. The rationality of targets is evaluated based on several criteria, including consistency with historical trends to ensure that expected achievements do not deviate too far from previous development patterns. Technical feasibility is also an important consideration, taking into account the availability of resources and existing capacity to support target implementation. In addition, targets must be economically realistic, including an analysis of the level of investment required and relevant supporting policies. Finally, the contribution of the target to the strategic objectives of regional development is a determining factor, ensuring that the achievement of the target supports the long-term vision and mission of development in West Sumatra.

4. Results and Discussion

4.1. Research Results

4.1.1. Indicator: Manufacturing Industry GDP Ratio

1. Historical Data Analysis

The historical growth rate during the 2010–2022 period was approximately -1.01% per year (annual decline). The target to increase the manufacturing industry GDP ratio from

8.46% in 2025 to 11.55% in 2045 indicates the need for significant growth. This highlights the necessity for intensive measures to drive growth in this sector beyond the historical average.

2. Required Growth Rate

$$CAGR = \frac{11{,}92^{\frac{1}{20}}}{8{,}46} - 1$$
$$CAGR = 1{,}0173 - 1 = 0{,}0173$$
$$CAGR = 1{,}73\%$$

This indicates that an average annual growth rate of approximately 1.73% is needed to achieve the target, which is significantly higher than the historical average.

3. Target Rationality

The manufacturing industry GDP ratio target of 11.55%–11.92% by 2045 in the RPJPD of West Sumatra requires an average growth rate of approximately 1.73% per year. Compared to the historical growth average of -1.01% per year (annual decline), this implies an **upper-value** target. Achieving such a shift from a historical decline of -1.01% per year to positive growth of 1.73% per year necessitates significant structural improvements. This target is rational if supported by strategic policies, such as increasing investments, regulatory reforms, strengthening technological innovation, and improving human resource quality. However, if these challenges are not addressed optimally, the target may be deemed less realistic.

4.1.2. Indicator: Tourism Development

a. GDP Ratio of Accommodation Provision

1. Historical Data Analysis

The contribution of the accommodation provision sector in West Sumatra, including hotels, lodging, and related tourism sectors, is influenced by the volume of domestic and international tourist visits. Based on historical data, the sector's contribution to GDP was approximately 1.2% in 2010, declined to 1.1% in 2020 due to the COVID-19 pandemic, and slightly increased to 1.3% in 2022 despite the limited recovery of the tourism sector. This data indicates fluctuations influenced by external factors, such as the pandemic, and internal factors, including infrastructure development and tourism appeal. In 2022, the contribution of the accommodation and food and beverage sector to West Sumatra's GDP was recorded at around 1.12%. Although the contribution remains small, this sector is expected to continue growing along with the post-pandemic recovery of the tourism sector.

2. Required Growth Rate

$$CAGR = \frac{2{,}43^{\frac{1}{20}}}{1{,}43} - 1$$
$$CAGR = 1{,}0309 - 1 = 0{,}0309$$
$$CAGR = 3{,}09\%$$

To achieve the 2045 target of 2.43%, the accommodation provision sector in West Sumatra requires an average annual growth rate of 3.09%.

3. Target Rationality

The target GDP ratio of 2.43% for accommodation provision in 2045 in West Sumatra's RPJPD requires an average growth rate of approximately 3.09% per year, almost three times the historical growth average of around 1.12% per year. This indicates an **upper-value** target, as it necessitates a nearly threefold increase in growth compared to the historical average. Achieving this target requires ambitious strategic measures. The target is deemed rational if supported by the development of flagship tourism destinations, increased accommodation

and service capacity, intensive tourism promotion, and improvement of supporting infrastructure.

b. Number of International Tourists

1. Historical Data Analysis

The contribution of the accommodation provision sector in West Sumatra, influenced by domestic and international tourist volumes, exhibited similar trends as previously noted. From 1.2% in 2010, it decreased to 1.1% in 2020 due to COVID-19 and slightly increased to 1.3% in 2022, reflecting both external and internal factors affecting tourism recovery.

2. Required Growth Rate

$$CAGR = \frac{500.000^{\frac{1}{20}}}{60.000} - 1$$
$$CAGR = 1{,}118 - 1 = 0{,}118$$
$$CAGR = 11{,}8\%$$

To achieve the target of 500,000 international tourists by 2045, West Sumatra's tourism sector requires an average annual growth rate of 11.8%.

3. Target Rationality

The target of 500,000 international tourists by 2045 necessitates an average annual growth rate of approximately 11.8%. Compared to the historical growth average of 1.12% per year, this target represents a highly ambitious or upper-value goal, requiring a more than tenfold increase in average annual growth compared to historical trends. Achieving this target demands a significant transformation of the tourism sector. The target is rational if supported by large-scale investments in infrastructure, aggressive international promotion, and comprehensive government policies. Enhancing human resources in the tourism sector through training and education, as well as focusing on halal tourism and cultural tourism, could strengthen the sector's appeal to international tourists.

4.1.3. Indicator: Proportion of Creative Economy GDP to National Creative GDP

1. Historical Data Analysis

Over the past decade, the contribution of the creative economy sector to West Sumatra's GDP has fluctuated. In 2010, the sector contributed approximately 0.8%, increasing slightly to 0.95% in 2015 but declining to 0.85% in 2020 due to the COVID-19 pandemic, which affected sub-sectors such as tourism and performing arts. By 2022, the sector began to recover, contributing around 1.0% to GDP. Overall, from 2010 to 2019, the sector's contribution increased gradually, though not significantly, before experiencing a sharp decline during the pandemic in 2020-2021. The historical average growth rate of the creative economy sector's contribution to West Sumatra's GDP from 2010 to 2022 was approximately 1.88% per year. However, fluctuations such as the sharp decline during the pandemic impacted the stability of this growth.

2. Required Growth Rate

$$CAGR = \frac{13{,}18^{\frac{1}{20}}}{1{,}11} - 1$$
$$CAGR = 1{,}003 - 1 = 0{,}003$$
$$CAGR = 0{,}3\%$$

To achieve the 2045 target of 1.18%, the creative economy sector in West Sumatra requires an average annual growth rate of 0.3%.

3. Target Rationality

The 2045 target of 1.18% for the proportion of West Sumatra's creative economy GDP to Indonesia's national creative GDP requires an average annual growth rate of approximately 0.3%. Compared to the historical average growth rate of 1.88% per year, this target is considered undervalued, as the required growth rate of 0.3% per year is significantly lower than the historical average of 1.88% per year. Maintaining or slightly improving the historical growth trend should make this target relatively easy to achieve. For the target to be more rational, the contribution of the creative economy sector should be increased to reflect its higher growth potential. This is especially important considering the sector's critical role in driving innovation, creating jobs, and diversifying the economy in West Sumatra.

4.1.4. Productivity of MSMEs, Cooperatives, and Regional-Owned Enterprises (BUMD)

a. Proportion of Small and Medium Enterprises (SMEs)

- Proportion of Non-Agricultural SMEs

1. Historical Data Analysis

The proportion of non-agricultural SMEs to West Sumatra's GDP has fluctuated over the past decade, with an average historical growth of approximately 0.76% per year. In 2010, the proportion stood at 5.2%, rising to 5.6% in 2015 due to supportive policies such as the People's Business Credit (KUR). The COVID-19 pandemic in 2020 caused the proportion to decline to 5.3% due to reduced demand but recovered to 5.7% in 2022, driven by digitalization and economic stimulus programs. This recovery highlights the potential for higher growth with the right supportive policies.

2. Required Growth Rate

$$CAGR = \frac{13{,}11^{\frac{1}{20}}}{11{,}15} - 1$$

$$CAGR = 1{,}008 - 1 = 0{,}0081$$

$$CAGR = 0{,}81\%$$

To achieve the 2045 target of 13.11%, non-agricultural SMEs in West Sumatra require an average annual growth rate of 0.81%.

3. Target Rationality

The 2045 target of 13.11% for non-agricultural SMEs' contribution to West Sumatra's GDP is considered rational and realistic, requiring only slight acceleration compared to the historical growth trend of 0.76% per year. With policies focused on market access, digitalization, and product innovation, this target can be sustainably achieved.

- Proportion of SMEs at the Provincial Level

1. Historical Data Analysis

The contribution of Small and Medium Industries (SMIs) to West Sumatra's GDP has fluctuated over the past decade. In 2010, the contribution was around 2.8%, driven by sectors such as food processing and handicrafts. By 2015, this increased to 3.1% due to government support for agribusiness-based and creative industries. However, the COVID-19 pandemic caused a significant decline to 2.7% in 2020 due to supply chain disruptions and reduced market demand. By 2022, contributions rose to 3.0%-3.2%, though recovery remains incomplete. From 2010 to 2019, the annual growth of SMI contributions was moderate at 0.1%-0.2% per year, interrupted by the pandemic, with recovery beginning in 2022.

2. Required Growth Rate

$$CAGR = \frac{5{,}09^{\frac{1}{20}}}{3{,}53} - 1$$
$$CAGR = 1{,}0184 - 1 = 0{,}0184$$
$$CAGR = 1{,}84\%$$

To achieve the 2045 target of 5.09%, SMIs in West Sumatra require an average annual growth rate of 1.84%.

3. Target Rationality

The 2045 target of 5.09% for SMIs' contribution to GDP is considered **ambitious**. It requires an annual growth rate of 1.84%, significantly higher than the historical growth of 0.1%-0.2% per year. Achieving this will demand significant efforts, including improved access to capital, strengthened infrastructure, enhanced market capabilities, and effective policy support. Aggressive and coordinated strategies, such as SME empowerment, competitiveness enhancement, and broader market development, are essential for achieving this target.

b. Entrepreneurship Ratio at the Provincial Level

1. Historical Data Analysis

West Sumatra's entrepreneurship ratio has grown moderately over the past decade, despite challenges from the COVID-19 pandemic. In 2010, the ratio was estimated at 2.1%, dominated by sectors such as culinary, handicrafts, and small trade. By 2015, it increased to 2.6%, driven by local government entrepreneurship programs. The pandemic reduced the ratio to 2.3% in 2020 as many small businesses ceased operations. In 2022, the ratio rebounded to 2.9% due to post-pandemic economic recovery, supported by programs like People's Business Credit (KUR) and entrepreneurship incentives. The average historical growth rate of the entrepreneurship ratio is estimated at 2.81% per year, reflecting a positive trend despite fluctuations.

2. Required Growth Rate

$$CAGR = \frac{9{,}39^{\frac{1}{20}}}{3{,}59} - 1$$
$$CAGR = 1{,}0479 - 1 = 0{,}0479$$
$$CAGR = 4{,}79\%$$

To achieve the 2045 target of 9.39%, West Sumatra's entrepreneurship ratio requires an average annual growth rate of 4.79%.

3. Target Rationality

The 2045 target of 9.39% for the entrepreneurship ratio is ambitious, requiring annual growth of 4.79%, almost double the historical growth rate of 2.81%. To achieve this, strategic breakthroughs are necessary, such as expanding entrepreneurship programs, improving access to financing, developing startup ecosystems, and strengthening entrepreneurship education at all levels. With consistent implementation of these steps, the target is achievable, though it will require substantial effort beyond historical growth trends.

c. Cooperative Business Volume Ratio to GDP

1. Historical Data Analysis

The cooperative business volume ratio to GDP in West Sumatra has fluctuated over the past decade. In 2010, the ratio was around 0.9%, primarily driven by cooperatives in agriculture, trade, and savings and loans. By 2015, it increased to 1.0% due to growth in savings and agribusiness cooperatives, despite low member participation rates. The COVID-19

pandemic caused the ratio to drop to 0.85% in 2020, as many small cooperatives faced management and capital constraints. By 2022, economic recovery pushed the contribution to approximately 1.1%, particularly in agricultural and savings cooperatives. The average historical growth rate is estimated at 2.03% per year, indicating stable growth potential despite pandemic disruptions.

2. Required Growth Rate

$$CAGR = \frac{3{,}46^{\frac{1}{20}}}{1{,}24} - 1$$
$$CAGR = 1{,}0538 - 1 = 0{,}0538$$
$$CAGR = 5{,}38\%$$

To achieve the 2045 target of 3.46%, the cooperative business volume ratio to GDP requires an average annual growth rate of 5.38%.

3. Target Rationality

The 2045 target of 3.46% for the cooperative business volume ratio to GDP is **very** ambitious, requiring an annual growth rate of 5.38%, more than double the historical growth rate of 2.03%. Achieving this target will require aggressive strategies, such as strengthening cooperative capacity through digitalization, increasing access to capital, developing community-based cooperatives, and diversifying cooperative businesses into higher value-added sectors. Without significant breakthroughs, the target may be difficult to achieve given historical challenges and fluctuations.

d. Return on Assets (ROA) of BUMD

1. Historical Data Analysis

Return on Assets (ROA) measures the efficiency of Regional-Owned Enterprises (BUMD) in generating profits from total assets. Historical estimates for West Sumatra's BUMD show fluctuations: in 2010, ROA was around 1.2%, supported by the energy, water, and local transportation sectors, despite management issues. By 2015, ROA increased to 1.5% due to improved financial services revenue and asset management. The COVID-19 pandemic caused a decline to 1.0%-1.2% in 2020, but economic recovery by 2022 increased ROA to an estimated 1.6%-1.8%, driven by asset management reforms and business diversification. Historical average growth is estimated at 2.72% per year, reflecting stable trends before the pandemic, with room for improvement through innovation and operational efficiency.

2. Required Growth Rate

$$CAGR = \frac{4{,}81^{\frac{1}{20}}}{1{,}92} - 1$$
$$CAGR = 1{,}0473 - 1 = 0{,}0473$$
$$CAGR = 4{,}73\%$$

To achieve the 2045 target of 4.81%, West Sumatra's BUMD ROA requires an average annual growth rate of 4.73%.

3. Target Rationality

The 2045 target of 4.81% for BUMD ROA is ambitious, requiring an annual growth rate of 4.73%, nearly double the historical rate of 2.72%. Achieving this will require significant improvements in operational efficiency, business innovation, management reforms, and diversification into high-value sectors. Without transformative changes in asset management and profit optimization, this target may be challenging to achieve given historical constraints.

4.1.5. Indicators of Quality Job Creation

a. Open Unemployment Rate (OUR)

1. Historical Data Analysis

The Open Unemployment Rate (OUR) in West Sumatra has shown fluctuations over the last decade. In 2010, the OUR was estimated at around 6.5%, with the informal sector absorbing most of the workforce. By 2015, it had decreased to 5.8% due to growth in the tourism, trade, and agribusiness sectors. However, the OUR rose to 7.2% in 2020 as a result of the COVID-19 pandemic, which severely impacted tourism, transportation, and small industries. By 2022, it had fallen back to 6.2%, driven by economic recovery and job creation in the service and trade sectors. Overall, the historical average reduction in OUR in West Sumatra is approximately -0.43% per year, reflecting a moderate decline trend despite the disruption caused by the pandemic.

2. Required Reduction

$$CAGR = \frac{3{,}03^{\frac{1}{20}}}{5{,}76} - 1$$

$$CAGR = 0{,}9735 - 1 = 0{,}0265$$

$$CAGR = -2{,}65\%$$

To achieve the target of 3.03% by 2045, OUR in West Sumatra must decrease by an average of -2.65% annually, from a baseline of 5.76% in 2025.

3. Target Rationality

The target OUR of 3.03%–4.03% by 2045 requires an annual reduction rate of -2.65%. Compared to the historical reduction rate of -0.43% per year, this target is ambitious and represents an upper value. Achieving this would necessitate aggressive strategic interventions, including improved education and vocational training, development of labor-intensive sectors, expansion of investments in creative industries and technology, and stronger workforce empowerment programs. Without significant interventions, the target may be difficult to meet given historical trends.

b. Proportion of Formal Job Creation

1. Historical Data Analysis

The proportion of formal job creation in West Sumatra has fluctuated over the last decade. In 2010, the formal employment proportion was around 30%, dominated by the informal sector, particularly in agriculture, crafts, and small trade. By 2015, it had risen to 32% due to growth in the industrial, service, and tourism sectors, as well as government programs encouraging informal-to-formal job transitions. However, in 2020, the proportion dropped to 28% due to the COVID-19 pandemic's impact on the formal sector. In 2022, it rebounded to 34%, aided by economic recovery and the reopening of tourism, education, and the digitalization of MSMEs. Overall, the historical average growth rate for formal employment proportion is estimated at 1.38% per year, showing a steady upward trend despite pandemic-related disruptions.

2. Required Growth

$$CAGR = \frac{70^{\frac{1}{20}}}{38} - 1$$

$$CAGR = 1{,}0357 - 1 = 0{,}0357$$

$$CAGR = 3{,}57\%$$

To reach the target of 70% by 2045, the proportion of formal job creation in West Sumatra must grow by an average of 3.57% annually.

3. Target Rationality

The target of 70% for formal job creation by 2045 requires an annual growth rate of 3.57%. Compared to the historical growth rate of 1.38% per year, this target is considered upper value and highly ambitious. Achieving it would require significantly more intensive policies and programs, such as substantial investments in the formal sector, workforce upskilling through education and training, incentives for companies generating formal employment, and economic transformation that supports industrial, service, and technological sector growth. Without strategic interventions, achieving this target is unlikely, given the moderate historical growth trends.

4.1.6. Indicator of Female Labor Force Participation Rate

1. Historical Data Analysis

The Female Labor Force Participation Rate (FLFPR) in West Sumatra has shown fluctuations over the last decade. In 2010, the FLFPR was estimated at around 45%, with a dominance in informal sectors such as agriculture, crafts, and small trade. By 2015, it had increased to 48%, driven by growth in trade, tourism, and manufacturing industries. However, the FLFPR declined to 47% in 2020 due to the COVID-19 pandemic, which caused many women to lose their jobs, particularly in the tourism, education, and healthcare sectors. By 2022, the FLFPR rebounded to 50%, although women remained predominantly involved in informal and non-permanent jobs. Overall, the historical average growth rate of FLFPR in West Sumatra is estimated at 1.11% per year, reflecting stable growth despite the pandemic's disruptions.

2. Required Growth

$$CAGR = \frac{73{,}30^{\frac{1}{20}}}{59{,}41} - 1$$

$$CAGR = 1{,}0109 - 1 = 0{,}0109$$

$$CAGR = 1{,}09\%$$

To achieve the target of 73.30% by 2045, the FLFPR in West Sumatra needs to grow at an average rate of 1.09% per year.

3. Target Rationality

The target FLFPR of 73.30% by 2045 in West Sumatra requires an annual growth rate of 1.09%. Compared to the historical growth rate of 1.11% per year, this target is relatively rational and realistic, as it aligns closely with the historical trend. With appropriate strategies, such as improving women's access to education and skill development, providing more inclusive job opportunities, and strengthening sectors that employ female workers, this target is achievable. However, success will heavily depend on efforts to address structural and social barriers that continue to limit women's participation in the formal labor market.

4.1.7. Indicator: Regional Innovation Index

1. Historical Data Analysis

The Regional Innovation Index (RII) in West Sumatra has shown fluctuating progress over the past decade. In 2010, the RII was estimated at around 60%, dominated by traditional sectors such as agriculture and local crafts with limited innovation. By 2015, the RII increased to 65%, driven by the development of the tourism sector, creative industries, and digital infrastructure, although innovation in technology and manufacturing sectors remained limited. In 2020, the RII decreased to 62% due to the impact of the COVID-19 pandemic, which restricted innovation across many sectors. However, in 2022, the RII rebounded to

69%, supported by economic recovery, digitalization of MSMEs, innovation in tourism products, and improved technological infrastructure. Overall, the historical average growth rate of the RII in West Sumatra is estimated at 1.41% per year, reflecting a growth trend despite disruptions caused by the pandemic.

2. Required Growth

$$CAGR = \frac{80}{72{,}50}^{\frac{1}{20}} - 1$$

$$CAGR = 1{,}1034 - 1 = 0{,}0050$$

$$CAGR = 0{,}50\%$$

To achieve the target of 80% by 2045, the Regional Innovation Index in West Sumatra needs to grow at an average rate of 0.5% per year.

3. Target Rationality Target

The target RII of 80% by 2045 in West Sumatra requires an annual growth rate of 0.5%. Compared to the historical growth rate of 1.41% per year, this target is considered **undervalued**, as it requires a significantly lower growth rate than the historical trend. A more realistic target for the RII in West Sumatra would be around 75% by 2045, necessitating an average growth rate of approximately 1.0% per year. This target aligns better with the historical growth rate and can be achieved through more focused policies to enhance technology, research and development, and strengthen innovation ecosystems across all sectors, particularly in manufacturing and creative industries. With sustained efforts in innovation investment and digitalization, this revised target is more realistic while remaining ambitious.

4.2. Discussion

In analyzing the development targets outlined in the West Sumatera RPJPD 2025-2045, it becomes evident that some targets are considered realistic, while others are deemed overly ambitious or insufficiently challenging.

The target for the processing industry's GRDP ratio, set at 11.55%–11.92% by 2045, requires an average growth rate of 1.73% per year—significantly higher than the historical average decline of -1.01% per year. According to Shafaeddin (2016), competitive advantage can be achieved through continuous innovation in key economic sectors. In West Sumatra, innovation in the development of leading tourism destinations, digitalisation, and international promotion is needed to support this growth. Data from Bappeda West Sumatra (2023) also shows that this sector has great potential if supported by adequate infrastructure.

This highlights the need for substantial investments in technology, infrastructure, and human resource development to enhance the competitiveness of this sector. The target of 500,000 international tourists by 2045 demands an annual growth rate of 11.8%, making it highly ambitious. Achieving this will require a comprehensive strategy encompassing promotion, infrastructure development, and improvements in the quality of tourism services. Research by Kazaz et al. (2008) shows that improving labour skills through education and training contributes significantly to productivity. To achieve this target, West Sumatra needs to expand access to education and skills training for women, especially in the formal sector.

Conversely, the target for the creative economy's GRDP share at 1.18% by 2045 requires an annual growth rate of 0.3%, much lower than the historical average of 1.88% per year. Research by Tödtling and Trippl (2005) suggests that innovation policies that focus on regional needs can increase the sector's contribution. In West Sumatra, the creative economy

sector has great potential to grow more rapidly if given support in the form of innovation ecosystem development and wider market access.

This suggests that the target is suboptimal, given the significant potential of the creative economy in West Sumatra. The target for MSME productivity, aiming for a 13.11% share of non-agricultural GRDP by 2045, necessitates a growth rate of 0.81% per year, which is only slightly higher than the historical average of 0.76%, making it realistic. Meanwhile, the target for entrepreneurship, set at 9.39% by 2045, requires a growth rate of 4.79% per year, significantly higher than the historical average of 2.81%. This underscores the need for intensive policies to enhance entrepreneurial capacity and access to support, such as training and financing. The target for BUMD's ROA, projected at 4.81% by 2045, requires an annual growth rate of 4.73%, exceeding the historical average of 2.72%. This reflects the challenges in improving efficiency and diversifying BUMD operations. For the creation of formal employment opportunities and the improvement of female labor force participation, the targets are considered realistic but will still require policies promoting gender equality and workforce capacity building.

Lastly, the target for the Regional Innovation Index (RII), set at 80% by 2045, requires a growth rate of 0.5% per year, which is lower than the historical average of 1.41%. This indicates that the target could be more ambitious, considering West Sumatra's significant innovation potential supported by technology-driven and research-based policies. Literature by Fundeanu and Badele (2014) highlighted the importance of regional innovation clusters in improving regional competitiveness. By strengthening investment in research and development and building innovation ecosystems in the manufacturing and creative economy sectors, West Sumatra can achieve this target more optimally. Overall, the successful achievement of these targets will require focused strategies, cross-sectoral collaboration, and strengthened sustainable development policies.

Some targets, such as the creative economy's contribution to GDP and TPAK, are quite realistic as they are in line with historical trends. However, other targets, such as the GDP ratio of the manufacturing industry and the number of international tourists, require extraordinary efforts to achieve. Evidence-based policy support, strategic investment, and cross-sector collaboration are key elements to ensure the sustainable achievement of these targets.

This study has limitations that need to be considered to ensure proper interpretation of the results presented. The analysis relies largely on secondary data from official reports, which may not fully reflect current conditions or local variations on the ground. The approaches used, especially growth projections based on historical data, assume the stability of various factors, such as government policies and global economic conditions, which are subject to change. In addition, social and cultural aspects, such as resistance to change or community involvement in achieving development targets, have not been explored in depth in this study. Limited access to up-to-date data for some indicators, such as regional innovation and creative sector contribution, may also affect the depth and accuracy of the analysis. Hence, the results of this study are expected to be an initial guide that needs to be complemented by further research and more comprehensive field data.

5. Conclusion

Based on an analysis of the targets outlined in the Regional Medium-Term Development Plan (RPJPD) for West Sumatra 2025-2045, efforts are needed to maintain momentum towards realistic goals and implement transformative strategies to achieve more ambitious objectives. Actions geared towards goals such as enhancing the contribution of the creative economy to the regional GDP and increasing female labor force participation should focus on sustaining growth through targeted interventions, including improving access to education and creating inclusive employment opportunities. Meanwhile, for more ambitious targets like the share of GDP from manufacturing industry and growth in international tourism, significant steps are required, such as investing in cutting-edge technology, improving infrastructure, and expanding tourism promotion campaigns. Additionally, strengthening entrepreneurship and the contributions of micro, small, and medium enterprises can be achieved through enhancing access to financing, supporting digitization, and capacity development initiatives. Collaborative efforts involving the government, private sector, and communities are crucial for aligning resources and effectively addressing common challenges. Moreover, promoting innovation and research-driven policies will be key to enhancing the Regional Innovation Index and fostering sustainable growth. These recommendations emphasize the importance of a balanced and strategic approach to achieving ambitious development goals in the RPJPD while ensuring inclusivity and competitiveness.

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