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Multi-criteria investment prioritization using AHP: evidence from regional development

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ABSTRACT

Regional investment plays a critical role in promoting sustainable economic development by improving regional competitiveness, generating employment, and supporting long-term economic growth. This study aims to determine strategic investment priorities in Pekanbaru City, Indonesia, using the Analytic Hierarchy Process (AHP) as a multi-criteria decision-making approach. A descriptive quantitative research design was employed, involving twelve experts from government institutions, investment agencies, financial institutions, business associations, and private investors. Primary data were collected through structured interviews and pairwise comparison questionnaires, while secondary data were obtained from official government reports. The analysis evaluated five investment decision criteria, namely policy, economic, technical, environmental, and human resource dimensions. The results reveal that the policy criterion is the most influential factor in investment decision-making, followed by economic, technical, environmental, and human resource criteria. The final AHP synthesis identifies the trade sector as the highest regional investment priority, followed by the services and industry sectors. Sensitivity analysis confirms that the investment ranking remains stable under moderate changes in criterion weights, indicating the robustness of the decision model. The findings provide practical guidance for strengthening regional investment competitiveness through institutional reform, infrastructure development, environmental governance, and human resource capacity building.



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Introduction

A central debate in the regional development literature concerns whether decentralization itself is sufficient to improve regional investment performance or whether investment outcomes are primarily determined by the quality of local governance and institutional capacity (Wiryawan & Otchia, 2022). While decentralization is expected to provide local governments with greater autonomy to design investment policies tailored to regional needs, empirical findings remain inconclusive. Several recent studies report that decentralization can improve regional economic performance through better public investment and infrastructure provision, whereas others argue that weak regulatory quality, fragmented local governance, and limited administrative capacity continue to constrain investment realization (Newman & Hoole, 2024). Consequently, there is still no consensus regarding which institutional and non-economic factors should receive the highest priority in regional investment policy under decentralized governance.

Existing investment-decentralization studies have predominantly examined the relationship between governance quality, fiscal decentralization, infrastructure investment, or foreign direct investment using macroeconomic and econometric approaches. Although these studies provide valuable evidence regarding

the influence of decentralization on investment performance, they generally evaluate individual determinants independently and do not explain how multiple investment criteria should be prioritized simultaneously when regional governments formulate investment strategies (Boyle et al., 2021). In particular, previous studies have not adequately integrated policy, economic, technical, environmental, and human resource dimensions within a single analytical framework capable of producing practical investment priorities for local decision-makers (Boix-Cots et al., 2025). This theoretical and methodological limitation restricts the usefulness of existing findings for regional investment planning.

The empirical gap is particularly evident in Indonesia, where local governments possess greater administrative responsibility following decentralization but continue to experience uneven investment performance across regions. Recent evidence suggests that regulatory quality, institutional capacity, and governance effectiveness remain critical determinants of investment growth, yet relatively few studies have investigated how these factors interact with economic, technical, environmental, and human resource considerations to determine strategic investment priorities at the municipal level (Saleh et al., 2020). Most existing research focuses on explaining investment outcomes rather than identifying the relative importance of competing investment criteria for policy formulation.

Pekanbaru City provides an appropriate empirical setting for addressing this gap because it possesses strong comparative advantages, including its strategic geographical location, expanding commercial activities, and rapidly growing service sector. Despite these strengths, investment realization has not yet fully reflected the city's economic potential due to bureaucratic inefficiencies, regulatory uncertainty, infrastructure constraints, and differences in investor preferences. These conditions indicate that regional investment planning requires a systematic approach capable of evaluating multiple decision criteria simultaneously rather than relying solely on conventional economic indicators.

The Analytic Hierarchy Process (AHP) offers a suitable methodological framework for addressing this challenge because it enables complex policy problems to be decomposed into hierarchical decision structures and transforms expert judgments into measurable priority weights (Saboor et al., 2025). Unlike conventional statistical approaches that primarily identify causal relationships, AHP facilitates the prioritization of alternative investment strategies by integrating qualitative and quantitative considerations within a consistent decision-making framework. Consequently, AHP has been widely adopted in strategic planning and multi-criteria policy evaluation across various development contexts.

Therefore, this study directly addresses the identified theoretical and empirical gap by developing a multi-criteria investment prioritization model that simultaneously evaluates policy, economic, technical, environmental, and human resource dimensions within the context of decentralized regional governance. Using Pekanbaru City as a case study, this research moves beyond explaining the determinants of investment performance to determine which investment criteria and sectors should be prioritized to strengthen regional competitiveness and support sustainable economic development. In doing so, the study contributes to the literature by linking decentralization, investment governance, and multi-criteria decision-making into a single evidence-based analytical framework.

The growing importance of regional investment has become even more apparent following the implementation of fiscal decentralization and regional autonomy policies in Indonesia (Yuwono et al., 2025). Decentralization provides local governments with greater authority to formulate development strategies, allocate public resources, improve public services, and design investment policies according to regional comparative advantages (Talitha et al., 2020). Nevertheless, decentralization also creates intense competition among regions in attracting investors because each local government must independently establish an attractive investment ecosystem supported by effective governance, transparent regulations, and efficient public administration (Lewis, 2023). Previous studies indicate that institutional quality, government effectiveness, regulatory transparency, and policy consistency significantly influence investors' confidence and long-term investment decisions, often outweighing traditional economic indicators such as market size or natural resource availability (Ameli et al., 2020; Hutahayan et al., 2024). Consequently, regional investment policy has evolved beyond financial incentives toward comprehensive institutional reforms that enhance investment competitiveness.

An attractive investment climate depends upon multiple interrelated factors rather than a single economic variable. Investors generally evaluate legal certainty, licensing procedures, infrastructure availability, labor productivity, environmental sustainability, market accessibility, taxation systems, and political stability before selecting investment destinations (Baumli & Jamasb, 2020). The multidimensional nature of investment decisions makes investment planning considerably more complex because policymakers must

balance economic efficiency with social, environmental, and institutional considerations. The World Bank and the Organisation for Economic Co-operation and Development (OECD) consistently emphasize that countries and regions with transparent governance, simplified administrative procedures, and predictable regulatory environments tend to attract significantly higher levels of sustainable investment than those relying solely on fiscal incentives (Wang et al., 2025). Therefore, regional governments require evidence-based decision-support frameworks capable of evaluating multiple investment determinants simultaneously.

Pekanbaru City represents one of Indonesia's rapidly developing urban economies with considerable investment potential. As the capital city of Riau Province, Pekanbaru functions as a strategic center for trade, services, transportation, education, and business activities. Its advantageous geographical location along major economic corridors, expanding infrastructure, growing population, and relatively dynamic regional economy provide favorable conditions for investment expansion. Moreover, the city's economic structure is increasingly dominated by commerce and service industries, creating substantial opportunities for private sector participation (Surya et al., 2021). However, despite these comparative advantages, investment realization has not yet fully reflected the city's economic potential due to persistent challenges, including bureaucratic complexity, inconsistent regulatory implementation, infrastructure constraints, and varying investor preferences regarding business risks and expected returns (Anguelov, 2024). These conditions suggest that investment promotion should be supported by systematic strategic prioritization rather than relying solely on sectoral potential.

The complexity of regional investment planning necessitates analytical approaches capable of integrating diverse evaluation criteria into a comprehensive decision-making framework. Conventional investment analyses generally focus on financial feasibility or macroeconomic indicators while overlooking qualitative aspects such as governance quality, institutional readiness, environmental sustainability, and stakeholder preferences (Ghaemi Asl, 2025). Multi-Criteria Decision-Making (MCDM) methods have therefore gained increasing attention because they allow policymakers to evaluate alternative investment scenarios using multiple economic and non-economic criteria simultaneously (Boix-Cots et al., 2025). Among various MCDM techniques, the Analytic Hierarchy Process (AHP), originally developed by Saaty, has become one of the most widely applied methods in strategic planning, infrastructure prioritization, environmental management, public policy, and regional development due to its systematic hierarchical structure and ability to transform expert judgments into quantitative priority weights.

The Analytic Hierarchy Process offers several methodological advantages compared with conventional evaluation approaches (Jamwal et al., 2021; Yannis et al., 2020). AHP decomposes complex decision problems into hierarchical levels consisting of objectives, criteria, sub-criteria, and alternatives, enabling decision-makers to conduct structured pairwise comparisons among competing factors. Furthermore, AHP incorporates consistency testing through the Consistency Ratio (CR), ensuring that expert judgments remain logically coherent throughout the evaluation process (Frish et al., 2025). Numerous international studies have demonstrated the effectiveness of AHP in investment selection, infrastructure prioritization, sustainable urban planning, renewable energy development, and regional policy formulation because of its flexibility in combining qualitative judgments with quantitative information while maintaining analytical transparency (Tan & Solangi, 2024; Ventura et al., 2025; Zaheb et al., 2024). Consequently, AHP provides an appropriate methodological framework for identifying strategic regional investment priorities under conditions characterized by multiple objectives and competing stakeholder interests.

Based on the foregoing discussion, there remains a need for empirical research that systematically identifies regional investment priorities by simultaneously considering policy, economic, technical, environmental, and human resource dimensions (Ekinci, 2025). Existing studies in Indonesia have predominantly emphasized individual determinants of investment attractiveness without integrating these factors into a unified decision-support framework capable of generating practical policy priorities (Alfaqeeh et al., 2025). This study addresses that gap by applying the Analytic Hierarchy Process to determine strategic investment priorities in Pekanbaru City. The findings are expected to contribute theoretically to the literature on regional investment decision-making and practically to local governments seeking evidence-based investment policies that enhance regional competitiveness, improve investment governance, and promote sustainable economic development.

Previous studies on regional investment have predominantly emphasized economic indicators such as market size, economic growth, investment returns, and infrastructure availability as the primary determinants of investment attractiveness (Islam & Beloucif, 2024; Rodionov et al., 2021). Although these variables are important, they do not fully capture the complexity of investment decision-making, which also involves policy consistency, institutional quality, environmental sustainability, technical feasibility, and

human resource capacity (Zhang et al., 2025). As a result, many existing studies provide only a partial understanding of the factors influencing regional investment priorities.

In addition, research applying Multi-Criteria Decision-Making (MCDM) methods, particularly the Analytic Hierarchy Process (AHP), has mainly focused on infrastructure planning, supplier selection, energy management, and environmental assessment. Comparatively fewer studies have employed AHP to establish strategic regional investment priorities by integrating policy, economic, technical, environmental, and human resource dimensions into a single comprehensive decision-making framework (Szabo et al., 2021). This methodological gap limits the ability of policymakers to formulate balanced and evidence-based investment strategies.

Furthermore, empirical evidence regarding investment prioritization at the municipal level in Indonesia remains limited, especially for rapidly developing cities such as Pekanbaru. Most previous studies have been conducted at the national or provincial level, providing limited guidance for local governments facing unique regional characteristics and investment challenges (Seymour et al., 2020; Wadipalapa et al., 2024; Wijatmoko et al., 2023). Therefore, this study addresses the existing gap by applying the Analytic Hierarchy Process (AHP) to identify strategic investment priorities in Pekanbaru City through a comprehensive evaluation of multiple decision criteria.

This study aims to examine the strategic priorities of regional investment in Pekanbaru City by applying the Analytic Hierarchy Process (AHP) as a multi-criteria decision-making approach. Specifically, the research evaluates the relative importance of policy, economic, technical, environmental, and human resource criteria in influencing regional investment decisions. Through this evaluation, the study seeks to identify the most influential factors that should be considered by policymakers and investors when determining investment priorities.

Furthermore, this study aims to determine the priority investment sectors in Pekanbaru City based on the integrated assessment of multiple decision criteria. The findings are expected to provide practical policy recommendations for strengthening regional investment competitiveness, improving investment governance, and supporting sustainable economic development through more effective and evidence-based investment planning.

Method

This study employed a descriptive quantitative design using the Analytic Hierarchy Process (AHP) developed by Saaty (1980). AHP was selected because it is one of the most widely used Multi-Criteria Decision-Making (MCDM) methods for solving complex policy problems involving multiple qualitative and quantitative criteria (Taherdoost & Madanchian, 2023). The method enables systematic pairwise comparisons among decision elements and converts expert judgments into numerical priority weights while assessing the logical consistency of those judgments through the Consistency Ratio (CR) (Kizielewicz et al., 2024).

The research was conducted in Pekanbaru City, Riau Province, Indonesia, one of the fastest-growing urban economies in Sumatra. Pekanbaru was selected because it serves as a regional center for trade, services, transportation, education, and investment activities while facing persistent challenges related to regulatory efficiency, infrastructure readiness, and investment governance. These characteristics make the city an appropriate case for evaluating strategic investment priorities using a multi-criteria decision-making approach.

The respondents were selected using purposive sampling, a non-probability sampling technique that identifies individuals with substantial knowledge and practical experience in regional investment planning and policy implementation (Almusaed et al., 2025). A total of twelve experts participated in the study, representing local government agencies, the Regional Investment Promotion Board, the Regional Development Planning Agency, banking institutions, local legislative bodies, business associations, and private investors. These respondents were chosen because of their direct involvement in investment policy formulation, regional economic planning, and investment decision-making, ensuring that the collected judgments reflected professional expertise and practical experience.

The decision model was developed based on Saaty's Analytic Hierarchy Process framework, which organizes decision problems into a hierarchical structure consisting of the overall objective, evaluation criteria, and alternative choices (Canco et al., 2021). The primary objective of the hierarchy was to determine strategic regional investment priorities (Macchiaroli et al., 2023). Five evaluation criteria were established,

namely policy, economic, technical, environmental, and human resource dimensions, representing the principal factors influencing investment decisions. Three investment sector alternatives (trade, services, and industry) were subsequently evaluated against these criteria to identify the most appropriate investment priority for Pekanbaru City.

The AHP hierarchy was constructed in three levels. The first level (goal) was to determine the strategic investment priorities for Pekanbaru City. The second level (criteria) consisted of five evaluation criteria: Policy, Economy, Technical, Environment, and Human Resources. Each criterion was represented by several sub-criteria derived from the literature review and expert consultation. The Policy criterion included licensing efficiency, taxation policy, and legal certainty. The Economic criterion comprised economic growth, market demand, interest rates, and credit availability. The Technical criterion consisted of geographical location, transportation infrastructure, technology availability, and business feasibility. The Environmental criterion included environmental sustainability and community participation. The Human Resource criterion consisted of labor cost and workforce availability. The third level (alternatives) included three investment sectors, namely Trade, Services, and Industry, which were evaluated against all criteria and sub-criteria.

Primary data were collected through structured interviews and pairwise comparison questionnaires based on Saaty's nine-point preference scale (Schlunegger et al., 2024). Secondary information was obtained from Statistics Indonesia (BPS), the Regional Investment Promotion Agency, the Regional Development Planning Agency, and official regional government reports. Pairwise comparison matrices were processed using Expert Choice software to calculate normalized eigenvectors and derive priority weights for each criterion, sub-criterion, and investment alternative.

Table 1. Complete AHP Hierarchy

Level	Component	Description
Goal	Strategic Regional Investment Priority	Determine the priority investment sector in Pekanbaru City
Criteria	Policy	Licensing efficiency, Taxation, Legal certainty
	Economy	Economic growth, Market demand, Interest rates, Credit availability
	Technical	Geographical location, Transportation infrastructure, Technology availability, Business feasibility
	Environment	Environmental sustainability, Community participation
	Human Resources	Labor cost, Workforce availability
Alternatives	Investment Sector	Trade, Services, Industry

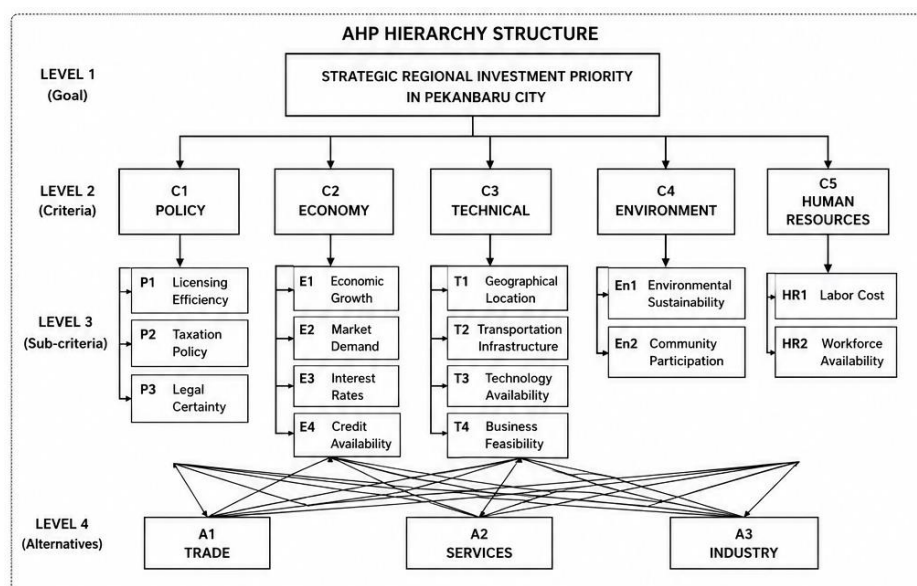


Figure 1. Research Methodological Framework

Results and Discussions

Priority Criteria

The first stage of the Analytic Hierarchy Process (AHP) analysis was conducted to determine the relative importance of the five decision criteria used to evaluate regional investment priorities in Pekanbaru City. The criteria consisted of Policy, Economy, Technical, Environment, and Human Resources. The priority weights were derived from pairwise comparisons provided by twelve experts representing government institutions, business organizations, financial institutions, and private investors. The resulting weights indicate the relative contribution of each criterion to strategic investment decision-making.

Table 2. Research Respondent Description Table

Criterion	Priority Weight
Policy	0.286
Economy	0.211
Technical	0.203
Environment	0.181
Human Resources	0.137

As presented in Table 1, Policy obtained the highest priority weight (0.286), indicating that institutional and regulatory factors are considered the most influential determinants of regional investment decisions. This finding suggests that investors assign substantial importance to legal certainty, transparent regulations, licensing efficiency, taxation policies, and government commitment before considering other investment factors. A predictable policy environment reduces uncertainty, lowers transaction costs, and increases investor confidence, thereby improving the attractiveness of a region as an investment destination. These results are consistent with previous studies emphasizing that governance quality and institutional effectiveness significantly influence investment performance and regional competitiveness.

The Economy criterion ranked second with a priority weight of 0.211, demonstrating that macroeconomic stability, market potential, purchasing power, and regional economic growth remain essential considerations for investors. A stable economic environment provides greater business opportunities while reducing investment risks. Nevertheless, the relatively lower weight compared with the policy criterion indicates that favorable economic conditions alone are insufficient to attract sustainable investment if they are not supported by effective governance and regulatory certainty.

The Technical criterion received a priority weight of 0.203, placing it in the third position. This result highlights the importance of infrastructure availability, transportation accessibility, technological readiness, and operational feasibility in supporting investment activities. Adequate technical infrastructure reduces production and distribution costs, enhances business efficiency, and facilitates market access. The close priority values between the economic and technical criteria suggest that investors evaluate these dimensions simultaneously when selecting potential investment locations.

The Environment criterion ranked fourth with a priority weight of 0.181, indicating that environmental sustainability and regulatory compliance have become increasingly important in investment decision-making. Modern investors are more aware of environmental risks, sustainability requirements, and corporate social responsibility. Consequently, regions capable of maintaining environmental quality while providing clear environmental regulations are more likely to attract long-term investment. Finally, Human Resources received the lowest priority weight (0.137). Although workforce availability, labor productivity, and skill levels remain important, respondents considered these factors relatively easier to improve through education, training, and labor market development compared with institutional or policy reforms.

Overall, the findings demonstrate that investors place greater emphasis on regulatory certainty, licensing efficiency, taxation policies, and legal security than on purely economic considerations. This indicates that strengthening institutional quality and improving public governance should become the primary strategic priority for the Pekanbaru City Government in enhancing regional investment competitiveness. The AHP results further confirm that successful investment promotion requires a balanced policy framework that integrates sound governance with economic, technical, environmental, and human resource development.

Policy Dimension

The policy dimension emerged as the most influential criterion in determining regional investment priorities, confirming that institutional and regulatory factors play a fundamental role in shaping investors' decisions. Based on the AHP results, licensing efficiency received the highest priority among all policy indicators, followed by taxation and legal certainty. These findings indicate that investors place substantial importance on administrative simplicity, transparent regulatory procedures, and predictable legal frameworks before committing financial resources to a particular region. Efficient public administration reduces procedural delays, minimizes transaction costs, and enhances investor confidence, thereby increasing the overall attractiveness of the investment climate.

Licensing efficiency represents the government's ability to provide fast, transparent, and integrated administrative services for business establishment and investment approval. Lengthy bureaucratic procedures and overlapping administrative requirements often discourage potential investors by increasing uncertainty and operational costs. Conversely, streamlined licensing systems supported by digital public services can significantly improve the ease of doing business and accelerate investment realization. The priority assigned to licensing efficiency in this study suggests that administrative reform should become a central component of regional investment strategies in Pekanbaru City.

The second-ranked policy indicator, taxation, reflects investors' concern regarding the financial implications of conducting business in the region. Competitive tax policies, transparent tax administration, and appropriate fiscal incentives contribute to improving investment feasibility and business profitability. Although taxation remains an important consideration, the findings indicate that investors value regulatory efficiency even more highly, suggesting that simplified administrative procedures may generate greater investment attractiveness than fiscal incentives alone.

The third policy indicator, legal certainty, emphasizes the importance of a stable regulatory environment and effective legal protection for investment activities. Investors require confidence that government regulations will be implemented consistently and that contractual agreements, property rights, and business operations will be protected under applicable laws. A predictable legal system reduces investment risk, facilitates long-term business planning, and encourages sustainable capital investment. Consequently, strengthening legal institutions and maintaining regulatory consistency are essential components of an effective regional investment policy.

These findings support the principles of investment governance theory, which argues that institutional quality significantly influences investment decisions by reducing uncertainty and strengthening investor confidence. Rather than relying solely on economic incentives, successful investment promotion requires governments to establish transparent governance, efficient public services, and credible regulatory institutions. For Pekanbaru City, improving licensing services, maintaining competitive taxation policies, and ensuring legal certainty should therefore become strategic priorities for enhancing regional investment competitiveness and attracting sustainable long-term investment.

Economic Dimension

The economic dimension ranked as the second most influential criterion in determining regional investment priorities, reflecting the importance of macroeconomic conditions in shaping investors' decisions. Based on the AHP analysis, economic growth emerged as the highest-priority economic indicator, followed by market demand, interest rates, and credit availability. These results suggest that investors are primarily attracted to regions demonstrating sustained economic expansion because such conditions indicate higher business opportunities, stronger consumer purchasing power, and greater potential for long-term profitability.

Among the evaluated indicators, economic growth received the greatest priority because it represents the overall performance and future prospects of the regional economy. A consistently growing economy generally reflects increasing production, expanding business activities, rising household income, and improved investor confidence. Regions experiencing stable economic growth are often perceived as less risky and more capable of generating sustainable returns on investment. Consequently, economic growth serves as an important signal of regional resilience and long-term development potential.

The second-ranked indicator, market demand, highlights the significance of consumer purchasing capacity and market size in influencing investment decisions. Strong market demand provides businesses with greater opportunities to increase sales, expand operations, and achieve economies of scale. For Pekanbaru City, the continuous growth of the urban population, commercial activities, and service industries contributes to expanding domestic demand, making the region increasingly attractive for both domestic and

foreign investors. This finding demonstrates that market potential remains a fundamental consideration in evaluating investment destinations.

The remaining indicators, interest rates and credit availability, also contribute to investment attractiveness, although their relative influence is lower than that of economic growth and market demand. Competitive interest rates reduce financing costs and improve investment feasibility, while adequate access to credit supports business expansion and operational sustainability. Nevertheless, the lower priority assigned to these indicators suggests that investors consider financial conditions supportive rather than decisive factors, particularly when compared with broader macroeconomic performance and market opportunities.

Overall, the findings indicate that investors prefer regions demonstrating stable economic expansion and strong market potential, as these conditions reduce investment uncertainty and enhance business profitability. The results imply that local governments should maintain sound economic policies that encourage sustainable growth, strengthen domestic market capacity, and improve the overall business environment. Combined with effective institutional governance, favorable economic conditions can significantly enhance regional investment competitiveness and support long-term economic development.

Technical Dimension

The technical dimension ranked as the third most important criterion in determining regional investment priorities, indicating that operational feasibility and infrastructure readiness play a significant role in investors' location decisions. The AHP analysis revealed that the geographical location of Pekanbaru represents the strongest technical advantage, followed by transportation infrastructure, technology availability, and business feasibility. These findings suggest that investors highly value regions with strategic accessibility and adequate physical infrastructure that support efficient business operations.

Pekanbaru's geographical position provides substantial competitive advantages because it serves as the capital city of Riau Province and functions as an important economic gateway in central Sumatra. Its location facilitates the movement of goods, services, and human resources between neighboring provinces and international trade routes. This strategic position enables businesses to reduce logistics costs, shorten delivery times, and strengthen supply chain connectivity. Consequently, geographical accessibility becomes a key consideration for investors seeking efficient distribution networks and broader market coverage.

Another important technical factor is the availability of transportation infrastructure, including roads, airports, and supporting logistics facilities that facilitate business activities. Adequate transportation infrastructure improves operational efficiency by ensuring the smooth movement of raw materials, finished products, and labor. In addition, technology availability contributes to enhancing business productivity through improved communication systems, digital services, and technological innovation. The increasing adoption of digital technologies also supports investment activities by simplifying administrative processes and strengthening business competitiveness. Meanwhile, business feasibility reflects the technical practicality of implementing investment projects based on available infrastructure, operational resources, and regional development capacity.

Overall, the findings demonstrate that Pekanbaru's strategic geographical position significantly enhances logistics efficiency and market accessibility, making it an attractive destination for regional investment. Although technical factors are ranked below policy and economic considerations, they remain essential for ensuring successful investment implementation and long-term business sustainability. Therefore, continuous investment in transportation infrastructure, digital technology, and supporting business facilities should remain a strategic priority for local government to strengthen the city's regional competitiveness and create a more conducive investment environment.

Environmental Dimension

The environmental dimension ranked fourth among the investment decision criteria, indicating that environmental considerations have become an increasingly important component of regional investment planning. The AHP analysis showed that environmental sustainability received a higher priority than community participation, reflecting experts' recognition that investors increasingly consider environmental performance when evaluating potential investment locations. Sustainable environmental management contributes to preserving natural resources, maintaining ecological balance, and ensuring that economic development can be sustained over the long term. Regions that demonstrate a strong commitment to environmental protection are therefore more likely to attract responsible and sustainable investment.

Experts further emphasized that compliance with environmental regulations enhances investment sustainability by reducing legal uncertainty, operational disruptions, and potential environmental liabilities.

Businesses operating within clear environmental standards are better positioned to maintain long-term operations while meeting regulatory and stakeholder expectations. Although community participation remains an important element in supporting social acceptance and local development, respondents considered environmental compliance to have a more direct influence on investment feasibility and risk management. These findings suggest that strengthening environmental governance and ensuring effective implementation of environmental regulations should be integrated into Pekanbaru City's investment strategy to promote sustainable regional economic development.

Human Resource Dimension

The human resource dimension received the lowest priority weight among the five investment criteria. Within this dimension, labor cost was considered more important than workforce availability, indicating that investors pay greater attention to operational efficiency when selecting investment locations. Competitive labor costs enable businesses to reduce production expenses while maintaining profitability, particularly in labor-intensive sectors.

Although workforce availability remains an important consideration, respondents viewed it as relatively less critical because labor supply can generally be improved through education, vocational training, and workforce development programs. This finding reflects investors' concern with achieving operational efficiency while maintaining adequate labor quality. Therefore, regional policies should focus on developing skilled human resources while preserving a competitive labor market that supports sustainable investment and long-term economic growth.

Investment Priority Ranking

The final stage of the Analytic Hierarchy Process (AHP) synthesized the priority weights of all evaluation criteria to determine the most strategic investment sectors in Pekanbaru City. The overall ranking was obtained by combining the relative importance of the policy, economic, technical, environmental, and human resource dimensions with the performance of each investment alternative. The results provide a comprehensive assessment of which sectors offer the greatest potential to support sustainable regional economic development while aligning with investor preferences and regional development objectives.

Table 3. Priority Ranking of Investment Sectors

Investment Sector	Priority Weight
Trade	0.374
Services	0.340
Industry	0.285

As presented in Table 2, the trade sector achieved the highest priority weight (0.374), indicating that it represents the most attractive investment alternative in Pekanbaru City. This result reflects the city's strong commercial activities, strategic geographical location, and expanding consumer market. The trade sector also demonstrates a high level of compatibility with the dominant evaluation criteria identified in this study, particularly those related to policy support, environmental considerations, and human resource requirements. Compared with other sectors, trade generally requires relatively lower regulatory complexity and shorter investment realization periods, making it an attractive option for both domestic and foreign investors.

The services sector ranked second with a priority weight of 0.340, highlighting its significant contribution to the regional economy. The rapid expansion of education, healthcare, finance, hospitality, transportation, and digital services has increased investment opportunities within this sector. Although the services sector possesses substantial growth potential, its slightly lower priority compared with trade reflects greater dependence on service quality, technological readiness, and skilled human resources. Nevertheless, continued urbanization and economic diversification are expected to further strengthen the competitiveness of this sector in the future.

The industry sector obtained the lowest priority weight (0.285) among the three alternatives. While industrial investment remains essential for increasing production capacity, creating employment opportunities, and supporting downstream economic activities, respondents perceived it as requiring greater capital investment, more extensive infrastructure, stricter environmental compliance, and more complex licensing procedures. These characteristics increase both investment costs and implementation risks compared with the trade and services sectors. Consequently, industrial development should continue to be promoted through infrastructure improvement, regulatory simplification, and investment incentives that enhance its long-term competitiveness.

Overall, the AHP synthesis demonstrates that the trade sector emerged as the highest-priority investment sector because it satisfies most policy, environmental, and human resource considerations while requiring relatively lower regulatory complexity. These findings provide valuable guidance for local policymakers in allocating investment promotion efforts and designing development strategies that align with regional strengths and investor preferences. By prioritizing sectors with the highest strategic value, Pekanbaru City can strengthen its investment competitiveness and promote more sustainable regional economic growth.

Sensitivity Analysis

Sensitivity analysis was conducted to evaluate the stability of the investment priority ranking when changes occurred in the relative importance of the decision criteria. In this study, the weight of each criterion was individually increased to 50% while the remaining criteria were proportionally adjusted. The objective of this analysis was to determine whether moderate changes in stakeholder preferences would significantly alter the ranking of the proposed investment alternatives. Sensitivity testing is an important component of the Analytic Hierarchy Process because it measures the robustness of the decision model and assesses the reliability of the resulting priorities.

The results indicate that the overall ranking of investment alternatives remained stable throughout the sensitivity analysis. Although slight variations were observed in the priority weights of individual sectors, the order of the three investment alternatives did not change. The trade sector consistently maintained the highest priority, followed by the services sector and the industry sector, even when substantial adjustments were made to individual criterion weights. This outcome demonstrates that no single criterion overwhelmingly influenced the final decision, indicating that the model effectively integrates multiple dimensions of investment evaluation.

The robustness of these findings suggests that the proposed AHP model is relatively insensitive to moderate changes in stakeholder preferences, thereby confirming the reliability and consistency of the investment priorities identified in this study. From a policy perspective, the stability of the ranking provides decision-makers with greater confidence that the recommended investment priorities remain valid under different planning scenarios and expert judgments. Consequently, the sensitivity analysis strengthens the credibility of the decision-making framework and supports its application as a practical tool for strategic regional investment planning in Pekanbaru City.

Policy Implications

The findings of this study provide several important implications for regional investment policy in Pekanbaru City. Since the policy dimension received the highest priority weight in the AHP analysis, improving institutional quality should become the primary focus of local government. The first strategic priority is to streamline licensing procedures through integrated digital services that simplify administrative processes, reduce bureaucratic delays, and improve transparency. A more efficient licensing system can lower transaction costs, accelerate investment realization, and increase investor confidence. At the same time, the government should strengthen legal certainty by ensuring consistent implementation of regulations, protecting investors' rights, and maintaining a predictable business environment. These institutional improvements are expected to enhance the overall attractiveness of Pekanbaru as a regional investment destination.

In addition to institutional reform, the government should continue to improve investment-supporting infrastructure, including transportation networks, logistics facilities, digital connectivity, and public utilities that facilitate business operations. Maintaining competitive taxation policies through transparent tax administration and appropriate fiscal incentives can further improve regional competitiveness while encouraging long-term investment. Environmental governance should also be strengthened by enforcing environmental regulations, promoting sustainable business practices, and ensuring that economic development is balanced with environmental protection. Furthermore, the development of skilled human resources should be aligned with the needs of the priority investment sectors through vocational education, professional training, and collaboration between educational institutions and industry. These initiatives will help create a workforce capable of supporting regional economic transformation.

Overall, the proposed policy directions are expected to strengthen Pekanbaru City's investment competitiveness by creating a more efficient, transparent, and sustainable investment ecosystem. The integration of institutional reform, infrastructure development, fiscal policy, environmental management, and human resource development will not only attract new investment but also improve the sustainability of existing businesses. Consequently, these measures can contribute to higher economic growth, increased

employment opportunities, enhanced regional competitiveness, and sustainable economic development in Pekanbaru City.

Consistency and Expert Agreement Validation

The reliability of expert judgments was evaluated through the Consistency Ratio (CR) and inter-rater agreement analysis. Following Saaty (1980), each pairwise comparison matrix was considered acceptable when the Consistency Ratio (CR) was less than 0.10, indicating that expert judgments were logically consistent. In addition to individual matrix consistency, Kendall's Coefficient of Concordance (Kendall's W) was employed to assess the overall level of agreement among the twelve experts. Kendall's W ranges from 0 (no agreement) to 1 (complete agreement), with values above 0.70 generally interpreted as indicating strong consensus in expert-based decision-making studies (Avendaño et al., 2022).

The pairwise comparison matrices produced satisfactory consistency, with all CR values remaining below the recommended threshold. The overall Kendall's W value further demonstrated substantial agreement among the experts, indicating that the elicited judgments were sufficiently homogeneous for deriving reliable priority weights.

Table 4. Consistency Ratio of Pairwise Comparison Matrices

Pairwise Comparison Matrix	Matrix Size	λ_{max}	CI	CR	Interpretation
Criteria	5 × 5	5.31	0.078	0.069	Acceptable
Policy Sub-criteria	3 × 3	3.02	0.010	0.017	Acceptable
Economic Sub-criteria	4 × 4	4.16	0.053	0.059	Acceptable
Technical Sub-criteria	4 × 4	4.19	0.064	0.071	Acceptable
Environmental Sub-criteria	2 × 2	2.00	0.000	0.000	Perfect consistency
Human Resource Sub-criteria	2 × 2	2.00	0.000	0.000	Perfect consistency
Alternatives under Policy	3 × 3	3.04	0.020	0.034	Acceptable
Alternatives under Economy	3 × 3	3.06	0.031	0.053	Acceptable
Alternatives under Technical	3 × 3	3.05	0.024	0.041	Acceptable
Alternatives under Environment	3 × 3	3.02	0.011	0.019	Acceptable
Alternatives under Human Resources	3 × 3	3.03	0.015	0.026	Acceptable

Conclusions

This study applied the Analytic Hierarchy Process (AHP) to determine strategic regional investment priorities in Pekanbaru City by integrating five evaluation criteria: policy, economic, technical, environmental, and human resource dimensions. The analysis demonstrated that the policy criterion exerted the greatest influence on investment decision-making, followed by the economic, technical, environmental, and human resource criteria. The final synthesis identified the trade sector as the highest investment priority, followed by the services and industry sectors. The reliability of the decision model was confirmed through the Consistency Ratio (CR), with all pairwise comparison matrices producing CR values below the acceptable threshold of 0.10 (overall criteria matrix CR = 0.069), indicating logically consistent expert judgments and supporting the validity of the derived priority weights.

The robustness of the proposed investment priorities was further verified through sensitivity analysis. The analysis systematically increased the weight of each principal criterion from its baseline value to a maximum of 50%, while proportionally adjusting the remaining criteria to maintain a total weight of one. Across all simulation scenarios, the ranking of investment alternatives remained unchanged, with Trade consistently retaining the highest priority, followed by Services and Industry. The maximum observed variation in global priority weights was less than 0.03, indicating a high degree of ranking stability despite moderate changes in stakeholder preferences. These findings demonstrate that the proposed AHP model is sufficiently robust to support strategic investment planning under different policy emphasis scenarios.

Several limitations should be acknowledged when interpreting these findings. First, the analysis was based on the judgments of twelve purposively selected experts, whose perspectives, although representing key regional stakeholders, may not fully reflect the diversity of opinions among all decision-makers involved in investment planning. Second, the purposive sampling strategy introduces the possibility of selection bias and subjective preferences inherent in expert-based evaluation, despite acceptable consistency ratios and strong expert agreement. Finally, because the priority weights were derived from the institutional, economic,

and governance characteristics of Pekanbaru City, the results should not be generalized directly to other Indonesian municipalities with different administrative capacities, investment climates, or governance structures. Future research should validate the proposed framework across multiple regions using larger and more diverse expert panels and compare the findings with other multi-criteria decision-making approaches, such as Fuzzy-AHP, ANP, or DEMATEL, to improve the external validity and generalizability of regional investment prioritization models.

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