

Barriers to the Labor Certification Implementation and Development in the Construction Services in South Sulawesi

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ABSTRACT

The present study aims to analyze the barriers encountered in the implementation of the labor certification in the construction services in South Sulawesi Province of Indonesia as well as strategies for this certification's improvement. Quantitative methods along with an Analytic Hierarchy Process (AHP) approach are deployed to evaluate the performance of construction labor certification coaching. Data were collected through a questionnaire that identified the main obstacles in improving the latter's performance. The results showed that the construction labor certification faces several challenges, such as a lack of incentives, unclear rules, policy incompatibility, limited exports, and a low understanding of technology. To overcome them, the government needs to improve regulations and infrastructure, certification bodies need to be more efficient, and the workforce needs to be more aware of the certification's importance. With good cooperation, the certification can run more smoothly and support a more competent and professional construction workforce.

Keywords- workforce; labor certification; South Sulawesi; productivity; construction project

I. INTRODUCTION

Construction projects in Indonesia play an important role in the country's development, thus they are expected to be successful. As Indonesia is rapidly developing, construction service business actors are expected to have a standard of competent and skilled workers [1]. It is, thus, necessary to increase worker skills and competence to achieve project success and a sense of responsibility regarding the undertaken project [2]. Labor productivity in road construction projects in Indonesia, particularly road preservation works, shows significant variations between regions [3]. Data from 2018 to 2022 reveal that labor productivity in Region II is consistently higher than in Regions I and III. Productivity in Region II is in a range of 3.1724 to 2.2045 km/day/person, superior to Region I, the productivity of which ranges from 2.4652 to 1.7079 km/day/person, and Region III, where productivity ranges from 1.7141 to 1.6302 km/day/person [4].

Productivity is influenced by various factors, such as internal labor, field conditions, time, and funds. However, there are differences in what factors influence each region. In Region II, the main influencing factors include internal labor, time, finance, and field conditions. Meanwhile, in Region III, priority is given in internal labor, finance, field conditions, and time. This discrepancy reflects regional disparities in the parameters affecting labor productivity on construction projects in Indonesia. Therefore, a more in-depth analysis of these factors is required to improve project efficiency and success in each region [1]. Construction service workers are required to have a Work Competency Certificate. Every service user and/or service provider must employ construction workers with such certificates [5]. Certificates of work competence are divided into Construction Expertise Certificates and Construction Skills Certificates [6].

Increasing regulatory requirements for skill, expertise, and safety certification are driving the approach to meeting regulatory obligations for training, and organizations are only

undertaking the minimum requirements to maintain compliance. However, planned reductions in the safety and security bureaucracy combined with the increasing industry demand for proven skills from contractors and suppliers, as well as cross-skilling have become particularly important during the ongoing economic crisis [7]. Law No. 2 of 2017 on Construction Services regulates the implementation of construction services in Indonesia to improve the construction sector's quality, safety, and competitiveness. This law covers various aspects, from contract regulation to labor certification and the responsibilities of construction service users and providers. Construction worker certification is required to ensure that recognized institutions conduct competence and safety, as well as training and competency tests. Supervision of project implementation is strictly enforced, with sanctions for violations including administrative and criminal sanctions. The law also emphasizes the importance of dispute resolution through mediation to maintain the smooth running of construction projects. One of the efforts to improve employees' competence and professionalism is through a quality assurance system in the form of a certification, as a follow-up to Law 18/1999, Article 15 of PP 28/2000 concerning business and the role of Construction Services Society. The law states that construction workers must follow Work Skills Certification or Work Expertise Certification conducted by the Construction Services Development Institute [8]. The most dominant inhibiting factor for skilled workers in high-level buildings in obtaining work competency certification is the latter's cost, as evidenced by the indicator percentage score of 26.59%. Most respondents objected to the certificate cost of Rp 250,000, so they were reluctant to obtain it [9].

Effective stakeholder management can positively impact project success but it does not guarantee it; instead, it opens up more significant opportunities to achieve such a success and add value to project results [10]. Each stakeholder has a good strategy and capacity to improve the skills of the construction workforce. However, this strategy has not been effectively implemented due to various obstacles, such as lack of coordination among stakeholders and lack of regulations that support its implementation [11]. The government has introduced several regulatory measures to address performance gaps in the workforce. Law No. 2 of 2017 on construction services emphasizes the requirement for construction workers to hold recognized Work Competency Certificates issued through structured assessments by certified institutions [12]. These certifications, comprising Construction Expertise Certificates and Construction Skills Certificates, are intended to ensure a qualified workforce [13]. However, challenges persist in implementing labor certification systems. High certification costs, limited access to training, lack of stakeholder coordination, and insufficient supporting regulations have hindered widespread adoption, particularly among workers in high-rise building sectors [14]. While some stakeholders have strategies to enhance workforce certification, these strategies often fail in implementation due to weak coordination and minimal institutional support [15].

Several previous studies have addressed individual aspects of this issue, such as labor productivity analysis, regulatory frameworks [16], the impact of certification on project success

[17], and stakeholder roles in workforce development [18]. However, there is a research gap in analyzing how these elements intersect, particularly in regional challenges, like those met in South Sulawesi. Specifically, existing literature has not sufficiently explored the performance of labor certification development from a multi-stakeholder perspective, the institutional, financial, and operational barriers faced in implementing labor certification at the regional level, and the effectiveness of existing regulatory frameworks in fostering workforce competence in local construction projects. This gap is critical, as overcoming these challenges can significantly improve construction project outcomes, ensuring a more qualified and standardized labor force.

Therefore, this study aims to analyze the performance of labor certification development and identify key obstacles to its implementation in the context of construction services in South Sulawesi Province. The results are expected to provide insights for policymakers and stakeholders to enhance labor quality and ensure the sustainability of construction workforce development programs.

II. LITERATURE REVIEW

A. Construction Work Competence

Competence is a person's ability to perform tasks or jobs based on knowledge, skills, and work attitudes according to established performance standards [19]. With these competencies, a person can perform tasks, organize work to run smoothly, adjust to potential plan changes, and use their abilities to solve problems or complete tasks in various conditions [20].

B. Construction Labor Competency Training

1) Implementation of Construction Competency Training

The circular letter of the Minister of Public Works and Housing of the Republic of Indonesia No. 23/SE/M/2019 states that the coaching and job training activities for prospective construction workers are an important component in creating superior and competitive human resources able to face global competition in the construction service business.

2) Training and Development Construction Scope

Training and development in the construction industry can improve workforce skills, knowledge, and abilities to work effectively. The process starts with identifying training needs based on job analysis and performance feedback, then designing a training program covering construction techniques, heavy equipment use, and work safety. Training is conducted through various methods, such as classroom, field practice, and online learning. Work safety is the primary focus, including personal protective equipment and emergency procedures. In addition to technical skills, workers are also trained in managerial skills, such as leadership and communication. Evaluations are conducted to measure training effectiveness, while successful participants can earn industry-recognized competency certifications [21].

C. Certification of Construction Labor

Certification is an assessment process that recognizes a person's competence and ability to fulfill statutory requirements through competency testing. It ensures the construction workforce's skills, quality, and workability to produce construction products that meet established quality standards [22].

D. Performance Prism

Performance prism is a performance measurement model that describes an organization as a three-dimensional prism with five sides: stakeholder satisfaction, strategy, process, capability, and contribution. The model emphasizes the reciprocal relationship between the organization and its stakeholders, which includes consumers, the workforce, suppliers, investors, the government, and society [23]. To achieve optimal performance, companies need to fulfill the needs and wants of stakeholders through practical strategies, support them with efficient operational processes, and build capabilities in the form of expertise, technology, and adequate facilities. In return, stakeholders are expected to make the necessary contributions to achieve organizational goals, rendering this model an important tool for measuring overall performance success [24, 25].

III. METHODOLOGY

A. Research Strategy

AHP is an effective method for prioritizing criteria and decision-making in complex problems, such as labor certification in construction services [26]. Similarly, the Performance Prism framework provides a comprehensive assessment of stakeholder perspectives and performance [27]. Table I shows the research questions, problem-solving strategies, and expected outcomes. The quantitative analysis utilized in this study compares criteria and alternatives that can produce a decision, namely selecting majors in prospective students using AHP. By deploying the AHP method, criteria and alternatives must be compiled to form a hierarchy. The selected criteria can be seen in Figure 1.

TABLE I. RESEARCH STRATEGY

Question	Strategy	Expected Outcomes
Research Question 1 (RQ1): What are the obstacles to fostering labor certification implementation in construction services?	Data collection: Literature review, Questionnaire survey, Data analysis: AHP	AHP: Identifying obstacles to fostering labor certification implementation in construction services.
Research Question 2 (RQ2): How are the duties, functions, and fostering labor certification implementation in construction services based on each stakeholder's involvement using the performance prism?	Data collection: RQ1 result, Interview Data analysis: Performance Prism	Analyzing the performance of labor certification implementation in construction services.

B. Data Collection

Primary data were obtained from questionnaire surveys and interviews with stakeholders fostering certification in South Sulawesi Province. The combination of questionnaire surveys and interviews with stakeholders is a widely accepted method for gathering both quantitative and qualitative data in similar contexts, as demonstrated in [28]. These methods allow for a thorough exploration of the barriers to labor certification and the role of each stakeholder in the process. Secondary data can be found in relevant journals and articles.

C. Data Analysis

In this study, a preliminary data analysis was carried out using the AHP. The AHP method can help solve complex problems by structuring a hierarchy of criteria, interested parties, and results and drawing various considerations to develop weights or priorities. After obtaining the AHP ranking results, an analysis is conducted based on them. This analysis is then mapped to the Performance Prism through stakeholder interviews, which are guided by the AHP findings to address the research problem formulation. The validity of the AHP method in this research is supported by its ability to produce consistent and reliable results through the use of pairwise comparison and Consistency Ratios (CRs) [29]. The Performance Prism framework ensures that multiple stakeholder perspectives are considered, improving result reliability.

The research objectives are directly aligned with the methodologies employed. AHP is utilized to identify and prioritize obstacles to labor certification implementation in construction services, as it allows for a systematic comparison of criteria. The performance Prism is then applied to assess stakeholder performance, ensuring that the results provide valuable insights for improving labor certificate implementation processes.

1) Analytical Hierarchy Process

- **Structural Hierarchy Formation:** This step aims to break down a complex problem into a hierarchical structure. This structure consists of elements grouped into different levels. The hierarchy starts with the primary goal at the highest level, followed by lower levels, which include criteria and sub-criteria, until it reaches the lowest level. Criteria and sub-criteria that support the goal are placed at the middle level. Meanwhile, the alternative or option to be selected is at the lowest level in the hierarchical structure. In this case, it is divided into eight categories: Policies and Regulations, Certification Cost, Administrative Process, Training Quality and Relevance, Socialization and Information, Stakeholder Engagement, Certification Bodies Management, and Technology Adaptation. Each of these criteria underlies several related sub-criteria.
- **Decision Making:** Once the hierarchy has been constructed, the next step is assigning prioritization ratings to each level's elements. It involves creating a comparison matrix that shows the relative condition of elements in quantitative numbers, usually on a scale of 1-9.

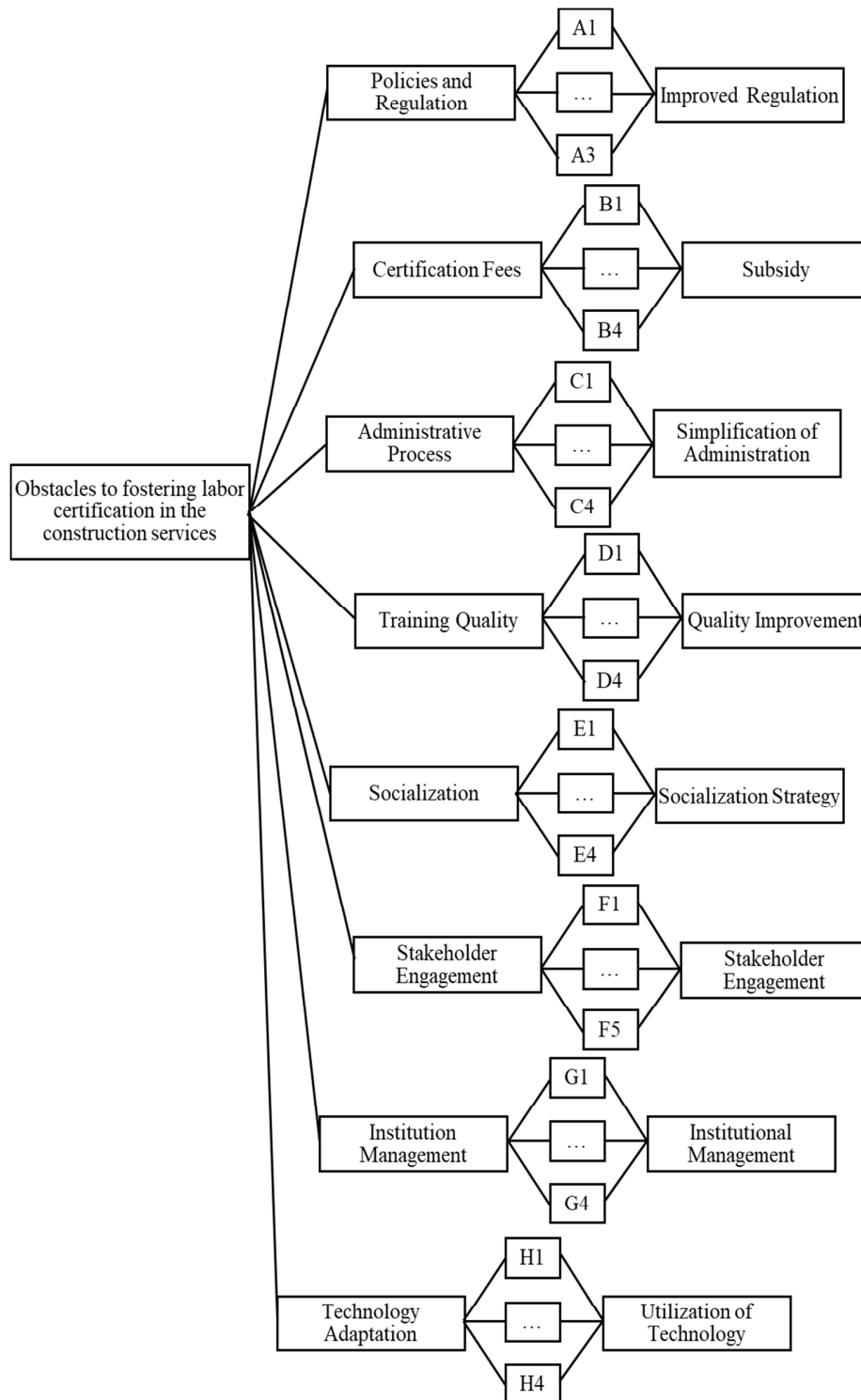


Fig. 1. Hierarchical structure of obstacles to labor certification implementation in construction.

- Element Weight Calculation: The comparison matrix is processed by calculating the following equation on each row.

$$W_i = n\sqrt{a_{i1} \times a_{i2} \times a_{i3} \times \dots \times a_{in}} \quad (1)$$

This process results in an eigenvector that also acts as a criterion weight. The criterion weight or eigenvector is expressed as (Xi), using:

$$X_i = \left(\frac{w_i}{\sum w_i} \right) \quad (2)$$

The largest eigenvalue (λ_{max}) is calculated by:

$$\lambda_{max} = \sum a_{ij} \times x_j \tag{3}$$

- Consistency Calculation: If the level of inconsistency or deviation from consistency is considered significant, the interview must be repeated with several respondents simultaneously. This deviation from consistency is measured by the consistency index, which is calculated using:

$$CI = \frac{\lambda_{max} - n}{n - 1} \tag{4}$$

- Calculation of Random Index (RI): a 1–9 rating scale is applied to evaluate the consistency of pairwise comparison matrices in AHP. The RI values depend on the matrix size and are provided in Table III [30].

TABLE II. PAIRWISE COMPARISON SCALE

Intensity	Description	Explanation
1	Both elements are equally important.	Two elements have equal influence on the goal.
3	One element is slightly more important than the other.	Experience and judgment slightly favor one element over the other.
5	One element is more important than the other.	Experience and judgment strongly favor one element over the other.
9	One element is definitely more important than the other.	Evidence favoring one element over the other has the highest possible level of corroboration.
2, 4, 6, 8	Values between two neighboring balance values.	This score is given when there are two compromises between two options.
Vise Versa	If element I gets one number compared to element J, then J has the opposite value when compared to I.	

TABLE III. RI VALUES BY MATRIX SIZE [30]

Size of matrix	RI value
1,2	0.00
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49
11	1.51
12	1.48
13	1.56
14	1.57
15	1.59

- An analysis involving 500 samples allows one to determine the average consistency value for matrices of various sizes when numerical decisions are randomly drawn from a scale of 1/9, 1/8, ..., 1, 2, ..., 9. The ratio between CI and RI in a matrix is called CR. In the AHP framework, a comparison matrix is considered acceptable if the CR value does not exceed 10% or is equivalent to 0.1.

$$CR = \frac{CI}{RI} \leq 0.1 \tag{5}$$

- Calculating alternative priorities to rank alternatives based on their relative weights. The alternative with the highest relative weight will be ranked first, and the alternative with the lowest will be ranked last.

2) Performance Prism

Qualitative data analysis involves in-depth data processing using observations, interviews, and literature. The techniques deployed to analyze qualitative data are summarizing, categorizing, and interpreting. Qualitative Analysis employs interviews and observations to answer questions, such as what, why, or how [14]. This study addresses RQ2 by conducting stakeholder mapping through the Performance Prism method to analyze labor certification improvement opportunities.

IV. RESULTS AND DISCUSSION

A. Risk Identification based Analysis

Table IV presents the categorization of various barriers that hinder the implementation of labor certification in the construction sector. These barriers are grouped into eight aspects: Policies and Regulations, Certification Cost, Administrative Process, Training Quality and Relevance, Socialization and Information, Stakeholder Engagement, Certification Bodies Management, and Technology Adaptation, each with specific indicators identified through qualitative data analysis. This classification serves as the foundation for further analysis of the factors affecting labor certification development.

B. Analytic Hierarchy Process Calculation

A questionnaire was completed by 30 respondents responsible for labor certification development in the implementation of construction services. The AHP method was used to rank or weight the applied criteria, with data processing carried out using Microsoft Excel.

Table V presents the priority values and rankings of various barriers affecting labor certification in construction services. It is divided into different categories, including Policies and Regulations, Certification Cost, Administrative Process, Training Quality and Relevance, Socialization and Information, Stakeholder Engagement, Certification Bodies Management, and Technology Adaptation. Each barrier is assigned a priority value, representing its relative importance, followed by a ranking based on its priority.

For instance, the highest-ranked barrier under Policies and Regulations is "Lack of policy incentives to encourage labor certification (A3)" with a priority value of 35.11%, followed by "Lack of clear and uniform regulations (A2)" and "Unsynchronized policies between the government and certification bodies (A1)". On the other hand, Stakeholder Engagement has the lowest-ranked barriers, with "Lack of communication between certification bodies and industry (F1)" ranked last with a priority value of 18.20%.

Table V provides an overview of the relative importance of each factor, highlighting where attention should be focused to improve the performance of labor certification systems.

TABLE IV. BARRIERS THAT HINDER THE IMPLEMENTATION OF LABOR CERTIFICATION

Code	Aspect	References
Policies and regulations		
A1	Unsynchronized policies between the government and certification bodies.	[31]
A2	Lack of clear and uniform regulations.	[31]
A3	Lack of policy incentives to encourage labor certification.	[32]
Certification cost		
B1	Limited budget for training programs.	[32]
B2	Lack of financial support from the company.	[32-33]
B3	High cost of certification.	[33]
B4	Lack of government subsidies for certification costs.	[33]
Administrative process.		
C1	Complex certification procedures.	[34]
C2	Long certification process.	[33-34]
C3	Lack of transparency in certification procedures.	[34]
C4	Large number of documents and requirements needed.	[34]
Training quality and relevance		
D1	Curriculum that is not relevant to industry needs.	[34]
D2	Ineffective training methods.	[34]
D3	Lack of evaluation and updating of the training curriculum.	[34-35]
D4	Limited training facilities and amenities.	[35]
Socialization and information		
E1	Lack of access to information about the certification program.	[35]
E2	Lack of socialization about the importance of certification.	[35]
E3	Limited effective communication media.	[35]
E4	Information that is not up-to-date or accurate.	[35]
Stakeholder engagement		
F1	Lack of communication between certification bodies and industry.	[36]
F2	Lack of stakeholder awareness of the importance of certification.	[35-36]
F3	Lack of financial support.	[36]
F4	Different stakeholder interests.	[36]
F5	No standardized collaboration between stakeholders.	[36]
Certification body management		
G1	Lack of competent human resources in the management of certification bodies.	[36-37]
G2	Slow administration process.	[37]
G3	Lack of co-operation with stakeholders.	[37]
G4	Limited funding for management and development.	[37]
Technology adaptation		
H1	Lack of technology understanding.	[37]
H2	Limited access to technology training.	[37-38]
H3	Labor resistance to technological change.	[38]
H4	Lack of technology infrastructure.	[38]

C. Identifying Tasks and Functions, and Fostering Construction Labor Certification

In supporting the improvement of the construction workforce quality, each party involved has an important role that complements each other. The government has the main task of creating clear and uniform policies and regulations

related to the certification. In addition, the government is also responsible for providing incentives, such as subsidizing certification costs, to make it more affordable for the workforce. The government functions as a director and supervisor, ensuring that all policies are correctly implemented. An implementation example is building an information system that facilitates the certification process and strengthens coordination between the agencies involved.

TABLE V. PRIORITY VALUES AND RANKINGS OF VARIOUS BARRIERS AFFECTING LABOR CERTIFICATION

Code	Priority value	Ranking
Policies and regulations		
A1	31.94%	3
A2	32.95%	2
A3	35.11%	1
Certification cost		
B1	22.23%	27
B2	25.75%	12
B3	25.75%	13
B4	26.28%	9
Administrative process		
C1	23.06%	24
C2	24.74%	17
C3	27.54%	6
C4	24.66%	18
Training quality and relevance		
D1	25.73%	14
D2	25.93%	11
D3	21.29%	28
D4	27.05%	7
Socialization and information		
E1	26.76%	8
E2	23.34%	22
E3	25.94%	10
E4	23.96%	19
Stakeholder engagement		
F1	18.20%	32
F2	20.17%	30
F3	20.52%	29
F4	22.36%	26
F5	18.75%	31
Certification body management		
G1	28.43%	4
G2	22.40%	25
G3	23.57%	21
G4	25.60%	15
Technology adaptation		
H1	28.09%	5
H2	23.67%	20
H3	23.09%	23
H4	25.15%	16

Certification bodies act as implementers of training and certification programs. They provide training that meets national standards, complement teacher work, modules, and technology-based facilities. Their function is to ensure that the training and certification quality is maintained according to the needs of the construction industry. In practice, certification bodies often organize online training to reach more participants, arrange flexible schedules, and communicate the certification importance to the workforce.

Construction workers are responsible for following the training and certification procedures and continuously

improving their skills to meet the labor market's needs. The primary function of the workforce is to implement the certification results in the field, ensuring good work standards. For example, workers should participate in technology-based training, provide feedback to certification bodies for improvement, and adapt to an increasingly digitalized certification system.

TABLE VI. PERFORMANCE PRISM

No	Stakeholders	Strategy	Process	Capability
1	Construction Services Centre Region VI	Harmonize national regulations to reduce unsynchronization.	Improve inter-agency coordination to synchronize policies.	Strengthening technology infrastructure to support digitalization of training.
2	Professional Certification Agency	Strengthen co-operation with government and the private sector to increase institutional capacity.	Speed up the evaluation and certification process by utilizing technology.	Provide competent human resources, such as certified teachers and examiners.
3	Labor	Participate in training and certification to improve competence and employment opportunities.	Follow certification procedures systematically according to the guidelines provided.	Adapt to technology to facilitate the training and certification process.

V. CONCLUSION

The current research identified five key obstacles that significantly hinder the improvement of certification coaching performance. These obstacles are: (1) lack of policy incentives to encourage labor certification (35.11%), (2) lack of precise and uniform regulations (32.95%), (3) unsynchronized policies between the government and certification bodies (22.94%), (4) lack of competent human resources in the management of certification bodies (28.43%), and (5) lack of technology understanding (28.09%).

Analysis of stakeholder satisfaction, contributions, strategies, processes, and capabilities indicates that inter-stakeholder collaboration plays a crucial role in enhancing the performance of construction labor certification coaching. The government functions as a policy director by offering incentives, harmonizing national regulations, and advancing technological infrastructure. Certification bodies are responsible for strengthening internal capacities, delivering relevant training programs, and ensuring the efficiency of certification processes through digitalization. Concurrently, the workforce is expected to increase their awareness of certification importance, adapt to technological advancements, and actively engage in the certification procedures. Through this synergy, the certification ecosystem can become more structured and inclusive, thereby supporting the development of a competent and professional construction workforce.

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