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Trends in Educational Staff Participation in the KILAB Program: A Policy Mix Perspective (2023–2025)

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Abstract

The Karya Inovasi Laboran (KILAB) Program was established by the Directorate of Human Resources to strengthen innovation capacity among educational laboratory staff in Indonesian higher education institutions. Despite the continued implementation of innovation-support policies, empirical evidence on participation trends and the role of an integrated policy mix in laboratory innovation programs remains limited. Drawing on the policy mix perspective, this study aims to examine participation trends in the KILAB Program and identify how program outreach, institutional support, incentive provision, and capacity-building initiatives are integrated to support participation. This study employed a quantitative descriptive design using longitudinal documentary data from the Competency Resources Portal covering the 2023-2025 implementation period. Data were analyzed using descriptive statistics, trend analysis, comparative growth analysis, and percentage analysis to identify changes in participation patterns and regional disparities. The findings show that the number of registrants increased from 291 in 2023 to 384 in 2024 and 639 in 2025, representing annual growth of 31.96% and 66.41%, respectively. However, the increase in submitted proposals and selected participants was not proportional to the growth in registrants, indicating that increased participation was not yet accompanied by equivalent improvements in innovation output. The findings also reveal persistent regional disparities, with participation concentrated in Java and relatively lower participation in several eastern Indonesian regions. These findings suggest that the integration of outreach, institutional support, incentives, and capacity building provides a supportive policy environment for expanding participation, while remaining insufficient to ensure equitable participation and improved innovation quality. The study contributes to the policy mix literature by demonstrating how multiple complementary policy instruments can be used to interpret participation dynamics in higher education laboratory innovation programs. Practically, the findings highlight the need for more targeted institutional support, region-sensitive outreach, and sustained capacity-building mechanisms to promote inclusive and higher-quality laboratory innovation.

Keywords: policy mix, laboratory innovation, educational staff, participation, KILAB.

1 Introduction

Background

Innovation has become a strategic pillar in improving the quality and competitiveness of higher education institutions. Beyond supporting teaching, research, and community service, innovation also contributes to institutional effectiveness, organizational learning, and sustainable academic

development. Universities are therefore expected to create an innovation ecosystem that encourages all human resources, including educational staff, to actively participate in developing innovative practices that improve laboratory management and academic services (Rahman et al., 2022; Sukinem et al., 2022; Wekke, 2022). Among educational staff, laboratory personnel play an important role in ensuring the effectiveness of laboratory-based learning and research activities. Their responsibilities extend beyond maintaining laboratory facilities to developing innovative methods, equipment, and management systems that support academic excellence. Consequently, strengthening laboratory staff innovation has become an important strategy for improving higher education quality and institutional competitiveness (Ashel & Riandi, 2022; Nasir & Mayasri, 2023).

To encourage innovation among laboratory personnel, the Directorate of Human Resources established the Karya Inovasi Laboran (KILAB) Program as a national platform for recognizing and developing innovative laboratory practices. Since its implementation in 2023, the program has demonstrated a continuous increase in participation, indicating growing awareness and interest among educational staff in innovation activities. However, participation levels remain uneven across regions and institutions, suggesting that policy interventions have not yet produced uniformly distributed outcomes. Previous studies have primarily examined innovation policies, institutional support, capacity building, or incentive mechanisms separately (Ismail & Asrori, 2023; Rahman et al., 2022; Turriate, 2023). Although these studies provide valuable insights, limited attention has been given to how multiple policy instruments interact simultaneously to influence participation in innovation programs. As a result, the role of a policy mix, defined as the integration of outreach, institutional support, incentives, and capacity-building strategies, remains insufficiently explored within the context of higher education innovation programs.

From the perspective of public policy, policy effectiveness is influenced not only by individual policy instruments but also by the interaction among complementary policy instruments implemented simultaneously (Howlett & Ramesh, 2014). Likewise, Innovation Diffusion Theory explains that innovation adoption depends on communication processes, institutional support, perceived benefits, and organizational readiness (M. Rogers, 2023). Integrating these theoretical perspectives provides a stronger analytical framework for understanding why participation in innovation programs differs across institutions and regions.

Accordingly, this study adopts policy mix as the principal analytical framework and operationalizes it through four dimensions: program outreach, institutional support, incentive provision, and capacity building. Educational staff participation is measured using three observable indicators, namely the number of registrants, submitted proposals, and selected innovation projects during the 2023–2025 implementation period. This operationalization enables a more systematic analysis of how integrated policy instruments contribute to participation growth. The novelty of this study lies not only in the use of longitudinal national data (2023–2025) but also in its comprehensive analysis of policy mix as an integrated policy framework influencing educational staff participation in laboratory innovation programs. Unlike previous studies that focused on single policy instruments, this research demonstrates how combinations of complementary policies shape participation trends and identifies regional disparities that remain important challenges for future higher education innovation policy.

Research Questions

Although previous studies have demonstrated that innovation policies, institutional support, and capacity-building initiatives contribute to innovation performance in higher education, most investigations have examined these policy instruments independently. Limited empirical evidence explains how an integrated policy mix influences educational staff participation in laboratory innovation programs using longitudinal data. Furthermore, previous studies have rarely evaluated whether increased participation is accompanied by improvements in the quality of innovation outputs or examined regional disparities in participation.

To address these research gaps, this study seeks to answer the following research questions:
1. How have participation trends in the KILAB Program evolved during the 2023–2025 implementation period?
2. What policy instruments have been implemented to encourage educational staff participation in the KILAB Program?
3. How does the integration of multiple policy instruments (policy mix) contribute to participation growth and what implications does it have for higher education innovation policy?

Research Objectives

This study aims to analyze participation trends in the Karya Inovasi Laboran (KILAB) Program and examine how an integrated policy mix contributes to increasing educational staff participation during the 2023–2025 implementation period. Specifically, the study seeks to:
1. analyze participation trends based on the number of registrants, submitted proposals, and selected participants;
2. identify the policy instruments implemented in the KILAB Program;
3. examine how the interaction among outreach activities, institutional support, incentives, and capacity-building initiatives contributes to participation growth; and
4. formulate policy recommendations for strengthening innovation participation and improving the quality of laboratory innovation in higher education institutions.

Research Contributions

Theoretical Contribution
This study contributes to the literature on public policy, policy mix, and higher education innovation by providing empirical evidence on how combinations of complementary policy instruments influence educational staff participation in innovation programs. Unlike previous studies that examined individual policy instruments separately, this study demonstrates that participation growth is shaped by the interaction among outreach activities, institutional support, incentive mechanisms, and capacity-building initiatives. Furthermore, the use of longitudinal data enables a better understanding of participation dynamics over time.

Practical Contribution
The findings provide evidence-based recommendations for the Directorate of Human Resources and higher education institutions in designing more effective policy strategies for strengthening educational staff participation. The study suggests that future policy should balance efforts to increase participation with initiatives aimed at improving proposal quality, strengthening institutional mentoring, and reducing regional disparities through targeted capacity-building programs.

2 Literature Review

Policy Mix

A policy mix refers to the use and combination of several policy instruments to achieve specific policy objectives. In the context of the Laboratory Technicians' Innovation Programme (KILAB), increasing the participation of educational staff cannot be achieved through a single policy instrument alone, but rather through a combination of programme outreach, institutional support, the provision of incentives, and capacity building. This combination must be designed so that the various policy instruments complement one another and reinforce the achievement of the programme's objectives. (Howlett & Rayner, 2013) explain that a policy mix involves the integrated use of several policy instruments, whilst ensuring consistency, coherence and compatibility between them. Meanwhile, (Howlett & Ramesh, 2014) emphasise the importance of alignment between policy design, institutional capacity, and

governance structures in determining the success of policy implementation. Thus, in this study, a policy mix is understood as the integration of various mutually supportive policy instruments to create conditions conducive to increasing the participation of educational staff in the KILAB programme.

Diffusion of Innovation

The theory of diffusion of innovation explains that the adoption and spread of an innovation are influenced by communication processes, innovation characteristics, and the social and institutional environment (García-Avilés, 2020; E. M. Rogers, 2003). In the context of KILAB, socialisation becomes an important instrument for providing educational staff with information about the programme's objectives, mechanisms, benefits, and procedures. Research in higher education also demonstrates the relevance of diffusion theory in explaining innovation adoption and participation (Al-Maroof, 2022). Institutional support plays a role in strengthening the innovation adoption process through organisational strategy, resources, and support mechanisms (Graham et al., 2016). When laboratory staff receive adequate information, organisational support, mentoring opportunities, and recognition, their likelihood of involvement in innovation activities increases. Therefore, diffusion of innovation theory provides a basis for interpreting how KILAB policies may support increased participation.

Participation of Educational Staff in Innovation

The participation of educational staff in innovation can be seen from their involvement in obtaining programme information, registering works, submitting proposals, undergoing the mentoring process, and producing innovative works (Bennett & Bennett, 2003; Zhao et al., 2020). In this study, participation is measured quantitatively by the number of registrants, the number of proposals submitted, and the number of works that pass the selection process. The use of these indicators allows changes in participation to be observed longitudinally over the 2023–2025 period. Thus, an increase in the number of registrants is not merely seen as a numerical change, but as an indicator of increased involvement of academic staff in the laboratory innovation ecosystem.

Capacity Building and Institutional Support

Capacity building is a key tool for enhancing the ability of educational staff to generate innovation. Training, mentoring, guidance on proposal writing, and the provision of facilities can help reduce the barriers faced by laboratory staff in producing innovative work (Zreen et al., 2021). In the context of KILAB, institutional support is crucial because an individual’s ability to innovate is determined not only by personal motivation but also by the availability of resources, facilities, administrative support, and the university’s internal policies (Al-Taie & Khattak, 2024). Therefore, capacity building and institutional support are positioned as part of a policy mix designed to encourage greater participation.

Conceptual Framework

Based on this theoretical review, this study considers that the participation of educational staff in KILAB is the result of the interaction of several policy instruments (Flanagan et al., 2011; Howlett & Rayner, 2013). Awareness-raising improves access to information; institutional support provides a supportive environment; incentives boost motivation; whilst capacity building enhances the ability of educational staff to produce innovative work (Capano et al., 2020). These four instruments are further understood as a unified ‘policy mix’. This framework is used to analyse the development of KILAB participation during 2023–2025 based on changes in the number of applicants, proposals submitted, and participants who passed the selection process.

Research Gap and Novelty

Research on innovation in higher education has extensively addressed the role of policy, organisational capacity, human resource development, and the diffusion of innovation. However, studies that specifically analyse the combination of policy instruments in enhancing the participation of academic staff—particularly laboratory staff—in higher education innovation programmes remain relatively limited (Flanagan et al., 2011; Meissner & Kergroach, 2021). This gap forms the basis of this study. Unlike previous research, which generally discusses innovation in general terms or focuses on academic innovation, this study specifically analyses trends in the participation of academic staff in the KILAB programme during the period 2023–2025 through the lens of a policy mix (Capano et al., 2020). The novelty of this research lies in the use of longitudinal programme data to examine changes in participation while interpreting the relationship between awareness-raising, institutional support, incentives and capacity building as complementary policy instruments.

3 Methods Research

Research Design

This study employed a quantitative descriptive research design using longitudinal secondary data to analyze participation trends in the Karya Inovasi Laboran (KILAB) Program during the 2023–2025 implementation period (Creswell & Creswell, 2018; Saunders et al., 2019). A quantitative descriptive design was selected because the study focuses on describing and interpreting changes in educational staff participation based on numerical indicators rather than testing causal relationships (Creswell & Creswell, 2018; Sekaran & Bougie, 2019). Therefore, this study does not employ explanatory statistical techniques such as regression or correlation analysis. The study operationalizes the policy mix through four policy dimensions: program outreach, institutional support, incentive provision, and capacity building. Educational staff participation is measured using three observable indicators: the number of registrants, submitted proposals, and selected innovation projects. This operationalization enables a systematic assessment of participation trends associated with the implementation of integrated policy instruments.

Data Sources

The study used secondary documentary data obtained from the official Competency Resources Portal managed by the Directorate of Human Resources, Ministry of Higher Education, Science, and Technology (Saunders et al., 2019; Sekaran & Bougie, 2019). The data consisted of:

- KILAB implementation guidelines;
- annual participation records (2023–2025);
- applicant databases;
- proposal submission records;
- participant selection reports;
- official policy documents related to laboratory innovation.

These documents were selected because they constitute the official administrative records used in implementing the KILAB Program and provide comprehensive longitudinal information regarding educational staff participation.

Data Collection and Validation

Data were collected using a documentary research method. Documentary evidence was systematically identified, classified, and extracted from official KILAB publications and administrative records.
To ensure the credibility of secondary data, document validation was conducted through cross-document verification. Participation statistics, implementation reports, and policy documents were

compared across multiple official sources published by the Directorate of Human Resources to verify the consistency, completeness, and accuracy of the data. This procedure enhances the reliability of documentary evidence and minimizes potential inconsistencies in secondary data (Creswell, 2014; Sekaran, U., & Bougie, 2016).

Research Variables

The operationalization of variables follows the concept of policy instruments proposed by (Howlett et al., 2020) and innovation diffusion theory by (M. Rogers, 2023).

Table 1. Operationalization of Research Variables

No.	Variable	Dimension	Indicator
1	Policy Mix (Independent Variable)	Program Outreach	Dissemination of program information, outreach intensity, accessibility of information
		Institutional support	Institutional commitment, administrative support, resource availability
		Incentive provision	Awards, funding support, recognition
		Capacity building	raining, mentoring, proposal development
2	Educational Staff Participation (Dependent Variable)	Participation level	Number of registrants
		Proposal submission	Number of submitted proposals
		Innovation achievement	Number of selected innovation projects

Data Analysis Techniques

Data analysis was conducted using several complementary quantitative techniques (Hair, 2020; Imam Ghozali, 2018). First, descriptive statistical analysis was employed to summarize participation data through frequencies, percentages, and tabular presentations. Second, trend analysis was performed to identify changes in educational staff participation throughout the three implementation periods (2023–2025). Third, comparative growth analysis was used to calculate annual participation growth and compare changes in registrants, submitted proposals, and selected participants across implementation periods. Fourth, percentage analysis was applied to compare participation across regions and institutional categories, enabling the identification of regional disparities in KILAB participation. Finally, descriptive statistical interpretation was employed to interpret empirical findings by relating observed participation patterns to the implementation of policy instruments within the policy mix framework. The analysis emphasizes identifying participation trends rather than establishing causal relationships because the study is based on documentary secondary data (Creswell, 2014; Imam Ghozali, 2018; Sekaran, U., & Bougie, 2016; Sugiyono, 2019).

4 Results and Discussion

Results

Overview of the KILAB Program

The Laboratory Technician Innovation Program (KILAB) is one of the educational staff competency development programs organized by the Directorate of Human Resources. This program aims to

encourage increased creativity and innovation among laboratory staff at universities through the development of innovative works that can support practical activities, research, and more effective and efficient laboratory management. The KILAB program began in 2023 and continues to be developed annually as part of efforts to enhance the competencies of educational staff in the laboratory field.

The implementation mechanism for the KILAB program begins with an announcement and outreach phase targeting universities across Indonesia. Interested educational staff then register through an online system and submit the innovative works they have developed. The submitted proposals or reports on innovative works then undergo a selection process by an evaluation team to determine which works meet the criteria for innovation and feasibility. The primary target of this program is laboratory staff who have the potential to develop innovations in laboratory facility management and support academic activities at higher education institutions. The KILAB Program has been implemented annually since 2023 as part of the Directorate of Human Resources' strategy to strengthen laboratory staff competencies through innovation-based activities

Participation Trends

Based on documentary data obtained from the Competency Resource Portal, participation in the KILAB Program increased continuously during the 2023–2025 implementation period. The number of registrants increased from 291 in 2023 to 384 in 2024 and 639 in 2025. In 2023, 130 innovation proposals were submitted and 69 participants were selected. In 2024, proposal submissions increased to 196, with 98 participants selected. In 2025, the number of submitted proposals increased further to 271, while the number of selected participants reached 100. Table 2 presents the annual number of registrants, submitted proposals, and selected participants during the observation period.

The number of registrants increased by 31.96% between 2023 and 2024 and by 66.41% between 2024 and 2025, indicating an accelerating participation trend. However, the increase in participation was not accompanied by a proportional increase in selected participants. The number of selected participants increased from 69 in 2023 to 98 in 2024 but only to 100 in 2025. Consequently, the selection rate declined from approximately 23.71% in 2023 to 25.52% in 2024 and 15.65% in 2025. This pattern indicates a widening gap between the growth in program participation and the number of participants progressing through the selection process.

Table 2. Participation of Educational Personnel in the KILAB Program

No.	Fiscal Year	Number of Registrants	Applications	Selected
1	2023	291	130	69
2	2024	384	196	98
3	2025	639	271	100

Figures 1–3 illustrate the regional distribution of applicants during the three implementation periods. Across all three years, Java consistently recorded the largest number of applicants, while eastern regions—including Maluku, Papua, and Nusa Tenggara—showed substantially lower participation levels. Although participation increased in most regions, the distribution remained geographically uneven throughout the observation period. The graph showing the development of participation in the KILAB program also reveals a clear upward trend, particularly in the number of registrants and the number of innovation proposals. This indicates that the KILAB program is becoming increasingly attractive to educational staff (Figures 1, 2, and 3).

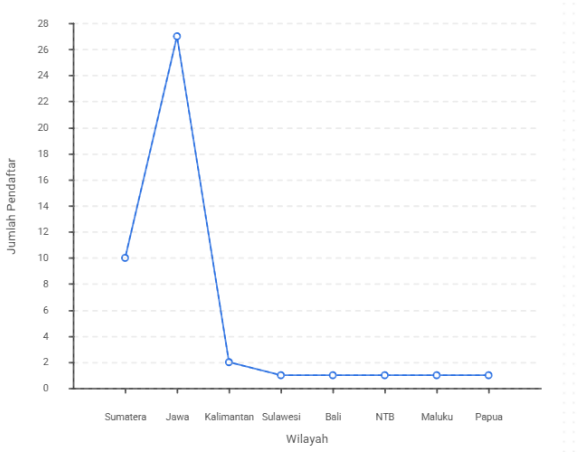

Figure 1. Distribution of KILAB Registrants by Region in 2023

Based on the data in Table 2, particularly in the column for participant applications in 2023, there is a disparity in the distribution of participation among proposing higher education institutions—both public (PTN) and private (PTS)—across regions in Indonesia. The Maluku region shows the lowest level of applications (Figure 1), indicating that access, information and institutional capacity to participate in the KILAB programme remain limited. Conversely, the Java and Sumatra regions dominate the number of applications, reflecting a concentration of resources, educational infrastructure and a higher intensity of programme outreach in those regions. In 2024, the lowest distribution was in the regions of West Nusa Tenggara, East Nusa Tenggara and Papua (Figure 2), whilst the highest was still in the Java region. Similarly, in 2025, the lowest was still in the Papua region and the highest in the Java region (Figure 3).

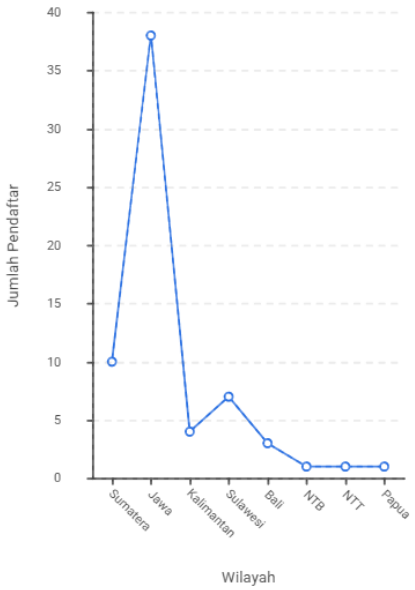

Figure 2. Distribution of KILAB Registrants by Region in 2024

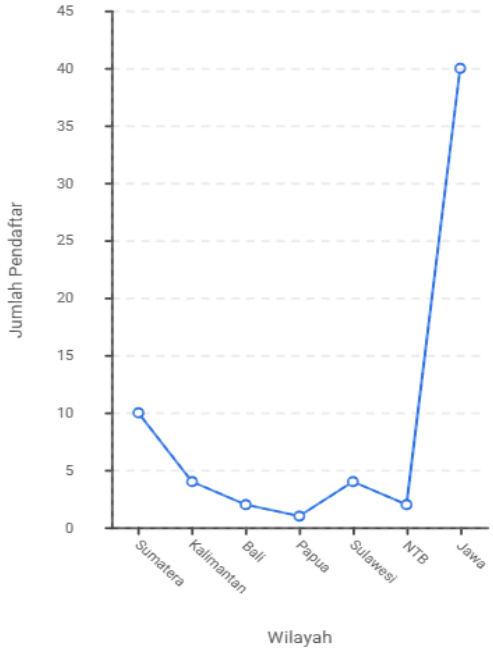

Figure 3. Distribution of KILAB Registrants by Region in 2025

Regional Distribution

The increase in participation in the KILAB program is closely tied to various policies implemented by the program administrators. One of the key policies is the program outreach initiative, carried out through guidelines, technical instructions, and outreach activities to disseminate information via the official website of the Directorate of Human Resources. Through these outreach activities, educational staff gain information about the program's benefits and the registration process for innovative works. Additionally, there is an incentive policy provided to participants who successfully produce the best innovation works. These incentives may take the form of awards, certificates, or opportunities to present innovation outcomes at academic forums. Another policy is innovation mentoring, which involves training and guidance for participants in drafting proposals and reports on innovation works. Through this mentoring policy, it is hoped that the ability of laboratory staff to develop innovations will improve.

The 2026 Laboratory Staff Innovation Works Program Guidelines (KILAB) serve as the foundation for implementing policies that influence the participation of educational staff. These guidelines include various policy components such as program outreach, incentive provision, capacity building, and institutional support, all of which directly contribute to increased participation. Through systematic arrangements regarding registration mechanisms, funding, and program implementation, the KILAB guidelines are able to encourage the involvement of educational staff in producing laboratory innovations. Thus, these guidelines serve as a policy instrument that strengthens the relationship between the policy mix and increased participation in the KILAB program (Figure 4). The KILAB program outreach session was conducted online via the Zoom Meeting platform, organized by the Directorate of Human Resources. This session aimed to provide information to educational staff, particularly laboratory technicians, regarding the mechanisms, requirements, and benefits of participating in the KILAB program. The outreach session was held on March 2, 2026, at 8:00 AM WIB and was attended by participants from various universities across Indonesia. Through this event, participants gained a more comprehensive understanding of the registration process, the development of innovation projects, and the selection stages of the KILAB program (Figure 4).

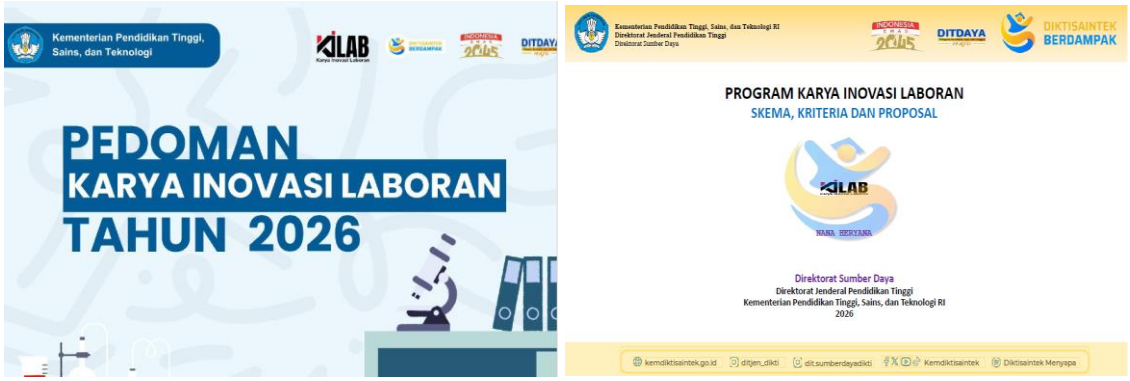

Figure 4. KILAB Program Guidelines and Outreach

Policy Instruments Implemented

Increased participation in the KILAB program is not influenced by a single specific policy but rather by a combination of various complementary policies. This combination of policies is known as a policy mix, which involves the integration of various policy instruments designed to achieve program objectives more effectively. In the context of the KILAB program, the policy mix implemented includes program outreach, institutional support, the provision of incentives, and capacity building for laboratory staff. Program outreach serves to raise awareness among educational staff regarding the existence of the KILAB program. Institutional support is also crucial because universities can provide facilities and policies that support laboratory innovation development. Meanwhile, the provision of incentives and innovation training can boost the motivation and ability of laboratory staff to produce innovative work.

Discussion

The findings demonstrate that educational staff participation in the KILAB Program increased substantially during the 2023–2025 implementation period. The annual growth rate increased from 31.96% between 2023 and 2024 to 66.41% between 2024 and 2025, indicating an accelerating participation trend. However, the number of selected participants increased only from 69 in 2023 to 98 in 2024 and 100 in 2025. The number of registrants grew from 291 participants in 2023 to 639 participants in 2025, indicating that the program has become increasingly attractive to laboratory personnel across Indonesian higher education institutions. This trend suggests that the integrated implementation of outreach activities, institutional support, incentives, and capacity-building initiatives has successfully encouraged greater participation in laboratory innovation programs. Nevertheless, the increase in participation was not accompanied by a proportional increase in the number of selected proposals, indicating that improving the quality of innovation outputs remains an important challenge.

These findings support the Policy Mix Theory proposed by (Flanagan et al., 2011; Howlett & Ramesh, 2014), which argues that policy effectiveness is determined by the interaction of complementary policy instruments rather than by a single intervention. In the context of the KILAB Program, the combination of outreach activities, institutional commitment, incentive mechanisms, and capacity-building initiatives appears to have created a supportive environment that motivated educational staff to participate more actively. Therefore, the findings provide empirical support for the proposition that an integrated policy mix can be associated with higher participation than reliance on a single policy instrument.

The results are also consistent with Innovation Diffusion Theory (M. Rogers, 2023), which explains that innovation adoption is influenced by communication channels, organizational support, and perceived benefits. Similar findings have been reported in higher education innovation studies (Asheim, B. T., Grillitsch, M., & Trippl, 2022). The continuous increase in participation suggests that systematic

dissemination of program information, together with institutional encouragement, has improved awareness and acceptance of innovation among laboratory staff. However, the unequal distribution of participation across regions indicates that the diffusion process has not yet reached the same level of effectiveness throughout Indonesia. Institutions located in Java continue to dominate participation, whereas eastern regions remain underrepresented, suggesting differences in organizational readiness and access to innovation support. This disparity indicates that the expansion of the program has not been spatially uniform. The concentration of participation in Java may reflect differences in institutional capacity, access to information, mentoring opportunities, and available innovation resources. However, because this study relies on documentary data, these factors should be interpreted as plausible explanations rather than statistically verified determinants.

These findings are consistent with previous studies reporting that institutional support and organizational capacity are critical determinants of innovation implementation in higher education (Ismail & Asrori, 2023; Rahman et al., 2022). The difference lies in the unit of analysis and policy perspective. Previous studies have primarily emphasized organisational support and institutional capacity as conditions for innovation, whereas this study places these factors within a broader policy-mix framework and examines their association with longitudinal participation patterns among laboratory staff. However, unlike earlier studies that mainly examined individual policy instruments, this research demonstrates that participation growth is influenced by the combined implementation of multiple policy instruments operating simultaneously. This finding extends previous literature by highlighting the importance of policy integration rather than isolated interventions in promoting innovation among educational staff.

Another important finding concerns the gap between participation quantity and innovation quality. Although participation increased by more than twofold during the observation period, the number of participants successfully passing the selection process showed only modest growth. The selection rate was approximately 23.71% in 2023, increased slightly to 25.52% in 2024, but declined to 15.65% in 2025. Thus, while registrant participation more than doubled over the observation period, the proportion progressing to the selection stage decreased substantially in 2025. This interpretation is consistent with innovation capability literature (Chesbrough, 2020; Meissner, D., Kergroach, S., & Cervantes, 2024). This indicates that increasing participation alone is insufficient to strengthen innovation performance. Capacity-building activities should therefore focus not only on encouraging participation but also on improving proposal preparation, innovation design, and mentoring throughout the innovation development process.

From a policy perspective, these findings imply that future KILAB implementation should prioritize a more balanced policy mix. In addition to maintaining outreach activities and incentive schemes, policymakers should strengthen institutional mentoring, expand technical assistance for universities in low-participation regions, and establish continuous proposal development programs. Such strategies are expected not only to increase participation but also to improve the quality and sustainability of laboratory innovations across Indonesian higher education institutions. Such integrated policy strategies are consistent with contemporary innovation policy frameworks (Borras & Edquist, 2013; Kuhlmann, S., & Rip, 2022). Such an integrated policy strategy should therefore shift from a primary emphasis on expanding participation toward a dual objective of widening access and strengthening innovation quality, particularly in regions with persistently low participation.

5 Conclussion

This study demonstrates that the implementation of an integrated policy mix plays an important role in enhancing educational staff participation in the Karya Inovasi Laboran (KILAB) Program. The combination of program outreach, institutional support, incentive provision, and capacity-building initiatives has contributed to the continuous growth of participation during the 2023–2025

implementation period. However, the findings also reveal that increased participation has not been fully accompanied by proportional improvements in the quality of innovation proposals, indicating that participation growth alone is insufficient to achieve sustainable innovation outcomes.

From a theoretical perspective, this study contributes to the literature on public policy and higher education innovation by providing empirical evidence that the effectiveness of innovation programs is influenced by the interaction of multiple policy instruments rather than by isolated interventions. The findings extend the application of Policy Mix Theory within the context of higher education innovation programs and demonstrate how integrated policy instruments can strengthen educational staff engagement in laboratory innovation activities.

From a practical perspective, the findings suggest that policymakers should optimize the design of the policy mix by balancing strategies aimed at increasing participation with initiatives focused on improving innovation quality. This can be achieved through continuous mentoring, targeted capacity-building programs, broader institutional support, and more intensive assistance for universities with relatively low participation levels. Such strategies are expected to reduce regional disparities while improving both the quantity and quality of laboratory innovation outputs. This study has several limitations. The analysis relied exclusively on secondary documentary data and focused primarily on participation indicators rather than individual behavioural or organizational factors. Consequently, the study could not examine the causal relationships between specific policy instruments and participant behaviour.

Future research is therefore recommended to employ mixed-methods, explanatory quantitative approaches, or structural modelling techniques to examine the causal effects of individual policy instruments on innovation performance. Comparative studies across different higher education innovation programs or institutional contexts would also provide a broader understanding of how policy mix strategies contribute to sustainable innovation ecosystems in higher education.

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