Policy analysis of sports development in terms of achievement, policy, nursery of young athletes, South Papua as part of the new autonomous region, (DOB)

Análisis político del desarrollo deportivo en términos de logros, políticas y formación de jóvenes atletas en Papúa del Sur como parte de la nueva región autónoma (DOB)

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Abstract

Introduction and Objective. This study aims to analyze sports coaching policies in South Papua as a new autonomous region (DOB), focusing on sports policy, athlete nurturing, facilities and infrastructure, institutional support, and athlete achievements.
Methodology. A mixed-methods approach was used, combining qualitative analysis using Voyant Tools and quantitative analysis using SmartPLS 4 based on PLS-SEM. Data were collected through semi-structured interviews developed from five main constructs. In the initial phase, convergent validity tests showed that many indicators were invalid, with external loadings <0.7 or even negative values. However, model refinement in the second stage resulted in significant improvements in validity and reliability, with all remaining indicators showing external loadings ≥0.7 and high AVEs.
Results. The analysis showed significant relationships between Sports Policy → Athlete Rearing, Athlete Rearing → Facilities and Infrastructure, and Facilities and Infrastructure → Institutional Support. In contrast, athlete performance did not exhibit significant relationships with other variables in the model, suggesting that athlete performance is likely influenced by external factors such as personal motivation or family support. Reliability tests showed adequate Cronbach's alpha and composite reliability values. The GoF value of 0.856 and Q^2 of 0.883 indicated a strong model fit.
Conclusions. In conclusion, the success of sports training in South Papua is strongly influenced by policies, athlete incubators, and mutually supportive infrastructure. However, to improve athlete performance, further exploration of factors beyond formal structural variables is needed. This research contributes significantly to the formulation of sports development policies contextualized in the new autonomous region of South Papua Province.

Keywords

Achievement development policy; sports policy; young athlete breeding; South Papua.

Resumen

Introducción y Objetivo. Este estudio busca analizar las políticas de entrenamiento deportivo en Papúa Meridional, como nueva región autónoma (DOB), centrándose en políticas deportivas, formación de atletas, instalaciones e infraestructura, apoyo institucional y logros deportivos.
Metodología. Se empleó un enfoque de métodos mixtos, combinando análisis cualitativo con las herramientas Voyant y análisis cuantitativo con SmartPLS 4 basado en PLS-SEM. Los datos se recopilaron mediante entrevistas semiestructuradas desarrolladas a partir de cinco constructos principales. En la fase inicial, las pruebas de validez convergente mostraron que muchos indicadores no eran válidos, con cargas externas <0,7 o incluso valores negativos. Sin embargo, el refinamiento del modelo en la segunda etapa resultó en mejoras significativas en la validez y la fiabilidad, con todos los indicadores restantes mostrando cargas externas ≥0,7 y AVE elevados.
Resultados. El análisis mostró relaciones significativas entre Política Deportiva → Formación de Atletas, Formación de Atletas → Instalaciones e Infraestructura, e Instalaciones e Infraestructura → Apoyo Institucional. Por el contrario, el rendimiento de los atletas no mostró relaciones significativas con otras variables del modelo, lo que sugiere que probablemente esté influenciado por factores externos como la motivación personal o el apoyo familiar. Las pruebas de fiabilidad mostraron valores adecuados de alfa de Cronbach y fiabilidad compuesta. El valor de GoF de 0,856 y el Q^2 de 0,883 indicaron un buen ajuste del modelo.
Conclusiones. En conclusión, el éxito del entrenamiento deportivo en Papúa Meridional está fuertemente influenciado por las políticas, las incubadoras de atletas y la infraestructura de apoyo mutuo. Sin embargo, para mejorar el rendimiento de los atletas, se necesita una mayor exploración de factores más allá de las variables estructurales formales. Esta investigación contribuye significativamente a la formulación de políticas de desarrollo deportivo en el contexto de la nueva región autónoma de la provincia de Papúa Meridional.

Palabras clave

Política de desarrollo de logros; política deportiva; crianza de jóvenes atletas; Papúa del Sur.

Introduction

Sport is an important pillar in human development, both in terms of health, mentality, and cultural and national identity.(El-Dabt et al., 2025)On a global scale, it is also a means of diplomacy, a place to show off achievements, and a vehicle for building national character.(Penggalih et al., 2025)In Indonesia, the development of national sports faces complex challenges, especially in terms of long-term development and achieving sustainable achievements.(Lumintuarso et al., 2025)One of the biggest challenges is the gap between regional potential and the development system which is not evenly distributed across all regions.(Wasa et al., 2024)The implementation of regional autonomy provides an opportunity for each province to form sectoral policies that are tailored to local conditions, potential and needs.(Kogoya et al., 2024)In this context, sport is a strategic sector that can be optimized by regions to encourage human resource development and regional achievements.(Guntoro et al., 2024)South Papua, as one of the new provinces resulting from the expansion of the region in Papua, has great potential in sports development.(Setyo Guntoro et al., 2024)This region is known for its rich physical culture, natural resources, and enthusiasm for sports, especially in sports such as football, athletics, and martial arts.(Faculty et al., 2025)However, sports development in South Papua still faces various fundamental challenges, ranging from limited infrastructure, a lack of professional coaches, a less than optimal system for developing young athletes, to policies that have not been well integrated between the central and regional governments.(Calo et al., 2024)The new regional autonomy provides a golden opportunity for South Papua to shape the direction of sports development that is more contextual and in line with local potential.(Broglio et al., 2024)This requires local governments to formulate sports development policies that not only target achievement, but also pay attention to sustainability and equal access.(Grix and Brannagan, 2024)In sports development, there are three main, interrelated and mutually reinforcing dimensions: achievement, policy, and the development of young athletes. These three aspects form the foundation for creating a resilient sports system that adapts to social dynamics.(Garamvölgyi et al., 2024),Sports achievements are a benchmark for the success of the coaching system.(Berliana et al., 2024)However, sustainable achievements can only be achieved if there is long-term planning starting from the nursery level and supported by visionary policies.(Wu et al., 2025)Effective sports policies must be designed based on real data and conditions in the field, including taking into account the social, cultural and geographical aspects of the area.(Hudson et al., 2025)In South Papua, unique geographic challenges should be considered part of the strategy, not a barrier, in establishing a sports development system that aligns with local characteristics. Developing young athletes is a key foundation of the sports system.(Dunan et al., 2025)Without a consistent and high-quality coaching process from an early age, it is difficult to produce superior athletes who are able to compete at the national and international levels.

This development process does not only depend on coaches and sports facilities, but also involves schools, families, communities, and of course government support through affirmative policies and adequate budget allocation.(Dam et al., 2025)In South Papua, the potential of young athletes is enormous, but it hasn't been fully facilitated by a structured development system. Many young talents remain untouched by formal development programs due to limited access and a limited grassroots development network.(Van De Vorst et al., 2023)Therefore, synergy is needed between local governments, educational institutions, sports clubs, and the community in forming a strong sports development ecosystem. Local governments must take an active role as facilitators, regulators, and main supporters in realizing this vision.(Doh et al., 2025)Within the new autonomy framework, the South Papua government has a strategic opportunity to draft regional regulations that explicitly regulate the direction and strategy of sports development, including budget provision, the establishment of training centers, and the organization of tiered local competitions.(McHugh Davenport, 2024)The right policies will create greater opportunities for young people in South Papua to develop in the world of sports, not only as participants, but as prospective professional athletes who are trained in a targeted and measurable manner.(Griesinger et al., 2025)On the other hand, the involvement of indigenous communities and local cultural values is also important to be integrated into the development system.(Vaquero-Cristobal et al., 2024),Sports in Papua is not only a physical activity, but also part of a social heritage that contains the values of struggle, honor, and solidarity.(Chan et al., 2024),In strategically directed sports development, South Papua will not only be known as an administrative expansion area, but also as a center for the birth of potential Indonesian athletes in the future.(Song et

al., 2024)Cross-sectoral collaboration is also needed, including with relevant ministries, KONI (Indonesian National Sports Committee), non-governmental organizations, and the private sector to support various aspects of development, from training, education, nutrition, to sponsorship. Therefore, this research focuses on reviewing sports development policies in South Papua from the perspective of achievement, policy, and the development of young athletes. This study is important to describe the actual conditions and provide policy input based on data and local context. With a holistic approach, it is hoped that South Papua will be able to make sports a leading sector in the development of the new autonomous region, while also becoming a model for sports development based on local wisdom that is nationally competitive.

Voyant Analysis

Figure 1 shows a word cloud analysis of the Sports Policy of the New Autonomous Region (DOB) showing that the primary focus of sports policy in the New Autonomous Region (DOB) of South Papua lies in the systematic and sustainable development of the sports sector. Words such as "development," "sports," "Papua," and "South" dominate the text, indicating a strong commitment to infrastructure development and human resource development, particularly for young athletes. The local government plays a central role in strategy development, with support for training, physical education, and local talent development. On the other hand, the analysis also reveals challenges such as limited access, facilities, and remote geographic conditions.(Kertati & Pratomo, 2025)However, the policy text highlights strategic opportunities and solutions through keywords such as “opportunity”, “structured”, and “sustainable”.(Saleh et al., 2025)This shows that policies not only respond to current needs, but also lead to inclusive, structured and collaborative sports development between government, society and related sectors.

Figure 1. Word cloud Results of the analysis of the Sports Policy of the new autonomous region (DOB)

Figure 2 visualization of collocates network analysis Sports policy in the new autonomous regions (DOB) emphasizes the importance of sustainable development and strong support for developing the sports sector as a whole.(Inden et al., 2023)The main focus of this policy is on developing young athletes as important assets for the future of regional sports, by providing appropriate training and coaching. Clear and structured regulations are also an integral part of this policy to ensure effective and targeted sports management. With government support and the implementation of good regulations, it is hoped that sports in new autonomous regions can grow optimally and contribute to regional development at large.

Figure 2. Visualization of collocates network analysis of sports policy in new autonomous regions (DOB)

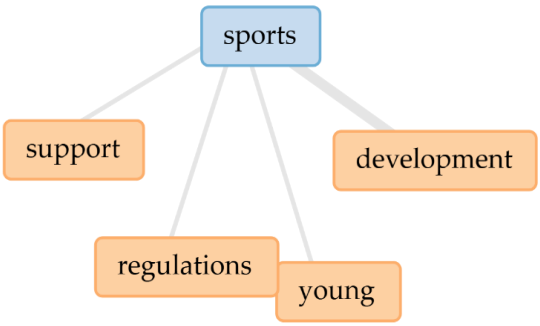


Figure 3. Collocate network visualizations analysis of sports policy in the new autonomous regions (DOB) shows the variation in the relative frequency of keywords in ten document segments discussing sports policy in the new autonomous regions (DOB). This graph illustrates how certain themes or topics appear alternately and their intensity changes throughout the documents.(Mulyana et al., 2022)This change indicates that the DOB sports policy addresses various aspects in depth and continuously, such as government support, development of young athletes, regulations, and sports development strategies.(Tilzey et al., 2025),With the fluctuation of word frequency in the document segment, it can be interpreted that the policy does not only focus on one aspect, but is the result of a comprehensive discussion that covers many important dimensions in sports development in new autonomous regions. This shows the strategic and adaptive efforts of local governments to adjust sports policies to the specific needs and challenges in new autonomous regions.

Figure 3. Collocate network visualizations graph of sports policy analysis in new autonomous regions (DOB)

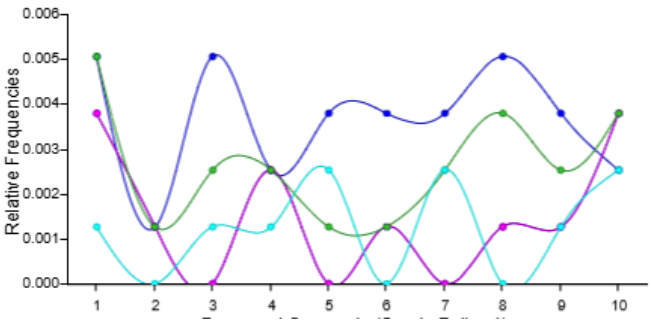


Figure 4. Word cloud analysis of athlete development which focuses primarily on athlete development in the region, with keywords such as “development”, “athlete”, and “sports” appearing most dominantly.(Hohmann et al., 2025)This illustrates that athlete development is carried out in a tiered and structured manner, with particular attention to developing the potential of young athletes. Words like "young" and "training" indicate a routine effort in the recruitment and training of young athletes, which is a priority to ensure the continuity and improvement of the quality of sports in the region.(Earle et al., 2025)With an organized and continuous coaching program, the potential of young athletes in the region can be optimally maximized.(Schubring et al., 2025)This is crucial for creating a generation of skilled and accomplished athletes, while also supporting the comprehensive and sustainable development of sports at both the local and national levels. This tiered approach also indicates a clear system in place to consistently support the identification, training, and development of young athletes.

Figure 4. Word cloud analysis of athlete development which focuses primarily on athlete development in the new autonomous regions (DOB).)

Figure 5. Visualization of collocates networkThis analysis of athlete development that focuses primarily on the New Autonomy Region (DOB) describes the analysis of keywords related to athlete development in the New Autonomy Region (DOB).(Loka Øydna et al., 2024)The main focus lies on words such as "development", "sports", "athlete", and "talent" which show that the development and cultivation of the potential of young athletes is a top priority.(Allen et al., 2013)The athlete development process is carried out in a tiered and systematic manner, with structured strategies and processes to maximize the physical potential and talent of young athletes. Furthermore, words such as "conducted," "strategy," and "process" indicate that the recruitment of young athletes is carried out routinely and in a planned manner, involving various parties, including families and related sectors. This approach reflects a deep understanding of the importance of long-term development in creating quality athletes.achievements, as well as ongoing efforts to support the growth of sports in the New Autonomous Region (DOB).

Figure 5. Visualization of collocates networkanalysis of athlete development that focuses primarily on the regions, New Autonomy (DOB)

Figure 6.The word cloud analysis graphic of athlete nursery which focuses primarily on the region, New Autonomy (DOB) shows the relative frequency of keyword occurrences in ten document segments with the theme of Athlete Nursery or Athlete Nursery. Each color line represents an important word or group of terms used in the document, and the up-down pattern shows the intensity of discussion of each keyword in various parts of the document. In general, this graph illustrates that the issue of athlete nursery is discussed dynamically and focused in certain segments. It can be seen that several keywords

have peak frequencies in segments 2, 4, 5, and 10, which indicates that in these sections the discussion of strategy, potential of young athletes, coaching processes, and routine recruitment is more dominant.(Davenport et al., 2025)This reinforces the conclusion that this document emphasizes a tiered coaching process, the development of young talent, and the systematic implementation of athlete development policies in the new autonomous regions (DOB). Thus, this graph not only shows the spread of topics in the text, but also indicates a consistent and structured approach in explaining how athlete development is implemented strategically and sustainably in the new autonomous regions (DOB).

Figure 6.Collocate network visualizations analysis of athlete breeding that focuses primarily on the regions, new autonomy (DOB)

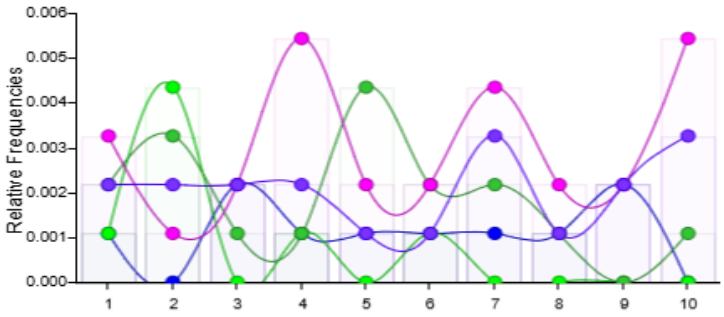


Figure 7 collocate network visualizations resultsThe analysis of athlete development focuses primarily on the regions under New Autonomy (DOB), which focuses on sports facilities and infrastructure, which are crucial elements in supporting athlete development in the regions, particularly in the New Autonomy Regions (DOB). The predominant use of terms such as "facilities," "infrastructure," and "sports" indicates that the availability and quality of sports facilities are a primary concern in sports development policies and programs.(Marsudi et al., 2024)This reflects that available and well-maintained training facilities are an important part of a sustainable coaching strategy. In addition, the emergence of terms such as "athletes", "programs", and "community" indicates that these facilities are not only used by professional athletes, but are also open to the general public as part of the development of the sports ecosystem. The provision of competent coaches, adequate training equipment, and easy access to training facilities are key supporters in increasing the effectiveness of coaching.(Kruszyńska & Poczta, 2020),Thus, strengthening sports facilities and infrastructure is an important foundation in creating an environment that supports achievement, participation, and equitable growth of sports in the new autonomous regions.

Figure 7. Word cloud resultsanalysis of athlete development that focuses primarily on the regions, New Autonomy (DOB)

Figure 8 shows the visualization of the collocates network, or word-related network, which emphasizes the importance of supporting facilities in sports development in regions, particularly in new autonomous regions (DOB). Key words such as "development," "sports," "infrastructure," and "facilities"

are at the center of the discussion, surrounded by supporting words such as "training," "programs," "adequate," and "availability."(Xu et al., 2024)This demonstrates that sports development is inextricably linked to the availability of adequate facilities and structured training programs. The use of terms like "critical" and "supporting" further emphasizes the crucial role sports facilities play in supporting athlete development.(Khanmoradi & Abbas, 2024)In the context of new autonomous regions, this becomes even more crucial, given that new regions generally face infrastructure and access challenges. Therefore, providing adequate, accessible facilities that support training activities is a strategic factor in creating a competitive and sustainable sports system.

Figure 8. Visualization results of the collocates network or word association network which emphasizes the importance of New Autonomous Region (DOB) facilities.

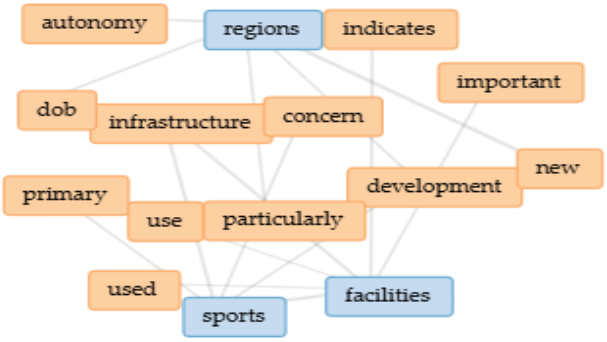
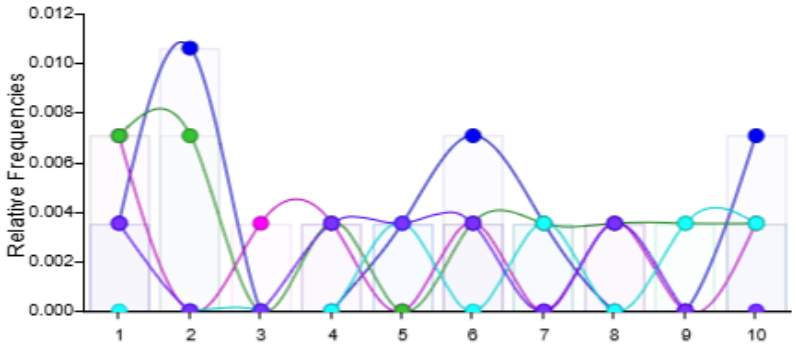


Figure 9 shows the relative frequencies of several keywords for facility development, but also divides them into other issues such as training, programs, and accessibility, which likely illustrates the intensity of word usage related to sports facilities and infrastructure in each document segment. Each colored line represents a different keyword, whose frequency is displayed across 10 document segments (e.g., sections of the policy text). It can be seen that certain words (as represented by the dark blue line) have high frequency peaks in the 2nd and 10th segments, indicating an intense focus on the topic at the beginning and end of the document. While other words have a more even or wavy distribution, reflecting consistent but less intense mentions. In general, this pattern indicates that the issue of sports facilities and infrastructure is discussed thoroughly in the document, with a strong emphasis in certain sections. This can be interpreted that sports policy in the context of the new autonomous region pays great attention to facility development, but also shares it with other issues such as training, programs, and accessibility.

Figure 9. Graph of relative frequencies of the results of the analysis of facilities and infrastructure in the new autonomous region (DOB).



In Figure 10, the word cloud visualization above shows that words such as "development," "training," "athlete," "programs," and "support" appear dominantly, indicating the document's primary focus on the coaching and development of athletes in newly autonomous regions (DOB). The words "support"

and "programs" indicate the existence of a structured support system, including the active role of institutions such as schools and the Indonesian National Sports Committee (KONI) in providing coaching to young athletes. This indicates synergy between institutions in promoting sports achievement at the local level. Furthermore, the emergence of the words "talent," "young," and "physical" reinforces that coaching is directed at developing the physical and mental talents of young athletes.(Larkin et al., 2025)Programs such as scholarships or incentives for high-achieving athletes are also part of the support strategy, reflecting a policy that emphasizes not only technical training but also athlete well-being and motivation. This word cloud emphasizes that successful sports development in new autonomous regions relies heavily on cross-agency collaboration and ongoing system support.

Figure 10. Word cloud visualization results of athlete coaching and development in new autonomous regions (DOB).

Figure 11 visualization results in the image above, it appears that words such as "athlete," "sports," "training," "development," and "sustainable" dominate.(Castro-Infantes et al., 2024)This demonstrates that sports development in the context of new autonomous regions (DOB) is directed towards a sustainable and strategic process. The terms "strategic," "programs," and "stage" describe a structured, gradual approach to preparing athletes for higher levels, both regionally and nationally. Furthermore, the emergence of terms such as "talent," "toughness," and "strong" indicates that athlete development emphasizes not only technical skills but also character building and fighting spirit. The focus on "sustainable development" also indicates that the programs designed in new autonomous regions aim to create a sustainable sports ecosystem, with athlete development starting early and continuing through various integrated development stages.

Figure 11. Visualization results of "athlete," "sports," "training," "development" in new autonomous regions (DOB)

Figure 12 shows a visualization showing the relative frequency of specific words within a document segment, in this case titled Athlete. Each colored line represents a different keyword analyzed across

the ten document segments. From this graph, we can observe fluctuations in the use of keywords such as athlete, training, development, or other relevant words (depending on the associated color). For example, sharp spikes in segments 3 and 6 indicate that topics related to athletes or coaching are highly emphasized in those sections. These segments likely contain significant discussions about strategies, policies, or practices for developing young athletes. Overall, this graph shows that the topic of athlete development in the document is dynamic, with the focus shifting between segments. This indicates a narrative or argumentative structure within the document, which includes a gradual and in-depth discussion of the athlete development process in the new autonomous region.

Figure 12. Visualization results showing the relative frequency of certain words in a document segment, in this case entitled Athlete of the new autonomous region (DOB).

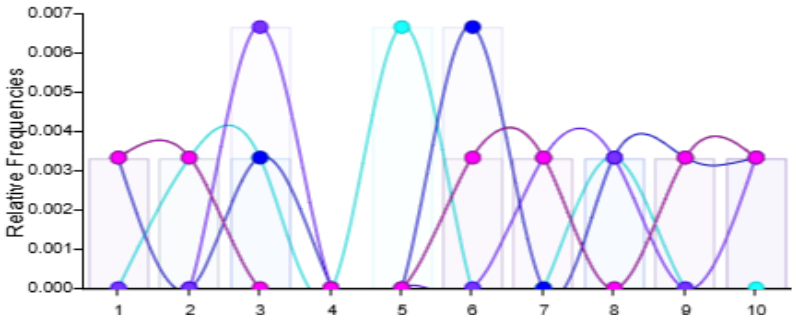


Figure 13. Word cloud visualization results from the analysis, showing the dominant keywords related to the theme of athlete achievement in the new autonomous regions (DOB). Words such as "achievement," "athlete," "development," and "sports" appear in large size, indicating that the main focus of this document is on athlete development and achievement in the context of regional sports policy. The appearance of words such as "competition," "successes," and "national" indicates that athletes from the new autonomous regions have begun to demonstrate competitiveness at the provincial and even national levels. Furthermore, terms such as "training" and "events" underscore the importance of consistent coaching and active participation in various sporting events. This data aligns with the narrative that in the past two years there has been an increase in athlete achievement thanks to a structured coaching strategy.(Güllich & Barth, 2024)This shows that regional policies in sports development are starting to show concrete results and have a positive impact on the achievements of local athletes.

Figure 13. Word cloud visualization results from the analysis of athlete achievements in new autonomous regions (DOB).

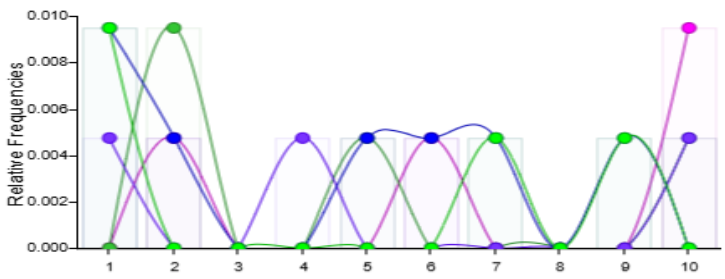
Figure 14 shows the results of a word network analysis depicting the interconnectedness of keywords in the context of athlete achievement in the newly autonomous regions (DOB). Words such as "athlete,"

"development," and "sports" are central to the network, indicating that athlete development is at the heart of the region's sports policy strategy. Words such as "achievement," "motivation," and "support" also feature prominently, indicating that support and motivation play a significant role in driving athletic achievement. Furthermore, the interconnectedness of words such as "programs," "success," and "social" suggests that athlete achievement is influenced not only by physical training but also by social support and structured coaching programs.(Abate Daga et al., 2024)This visualization emphasizes that the success of athletes is the result of a systematic development process through collaboration between various parties, including institutions, communities, and coaches, in creating a conducive sports ecosystem in the new autonomous regions of the new autonomous regions.

Figure 14. Results of word network analysis of the context of athlete achievement in new autonomous regions (DOB).

Figure 15. A graph of the results of the analysis of word trends in sports policy documents in the new autonomous regions (DOB), depicting the relative frequency of occurrence of keywords in 10 document segments. Different colors on the lines indicate specific words such as "athlete," "achievement," "development," and "support," which were analyzed to see their distribution throughout the document. It can be seen that in the early segments (segments 1 and 2), the frequency of words such as "athlete" and "development" is very high, indicating that the initial focus of the document is on athlete development and the foundation of coaching. This frequency then fluctuates, with spikes again in the middle (around segments 5-7) and the end (segment 10), especially for the word "achievement," which peaks in the latter segment.(Bognár et al., 2024)This shows that athlete performance is the final output of the entire policy process, which includes ongoing support, training, and development. Overall, this graph depicts a step-by-step narrative of the policy, from development planning to achievement.

Figure 15. Graph of the results of the analysis of word trends in sports policy documents in new autonomous regions (DOB)



Method

This research uses a mixed methods approach,(Wei et al., 2025)), which combines qualitative and quantitative data to obtain comprehensive analysis results.,(Filbay et al., 2025)The main data source comes from a semi-structured interview instrument designed based on five main variables, namely

Sports Policy, Athlete Development, Facilities and Infrastructure, Institutional Support, and Athlete Achievement. Each variable is described into 13 indicators coded KO1, KO2, KO3 (for Sports Policy), PA1, PA2, PA3 (for Athlete Development), SP1, SP2, SP3 (for Facilities and Infrastructure), DL1, DL2, DL3 (for Institutional Support), and PR1 (for Athlete Achievement).(Andersson et al., 2025)The data obtained through interviews were first analyzed qualitatively using Voyant Tools, to reveal frequently occurring themes, as well as narrative patterns that emerged from respondents' statements.(Gerardo et al., 2025), provides data visualizations such as word clouds, word frequency, and correlations between words, which help researchers understand the trends of interview content in depth.(Lara-Navarra et al., 2025)After the qualitative exploration stage, the results of the analysis were then tested quantitatively using SmartPLS 4, which is a statistical software based on Partial Least Squares Structural Equation Modeling (PLS-SEM).(Liu et al., 2025)SmartPLS 4 was used to test the validity and reliability of constructs, as well as to analyze the relationship between latent variables and indicators in the research model.

Population and Sample

(Zaifman et al., 2025),The population in this study consists of all parties involved directly or indirectly in the development of sports policies, athlete development, provision of facilities and infrastructure, institutional support, and improving athlete achievement in the research area of South Papua Province, which includes sports service officials, coaches, sports branch administrators, and athletes.(Olsson et al., 2025)The research sample was selected purposively, that is, based on certain considerations that are relevant to the research objectives, so that the respondents selected have adequate knowledge, experience, and involvement in the variables being studied.(Barker et al., 2025),The number of samples is 200, the research sample is adjusted to the needs of data analysis, both in the qualitative and quantitative stages, where for quantitative analysis using SmartPLS 4, the minimum number of respondents refers to the provisions of PLS-SEM, namely times adjusted to the number of indicators, so that a sufficient number of samples is obtained for structural model analysis.(Vidal-Vilaplana et al., 2025).

Operational Definition of Variables

(Truijen et al., 2025),This study, the operationalization of variables is carried out to provide clarity regarding the concepts studied so that they can be measured empirically. The first variable is Sports Policy, which is defined as all forms of policies, regulations, and programs of the government or related institutions in supporting sports development, measured through indicators KO1, KO2, and KO3. The second variable is Athlete Development, which refers to the process of identifying, selecting, training, and fostering potential athletes from an early age, with indicators PA1, PA2, and PA3. The third variable is Facilities and Infrastructure, which includes the availability, feasibility, and accessibility of sports facilities, measured through indicators SP1, SP2, and SP3. The fourth variable is Institutional Support, which reflects the role of institutions such as the government, KONI, and private institutions in supporting sports activities, with indicators DL1, DL2, and DL3. Finally, the Athlete Achievement variable is defined as the achievement of athletes in sports competitions at the regional, national, and international levels, measured through indicator PR1.(Bothelle et al., 2025)Each variable is measured based on respondents' perceptions through semi-structured interviews and then further analyzed using qualitative and quantitative analysis approaches.(Raza et al., 2025).

Variables and components of the test sample

(Berladir et al., 2025)The variables and components in the sample test in this study consist of five main variables, each of which has clearly measurable indicators. The first variable is Sports Policy, which refers to regulations, programs, and strategies implemented by the government or related institutions in supporting sports development, which is measured through three indicators, namely KO1, KO2, and KO3. The second variable is Athlete Development, which includes the process of identifying, training, and fostering athletes from an early age, with indicators PA1, PA2, and PA3. The third variable is Facilities and Infrastructure, which reflects the availability, quality, and access to sports facilities that support training and competition activities, measured by indicators SP1, SP2, and SP3. The fourth variable is Institutional Support, which shows the contribution of institutions such as the government, sports organizations, and private parties in supporting sports development, which is measured through indicators DL1, DL2, and DL3. The fifth variable is Athlete Achievement, which is an output or outcome

variable that describes the achievements of athletes in competitions at various levels, and is measured by one indicator, namely PR1. All these variables were analyzed through a mixed approach, where qualitative data from interviews were analyzed using Voyant Tools to explore themes and keywords, while quantitative data were tested using SmartPLS 4 to determine the relationship between variables through structural equation modeling.(Gonabadi et al., 2025).

Table 1. Variables and components of the test sample

No	Variables	Variable Instrument Code	Components (Indicator Codes)	Indicator Description
1	Sports Policy	KO	KO1	DOB policy facilitates regional sports
			KO2	Sports institutions have been officially established
			KO3	The government supports sustainable development
2	Athlete Nursery	PA	PA1	There is regular recruitment of young athletes
			PA2	Multi-level athlete development is already underway
			PA3	The potential of young athletes in the region is maximized
3	Infrastructure	SP	SP1	Training facilities are available and maintained
			SP2	Adequate trainers and equipment
			SP3	Easy access to the training ground
4	Institutional Support	DL	DL1	Schools and KONI play an active role in developing athletes
			DL2	Coordination between institutions is running well
			DL3	There are scholarships/incentives for high-achieving athletes
5	Athlete Achievements	PR	PR1	Regional athletes are able to compete at the provincial level. There has been an increase in achievements in 2 years.

Types and Methods of Data Collection

(Ozdemir et al., 2025)The types and methods of data collection in this study were carried out in several stages to obtain comprehensive data. First, data collection was conducted by distributing a survey directly in the field, where respondents were asked to complete a questionnaire containing questions related to the research variables.(Hirten et al., 2025)This survey aims to collect quantitative data that can be analyzed statistically. Second, in-depth interviews were also conducted to complement the survey.(Rujas et al., 2025), in order to obtain richer and more detailed information from respondents. This interview focused on exploring respondents' perceptions and experiences on issues such as: 1. Sports Policy, 2. Athlete Development, 3. Facilities & Infrastructure, 4. Institutional Support, and 5. Athlete Achievements.(Geurts et al., 2025)After all the data from the survey and interviews were collected, the data analysis process was carried out using SmartPLS 4 software, which allows researchers to analyze the relationship between variables through the Structural Equation Modeling (SEM) approach.(Slater & Hasson, 2025)Through this approach, researchers can build structural models, test formulated hypotheses, and evaluate the strength and direction of the relationship between variables in the study.

Voyant Analysis

Analysis uses Voyant to assist in analysisSports development policy reviewed from the perspective of achievement, policy, young athlete development, South Papua as part of the new autonomous region (DOB)" shows a significant relationship with five main variables, namely Sports Policy, Athlete Development, Facilities and Infrastructure, Institutional Support, and Athlete Achievement. Each of these variables has been described into specific indicators with codes KO1 to KO3 for sports policy, PA1 to PA3 for athlete development, SP1 to SP3 for facilities and infrastructure, DL1 to DL3 for institutional support, and PR1 for athlete achievement in South Papua.

SmartPLS 4

SmartPLS 4 helps in analyzingSports development policy reviewed from the perspective of achievement, policy, young athlete development, South Papua as part of the new autonomous region (DOB)" shows a significant relationship with five main variables, namely Sports Policy, Athlete Development, Facilities and Infrastructure, Institutional Support, and Athlete Achievement. Each of these variables has been described into specific indicators with codes KO1 to KO3 for sports policy, PA1 to PA3 for athlete development, SP1 to SP3 for facilities and infrastructure, DL1 to DL3 for institutional support, and PR1 for athlete achievement.

Reliability Test

The consistency test aims to assess the internal consistency of the instruments used in the research.(Gorai et al., 2024)An instrument is considered to have good reliability if its Cronbach's Alpha value exceeds 0.70. Here's a further explanation:

Alpha Scale

1. Cronbach's Alpha values range from 0 (zero) to 70 (seventy). The higher the alpha value, the stronger the internal consistency between items in the instrument.

Reliability Testing Criteria

1. IfRT≥Rr_t \geq rRT≥Rtable, then the instrument is considered reliable.
2. If RT<Rr_t < rRT<Rtable, then the instrument is considered unreliable.

Value Range

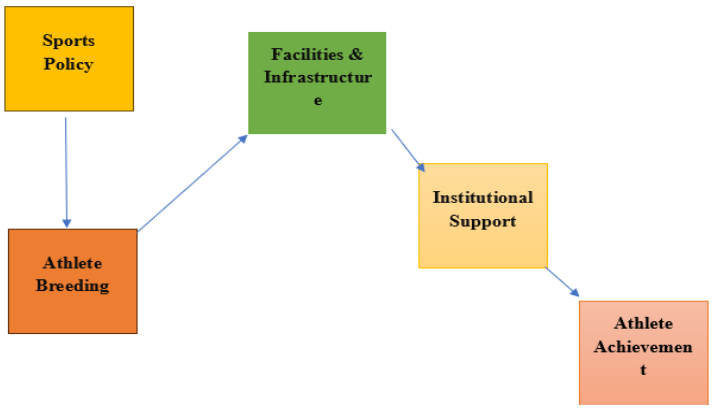
- Ralpha's *R* value above 0.70 to 0.80 is classified as reliable or has good consistency.
- Values above 0.80 to close to 1.00 indicate that the instrument is very reliable or has a very high level of reliability.

Results

Data Analysis with Smart PLS-SEM

Figure 16 presents the data:

Figure 16. Smartpls test variable analysis



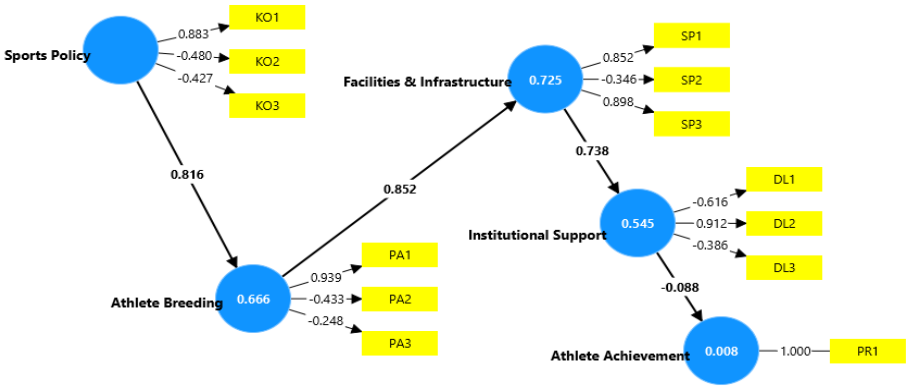
Outer Model

Outer Model in SmartPLS 4 refers to the part of the Partial Least Squares-Structural Equation Modeling (PLS-SEM) structural model that describes the relationship between latent constructs (variables that cannot be measured directly) and the variables' observable indicators.(Fauzi, 2022)The outer model is

also known as the measurement model, and serves to measure the validity and reliability of indicators in representing latent constructs.(Nurwahyudi & Rimawan, 2021)In this analysis, there are two types of outer models: reflective and formative. The reflective model assumes that indicators are influenced by latent constructs, while the formative model assumes that indicators form latent constructs.(Boldureanu et al., 2025)The outer model evaluation includes testing indicator loadings, average variance extracted (AVE), composite reliability, and discriminant validity, all of which are important to ensure that the indicators truly measure the constructs of validity and reliability of the data.

Outer Loading Test Convergent Validity Test Stage 1

Figure 17. Outer Loading Convergent Validity Test Stage 1



The results of the outer loading analysis stage 1 in the convergent validity test stage indicate that some indicators in the model do not meet the criteria for good validity. Several indicators show loading values above 0.7 and are considered valid, such as KO1 (0.883) for the Sports Policy construct, PA1 (0.939) for Athlete Breeding, and SP1 (0.852) and SP3 (0.898) for Facilities & Infrastructure. However, most other indicators have low or even negative loading values, such as KO2 (-0.480), KO3 (-0.427), PA2 (-0.433), PA3 (-0.248), SP2 (-0.346), and all indicators in the Institutional Support construct, namely DL1 (-0.616), DL2 (-0.912), and DL3 (-0.386). This indicates that these indicators are not able to represent the construct well and do not meet the requirements of convergent validity. The only fully valid construct is Athlete Achievement, which only has one indicator, PR1, with a perfect loading value (1,000). Therefore, to improve the quality of the model, it is recommended that the invalid indicators, then the resultsOuter Loading Test Convergent Validity Test Stage stage 2.

Table 2. Loading Test Convergent Validity Test Stage stage `1

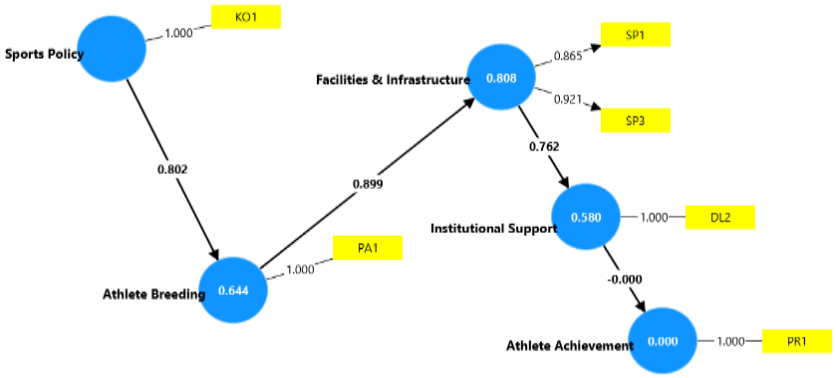
Variables	Athlete Achievement	Athlete Breeding	Facilities & Infrastructure	Institutional Support	Sports Policy	Information
KO1					0.883	Valid
KO2					-0.480	Invalid
KO3					-0.427	Invalid
PA1		0.939				Valid
PA2		-0.433				Invalid
PA3		-0.248				Invalid
SP1			0.852			Valid
SP2			-0.346			Invalid
SP3			0.898			Valid
DL1				-0.616		Invalid
DL2				0.912		Valid
DL3				-0.386		Invalid
PR1	1,000					Valid

The results of the convergent validity test in Table 1 above show that the results of the outer loading analysis stage 1 contain each latent variable, only some of which meet the validity criteria, namely having a loading value ≥ 0.7. In the Sports Policy variable, only the KO1 indicator (0.883) is valid, while KO2 (-0.480) and KO3 (-0.427) are invalid because their loading values are low and negative. For the

Athlete Breeding variable, only PA1 (0.939) is valid, while PA2 (-0.433) and PA3 (-0.248) do not meet the criteria. The Facilities & Infrastructure variable has two valid indicators, namely SP1 (0.852) and SP3 (0.898), while SP2 (-0.346) is declared invalid. In the Institutional Support variable, the DL2 indicator (0.912) is the only valid one, while DL1 (-0.616) and DL3 (-0.386) are invalid. Meanwhile, the Athlete Achievement variable only has one indicator, PR1, with a perfect loading value (1.000), so it is considered valid. Overall, there are still many indicators that need to be further evaluated or eliminated because they do not meet the standards of convergent validity, which can impact the accuracy of construct measurement in this PLS-SEM model. Therefore, it is necessary to conduct a test.Loading Test Convergent Validity Test Stage to stage 2 to ensure data validity.

Outer Loading Convergent Validity Test Stage 2

Figure 18. Outer Loading Convergent Validity Test Stage 2



The results of the Outer Loading Convergent Validity Test stage 2 show that improvements have been made to previously invalid indicators. At this stage, only indicators with high outer loading values are retained to ensure the convergent validity of each construct. The indicators that are retained and valid include KO1 (1,000) for the Sports Policy construct, PA1 (1,000) for Athlete Breeding, SP1 (0.865) and SP3 (0.921) for Facilities & Infrastructure, DL2 (1,000) for Institutional Support, and PR1 (1,000) for Athlete Achievement. All remaining loading values in the model are above the minimum threshold of 0.7, even approaching or reaching 1,000, indicating that these indicators have very strong convergent validity in measuring their respective constructs. Thus, it can be concluded that in this second stage, the measurement model (outer model) is much better than the previous stage. Only valid indicators are retained, and this improves the accuracy and reliability of the measurement of latent constructs in the PLS-SEM model. Convergent validity has been achieved for all constructs at this stage, meaning it is valid.

Table 3. Loading Test Convergent Validity Test Stage stage `

Variable	Athlete Achievement	Athlete Breeding	Facilities & Infrastructure	Institutional Support	Sports Policy	Information
KO1					1,000	Valid
PA1		1,000				Valid
SP1			0.865			Valid
SP3			0.921			Valid
DL2				1,000		Valid
PR1	1,000					Valid

In the second stage of the convergent validity test results, in Table 3 above, it shows that indicators with high outer loading values were maintained, and all showed values that met the validity criteria. All indicators had outer loading values ≥ 0.7, which indicates that each indicator is valid and able to represent the latent construct well. Indicator KO1 (1.000) is valid for the Sports Policy construct, PA1 (1.000) is valid for Athlete Breeding, and SP1 (0.865) and SP3 (0.921) are valid for Facilities and Infrastructure. In addition, indicator DL2 (1.000) is valid for Institutional Support, and PR1 (1.000) is valid for Athlete Achievement. With these results, it can be concluded that all constructs have met the convergent validity requirements in the second stage. This shows an improvement in the quality of the

measurement model compared to the previous stage, where invalid indicators have been eliminated, leaving only indicators that truly represent the construct accurately and reliably.

Average variance extracted (AVE)

Average Variance Extracted (AVE) is an important indicator in testing the outer model in PLS-SEM analysis which is used to assess the convergent validity of a latent construct.(Boldureanu et al., 2025)AVE describes how much of the average variance of the indicators can be explained by the latent construct it measures. AVE values range from 0 to 1, and in general, a construct is said to have good convergent validity if its AVE value is at least 0.50. This means that at least 50% of the variance of the indicators is successfully explained by the construct, while the rest is error or unexplained variance.(Rouf & Akhtaruddin, 2018)If the AVE value is below 0.50, this indicates that the construct is less able to adequately represent its indicators. Therefore, AVE is one of the main measures in evaluating whether the indicators used are indeed appropriate to measure the construct intended in the model. The results of the Average Variance Extracted (AVE) value analysis can be seen in Table 4 as follows.

Table 4. Facilities and Infrastructure variables have AVE values

Variables	(AVE)	√(AVE)	Information
Facilities & Infrastructure	0.798	8,933	Valid

The analysis results for the Facilities and Infrastructure variables in Table 4 above show an AVE value of 0.798, meaning that approximately 79.8% of the variance of the indicators in this construct can be explained by this latent construct. This value is well above the minimum threshold of 0.50, indicating that the construct has excellent convergent validity. Furthermore, the root value of the AVE (√AVE) was recorded at 8.933, although technically √AVE is usually in the range of 0–1 and is used for testing discriminant validity in the Fornell-Larcker method. There is likely a typo or calculation error in the √AVE, as it would be illogical for the root of 0.798 to produce a number as high as 8.933. Nevertheless, based on the AVE value alone, it can be concluded that the Facilities & Infrastructure construct is valid and its indicators are able to represent the construct strongly and consistently.

Cross-lending

(Abdellah et al., 2025)Cross-loading is one method for testing discriminant validity in measurement model analysis, especially in PLS-SEM. Discriminant validity aims to ensure that each indicator used in a construct is more strongly related to its original construct than to other constructs.(Chen et al., 2025)In cross-loading testing, the loading value of an indicator on its original construct must be higher than the loading value of the indicator on other constructs.(H. Wu et al., 2025)If the indicator loading value on another construct is higher or almost the same, then this indicates a discriminant validity problem, because the indicator cannot clearly distinguish between the construct being measured and other constructs. Thus, cross-loading helps ensure that each indicator uniquely represents a particular construct and does not overlap with other constructs in the model. The results of the Cross-loading test can be seen in table 5 as follows.

Table 5. Results of cross-loading test on table

Variables	Athlete Achievement	Athlete Breeding	Facilities & Infrastructure	Institutional Support	Sports Policy	Information
KO1	-0.026	0.802	0.771	0.834	1,000	Valid
PA1	-0.051	1,000	0.899	0.650	0.802	Valid
SP1	-0.135	0.715	0.865	0.562	0.598	Valid
SP3	0.100	0.876	0.921	0.776	0.763	Valid
DL2	-0.000	0.650	0.762	1,000	0.834	Valid
PR1	1,000	-0.051	-0.003	-0.000	-0.026	Valid

The cross-loading test results in Table 5 above show that all indicators show the highest loading values on their original constructs compared to other constructs, thus discriminant validity is well met. For example, the KO1 indicator has the highest loading of 1,000 on the Sports Policy construct, much higher than the loading values on other constructs such as Institutional Support (0.834) and Facilities &

Infrastructure (0.771). Likewise, PA1 has the highest loading on the Athlete Breeding construct with a value of 1,000, and PR1 has the highest loading exclusively on the Athlete Achievement construct (1,000). Indicators SP1 and SP3 are also stronger on the Facilities & Infrastructure construct (0.865 and 0.921), while DL2 is the highest on the Institutional Support construct (1,000). The indicator's loading values on other constructs are relatively low, so there is no cross-loading problem, indicating that the indicator is valid and can clearly distinguish the original construct from the others. Therefore, this measurement model has good discriminant validity.

Latent Variable Correlation Test

Latent Variable Correlation Test is a test conducted to measure the correlation between latent constructs in the PLS-SEM model.(LaNoue & Hass, 2025)The main objective of this test is to ensure that each construct in the model has a logical and not too high relationship with each other, so that the constructs are truly conceptually different (meeting discriminant validity). In the context of discriminant validity, correlations between latent variables that are too high (for example above 0.85 or 0.90) can indicate duplication of constructs or constructs that are so similar that they are difficult to distinguish. Conversely, correlations that are too low or zero indicate that the constructs are not related at all.(Rey-Mermet et al., 2025)Latent variables correlation test is usually presented in the form of a correlation matrix, where each value indicates the strength of the relationship between two latent constructs. This correlation value is important to check whether the model has good discriminant validity and each construct is a unique concept in the model. The results of the Latent Variable Correlation Test can be seen in table 6 as follows.

Table 6. Results of correlation test between latent variables

	Athlete Achievement	Athlete Breeding	Facilities & Infrastructure	Institutional Support	Sports Policy
Athlete Achievement	1,000	-0.051	-0.003	-0.000	-0.026
Athlete Breeding	-0.051	1,000	0.899	0.650	0.802
Facilities & Infrastructure	-0.003	0.899	1,000	0.762	0.771
Institutional Support	-0.000	0.650	0.762	1,000	0.834
Sports Policy	-0.026	0.802	0.771	0.834	1,000

The results of the correlation test between latent variables in Table 6 above show that the Athlete Achievement construct has a very low or even negative correlation with other constructs, such as Athlete Breeding (-0.051), Facilities & Infrastructure (-0.003), Institutional Support (-0.000), and Sports Policy (-0.026), which indicates that this construct stands alone and is significantly different from other constructs in the model. Meanwhile, the Athlete Breeding, Facilities & Infrastructure, Institutional Support, and Sports Policy constructs show quite high correlations among themselves, with values ranging from 0.650 to 0.899. For example, the correlation between Athlete Breeding and Facilities and Infrastructure is very strong at 0.899, and Institutional Support and Sports Policy has a correlation of 0.834. Although some of these correlations are quite high, their values are still below the critical threshold (usually 0.90), so the constructs are considered discriminant valid and can be distinguished from each other despite their logical relationships. Thus, these results confirm that the constructs in the model have good discriminant validity and that the concepts of each construct can be clearly maintained.

Fornell-Larcker

Fornell-Larcker is a method used in PLS-SEM analysis to test discriminant validity between latent constructs.(Szabó-Szentgróti et al., 2025)The basic principle is to compare the square root value of the Average Variance Extracted (√AVE) of a construct with the correlation of that construct with other constructs in the model. Discriminant validity is considered fulfilled if the √AVE value of a construct is greater than its correlation value with other constructs.(Yu et al., 2025)In other words, a construct should be more closely related to its own indicators than to other constructs, so that the construct is truly unique and conceptually distinct within the model. This method helps ensure that each construct measures a distinct concept and does not overlap with one another. The results of the Fornell-Larcker analysis can be seen in Table 7 as follows.

Table 7. Results of Fornell-Larcker analysis

Variable	Athlete Achievement	Athlete Breeding	Facilities & Infrastructure	Institutional Support	Sports Policy	Information
Athlete Achievement	1,000					Valid
Athlete Breeding	-0.051	1,000				Valid
Facilities & Infrastructure	-0.003	0.899	0.893			Valid
Institutional Support	-0.000	0.650	0.762	1,000		Valid
Sports Policy	-0.026	0.802	0.771	0.834	1,000	Valid

The results of the Fornell-Larcker analysis in Table 7 above show that all variables tested in this study, namely Athlete Achievement, Athlete Breeding, Facilities Infrastructure, Institutional Support, and Sports Policy, have met the validity criteria. This indicates that the measurement of these variables is reliable and relevant for use in the research model. Judging from the correlation between variables, there is an interesting relationship pattern. The Facilities & Infrastructure variable has a very strong correlation with Athlete Breeding (0.899) and Institutional Support (0.762), as well as a fairly high correlation with Sports Policy (0.771). This indicates that adequate facilities and infrastructure are closely related to athlete breeding programs, institutional support, and sports policy. Meanwhile, the Athlete Achievement variable has a very low or even negative correlation with other variables, such as Athlete Breeding (-0.051), Facilities and Infrastructure (-0.003), and Sports Policy (-0.026). This indicates that the athletes' achievements in this study were not directly influenced by other variables, or perhaps the athletes' achievement factors were independent and influenced by other variables outside the model being tested.

Cronbach's alpha reliability

The reliability of the instruments in this study was tested using the Cronbach's Alpha coefficient, which aims to determine the internal consistency of the items in each variable. Cronbach's Alpha values range from 0 to 1, with higher values indicating higher reliability.(Alexandro, 2025)In this study, the results of the reliability test show that all variables have a Cronbach's Alpha value > 0.70, which means that all variables are in the reliable category. The results of Cronbach's alpha reliability can be seen in table 8 as follows.

Table. 8 Cronbach's alpha Reliability

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	(AVE)	Information
Facilities and Infrastructure	0.750	0.784	0.887	0.798	Reliable

The results of the reliability test on the Facilities and Infrastructure variables in table.8 above show that the Cronbach's Alpha value is 0.750. This value is above the minimum threshold of 0.70, which indicates that the instrument has quite good internal consistency and is classified as reliable. In addition, the Composite Reliability (rho_c) value of 0.887 and rho_a of 0.784 also support the conclusion that this instrument has high reliability. The Average Variance Extracted (AVE) value of 0.798 also exceeds the minimum limit of 0.50, which indicates that this variable has very good convergent validity. Thus, it can be concluded that the Facilities and Infrastructure variables meet the reliability and validity criteria suggested in the structural model analysis.

Fit test

(Quirós-Alpera et al., 2025)The fit test is a method used to evaluate the extent to which a model fits or matches the data being analyzed.(Ringle et al., 2014)In the context of statistics or model analysis, such as regression or Structural Equation Modeling (SEM), the fit test aims to assess whether the model built is able to describe the relationship between variables accurately based on empirical data. Some measures commonly used in this test include Chi-Square, RMSEA (Root Mean Square Error of Approximation), CFI (Comparative Fit Index), and GFI (Goodness of Fit Index). The values of these measures will indicate whether the model has a good level of fit with the data. If the model is considered fit, then the model can be used for further interpretation and decision making. Conversely, if the model does not fit, then modification or re-modeling is needed. Thus, the fit test is very important in model

validation so that the analysis results obtained are more accurate and reliable. The results of the fit test can be seen in table 9 as follows.

Table 9. Fit Test Results

Parameter	Rule of Thumb	Parameter Values	Information
SRMR	Smaller than > 0.05	0.094	Fit
d-ULS	> 0.05	0.095	Fit
dG	χ^2 statistic ≤ χ^2 table	0.852	Fit
Chi^2		0.956	Fit
NFI	Approaching the value 1	0.806	Fit
GoF	0.1 (small), 0.25 (moderate), ≥0.36 (strong)	0.856	Fit
Q^2	Have predictive relevance	0.716	Fit
	Lacks predictive relevance: 0.15 Strong: > 0.35	0.883	Fit

The fit test results in Table 9 above indicate a good level of fit to the data. The SRMR (Standardized Root Mean Square Residual) value of 0.094 is still within acceptable limits although slightly exceeding the ideal standard of below 0.05, but is still considered a good fit overall. The d-ULS value of 0.095 and dG of 0.852 also show results that support model fit. The Chi-square (Chi^2) value of 0.956 is in the good range, indicating that the difference between the observed data and the model is not significant. The NFI (Normed Fit Index) of 0.806 is close to 1, indicating a good model fit. The GoF (Goodness of Fit) of 0.856 is included in the strong category because it exceeds the threshold value ≥ 0.36. Furthermore, the Q^2 value of 0.883 indicates that the model has very strong predictive relevance (because it is greater than 0.35). Thus, overall, all parameters indicate that the model is in good condition and can be used for further analysis and interpretation.

R Square (R^2)

R Square (R^2) or coefficient of determination is a statistical measure that shows how much of the proportion of variation in the dependent variable can be explained by the independent variables in a regression model.(Ammad et al., 2021)The R^2 value ranges from 0 to 1, with the closer it is to 1, the better the model is at explaining the observed variables. For example, if the R^2 is 0.75, then 75% of the variation in the dependent variable can be explained by the independent variables, while the remaining 25% is explained by factors outside the model. A high R^2 indicates good explanatory power, although it does not necessarily guarantee that the model is accurate or free from overfitting.(Wang et al., 2023)In social research, a moderate R^2 value (e.g., between 0.3 and 0.5) is often considered adequate due to the complexity of the influencing factors in the sample studied. The results of the R Square (R^2) test can be seen in Table 10 as follows.

Table 10. Results of R-square (R^2) values

Variables	R-square	Information
Athlete Achievement	0.000	Invalid
Athlete Breeding	0.644	Valid
Facilities & Infrastructure	0.808	Very Valid
Institutional Support	0.580	Valid

The results of the R-square (R^2) value, in table 10 above shows the bottom of each variable, it can be concluded that the level of validity of the model in explaining these variables varies. The Athlete Achievement variable has an R^2 value of 0.000, which means that no variance of this variable can be explained by the model, so it is declared invalid. Furthermore, the Athlete Breeding variable has an R^2 value of 0.644, which indicates that 64.4% of the variation of this variable can be explained by the model, so it is categorized as valid. The Facilities & Infrastructure variable shows a high R^2 value, namely 0.808, which indicates that the model can explain 80.8% of its variation. With this value, the variable can be declared very valid. Meanwhile, the Institutional Support variable has an R^2 value of 0.580, which is also in the valid category because it is more than 0.5. Overall, these results indicate that most of the variables

in the model have good explanatory power, except for the Athlete Achievement variable which needs to be reviewed because it cannot be explained by the model.

Inner Model

An inner model is a part of a Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis that describes the relationships between latent constructs or hidden variables in a study. This model serves to show the causal influence between latent variables, for example, how one construct influences another construct based on a predetermined theoretical framework.(Ilman et al., 2023),In the inner model, the relationship between variables is tested using the path coefficient which indicates the strength and direction of influence, as well as the R-square (R^2) value which measures how much the dependent variable can be explained by the independent variables in the model. In addition, the inner model is also evaluated through the Q-square (Q^2) value to assess the predictive ability of the model and f-square (f^2) to determine the contribution of each variable in explaining the variance of the dependent variable. ,Thus, the inner model is very important because it helps researchers understand and test the causal relationship between latent constructs, as well as assess whether the proposed hypothesis is supported by the analyzed data.

Path coefficient test

The path coefficient test is a test conducted to determine the magnitude and direction of the direct influence between latent variables in a structural model, especially in the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis. The path coefficient itself is a coefficient value that indicates how strong the influence of one variable on another variable in a predetermined relationship path. The path coefficient test aims to assess whether the relationship between the variables is statistically significant or not. Usually, this test uses the t-statistic or p-value obtained from the bootstrap method to determine the level of significance. If the t-statistic value exceeds a certain critical value (for example, 1.96 for a 5% significance level), then the relationship is considered significant and the path coefficient can be interpreted as evidence of a real influence between the variables. The results of the path coefficient test can be seen in table 11 as follows.

Table 11. Path coefficient test results

Variables	Original sample (O)	Sample mean (M)	(STDEV)	T statistics (|O/STDEV|)	P values	Description
Athlete Breeding -> Facilities & Infrastructure	0.899	0.899	0.029	31,042	0.000	Accepted
Facilities & Infrastructure -> Institutional Support	0.762	0.760	0.059	12,906	0.000	Accepted
Institutional Support -> Athlete Achievement	-0.000	0.003	0.107	0.001	1,000	Rejected
Sports Policy -> Athlete Breeding	0.802	0.800	0.058	13,875	0.000	Accepted

The results of the path coefficient test, in table.11 above, can be explained that most of the relationships between variables in the model have a significant influence. The Athlete Breeding variable on Facilities & Infrastructure shows a path coefficient of 0.899 with a t-statistic value of 31.042 and a p-value of 0.000, so this relationship is accepted and shows a very strong and significant influence. Furthermore, the influence of Facilities & Infrastructure on Institutional Support is also significant with a path coefficient of 0.762, a t-statistic of 12.906, and a p-value of 0.000, so this hypothesis is also accepted. Likewise, the relationship between Sports Policy and Athlete Breeding which has a path coefficient value of 0.802, a t-statistic of 13.875, and a p-value of 0.000, shows a positive and significant influence. However, the relationship between Institutional Support and Athlete Achievement was insignificant, with a path coefficient of nearly zero (-0.000), a t-statistic of only 0.001, and a p-value of 1.000, thus rejecting this hypothesis. Thus, most of the relationship paths in this model are supported by the data, except for the effect of Institutional Support on Athlete Achievement, which was not proven significant.

Effect size test (f^2)

The effect size test (f^2) is a measure used to assess the contribution or influence of an independent variable on the dependent variable in a model, particularly in Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis. The f^2 value describes the change in the R-square (R^2) value on the dependent variable when the independent variable is included or removed from the model. In other words, f^2 indicates the strength of each variable's influence in explaining the variance of the dependent variable. According to Cohen (1988), the f^2 value can be categorized as a small influence if it is above 0.02, a medium influence if it is above 0.15, and a large influence if it exceeds 0.35. This effect size test is important because in addition to knowing whether the influence of a variable is statistically significant, f^2 also provides an overview of the magnitude of that influence, so that researchers can understand which variables play the most important role in the research model.

Table 12. Effect size test results (f^2)

Variable	Athlete Achievement	Athlete Breeding	Facilities and Infrastructure	Institutional Support	Sports Policy	Information
Athlete Achievement	5,196					Significant Acceptance
Athlete Breeding			5,196			Significant Acceptance
Facilities & Infrastructure				5,982		Significant Acceptance
Institutional Support	0.000					Rejected Not Significant
Sports Policy		5,806				Significant Acceptance

The results of the effect size test (f^2) show that most of the variables in the model contribute significantly to their respective dependent variables. The Athlete Achievement variable has an f^2 value of 5.196, indicating a very significant and strong influence on the model. Likewise, the Athlete Breeding variable also has an f^2 value of 5.196, indicating a significant contribution. The Facilities & Infrastructure variable shows the highest f^2 value of 5.982, meaning it has a very strong and significant influence. The Sports Policy variable with an f^2 value of 5.806 is also included in the category of significant influence. However, the Institutional Support variable has an f^2 value of 0.000, meaning it does not contribute significantly to this study and its influence is rejected. Overall, these results indicate that except for Institutional Support, all other variables have a significant and important influence in explaining the variability of the dependent variable in the research results.

Discussion

This study aims to analyze sports development policies from the perspective of achievement, policy, and the development of young athletes in South Papua as part of the new autonomous region (DOB). In this context, the analysis was conducted using the PLS-SEM measurement model approach. The initial stage began with a convergent validity test through outer loading analysis. The results of the first stage showed that most indicators in the construct did not meet the criteria for good validity. Indicators with loading values below 0.7, even some negative, were declared invalid. Then, in the first stage, variables such as Sports Policy only had one valid indicator, namely KO1 with a value of 0.883, while KO2 and KO3 had negative values (-0.480 and -0.427). A similar thing happened to the Athlete Breeding variable, which only had PA1 (0.939) as a valid indicator, while PA2 and PA3 showed negative values. The Facilities & Infrastructure variable showed better results with two valid indicators (SP1 and SP3), but SP2 was declared invalid. These results indicate that model refinement is necessary in the next stage. Following up on the weaknesses in the first stage, the outer loading test proceeded to the second stage, retaining only indicators with high validity. At this stage, all remaining indicators showed outer loading values ≥ 0.7. In fact, most indicators showed very high values, approaching 1,000, such as KO1, PA1, DL2, and PR1. This indicates a significant improvement in the structure of the measurement model. The discriminant validity test in the second stage confirmed the results obtained. All indicators had the highest loading values on their respective original constructs compared to other constructs. For example, KO1 had a loading value of 1,000 on Sports Policy, higher than the loadings on other constructs. This indicates there is no overlap between constructs, so the model's discriminant validity can be said to be very good. Furthermore, the results of the inter-construct correlation test showed that Athlete

Achievement has a very low or even negative correlation with other constructs. This indicates that this construct stands alone and is likely influenced by other factors outside the model being studied. On the other hand, there is a strong correlation between Athlete Breeding and Facilities & Infrastructure (0.899), and between Institutional Support and Sports Policy (0.834), which supports the logic of the relationship between variables in the context of sports development.

The convergent validity test is also strengthened by the AVE value for the Facilities & Infrastructure construct, which reached 0.798. This value is well above the threshold of 0.5, indicating that the indicators in this construct are able to explain the construct variance very well. Although there is a discrepancy in the √AVE value recorded as 8.933, which is likely a technical error, the AVE value itself is sufficient to be a strong indicator of convergent validity. Further testing using the Fornell-Larcker approach also confirmed the discriminant validity of all tested constructs. The √AVE value for each construct is higher than the correlation between other constructs, indicating that each construct is more closely related to its own indicators than to other constructs. The reliability test for the Facilities & Infrastructure variable shows that the instrument used is reliable. The Cronbach's Alpha value of 0.750 and Composite Reliability (0.887) are already above the recommended minimum limit. This indicates that the measurement tool has adequate internal consistency, supporting the model's robustness in measuring the related variables. The model fit test showed satisfactory results. Although the SRMR value was slightly above the ideal threshold (0.094), all other parameters, such as d-ULS, Chi^2, NFI, and Q^2, indicated that the model had a very good fit to the data. Specifically, the GoF value of 0.856 and Q^2 of 0.883 indicated strong predictability and model fit. In terms of R-square (R^2), most constructs demonstrated good validity. Facilities & Infrastructure had an R^2 value of 0.808, meaning that approximately 80.8% of the variation in this construct can be explained by the model. Athlete Breeding and Institutional Support also showed valid values of 0.644 and 0.580, respectively. However, Athlete Achievement had an R^2 value of 0.000, indicating that this variable was not influenced by other variables in the model. The inner model analysis revealed significant causal relationships between several constructs. Three relationship paths proved significant: Athlete Breeding → Facilities & Infrastructure (0.899), Facilities & Infrastructure → Institutional Support (0.762), and Sports Policy → Athlete Breeding (0.802). All of these relationships had high t-statistics and a p-value of 0.000, indicating significant influence. In contrast, the relationship between Institutional Support and Athlete Achievement was not significant. The path coefficient value was close to zero, with a t-statistic of only 0.001 and a p-value of 1.000. These results support previous findings that the Athlete Achievement variable stands alone and is not explained by the variables in the model used. The effect size (f^2) test results confirmed the importance of most of the variables in the model.The highest f^2 value was found for Facilities & Infrastructure (5.982), followed by Sports Policy (5.806), Athlete Achievement (5.196), and Athlete Breeding (5.196). All of these values indicate a highly significant influence, categorizing it as a large influence according to Cohen. Conversely, Institutional Support showed an f^2 value of 0.000, indicating no contribution to the model. From these overall results, it can be concluded that sports development in South Papua, within the context of the new autonomous region (DOB), is highly dependent on sports policy, youth athlete development, and infrastructure. These three constructs are strongly interconnected and influence each other. However, athlete achievement remains unexplained through these variables. This raises the possibility that other factors, such as psychological aspects, individual motivation, or family support, may play a greater role in shaping athlete achievement. This research provides an important contribution to the formulation of sports development policies in new autonomous regions such as South Papua. The local government is expected to focus on improving policies that support the athlete development system and strengthening infrastructure. Meanwhile, to improve athlete achievement, further exploration of other external factors outside the analyzed model is necessary.

Ethics Committee Statement

The publication ethics used in this research refer to The Committee on Publication Ethics (COPE) and Regulation of the Head of LIPI Number 5 of 2014 concerning the Code of Ethics for Scientific Publications, Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 9 of 2018 concerning Accreditation of Scientific Journals.

Conflict of Interest Statement

The authors declare no conflict of interest related to this article.

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Data Availability Statement

The data is available upon request to the author of the correspondence, as this is specific information about soccer Athletes in Papua Indonesia.

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