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Enhancing Educational Relevance and Graduate Employability through the Penta Helix Collaboration Model: A Strategic Approach for Promoting IAIN Parepare

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Abstract

In the context of rapid technological disruption and evolving labor market demands, higher education institutions must ensure that their curricula and programs remain relevant while enhancing graduate employability. This study examines the application of the Penta Helix collaboration model—integrating government, academia, industry, media, and community—as a strategic framework for promoting IAIN Parepare and improving workforce readiness. Employing a sequential exploratory mixed-methods design, qualitative data were collected through interviews, observations, and document analysis, followed by quantitative validation using Structural Equation Modeling–Partial Least Squares (SEM-PLS). Findings indicate that structured collaboration among Penta Helix stakeholders significantly enhances educational relevance, provides practical learning opportunities, and strengthens alumni competencies, particularly through internships, digital skill development, and adaptive curricula. Government support, industry engagement, and media-driven promotion play pivotal roles in increasing institutional visibility and bridging the gap between academic preparation and labor market requirements. While challenges remain, including uneven stakeholder participation and skill gaps in digital competencies, the study demonstrates that synergistic Penta Helix collaboration fosters graduate employability, institutional branding, and social engagement. The results offer practical implications for Islamic higher education institutions seeking to integrate multi-stakeholder strategies and highlight opportunities for future research on longitudinal impacts and digital innovation in graduate readiness.

INTRODUCTION

In the era of rapid technological disruption and evolving labor market structures, higher education institutions are increasingly required to demonstrate the relevance of their programs and the employability of their graduates. Global reports, including those from the World Economic Forum (WEF), highlight that more than 50% of jobs will require reskilling by 2030, driven by automation, digitalization, and the expansion of knowledge-based economies. This shift underscores the urgent need for higher education to transform its curricula, partnerships, and learning ecosystems to remain competitive and socially responsive.

Contemporary scholarship emphasizes that improving graduate employability is no longer achievable through academic efforts alone. Instead, scholars such as Etzkowitz and Leydesdorff have advanced multi-stakeholder collaboration frameworks most notably the Triple Helix model that integrate academia, government, and industry. Building upon this foundation, the Penta Helix model expands the framework by incorporating civil society and media, thus creating a more holistic ecosystem for innovation, social engagement, and human capital development. This

approach has gained increasing relevance in the context of higher education reforms, particularly in emerging economies where institutional capacity and industry absorption vary widely.

However, existing studies reveal persistent challenges. Mismatches between university curricula and labor market expectations remain significant; employers frequently identify gaps in graduates' soft skills, digital literacy, and practical experience. Moreover, universities often struggle to establish enduring partnerships with industry and government agencies, limiting opportunities for internships, applied research, and experiential learning. While the Penta Helix model offers a strategic solution to these issues, empirical research on its application within Islamic higher education institutions—including State Islamic Institutes (IAIN) remains scarce. The majority of prior work has focused on regional development, tourism, or public policy, leaving a gap in understanding how Penta Helix synergy can enhance educational relevance and graduate employability.

In the context of IAIN Parepare, these challenges and opportunities are particularly salient. On one hand, the institution benefits from government investment in educational infrastructure, scholarships, and policy support. Industry representatives, such as state-owned enterprises, also provide internship opportunities aimed at strengthening students' workplace readiness. The adaptive curriculum reforms carried out by the institution indicate a commitment to aligning academic competencies with contemporary labor market needs. On the other hand, disparities in stakeholder engagement, uneven regional economic development, and varying levels of institutional visibility pose obstacles to maximizing these opportunities.

Therefore, this study"Enhancing Educational Relevance and Graduate Employability through the Penta Helix Collaboration Model: A Strategic Approach for Promoting IAIN Parepare" aims to fill this gap by examining how multi-stakeholder collaboration contributes to improving curriculum relevance, enhancing graduate capabilities, and expanding employment pathways. Beyond its developmental significance, the study also explores how the effective implementation of the Penta Helix model can serve as a strategic mechanism for strengthening institutional branding and competitiveness in the broader higher education landscape.

The findings are expected to provide a comprehensive understanding of the role of Penta Helix collaboration in shaping educational transformation, offering practical implications for policymakers, university leaders, and stakeholders seeking to promote innovative, market-responsive, and socially engaged higher education ecosystems.

Literature Review

The transformation of higher education in response to dynamic labor market demands has been extensively explored across multiple theoretical and empirical studies. Within this discourse, multi-stakeholder collaboration models such as the Triple Helix and its expanded form, the Penta Helix, have increasingly gained prominence as frameworks for enhancing educational relevance, fostering innovation, and strengthening institutional competitiveness. The following review synthesizes prior research that informs the present study's conceptual foundation and highlights existing gaps that justify further scholarly inquiry.

Jaelani (2019) examines the evolution of higher education missions through the lens of the Triple Helix model, emphasizing the transformative interactions among academia, government, and industry in fostering innovation and economic development. His work illustrates that

universities are no longer confined to traditional teaching and research roles, but are increasingly embedded in socio-economic ecosystems shaped by institutional logics, values, and historically constructed practices. While Jaelani's research provides foundational insights into three core actors of collaborative governance, it does not account for the additional dimensions of media and civil society, which are central to the Penta Helix model. This distinction underscores the need for expanded frameworks—particularly in contexts where institutional visibility and community engagement are integral to higher education promotion strategies.

Research by Yusrodi (2023) demonstrates the applicability of the Penta Helix model in advancing micro, small, and medium enterprises (MSMEs) through collaboration among government, academia, industry, community, and media stakeholders. Although positioned within the realm of MSME development, the study highlights the model's capacity to strengthen institutional ecosystems and generate inclusive socio-economic outcomes. Nevertheless, the research remains descriptive and does not explore how Penta Helix collaboration may influence higher education governance, curricular alignment, or alumni employability. This indicates a clear divergence of focus and reflects a gap in empirical studies applying Penta Helix principles within the context of educational relevance and university promotion.

Krisnanik et al. (2021) analyze the integration of the Penta Helix model within the design of the Merdeka Belajar–Kampus Merdeka (MBKM) curriculum. Their findings reveal that collaborative engagement with industry, government, media, and community stakeholders can enhance curriculum implementation and facilitate more effective monitoring of learning outputs. The application of CATWOE analysis in this study provides a structured understanding of diverse stakeholder perspectives. However, the research is limited to a single academic program and does not extend its analysis to broader institutional promotion strategies or long-term graduate employability, thereby highlighting an opportunity for research that situates Penta Helix collaboration within a wider institutional strategy.

Spanjaard et al. (2018) emphasize the importance of experiential learning in preparing students for increasingly competitive job markets. Their findings suggest that universities must provide practical, real-world learning opportunities that transcend academic achievement and equip students with holistic competencies. The relevance of their work lies in linking university initiatives to career readiness; however, the study does not incorporate multi-stakeholder collaboration as a strategic enabler of employability. A research gap thus remains in understanding how coordinated input from industry, community, media, and government can strengthen institutional capacity to produce employable graduates.

Angelito et al. (2022) explore the role of relationship marketing in higher education and argue that universities should not position students merely as customers but instead focus on curated academic experiences and long-term stakeholder relationships. Their findings underscore the importance of sustained engagement with alumni and employers. Although this study contributes a valuable perspective on higher education marketing, it does not examine how multi-stakeholder collaboration—particularly within the Penta Helix framework—can shape institutional branding or contribute to inclusive stakeholder participation in curriculum relevance and employability outcomes.

Junaidi et al. (2024) investigate factors influencing enrollment intention in Islamic higher education institutions (IHEs), identifying brand awareness and brand trust as critical determinants. Their findings highlight the need for strategic promotion and long-term brand development to increase institutional attractiveness. While relevant to understanding promotional dynamics, the

study does not examine how collaborative networks (industry, government, community, media) may enhance brand effectiveness or contribute to alumni employability. This gap is particularly important in the context of Islamic higher education institutions seeking to strengthen their societal and market relevance through broader stakeholder engagement.

METHODS

This study employs a sequential exploratory mixed-methods design, integrating qualitative inquiry in the initial phase followed by a quantitative phase to obtain a comprehensive understanding of how the Penta Helix collaboration model enhances educational relevance and graduate employability at IAIN Parepare. The qualitative phase aims to explore the dynamics of partnership among academia, government, industry, community, and media stakeholders across South Sulawesi. Insights generated from this phase form the basis for constructing the quantitative survey instrument, which is subsequently tested to examine the influence of Penta Helix elements on alumni readiness for the labor market.

Qualitative data were collected through semi-structured interviews, field observations, and document analysis. Participants were selected using purposive sampling based on criteria such as having a minimum of two years of formal collaboration (MoU) with IAIN Parepare and being located in Parepare, Makassar, Barru, and Pinrang. Informants included university leaders, lecturers, industry representatives, government officials, media partners, community members, and alumni. The qualitative process explored perceptions regarding educational relevance, competency needs in the digital era, and the contribution of cross-sector collaboration to expanding employment pathways for graduates. Observations were conducted during collaborative activities such as internships, workshops, stakeholder meetings, and academic–industry engagements.

The quantitative phase utilized a structured questionnaire developed from qualitative findings and analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). This analysis examined the relationships between Penta Helix elements—academia, government, industry, community, and media—and graduates' job readiness. Quantitative data served as a verification mechanism to strengthen or challenge emerging qualitative themes. Secondary data, including institutional reports, government regulations, industry publications, and relevant empirical studies, were used to support triangulation and enrich contextual understanding.

The trustworthiness of qualitative findings was ensured through methodological triangulation (interviews, observations, and documentation), member checking, prolonged engagement, and negative-case analysis. The thematic analysis followed systematic coding, categorization, and theme development. Integration of qualitative and quantitative results occurred during the interpretation stage, providing a holistic understanding of how the Penta Helix model

contributes to educational relevance and employability outcomes. The quantitative hypothesis tested in this research is: H1: Penta Helix collaboration has a significant influence on the job readiness of IAIN Parepare graduates.

RESULTS AND DISCUSSION

1. The Role of Penta Helix Collaboration in Promoting IAIN Parepare

The findings indicate that the implementation of the Penta Helix model—consisting of government, academia, industry, community, and media—has created a positive synergy in promoting IAIN Parepare and strengthening its relevance to labor-market needs.

a. Industry Engagement

Interviews with industry partners show strong awareness of the need to align graduates' competencies with workplace requirements. An industry representative stated:
"The industry, such as BFI Finance, can actively contribute by providing direct feedback to the campus regarding skill gaps among graduates or future labor-market trends."
This highlights the industry's willingness to engage in continuous communication with the university and provide real-time updates on evolving skill demands.

Industry actors also expressed openness to broader collaboration, including training, industrial visits, and internships. BFI Finance confirmed their involvement by stating:
"BFI Finance Parepare has collaborated with the campus and routinely participates in job fairs for recruitment." Similarly, Bank Syariah Indonesia (BSI) maintains a long-term partnership through the MBKM Internship Program, which has resulted in the recruitment of high-performing interns into teller and marketing positions. In contrast, WOM Finance revealed that no formal collaboration exists due to centralized recruitment handled by external vendors. However, the company expressed readiness for more structured cooperation in the future.

PT. Permodalan Nasional Madani (PNM) also confirmed existing collaboration, though opportunities for expanding promotional activities remain untapped. Despite this, PNM acknowledged the potential role of industry sectors as indirect promoters of IAIN Parepare through alumni recruitment and institutional interaction.

b. Government Support

Government involvement represented by BUMN institutions such as PT. Jasa Raharja and PT. Telkomsel plays a foundational role. Jasa Raharja expressed strong support for higher education through student internship programs aimed at equipping students with practical workplace experience. Telkomsel representatives further emphasized government contribution through financing (APBN and Ministry of Religious Affairs budgets), infrastructure development (libraries, laboratories, IT facilities, dormitories), and scholarship schemes including KIP Kuliah and various merit-based awards.

Government support is also aligned with national policies encouraging university–industry collaboration through the Kampus Merdeka program, enabling students to conduct industry internships and applied research. In this regard, curriculum alignment with regional and national labor-market needs was highlighted as a key priority.

c. Media Contributions

Student media at IAIN Parepare, Redline, and local media partners actively contribute to institutional promotion through event coverage, joint publications, journalism training, and media partnerships. They emphasized the need to strengthen positive narratives about successful alumni:
"Many alumni of religious institutions are successful, yet underexposed. Media must highlight

these success stories." This reflects a media-driven effort to strengthen institutional reputation and public visibility.

d. Community Participation

UMKM communities have participated in university activities such as entrepreneurship training, seminars, mentoring, and job fairs. Their involvement supports skill development while enhancing the university's visibility in the local economy. As stated by one informant:

"The UMKM community has been involved in several campus activities such as entrepreneurship training, seminars, and mentoring." Their participation in job fairs as service providers further strengthens socio-economic engagement within the Penta Helix framework.

2. How Penta Helix-Based Promotion Enhances Employment Opportunities for Alumni
Industry Perceptions of Graduate Quality

Industry partners generally view IAIN Parepare graduates positively. BFI Finance noted:

"In general, graduates have integrity, work ethics, and strong foundational knowledge."

However, they also identified gaps in digital skills, financial product knowledge, and software proficiency. These findings are reinforced by SIMGROUP, stating that graduates display discipline, adaptability, and strong interpersonal skills—making them suitable for service-oriented positions.

BSI Parepare also appreciated graduates' strong ethics and morality, essential for Islamic banking operations. Nonetheless, they emphasized the need for deeper understanding of complex Islamic financial products and regulations.

a. Curriculum and Skill Alignment

Interview results show partial alignment between graduate competencies and employer expectations. Technical competencies—particularly digital literacy, data analysis, and understanding of financial systems—remain areas for improvement. This creates an opportunity for stronger curriculum–industry integration.

b. Cross Field Employability

PNM emphasized that many successful alumni excel even outside their academic field, demonstrating strong adaptability:

"Alumni who grow and succeed often work in fields unrelated to their academic background."

This indicates that soft skills—such as communication, integrity, and teamwork—serve as major employability assets.

c. Career Preparation Through Penta Helix Collaboration

Government-supported programs such as Langkah Bakti Jasa Raharja (LBJR) open opportunities for graduates from all disciplines to gain internship experience. Telkomsel highlighted the importance of strengthening research collaboration, applied innovation, and industrial certification to increase graduate competitiveness.

d. Community Contributions to Employability

UMKM communities emphasized that students have strong potential but need more practical exposure:

"Students have great potential—they just need more opportunities to practice and engage directly with the field." UMKM collaboration also fosters creativity and agility—skills essential for modern job markets.

e. The Influence of Penta Helix Elements on the Work Readiness of IAIN Parepare Graduates

1. Inferential Analysis

Inferential analysis was conducted using SmartPLS 4 with the PLS-SEM approach to evaluate both the measurement model (outer model) and the structural model (inner model). The analysis aims to ensure the validity, reliability, and predictive capability of the model that examines the role of the Penta Helix elementsGovernment, Academia, Industry, Community, and Media—on Work Readiness and Educational Relevance.

a. Outer Model

1). Convergent Validity

Convergent validity was assessed through loading factors and Average Variance Extracted (AVE). than half of the variance of its indicators. Thus, all constructs satisfied convergent validity requirements.

Table 1. Outer Loading Results for Convergent Validity Test

Variable	Government	Academia	Industry	Community	Media	Employability	Remarks
X1.1	0.830						Valid
X1.2	0.864						Valid
X1.3	0.833						Valid
X1.4	0.844						Valid
X2.1		0.831					Valid
X2.2		0.859					Valid
X2.3		0.868					Valid
X2.4		0.837					Valid
X3.1			0.842				Valid
X3.2			0.779				Valid
X3.3			0.864				Valid
X3.4			0.866				Valid
X4.1				0.889			Valid
X4.2				0.867			Valid
X4.3				0.816			Valid
X4.4				0.866			Valid
X5.1					0.833		Valid
X5.2					0.794		Valid
X5.3					0.876		Valid
X5.4					0.898		Valid
Y1						0.838	Valid
Y2						0.855	Valid

Y3						0.899	Valid
Y4						0.905	Valid
Y5						0.849	Valid

Source: Processed Data, SmartPLS 4, 2025

All indicators demonstrated loading factor values above **0.70**, indicating strong convergence with their respective constructs. All constructs recorded AVE values above **0.50** (ranging from 0.703 to 0.756), confirming that each latent variable was able to explain more

b. Discriminant Validity

Discriminant validity was evaluated using cross-loadings.

Table 2. Results of Cross-Loading Test for Discriminant Validity

Variable	Government	Academia	Industry	Community	Media	Employability	Description
X1.1	**0.830**	0.533	0.666	0.592	0.617	0.564	Valid
X1.2	**0.864**	0.607	0.702	0.652	0.671	0.604	Valid
X1.3	**0.833**	0.676	0.706	0.668	0.678	0.606	Valid
X1.4	**0.844**	0.702	0.692	0.634	0.628	0.643	Valid
X2.1	0.569	**0.831**	0.549	0.587	0.538	0.585	Valid
X2.2	0.588	**0.859**	0.635	0.605	0.616	0.524	Valid
X2.3	0.632	**0.868**	0.693	0.673	0.638	0.615	Valid
X2.4	0.740	**0.837**	0.766	0.729	0.778	0.703	Valid
X3.1	0.731	0.753	**0.842**	0.738	0.732	0.669	Valid
X3.2	0.593	0.465	**0.779**	0.578	0.501	0.475	Valid
X3.3	0.704	0.715	**0.864**	0.731	0.709	0.590	Valid
X3.4	0.711	0.662	**0.866**	0.795	0.729	0.663	Valid
X4.1	0.707	0.722	0.778	**0.889**	0.669	0.584	Valid
X4.2	0.641	0.602	0.708	**0.867**	0.602	0.651	Valid
X4.3	0.673	0.699	0.750	**0.816**	0.707	0.534	Valid
X4.4	0.582	0.622	0.706	**0.866**	0.657	0.633	Valid
X5.1	0.611	0.686	0.743	0.692	**0.833**	0.599	Valid
X5.2	0.646	0.575	0.610	0.560	**0.794**	0.587	Valid
X5.3	0.678	0.640	0.659	0.669	**0.876**	0.639	Valid
X5.4	0.688	0.694	0.730	0.683	**0.898**	0.740	Valid
Y1	0.622	0.589	0.601	0.561	0.675	**0.838**	Valid
Y2	0.631	0.565	0.597	0.561	0.605	**0.855**	Valid
Y3	0.598	0.544	0.608	0.616	0.632	**0.899**	Valid
Y4	0.616	0.633	0.668	0.670	0.647	**0.905**	Valid
Y5	0.652	0.774	0.662	0.621	0.713	**0.849**	Valid

Source: Processed Data, SmartPLS 4, 2025

Each indicator loaded highest on its intended construct compared to other constructs. The results indicate that all constructs are empirically distinct and measure different conceptual dimensions. Therefore, discriminant validity is fully established.

c. Construct Reliability

Construct reliability was measured through **Cronbach's Alpha** and **Composite Reliability (CR)**.

Table 3. Cronbach's Alpha Values

Variable	***Cronbach's alpha***	**Description**
Government	0.864	Reliable
Academia	0.871	Reliable
Industry	0.859	Reliable
Community	0.882	Reliable
Media	0.873	Reliable
Work Readiness	0.919	Reliable
Educational Relevance	0.914	Reliable

Source: Processed Data, SmartPLS 4, 2025

All constructs exceeded the threshold of **0.70** for both reliability indicators.Cronbach's Alpha ranged from **0.859 to 0.919**, while CR ranged from **0.904 to 0.939**, indicating strong internal consistency.

Table 4. Composite Reliability Values

Variable	***Composite Reliability*** **(rho_c)**	**Description**
Government	0.908	**Description**
Academia	0.911	Reliable
Industry	0.904	Reliable
Community	0.919	Reliable
Media	0.913	Reliable
Work Readiness	0.939	Reliable
Educational Relevance	0.936	Reliable

Source: Processed Data, SmartPLS 4, 2025

This confirms that all constructs are reliably measured and suitable for further analysis.

d. Model Fit

Model fit evaluation shows:

Table 5. Model Fit Test Results

Parameter	Rule of Thumb	Parameter Value	Description
SRMR	Less than 0.10	0.075	Fit
NFI	Close to 1	0.677	Less Fit
GoF	0.1 (small), 0.25 (moderate), 0.36 (strong)	0.716	Strong Fit
Q2 Predictive Relevance	Q^2 0: has *Predictive Relevance*	Work Readiness Q^2 = 0.595	Strong predictive
	Q^2 = 0: lacks predictive relevance	Q^2 Educational relevance = **0.690**	
	0.02 (weak), 0.15 (moderate), 0.35 (strong)		

Source: Processed Data, SmartPLS 4, 2025

SRMR = 0.075, indicating a good model fit (< 0.10). **NFI = 0.677**, categorized as less optimal. **GoF = 0.716**, indicating a strong overall model fit. **Q^2 values** for endogenous constructs (0.595 and 0.690) indicate strong predictive relevance (> 0.35). Overall, the model demonstrates strong predictive ability and acceptable overall fit.

2. Inner Model

a. Coefficient of Determination (R^2)

R^2 results show strong explanatory power:

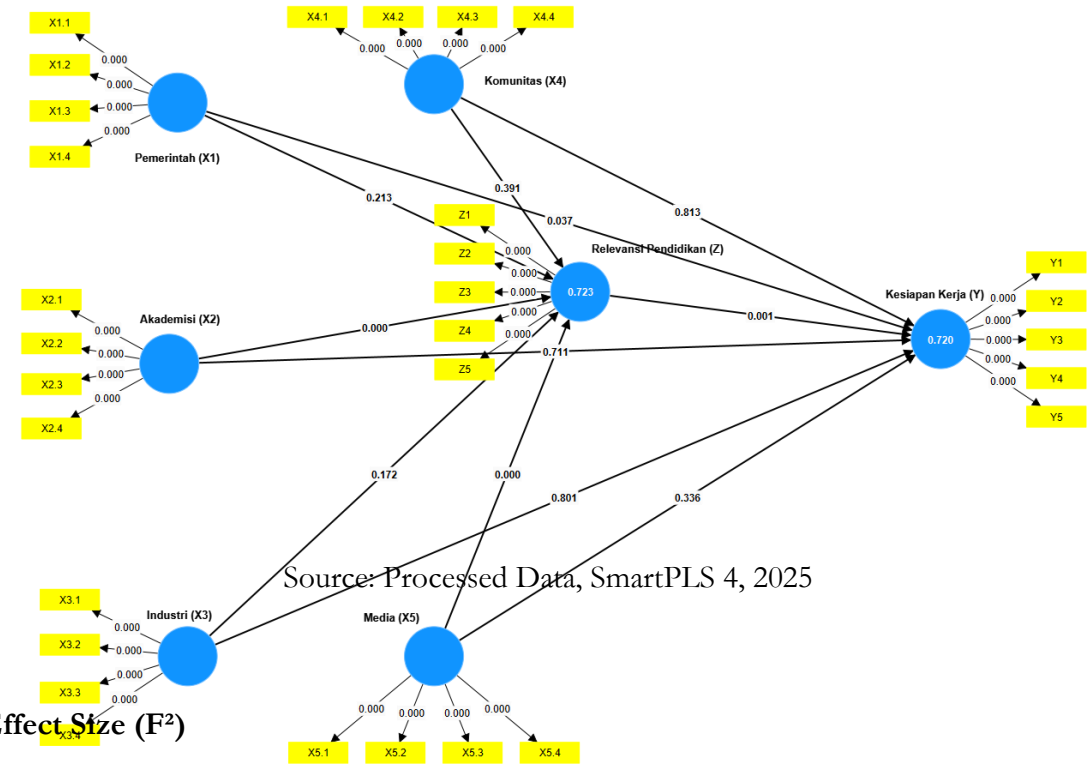
Table 6. R-Square (R^2) Test Results

Dependent Variables	R-*Square*	R-*Square Adjusted*
Work Readiness	**0.720**	**0.701**
Educational Relevance	**0.723**	**0.708**

Source: Processed Data, SmartPLS 4, 2025

Work Readiness: R^2 = 0.720 → 72% of variance explained by exogenous variables. **Educational Relevance: R^2 = 0.723** → 72.3% of variance explained. Both values indicate strong predictive capability.

Figure 1. PLS-SEM Algorithm Output



Source: Processed Data, SmartPLS 4, 2025

b. Effect Size (F^2)

Effect size analysis shows varying influence levels among Penta Helix variables:

Table 7. Effect Size (F^2) Test Results

Variable	Government	Academia	Industry	Community	Media	Employability
Government						0.060
Academia						0.002
Industry						0.001
Community						0.001
Media						0.014
Employability						
Educational Relevance						0.271

Source: Processed Data, SmartPLS 4, 2025

Government → Work Readiness: **medium effect (F^2 = 0.060)**, Academia → Work Readiness: **small effect (F^2 = 0.002)**, Industry → Work Readiness: **very small effect (F^2 = 0.001)**, Community → Work Readiness: **very small effect (F^2 = 0.001)**, Media → Work Readiness: **small effect (F^2 = 0.014)** and Educational Relevance → Work Readiness: **large effect (F^2 = 0.271)** Educational Relevance is the strongest predictor of Work Readiness.

c. Hypothesis Testing

Bootstrapping analysis was used to examine direct and indirect effects.

Table 8. Direct Effect Path Coefficient Bootstrapping Results

Path Coefficient	Original Sample	T-Statistics	P-Values	Remarks
Government → Work Readiness	0.248	2.088	0.037	Supported
Government → Educational Relevance	-0.115	1.246	0.213	Not Supported
Academia → Work Readiness	0.041	0.371	0.711	Not Supported
Academia → Educational Relevance	0.319	3.485	0.000	Supported
Industry → Work Readiness	-0.047	0.252	0.801	Not Supported
Industry → Educational Relevance	0.200	1.367	0.172	Not Supported
Community → Work Readiness	0.033	0.237	0.813	Not Supported
Community → Educational Relevance	0.104	0.857	0.391	Not Supported
Media → Work Readiness	0.128	0.963	0.336	Not Supported
Media → Educational Relevance	0.403	3.705	0.000	Supported
Educational Relevance → Work Readiness	0.524	3.365	0.001	Supported

Source: Processed Data, SmartPLS 4, 2025

Path coefficients were evaluated using **t-statistics** and **p-values** at a 5% significance level. Significant relationships indicate strong statistical support for the proposed hypotheses, while non-significant paths indicate negligible influence.

Discussion

1. The Role of Penta Helix Collaboration in Promoting IAIN Parepare

The findings indicate that Penta Helix collaboration—comprising government, academia, industry, media, and community stakeholders—has begun to function as an integrated ecosystem that supports the strategic positioning of IAIN Parepare. Industry actors such as BFI Finance and Bank Syariah Indonesia (BSI) demonstrate an active role not merely as end-users of graduates but as co-

creators of educational relevance through continuous feedback, internship programs, and participation in campus job fairs. Government support, represented by state institutions such as Telkomsel and Jasa Raharja, further reinforces this ecosystem through funding allocations, infrastructure development, scholarship provision, and structured internship opportunities. These multi-stakeholder interactions show that the institution is benefiting from a networked model of educational development that enhances institutional visibility while strengthening graduate preparedness for labor market demands.

In addition to the state and industry, engagement from community groups—particularly MSME networks—and the media provides complementary support that amplifies the institutional brand and deepens community linkages. Media partnerships and campus journalism initiatives contribute to knowledge dissemination, reputation building, and visibility of alumni achievements, which are critical for institutional competitiveness in the digital era. Meanwhile, MSME involvement in entrepreneurship programs, mentoring, and campus events such as job fairs fosters experiential learning environments aligned with local economic realities. Although collaboration within the Penta Helix framework is evident, the study highlights asymmetric intensity among actors and the need for more structured coordination mechanisms. Strengthening governance, ensuring routine communication, and institutionalizing joint evaluation platforms are essential to enhance the long-term impact of the Penta Helix model on institutional promotion and graduate quality.

2. Penta Helix–Based Promotion of IAIN Parepare and Its Influence on Alumni Employability

Stakeholder assessments reveal that the promotion of IAIN Parepare through the Penta Helix framework has contributed positively to alumni employability, particularly through the strong moral character, integrity, and work ethic instilled in students. Industry partners such as BFI Finance, BSI, PNM, and SIMGROUP consistently highlight these attributes as distinctive comparative advantages that align with the behavioral expectations of modern workplaces. However, the findings also reveal a noticeable skills gap in technical competencies, digital literacy, and applied knowledge of Islamic financial products—areas increasingly demanded in a technologically driven labor market. This imbalance underscores the urgent need for curriculum reorientation, enhancement of practice-based learning, and expanded industry engagement to strengthen the integration of soft skills and hard skills among graduates.

A cross-analysis using the Penta Helix framework and the extended marketing mix (7P) shows that alumni character represents the institution's core "product value," yet the professional competencies embedded within the educational process require systematic enhancement. Industry players can support this through structured internships, industrial mentoring, and certification programs; government actors through regulatory alignment and link-and-match policies; while media and community partners contribute to branding, outreach, and social legitimacy. When these collaborative channels function cohesively, IAIN Parepare is well-positioned to produce graduates with dual competitiveness: ethically grounded in Islamic values and professionally capable in digital-economic environments. This dual capability is essential for strengthening graduate employability and for reinforcing the contribution of Islamic higher education institutions to contemporary socio-economic development.

3. The Utilization of Digital Technology and Social Media in Connecting IAIN Parepare with Industry

The utilization of digital technology has become a central element in modern industry operations, as evidenced by findings from BFI Finance, WoM Finance, and BSI Finance Parepare. These

institutions emphasize that digital competencies—such as data literacy, proficiency in digital administrative platforms, and mastery of professional software—are fundamental skills for university graduates. This underscores the need for integrating technology into the IAIN Parepare curriculum through industry-based learning, financial information systems, and digital projects that provide students with technology-driven work experience. Furthermore, digital competencies serve as a strategic infrastructure within the Penta Helix model, enabling systematic connections among academia, industry, media, and the community through institutional digital platforms and social media.

Additional insights from PNM, SIM, Telkomsel, and SMEs indicate that digitalization is essential not only for large industries but also for public services, telecommunications, and micro-enterprises. While technical digital skills are critical, interpersonal competencies—such as professional communication, adaptability, work ethics, and resilience under pressure—remain essential for workforce readiness. In this context, digital transformation at IAIN Parepare should be complemented by strengthening soft skills and Islamic ethical values. By integrating digital campus initiatives with practice-based learning, industry partnerships, and optimized digital media, the institution can enhance graduate competitiveness and institutional visibility in the public domain.

4. Challenges and Opportunities for IAIN Parepare in Implementing the Penta Helix Model

The study indicates that implementing the Penta Helix model at IAIN Parepare faces structural challenges, particularly regarding the consistency of collaboration, technological gaps, and the capacity of actors to provide sustained support. Industry stakeholders stress that graduates must possess balanced digital and soft skills, while SMEs and financial institutions highlight the importance of practical experience and adaptive curricula. Nevertheless, stakeholder communication remains episodic and has not yet been integrated into a systematic, sustainable collaboration framework. Additional challenges include limited practical facilities, low community participation, and gaps in students' digital marketing, modern administration, and data analysis competencies.

Conversely, substantial opportunities exist through active engagement with industry, SMEs, government, and media in supporting the Penta Helix ecosystem. Stakeholders are willing to collaborate through internships, digital training, mentoring, real-world case studies, and technology-based entrepreneurship development. Recommendations for establishing IT-based study programs and optimizing facilities such as the Mini Syariah Bank indicate that curriculum transformation can enhance educational relevance and expand students' career prospects. When combined with systematic collaboration governance—through annual agendas, digital coordination platforms, and cross-stakeholder evaluation—the Penta Helix model can strategically increase the university's attractiveness, strengthen graduate employability, and accelerate IAIN Parepare's adaptation to the dynamics of the digital labor market.

5. The Impact of Penta Helix Collaboration on the Employability of IAIN Parepare Alumni

Quantitative findings demonstrate that the measurement model (outer model) meets all validity and reliability criteria, with all indicators exhibiting factor loadings above 0.70 and AVE values exceeding 0.50. This confirms that the constructs—Penta Helix collaboration, adaptive

curriculum, government participation, and educational relevance—are accurately represented and distinct, as indicated by discriminant validity. The inner model evaluation further revealed moderate to strong R^2 values, suggesting that independent variables substantially explain the dependent variable, thereby indicating robust predictive capacity. Direct effects analysis showed significant positive impacts of Penta Helix components, particularly government and industry, on educational relevance and graduate employability ($p < 0.05$). Support mechanisms such as scholarships, educational funding, and internship opportunities effectively enhance curriculum relevance, while adaptive curricula aligned with technological trends bridge higher education and labor market demands. Indirect effects further reveal that collaboration yields stronger outcomes when mediated through relevant, practice-oriented curricula, highlighting that strategic partnerships must be operationalized through tangible learning experiences to improve graduate outcomes.

The findings also underscore the dual importance of internal and external educational relevance. Internally, adaptive curricula ensure alignment between learning objectives, content, methods, and assessment, while externally, collaboration with government, industry, and communities strengthens links to labor market requirements. Penta Helix collaboration enhances exposure to internships, digital skills, and real-world applications, enabling students to acquire both technical competencies and professional soft skills. Consequently, graduates exhibit higher employability, adaptability, and readiness to meet evolving industry demands. Empirical evidence from this study indicates that combining structured cross-sector collaboration with curriculum innovation constitutes an effective strategy for Islamic higher education institutions like IAIN Parepare to foster graduate competitiveness and strengthen the connection between education and socio-economic needs.

CONCLUSION

1. Collaboration among government, academia, industry, media, and community plays a pivotal role in enhancing the visibility of IAIN Parepare. Each stakeholder contributes uniquely: the government provides regulatory support and policy facilitation, academia develops curricula, industry offers practitioners and real-world case studies, media drives storytelling and publication, and the community fosters social networks. This synergy enables the university to effectively showcase its identity, strengths, and academic achievements to a broader audience.
2. Promotion driven by Penta Helix collaboration not only strengthens the university's reputation but also positively influences alumni employability. Engagement with industry through internships, business cases, and digital experiences equips graduates with relevant skills and practical knowledge, enhancing their competitiveness in the labor market.
3. Digital technologies and social media serve as key bridges connecting the university with industry. Digital systems for data management, administration, and communication, combined with social media storytelling and digital publications, expand the university's reach, promote a progressive image, and facilitate effective interactions among students, alumni, and employers.
4. Key challenges include enhancing students' digital skills, updating curricula to maintain relevance, and adapting effective communication strategies. Opportunities encompass improving graduate competencies, developing new industry-aligned programs, and strengthening the university's branding through inspiring narratives of the academic community and alumni achievements.

5. Penta Helix collaboration significantly enhances alumni readiness for the workforce. Government support through scholarships, funding, and facilities, combined with industry-provided internships and practical experience, directly improves graduate competencies. Academia reinforces this readiness via adaptive curricula responsive to technological and labor market demands, while community involvement strengthens character, soft skills, and social networks. Additionally, this collaboration indirectly affects employability through enhanced educational relevance, bridging the gap between learning and workplace demands. Stronger synergy among Penta Helix elements therefore correlates with higher graduate preparedness and adaptability in the digital era.

Practical Implications and Future Research Recommendations

1. Practical Implications

The findings of this study offer several practical implications for higher education institutions, particularly Islamic universities such as IAIN Parepare. First, integrating the Penta Helix model into strategic planning can enhance both institutional visibility and alumni employability by fostering structured collaboration among government, academia, industry, media, and community. Second, universities should prioritize digital literacy and soft skills development within adaptive curricula to meet evolving industry demands, ensuring graduates are equipped for the digital workforce. Third, the utilization of digital technologies and social media for institutional promotion, career services, and alumni engagement can strengthen industry linkages, facilitate knowledge exchange, and enhance the university's public image. Finally, establishing systematic mechanisms for internships, practical learning, and community engagement allows students to gain real-world experience, bridging the gap between academic preparation and workplace requirements.

2. Future Research Recommendations

Future studies should explore the longitudinal effects of Penta Helix collaboration on alumni career trajectories, particularly in sectors experiencing rapid digital transformation. Comparative research across multiple Islamic higher education institutions could examine contextual factors influencing the effectiveness of cross-sector collaboration. Additionally, investigating the integration of advanced digital tools—such as AI-based learning platforms, FinTech simulations, or data analytics applications—may provide insights into how technological adoption further enhances graduate readiness. Finally, qualitative research focusing on stakeholder perceptions and the dynamics of multi-sector collaboration can offer deeper understanding of best practices for sustaining effective Penta Helix partnerships in diverse cultural and institutional contexts.

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