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Digital Technology and Local Policy: An Evidence-Based Collaborative Model for Sports Talent Identification

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Abstract

Background: Talent identification requires objective and consistent data use, yet many athlete development systems still rely on limited technological support and uneven policy implementation. Aligning digital tools with local policy is therefore essential for creating a more coherent evidence-based approach.
Aims: This study explains the relationship between technology utilization and local policy support in enhancing talent identification effectiveness and formulates a collaborative conceptual model integrating both components.
Methods: This study used a quantitative explanatory design involving 50 participants consisting of coaches, physical education teachers, and student athletes selected through purposive sampling. Data were obtained through TIDev outputs, validated questionnaires, and structured observations. Analysis was performed using descriptive statistics, Pearson's correlation, and multiple regression through SPSS to evaluate technology utilization, policy support, and talent mapping efficiency. A conceptual model was formulated through interpretive synthesis based on empirical patterns and relevant theories.
Results: Technology utilization showed high mean scores, while policy implementation and impact were moderate. Correlation analysis indicated no significant relationship between policy support and technology use. Regression results showed that TIDev significantly improved talent-mapping efficiency, whereas policy support had no direct effect. Expert validation yielded a high I-CVI score (0.88), confirming relevance of the proposed collaborative model.
Conclusion: This study shows that TIDev contributes meaningfully to improving the effectiveness of talent identification, whereas local policy support has not yet been fully integrated into operational practice. Based on the empirical patterns, a collaborative conceptual model was formulated to illustrate how technological evidence and policy structures can be aligned to strengthen talent identification.

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INTRODUCTION

Accurate talent identification in the early stages plays a decisive role in shaping the long-term success of athlete development and performance progression. This process not only determines which individuals are ready to enter structured training pathways, but also informs the design of training programs, developmental milestones, and targeted interventions that align with athletes' specific needs (Sarmento et al., 2018). Scholarship in this area consistently highlights that effective talent identification requires objective and standardized assessments supported by longitudinal data, ensuring that selection decisions do not rely on intuition or coaching bias (Barraclough et al., 2022; Höner et al., 2023). Yet, in many development settings, these scientific principles are not applied consistently, leaving concerns about the accuracy and stability of selection outcomes (Henriksen et al., 2010; Johnston et al., 2018).

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A growing body of research attributes these challenges to institutional capacity constraints and weak data management practices within athlete development systems. Höner et al., (2023) note that many training organizations still lack standardized documentation systems, making it difficult to track athletes' profiles reliably and continuously. Coutinho et al., (2016) further emphasize that the use of nonstandardized instruments and manual record-keeping limits coaches' ability to conduct evidence-based evaluations. In addition, variations in coaches' competencies in performing performance assessments, limited training in data analysis, and the absence of coordinated mechanisms across institutions contribute to fragmented talent identification processes (Salas et al., 2017). These conditions suggest that the difficulties in talent identification stem not only from the selection methods themselves, but also from the broader readiness of development systems to provide adequate technical infrastructure, skilled personnel, and systematic evaluation procedures.

The rapid advancement of digital technologies has opened new opportunities to address several long-standing challenges in athlete selection and development. Performance analysis systems, monitoring applications, and software such as Talent Identification Development (TIDev) enable a more objective identification process by facilitating standardized data collection, the creation of athlete performance profiles, and the longitudinal tracking of developmental progress (Buhari et al., 2024; Juginović et al., 2025; Morganti et al., 2024). Early studies have demonstrated that digital tools can enhance consistency in selection decisions and provide more accurate representations of athletes' capabilities (Liu, 2025; Marsuki et al., 2025a; Newhouse, 2015). However, the extent to which these technologies improve practice depends heavily on users' readiness, including coaches, physical education teachers, and local officials responsible for interpreting and utilizing the generated data (Koh et al., 2022; Popeska et al., 2017; Zubaidah et al., 2024). This underscores that technology may expand analytical capacity, yet its real impact is shaped by the organization's ability to embed digital tools meaningfully into development processes.

Within this landscape, local policy frameworks play a pivotal role, as they define the direction of athlete development, establish coordination mechanisms, and determine operational standards governing talent identification activities. Governance models highlight that the success of athlete development systems relies on the capacity of institutions to collaborate systematically, share information, and align their objectives (Bryson et al., 2014; Crosby et al., 2017). Nonetheless, several studies suggest that regional policies have not fully adapted to the demands of digital transformation in sports development. Existing regulations often lack provisions that promote sustained data use or ensure that digital innovations can be leveraged optimally (De Bosscher et al., 2015; Hylton, 2013; Milakovich, 2021). These findings indicate that the effectiveness of digitalization efforts is closely tied to the degree of policy support and institutional alignment.

Although digital technologies offer significant potential, their benefits can only be realized when implemented within a policy framework that supports data integration, facilitates inter-institutional coordination, and promotes the systematic use of information. Technology may generate performance data and athlete profiles, yet policies determine how that information is processed, shared, and translated into development decisions. Consequently, technology and policy should not be viewed as separate components, but rather as mutually reinforcing elements that collectively shape the success of talent identification efforts.

A review of the existing literature reveals that research on digital technologies in sports development has largely focused on the technical use of digital tools, with limited attention to their integration into broader governance structures. Studies such as those by Bourdon et al. (2017), Akenhead & Nassis (2016), and Impellizzeri et al. (2019) highlight the potential of digital devices to support data-driven athlete profiling, yet they do not address the role of regional policy in regulating or guiding their use. Conversely, scholarship on regional sports policy tends to emphasize institutional and funding issues without linking these discussions to the ongoing digitalization of athlete development systems (Ardiyanto et al., 2024; De Bosscher et al., 2015; Doherty et al., 2014). This disconnect suggests that the relationship between talent identification technologies and regional policy frameworks remains underexplored, and no current research has clearly articulated how these two domains might be integrated within a collaborative structure.

Building on this gap, the present study aims to examine the relationship between the use of digital technologies and regional policy support in enhancing the effectiveness of talent identification. The study seeks to develop a collaborative conceptual model that illustrates the

synergy between technological innovation and regional governance, offering a foundation for more structured, adaptive, and sustainable athlete development practices.

METHOD

Research Design

This study adopts a quantitative explanatory design to examine the relationships among the use of Talent Identification Development (TIDev) technology, regional policy support, and the effectiveness of athlete talent identification processes. The explanatory approach enables the investigation of causal tendencies and empirical association patterns through statistical analysis (Skinner & Dancis, 2025). n this study, TIDev serves as an existing technological tool, it is applied as provided, without modification or redevelopment. The quantitative findings generated through this approach then inform the construction of a collaborative conceptual model by integrating empirical patterns with theoretical perspectives on talent identification and sport governance (Jabareen, 2009). Consequently, the research design serves a dual purpose: it tests the interrelationships among variables while also providing an empirical foundation for conceptualizing the synergy between technological innovation and policy frameworks.

Participant

This study was conducted in an area in East Kutai Regency that covers four sports development zones, namely West, Central, East, and Coastal. The study population included physical education teachers, coaches affiliated with the local KONI coaching structure, officials and staff of the Youth and Sports Agency (Dispora), and student athletes participating in talent identification programs. From this population, 50 participants were selected using purposive sampling, consisting of 30 physical education teachers and Dispora officials or staff involved in the implementation of regional sports policies, as well as 20 student athletes aged 11 to 14 years who underwent the talent identification process using TIDev. The sample selection was based on the relevance of the participants' roles and direct involvement in athlete development and the implementation of local policies, thus ensuring that their experiences were relevant to the research objectives (Robinson, 2024). This approach ensured that all participants had experience aligned with the study's aims.

Instrument

The first instrument used in this study was the TIDev software, which provides standardized athlete performance data, including anthropometric measurements, biomotor abilities, and visualized performance profiles. These outputs served as the basis for evaluating the extent to which TIDev supports the talent identification process. The second instrument consisted of a five-point Likert questionnaire designed to assess users' perceptions of technological utilization and regional policy support. The questionnaire underwent expert-based content validation and was deemed appropriate for use. Reliability testing yielded Cronbach's Alpha values above 0.70, indicating strong internal consistency. The third instrument was a set of structured field observations intended to contextualize the quantitative findings. The observations documented workflow, user engagement, and the actual conditions under which TIDev-based talent identification was implemented. Although these observations were not subjected to formal qualitative analytical procedures, they were incorporated to enrich the interpretation of the quantitative results.

Procedures

Data collection was carried out through three systematically arranged stages. The first stage involved an orientation session on the use of TIDev for physical education teachers, coaches, and Dispora officials. During this session, participants were introduced to system features, data entry procedures, account creation, dashboard navigation, and the assessment workflow. The purpose of this technical briefing was to establish a uniform understanding among users, ensuring consistent and accurate implementation across zones.

The second stage consisted of field implementation, during which TIDev was used to assess 20 student-athletes from the four development zones. The athletes completed a series of anthropometric and biomotor tests aligned with system standards. All performance data were entered directly into TIDev and processed into standardized talent profiles. This stage served not

only as the core data-collection process but also as a practical test of users' ability to operate the technology in real training environments.

The third stage involved administering the perception questionnaire to physical education teachers, coaches, and Dispora officials after they had completed the TIDev-based assessment activities. The questionnaire captured evaluations of technology utilization, regional policy support, and the perceived effectiveness of the system in facilitating the talent identification process. This stage provided additional quantitative evidence to help interpret the empirical findings derived from the implementation of the digital tool.

Data Analysis

Data analysis was conducted using both descriptive and inferential statistical approaches with the support of IBM SPSS Statistics. Descriptive statistics were employed to present the characteristics of the athletes and to illustrate the distribution of users' perceptions regarding technology use and policy support. Analysis of variance (ANOVA) was applied to examine the extent to which TIDev could differentiate athlete performance categories based on the test results. Pearson correlation analysis was used to evaluate the relationship between perceptions of technological utilization and regional policy support, while simple linear regression assessed the influence of technology use on the effectiveness of talent identification (Field, 2024). The outcomes of these statistical analyses were then synthesized with existing sport governance theory to construct a conceptual collaborative model that illustrates how technology and policy interact to support athlete talent identification.

Construction of the Conceptual Model

The collaborative model developed in this study was not constructed through a formal R&D procedure or qualitative analytical techniques, but rather through an interpretive synthesis that integrates empirical patterns from regression and correlation analyses with established theories of talent identification and sport governance. The development process consisted of three major steps. First, empirical patterns were examined using ANOVA, correlation, and regression results to capture the effectiveness of TIDev and the relationships between technology use and regional policy support. Second, these findings were aligned with talent identification theory to explain how digital tools can enhance the objectivity and consistency of athlete selection. Third, the empirical insights were combined with sport governance and digital governance frameworks that encompass nine established indicators (De Bosscher et al., 2015; Lindsey et al., 2020) to clarify the role of regional policy in ensuring the sustainability and effectiveness of technological implementation. Through this synthesis, the resulting conceptual model illustrates how technological use and policy support can synergize to enhance the effectiveness of athlete talent identification processes.

RESULTS AND DISCUSSION

Results

The results section presents the empirical findings from descriptive and inferential analyses evaluating the use of TIDev technology, regional policy support, and the effectiveness of the athlete talent identification process. Descriptive statistics provide an overview of respondents' perceptions regarding technological needs and the quality of regional policy. In contrast, correlation and regression analyses assess the relationships and predictive influences among the core components of the development system. In addition, athlete performance data generated through TIDev implementation are included to illustrate potential classifications and recommended sport pathways. Perception-based analyses were conducted with 30 respondents, while athlete performance data were drawn from 20 student athletes. These findings form the empirical foundation for constructing the collaborative conceptual model that explains how technology and policy operate synergistically to strengthen talent identification. Table 1 presents the descriptive statistics.

Table 1. Descriptive Statistics of Core Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Technology Utilization (TIDev)	30	3.60	5.00	4.32	0.41
Local Policy Support	30	3.40	5.00	4.11	0.38
Talent Mapping Efficiency	30	3.20	4.90	4.07	0.44

Descriptive statistics were compiled to provide an overview of the principal variables examined in the study. As shown in Table 1, technology utilization via TIDev yielded a high mean score (M = 4.32, SD = 0.41), indicating strong user engagement with the system during athlete assessments. Local policy support also displayed a relatively high average score (M = 4.11, SD = 0.38), although subsequent inferential analyses indicated that its direct effect was not statistically significant. Talent mapping efficiency recorded a moderately high mean value (M = 4.07, SD = 0.44), reflecting generally positive yet somewhat varied perceptions of the effectiveness of assessing athlete potential. Taken together, these descriptive findings are consistent with the inferential results and provide a solid basis for the correlation and regression analyses that follow.

Before conducting correlation and regression analyses, several preliminary tests were performed to confirm that the assumptions for parametric procedures had been met. The Shapiro–Wilk normality test indicated that all variables had p-values greater than 0.05, confirming normal distribution. Linearity testing showed a linear relationship between the predictor variables and the dependent variable. Multicollinearity checks yielded Variance Inflation Factor (VIF) values below 10 and tolerance values above 0.10, demonstrating an absence of multicollinearity among predictors. Additionally, homoscedasticity was confirmed by the residual scatterplot, which showed a random distribution. These results confirm that the assumptions underlying parametric analysis were satisfied, allowing correlation and regression procedures to be conducted appropriately.

Beyond the primary variables included in the regression model, the study also measured technological needs across three essential aspects of the athlete development system: talent identification, training, and performance evaluation. This assessment was designed to contextualize the extent to which technology is perceived as a strategic necessity by coaches, physical education teachers, and policy stakeholders. The results of the technological needs assessment are presented in Figures 1 through 3, illustrating the level of urgency and the consistency of user perceptions regarding the role of technology within the athlete development framework.

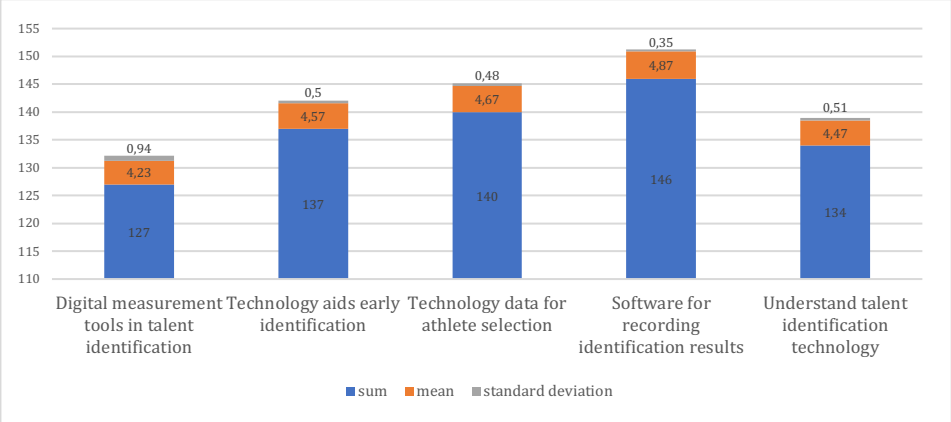

Figure 1. Talent Identification Technology Data

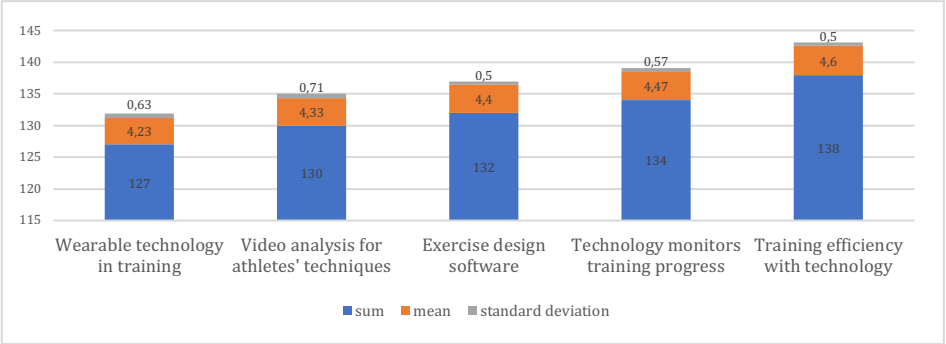

Figure 2. Training Technology Data

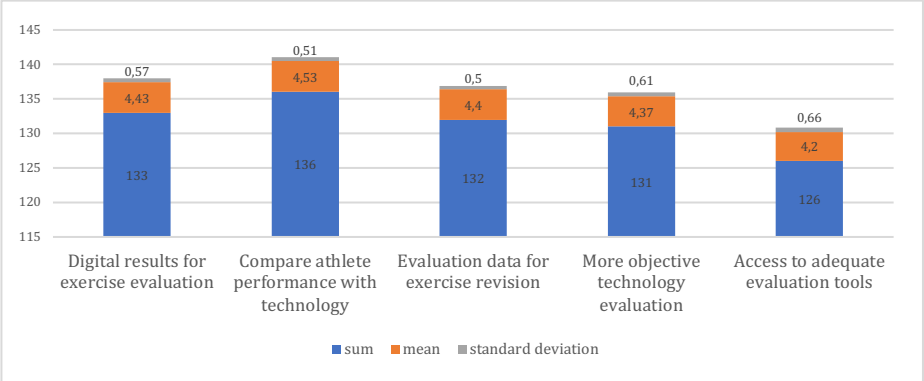

Figure 3. Exercise Evaluation Technology Data

Figure 1–3 presents descriptive statistical results for three domains of sports technology needs: talent identification, training, and training evaluation. Across all domains, the mean scores exceeded 4.00, indicating that respondents consistently perceive technology as a highly needed component throughout the athlete development process. The standard deviation values between 0.55 and 0.58 show relatively uniform responses, suggesting shared views among users regarding the strategic importance of technology. These findings reinforce the urgency of integrating and scaling digital tools within regional sports coaching systems.

Relationship Between Local Policy and Technology Utilization

To examine whether local policy support is associated with how technology is utilized in the talent identification system, a Pearson correlation analysis was conducted. This analysis aims to determine the extent to which policy direction, regulatory quality, and institutional support are aligned with the actual use of TIDev in the field. The correlation results are presented in Table 2.

Table 2. Correlation analysis of local policies and technology use

		Local policy	Technology Utilization
Local policy	Pearson Correlation	1	.213
	Sig. (2-tailed)		.259
	N	30	30
Use technology	Pearson Correlation	.213	1
	Sig. (2-tailed)	.259	
	N	30	30

The results indicate a low and non-significant correlation between local policy support and technology utilization ($r = 0.213$; $p = 0.259$). This finding suggests that although regional policy documents and strategic plans may appear adequate, they are not yet fully integrated with the actual use of digital systems such as TIDev in coaching practice. In other words, technology adoption in the field still tends to rely more on individual initiative and operational needs than on systematic guidance from local policy frameworks.

Policy Integration Support

To provide a deeper understanding of how local policies align with talent identification practices, three policy components were analyzed: the quality of policy documents, policy implementation, and the perceived impact on coaching outcomes. These components were assessed using descriptive statistics, and the results are illustrated in Figures 4–6.

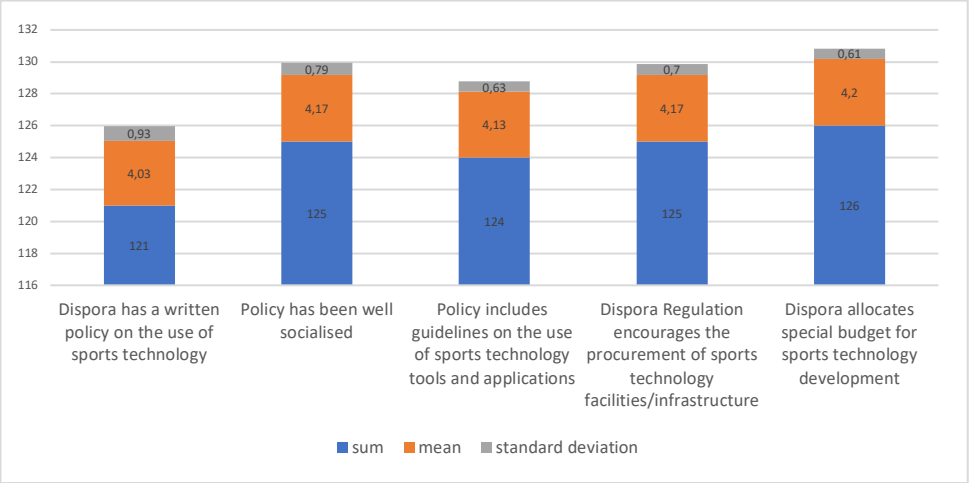

Figure 4. Policy and regulation data

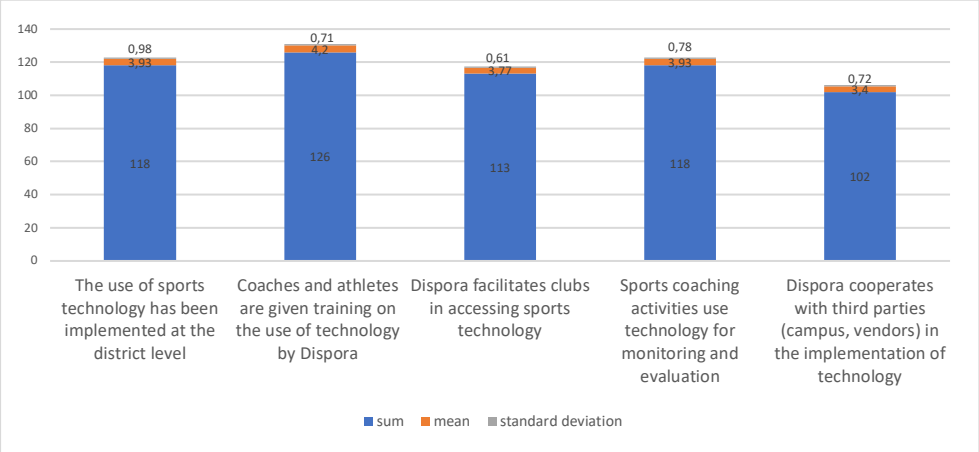

Figure 5. Policy implementation data

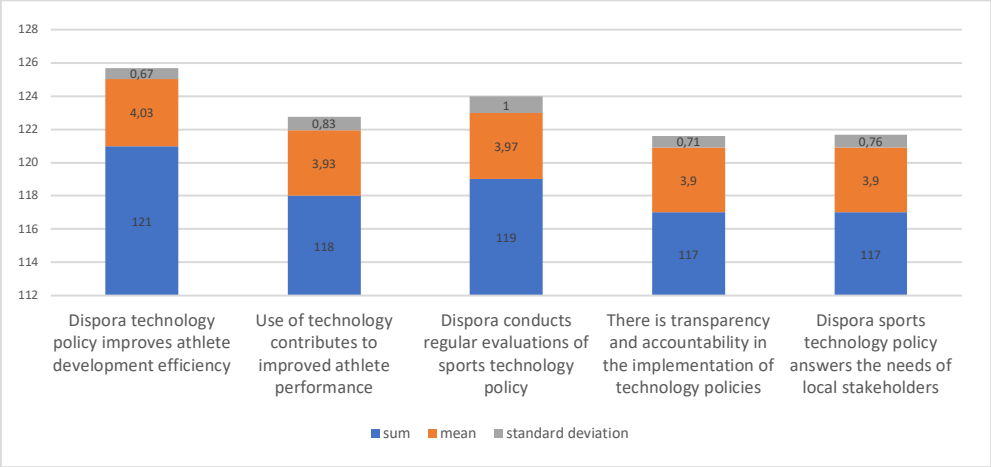

Figure 6. Policy impact and evaluation data

The descriptive analysis in Figures 4–6 reveals distinct patterns in respondents' perceptions of the policy environment. Figure 4 indicates that policy formulation is rated positively (mean = 4.41),

suggesting that regulatory documents and strategic plans are considered adequate and relevant to regional sports development needs. However, Figure 5 shows that policy implementation is rated lower (mean = 3.97), indicating that policy directives are not being executed at an optimal or consistent level across stakeholders. Meanwhile, Figure 6 reveals that the perceived impact of these policies is also moderate (mean = 3.95), indicating that although the policies exist, their influence on coaching practices and talent identification outcomes has not been fully realized.

These findings collectively demonstrate a policy–practice gap, where strong policy documents are not yet matched by equally strong implementation and measurable impact. This gap aligns with the earlier correlation result, which showed that policy support does not significantly correlate with technology utilization, reinforcing the need for better integration between policy frameworks and operational technology use in the field.

Regression Analysis for Talent Mapping Efficiency

The researchers further examined the extent to which technology utilization and local policy support contribute to the effectiveness of the talent identification process, and a multiple regression analysis was conducted. This analysis evaluates the combined and individual effects of TIDev technology and policy support on talent mapping efficiency. The regression model provides insight into which factors significantly influence the accuracy, consistency, and usefulness of athlete profiling generated during the assessment. The results of the regression analysis are presented in Tables 3–5.

Table 3. Model Summary Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.664[a]	.442	.400	.656
a. Predictors: (Constant), Local Policy, TIDev Technology				

Table 3 presents the model summary, indicating that TIDev technology and local policy jointly explain 44.2% of the variance in talent mapping efficiency (R^2 = 0.442). This suggests that the integration of digital tools and supportive policy environments plays a substantial role in determining how effective the talent identification process.

Table 4. ANOVA Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	9.184	2	4.592	10.674	.000[a]
Residual	11.616	27	.430		
	20.800	29			
a. Predictors: (Constant), Local Policy, TIDev Technology					
b. Dependent Variable: Talent Mapping Efficiency					

Table 4 presents the ANOVA test, which shows a significant main effect (F value = 10.674; ρ = 0.001), indicating that combining TIDev technology and local policies significantly affects talent mapping efficiency.

Table 5. Regression Coefficient Analysis Results

Model		Unstandardized Coefficients	Standardized Coefficients		t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.669	1.422		-.470	.642
	TIDev Technology	.880	.231	.606	3.801	.001
	Local Policy	.018	.025	.1116	.729	.472
a. *Dependent Variable: Talent Mapping Efficiency*						

Table 5 presents the results of the regression coefficient analysis. TIDev technology significantly improves talent mapping efficiency (B = 0.880; ρ = 0.001), meaning that a one-unit increase in TIDev score increases efficiency by 0.880 units. Local policy does not have a significant direct effect (B = 0.018; ρ = 0.472), suggesting that it acts primarily as an indirect supporting factor.

TIDev Implementation

In addition to the core variables examined in the regression analysis, the study also assessed technological needs across three critical components of the athlete development system: talent identification, training processes, and performance evaluation. This assessment situated user perceptions within a broader developmental context. It determined the extent to which technology is regarded as a strategic requirement by coaches, physical education teachers, and policy actors. The outcomes of this assessment are displayed in Figures 1 through 3, providing insight into both the perceived urgency of technological integration and the degree of alignment among stakeholders regarding its role in supporting athlete development.

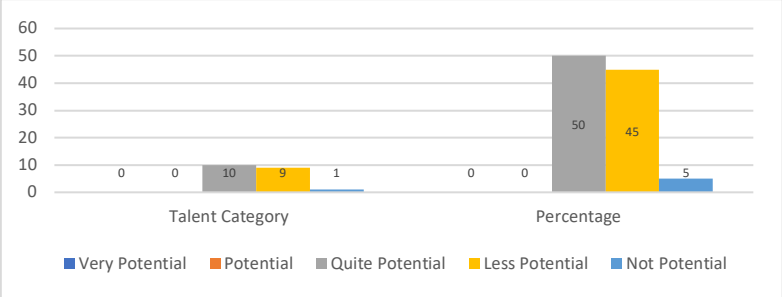

Figure 7. Percentage of potential talent

Figure 7 shows that most athletes fall into the moderately potential category (50 percent), followed by those in the less potential category (45 percent), with only 5 percent classified as not potential. No athletes were identified as belonging to the potential or very potential categories. These results suggest that, according to TIDev's assessment standards, the initial abilities of athletes in the study area remain at an early developmental stage, indicating the need for continued and structured training support.

User Perception and Satisfaction

To complement the analysis of technological effectiveness, the study also examined users' perceptions of TIDev, including their understanding of system features, evaluations of the system's effectiveness, and satisfaction after using it in the development process. This perceptual analysis is essential for assessing the readiness of technological implementation in real settings, as user support is one of the primary determinants of successful adoption of digital innovations. The correlation results among the perceptual components are presented in Table 6.

Table 6. Correlation analysis between understanding, effectiveness, and user satisfaction of TIDev

		Understanding	Effectiveness	Satisfaction
Understanding	Pearson Correlation	1	.656**	.777**
	Sig. (2-tailed)		.000	.000
	N	30	30	30
Effectiveness	Pearson Correlation	.656**	1	.660**
	Sig. (2-tailed)	.000		.000
	N	30	30	30
Satisfaction	Pearson Correlation	.777**	.660**	1
	Sig. (2-tailed)	.000	.000	
	N	30	30	30
*****. Correlation is significant at the 0.01 level (2-tailed).***				

The results presented in Table 6 show that all relationships among the perception variables are positive and statistically significant. A strong correlation was found between user understanding and satisfaction ($r = 0.777$; $p < 0.01$), indicating that the more users understand TIDev's functions, the higher their satisfaction. Significant relationships were also observed between understanding and perceived effectiveness ($r = 0.656$; $p < 0.01$) and between effectiveness and satisfaction ($r = 0.660$; $p < 0.01$). These findings suggest that the successful implementation of TIDev depends not

only on its technical outputs but also on users' capacity to understand and engage with the system. Consequently, enhancing training and technical support can strengthen the effectiveness and long-term sustainability of technology use in athlete development programs.

Expert Validation of the Collaboration Model

As the final stage of the empirical analysis, the collaborative model integrating TIDev technology and regional policy was evaluated by three experts with competencies in sport science, sports policy, and the implementation of development technologies. The validation process employed the Item-Content Validity Index (I-CVI) to assess the model's relevance, procedural coherence, flexibility, and overall applicability within the context of regional athlete development. The validation results are presented in Table 7.

Table 7. Expert validation results

No	Indicator	Expert Number			Total Agreement	I-CVR
		1	2	3		
1	The collaboration model is relevant to the needs of the sports coaching system in the region	1	1	1	3	1.00
2	Logical, systematic, and mutually reinforcing model steps	1	1	1	3	1.00
3	The model is flexible and can be adapted to other regions	1	1	1	3	1.00
4	Integration of objective data from software with evidence-based policies	1	1	0	2	0.67
5	Flow of the training system based on potential mapping	1	1	1	3	1.00
6	Digital data-driven monitoring and evaluation opportunities	1	1	1	3	1.00
7	Availability of supporting human resources (technology operators, trained trainers)	0	1	1	2	0.67
8	Technology infrastructure support at the school and local level	1	1	0	2	0.67
9	Coordination mechanism between agencies (Dispora, school, KONI)	0	0	0	0	0.00
		7	**8**	**6**	**Mean I-CVI**	**0.88**
	Relevant proportions	**0.78**	**0.89**	**0.67**		

The validation results indicate that the collaborative model achieved an average I-CVI score of 0.88, which falls within the high content validity category, suggesting that most indicators were rated as highly relevant by the experts. The indicators with the highest validity scores included the model's alignment with regional development needs, the clarity of its procedural flow, its adaptability to other local contexts, and the integration of TIDev's objective data with regional policy considerations. However, several indicators received comparatively lower ratings, particularly those related to the availability of trained human resources (such as technology operators and qualified coaches), the adequacy of technological infrastructure in schools and regional institutions, and the coordination mechanisms among agencies, including Diaspora, schools, and the local KONI branch.

Discussion

The findings of this study indicate that TIDev technology significantly influences the effectiveness of athlete talent mapping. Regression results show that TIDev makes a substantial contribution to improving the accuracy and consistency of the talent identification process, aligning with previous research emphasizing that digital tools enhance the objectivity of assessments and strengthen decision-making in athlete development (Buhari et al., 2024; Marsuki et al., 2025b). Because TIDev generates standardized, visual, and easily interpretable data outputs, coaches and physical education teachers are better able to evaluate athlete potential systematically. These results also reinforce the argument put forward by Kelly & Williams (2020) that technological success in sport settings depends mainly on a system's ability to produce data that can be operationalized directly in training and development practices.

In contrast, regional policy support did not have a significant direct effect on talent identification effectiveness, despite a relatively high mean perception score for policy quality. Correlation and regression analyses showed that policy frameworks are not yet closely connected to field-level practice, reflecting a persistent policy–practice gap commonly noted in sport governance literature (De Bosscher et al., 2015; Lindsey & Darby, 2019). This disconnect suggests that the existence of a policy document alone does not automatically ensure strong implementation, particularly when coordination mechanisms, technological infrastructure, and data-driven monitoring systems are not functioning optimally.

From a governance perspective, these conditions run counter to theoretical expectations that policy should provide direction, establish standards, and promote the adoption of innovation. The empirical findings suggest that existing policies remain declarative and have not been translated into clear operational procedures. The lack of statistical significance does not imply that policy is unimportant; rather, it indicates that regional governance systems have not yet reached the level of implementation readiness required for policy to exert a tangible influence on talent identification. This highlights the need for policy reform that goes beyond document formulation and ensures policies can serve as operational instruments to regulate workflows, institutional coordination, and the integration of digital data into athlete development.

Field implementation findings further illustrate the asymmetric relationship between technology and policy. The predominance of moderately potential and less potential classifications among athletes demonstrates that TIDev was able to provide an objective snapshot of initial athlete abilities, yet long-term development still requires structured training interventions and consistent policy support (Johnston et al., 2018). Additionally, the significant associations between user understanding, perceived effectiveness, and satisfaction with TIDev show that human resource readiness plays a mediating role in the successful integration of technology. Thus, system effectiveness is not driven solely by technology; it also depends on the capacity of coaches and physical education teachers to interpret and use data appropriately.

These empirical patterns form a robust foundation for constructing the collaborative model proposed in this study. Because technology directly influenced talent identification, while policy did not, a bridging mechanism is needed to bring both elements together within an integrated operational framework. The proposed model combines digital data from TIDev, institutional support, and coaching practices to make the talent identification process more structured and sustainable. The collaborative model is grounded in sport governance and digital governance perspectives, positioning technology as the provider of objective data and policy as the structure that guides direction, coordination mechanisms, and implementation continuity (Cho et al., 2024; Filipe, 2024; Yabin & Weiguo, 2024). Within this framework, collaboration is essential to ensure that TIDev's data do not remain at the documentation stage but are also used in planning, decision-making, and evaluation. The model situates TIDev as an evidence-based data hub and regional policy as the coordinating framework that integrates the roles of schools, KONI, and Dispora.

The model's conceptual contribution lies in its effort to bridge the gap between technology and policy through a collaborative system that emphasizes a digital data center, coordination mechanisms, human resource readiness, and evidence-based development pathways. This approach offers a new direction for building a more integrated, responsive, and data-driven regional sport development system, while also enriching the broader literature on the interplay between digital innovation and governance in regional-level athlete development.

Implications

The findings of this study suggest that the effectiveness of regional talent identification is strongly dependent on the operational integration of technology and institutional support. In practical terms, this implies that local governments and development institutions must establish coordination mechanisms that ensure TIDev's digital data are consistently utilized in program planning, athlete placement, and the evaluation of training outcomes. Strengthening the competencies of coaches and physical education teachers is also a strategic priority, as accurate and meaningful data interpretation is essential for generating impact. From a policy standpoint, the results underscore the need for closer alignment between regional regulations and technological

practices in the field, ensuring that policy functions not merely as a formal document but as an operational instrument that reinforces an evidence-based development system.

Research Contribution

The primary contribution of this study lies in the development of a collaborative model that integrates talent identification technology with regional policy frameworks. The model offers a new perspective on how technology and policy can work in complementary ways to strengthen athlete development systems, addressing a gap in the literature that has largely examined these two domains in isolation. The study also advances sport governance scholarship by incorporating a digital governance perspective, positioning athlete performance data as the central element for cross-institutional coordination. In addition, the research provides empirical evidence of TIDev's effectiveness within a regional context, offering a practical reference for the development of similar systems in other areas.

Limitations

This study has several limitations that should be acknowledged. First, the relatively small sample size—particularly within the athlete group—limits the generalizability of the findings to broader populations. Second, the study measured user perceptions but did not assess the long-term impact of technological implementation on athletes' performance development. Third, the policy data analyzed were confined to the regional level, without incorporating the potential influence of national federations or higher-level institutions that may shape the effectiveness of athlete development systems. Moreover, the collaborative model proposed in this study has not yet been tested through full-scale field implementation, and its operational effectiveness remains to be empirically validated.

Suggestions

Future research is encouraged to employ larger samples and include a wider range of sports disciplines to provide a more comprehensive understanding of TIDev's effectiveness. Longitudinal studies are also needed to assess the extent to which the technology contributes to athletes' performance development over time. From a policy perspective, investigations incorporating a multi-level governance framework would be valuable for examining how regional, provincial, and national policies interact to support the digitalization of athlete development systems. For practical implementation, intensive training for coaches and physical education teachers, along with adequate digital infrastructure, should be prioritized to ensure that the proposed collaborative model can be applied effectively. Additionally, piloting the model in several regions may serve as an essential step in evaluating its feasibility and operational effectiveness in real-world settings.

CONCLUSION

This study demonstrates that digital talent identification technology, represented by TIDev, plays a significant role in enhancing the effectiveness of athlete talent mapping by providing standardized and objective performance data. In contrast, local policy support, although perceived as adequate in formulation, has not yet been operationally integrated into talent identification practices and therefore does not directly influence mapping efficiency. Based on these empirical patterns, the study formulates a collaborative conceptual model that positions technology as the primary, evidence-based assessment mechanism, while assigning local policy the role of structural support to ensure alignment, coordination, and sustainability. The model highlights the importance of strengthening interinstitutional collaboration, improving human resource readiness, and developing governance structures that enable technology and policy to function synergistically in regional talent identification systems.

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AUTHOR CONTRIBUTION STATEMENT

This manuscript was developed with the contributions of MRB, HDN, HIM, and MHF. MRB conceptualized the research, drafted the initial manuscript, and conducted critical revisions to the intellectual content. sttHDN designed and developed the technology and local policy collaboration model. HIM analyzed the data, interpreted the findings, and compiled the final research report. MHF collected data related to technology and local policy.

AI DISCLOSURE STATEMENT

The author used AI solely as an assistive tool to check grammar, refine formatting, and enhance readability. The tool was not employed to generate scientific content, conduct analyses, or develop the conceptual model. The author fully developed all ideas, interpretations, and substantive conclusions. The author carefully reviewed and revised all outputs and assumes complete responsibility for the final manuscript.

CONFLICTS OF INTEREST

The authors certify that this work was conducted independently and is free from any financial, institutional, or personal conflicts of interest that could affect the objectivity or integrity of the research.

REFERENCES

Akenhead, R., & Nassis, G. P. (2016). Training load and player monitoring in high-level football: Current practice and perceptions. *International Journal of Sports Physiology and Performance*, *11*(5), 587–593. https://doi.org/10.1123/ijspp.2015-0331

Ardiyanto, S. Y., Gusliana, H. B., Nurkadri, N., Novita, N., Bahriyanto, A., Setyawan, H., Putro, B. N., Harmanto, H., Darmawan, A., & Latino, F. (2024). Legal and social perspectives on the phenomena of supporter violence in sport. *Retos: Nuevas Tendencias En Educación Física, Deporte y Recreación*, *60*, 232–241. https://doi.org/10.47197/retos.v60.108804

Barraclough, S., Till, K., Kerr, A., & Emmonds, S. (2022). Methodological approaches to talent identification in team sports: A narrative review. *Sports*, *10*(6), 81. https://doi.org/10.3390/sports10060081

Bourdon, P. C., Cardinale, M., Murray, A., Gastin, P., Kellmann, M., Varley, M. C., Gabbett, T. J., Coutts, A. J., Burgess, D. J., & Gregson, W. (2017). Monitoring athlete training loads: Consensus statement. *International Journal of Sports Physiology and Performance*, *12*(s2), S2-161. https://doi.org/10.1123/IJSPP.2017-0208

Bryson, J. M., Crosby, B. C., & Bloomberg, L. (2014). Public value governance: Moving Beyond traditional public administration and the new public management. *Public Administration Review*, *74*(4), 445–456. https://doi.org/10.1111/puar.12238

Buhari, M. R., Sapulete, J. J., Hasanuddin, M. I., & Susilawati, S. (2024). Smart Sports Recruitment: Leveraging Software for Talent Precision. *Journal of Coaching and Sports Science*, *3*(2), 135–152. https://doi.org/10.58524/jcss.v3i2.529

Cho, S., Conrad, M., Holden, J., & Dodds, M. (2024). Regulatory schemes and legal aspects of sport governance: Theoretical perspectives and conceptual framework. *Journal of Global Sport Management*, *9*(2), 269–284. https://doi.org/10.1080/24704067.2023.2249481

Coutinho, P., Mesquita, I., & Fonseca, A. M. (2016). Talent development in sport: A critical review of pathways to expert performance. *International Journal of Sports Science & Coaching*, *11*(2), 279–293. https://doi.org/10.1177/1747954116637499

Crosby, B. C., 'T Hart, P., & Torfing, J. (2017). Public value creation through collaborative innovation. *Public Management Review*, *19*(5), 655–669. https://doi.org/10.1080/14719037.2016.1192165

De Bosscher, V., Shibil, S., Westerbeek, H., & Van Bottenburg, M. (2015). *Successful elite sport policies: An international comparison of the sportspolicy factors leading to international sporting success*

(SPLISS 2.0) in 15 nations. Meyer & Meyer Verlag. https://doi.org/10.5771/9781782557449-15

Doherty, A., Misener, K., & Cuskelly, G. (2014). Toward a multidimensional framework of capacity in community sport clubs. *Nonprofit and Voluntary Sector Quarterly*, *43*(2_suppl), 124S-142S. https://doi.org/10.1177/0899764013509892

Field, A. (2024). *Discovering statistics using IBM SPSS statistics*. Sage publications limited.

Filipe, G. F. (2024). *Data governance for effective sports companies: A strategy to enhance performance and compliance in the age of sports information* [Master's Thesis, Universidade NOVA de Lisboa (Portugal)].

Henriksen, K., Stambulova, N., & Roessler, K. K. (2010). Holistic approach to athletic talent development environments: A successful sailing milieu. *Psychology of Sport and Exercise*, *11*(3), 212–222. https://doi.org/10.1016/j.psychsport.2009.10.005

Höner, O., Larkin, P., Leber, T., & Feichtinger, P. (2023). Talent identification and development in Sport. In J. Schüler, M. Wegner, H. Plessner, & R. C. Eklund (Eds.), *Sport and Exercise Psychology* (pp. 549–581). Springer International Publishing. https://doi.org/10.1007/978-3-031-03921-8_23

Hylton, K. (2013). *Sport development: Policy, process and practice*. Routledge. https://doi.org/10.4324/9780203082829

Impellizzeri, F. M., Marcora, S. M., & Coutts, A. J. (2019). Internal and external training load: 15 years on. *Int J Sports Physiol Perform*, *14*(2), 270–273. https://doi.org/10.1123/ijspp.2018-0935

Jabareen, Y. (2009). Building a conceptual framework: Philosophy, definitions, and procedure. *International Journal of Qualitative Methods*, *8*(4), 49–62. https://doi.org/10.1177/160940690900800406

Johnston, K., Wattie, N., Schorer, J., & Baker, J. (2018). Talent identification in sport: A systematic review. *Sports Medicine*, *48*(1), 97–109. https://doi.org/10.1007/s40279-017-0803-2

Juginović, A., Kekić, A., Aranza, I., Biloš, V., & Armanda, M. (2025). Next-generation approaches in sports medicine: The role of genetics, omics, and digital health in optimizing athlete performance and longevity—a narrative review. *Life*, *15*(7), 1023. https://doi.org/10.3390/life15071023

Kelly, A. L., & Williams, C. A. (2020). Physical characteristics and the talent identification and development processes in male youth soccer: A narrative review. *Strength & Conditioning Journal*, *42*(6), 15–34. https://doi.org/10.1519/SSC.0000000000000576

Koh, K. T., Tan, L. Q. W., Camiré, M., Paculdar, M. A. A., & Chua, W. G. A. (2022). Teachers' and students' perceptions of factors influencing the adoption of information and communications technology in physical education in Singapore schools. *European Physical Education Review*, *28*(1), 100–119. https://doi.org/10.1177/1356336X211017949

Lindsey, I., & Darby, P. (2019). Sport and the sustainable development goals: Where is the policy coherence? *International Review for the Sociology of Sport*, *54*(7), 793–812. https://doi.org/10.1177/1012690217752651

Liu, H. (2025). Technology-based sports performance enhancement: A conference review. *Intelligent Sports and Health*, *1*(2), 98–102. https://doi.org/10.1016/j.ish.2025.04.002

Marsuki, A., Risal, A. W., Aprilo, I., Sulfa, M., & Ali, F. A. (2025a). Improving athlete performance through technology-based sports learning innovation. *JIKor: Jurnal Ilmu Keolahragaan*, *1*(1), 27–35. https://doi.org/10.1080/00336297.2005.10491862

Marsuki, A., Risal, A. W., Aprilo, I., Sulfa, M., & Ali, F. A. (2025b). Improving athlete performance through technology-based sports learning innovation. *JIKor: Jurnal Ilmu Keolahragaan*, *1*(1), 27–35.

Martindale, R. J., Collins, D., & Daubney, J. (2005). Talent development: A guide for practice and research within sport. *Quest*, *57*(4), 353–375. https://doi.org/10.1080/00336297.2005.10491862

Milakovich, M. E. (2021). *Digital governance: Applying advanced technologies to improve public service*. Routledge. https://doi.org/10.4324/9781003215875

Morganti, G., Lascu, A., Apollaro, G., Pantanella, L., Esposito, M., Grossi, A., & Ruscello, B. (2024). (Beyond) the field of play: Contrasting deterministic and probabilistic approaches to talent

identification and development systems. *Sport, Education and Society*, *29*(7), 876–889. https://doi.org/10.1080/13573322.2023.2212689

Newhouse, C. P. (2015). Using digital technologies to improve the authenticity of performance assessment for high-stakes purposes. *Technology, Pedagogy and Education*, *24*(1), 17–33. https://doi.org/10.1080/1475939X.2013.851031

Popeska, B., Jovanova-Mitkovska, S., & Sivevska, D. (2017). Implementation of technology in physical education teaching process based on teachers' experiences. *in: BRICESS 2017 - BRICESS Inagural Conference of Exercise and Sport Science.*

Robinson, R. S. (2024). Purposive sampling. In *Encyclopedia of quality of life and well-being research* (pp. 5645–5647). Springer. https://doi.org/10.1007/978-3-031-17299-1_2337

Salas, E., Rosen, M. A., Held, J. D., & Weissmuller, J. J. (2017). Performance measurement in simulation-based training: A review and best practices. *Simulation in Aviation Training*, 393–441. https://doi.org/10.4324/9781315243092-21

Sarmento, H., Anguera, M. T., Pereira, A., & Araújo, D. (2018). Talent Identification and development in male football: A systematic review. *Sports Medicine*, *48*(4), 907–931. https://doi.org/10.1007/s40279-017-0851-7

Skinner, E., & Dancis, J. (2025). Descriptive and explanatory designs. *Human Development-Revision*. Pressbook.

Vaeyens, R., Lenoir, M., Williams, A. M., & Philippaerts, R. M. (2008). Talent identification and development programmes in sport: Current models and future directions. *Sports Medicine*, *38*(9), 703–714. https://doi.org/10.2165/00007256-200838090-00001

Yabin, J., & Weiguo, Z. (2024). From Governance Technology to Technology Governance: Formation and Resolution of the" Technology Paradox" in the Digital Transformation of Sport Governance. *Journal of Shanghai University of Sport*, *48*(9), 12–23.

Zubaidah, E., Monalisa, M., Rusadi, S., & Handoko, T. (2024). E-readiness analysis to accelerate transformation towards e-government in regional government in Indonesia. *Jurnal Bina Praja*, *16*(1), 37–53. https://doi.org/10.21787/jbp.16.2024.37-53