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Transformation of Labor Productivity in Bali; Identification of Post-Pandemic Strategic Policies Using the MULTIPOL Approach

Ni Nyoman Reni Suasih[1*], I Nyoman Mahaendra Yasa[2], Hubert Hieke[3], Jati Kasuma Ali[4], Samsoo Sa-U[5], Vicente Manuel Luis Guterres[6]

[1,2] Economics Department, Faculty of Economics and Business, Udayana University, Indonesia
[3]Schiller International University in Germany, Heidelberg, Germany
[4]Faculty of Business and Management, Universiti Teknologi MARA, Sarawak, Malaysia
[5]Faculty of Islamic Sciences, Prince of Songkla University, Thailand
[6]Departamento Comercio e Turismo, Universidade Nasional Timor Lorosa'e, Timor-Leste

E-mail: renisuasih@unud.ac.id

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Abstract

Bali is one of the regions in Indonesia most affected by the Covid-19 pandemic due to its economy being heavily reliant on the tourism sector. As part of efforts to accelerate economic recovery and take preventive measures against future shocks, the government has been striving for economic transformation. This study contributes a novel perspective by anticipating future socio-economic disruptions through proactive labor policies. However, the main challenge faced is the low labor productivity, which remains a crucial issue for the long-term sustainability of Bali's economy. This study aims to develop strategies for improving labor productivity using a prospective-MULTIPOL analysis approach. Data for the MULTIPOL analysis were collected through Focus Group Discussions involving representatives from government agencies, labor associations, and academia. The MULTIPOL analysis reveals three main scenarios: government intervention, human resource intervention, and investment optimization. The key findings indicate that education policies, particularly up-skilling and re-skilling programs, are essential for improving labor productivity and facilitating the transition to a middle-class workforce. Additionally, improving labor market access and optimizing investments in infrastructure and technology are necessary to support the region's labor market. The practical implications include guiding policymakers in designing resilient workforce strategies during crisis recovery. By incorporating participatory foresight into policy design, it advances the global discourse on creating resilient and inclusive labor systems capable of withstanding socio-economic disruptions. The methodology bridges long-term scenario analysis with actionable policy measures, offering a valuable model for sustainable workforce development worldwide.

Keywords: Labor Productivity; MULTIPOL Analysis; Government Intervention; Human Resource Intervention; Investment Optimization

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1. Introduction

The COVID-19 pandemic severely affected Bali's economy and had a significant impact on the welfare of its people (Budhi et al., 2022). The policy of restricting public movement halted tourism activities, a sector that Bali heavily relies on as the main driver of its economy. Tourism is indeed a sector vulnerable to macroeconomic shocks (Santamaria and Filis, 2019). This also highlights the importance of economic transformation to make Bali's economy more resilient and sustainable (Mahaendrayasa et al., 2024).

In response, the Ministry of National Development Planning (Bappenas) in collaboration with the Provincial Government of Bali has developed the Bali Economic Roadmap towards a new bali era; Green, Resilient, and Prosperous. The economic transformation of Bali is an economic development process with long-term impacts, in line with Indonesia's vision for 2045. Bali's economic transformation encompasses six major strategies, which are implemented through various development programs: 1) Smart and Healthy Bali; 2) Productive Bali; 3) Green Bali, 4. Integrated Bali, 5. Bali Smart Island, and 6. Conducive Bali (Bappenas RI, 2021).

Bappenas has identified labor-related issues as the primary obstacle to Bali's economic growth. Factors such as education, health, infrastructure, and macro-fiscal conditions are considered secondary. Labor productivity, defined as value added per worker, remains low in Bali compared to similar regions, posing a serious threat to long-term development. More specifically, the positioning of labor productivity in Bali Province is presented in Figure 1, allowing for comparison with other regions that have similar economic conditions (GDP).

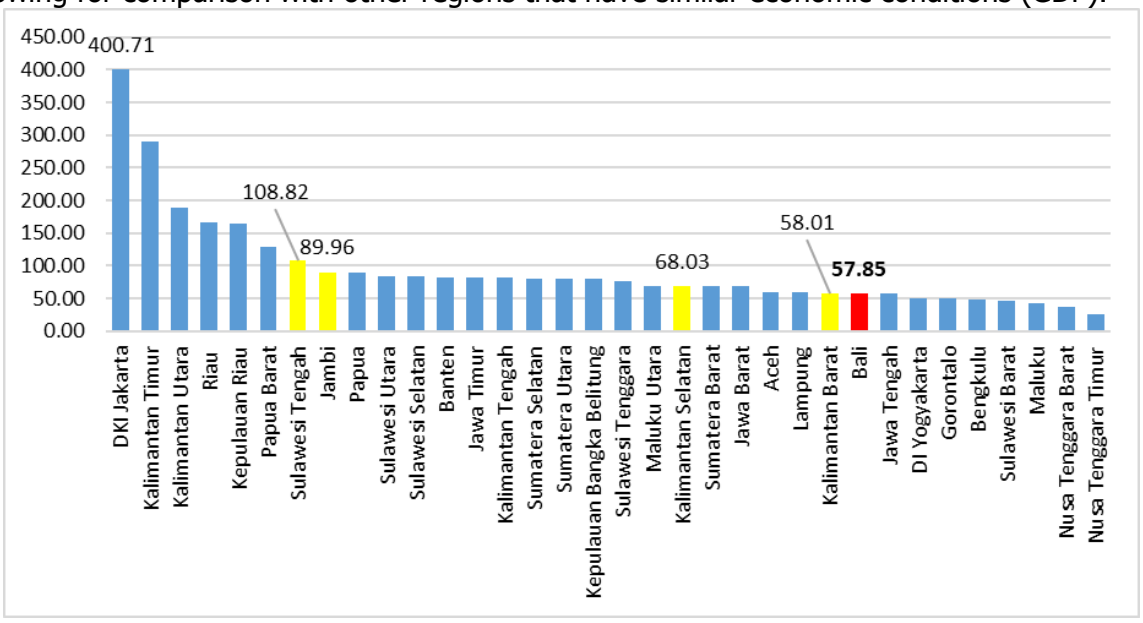

Figure 1. Labor Productivity per Province, 2022 (Million IDR per Worker)
Source: Statistics Indonesia (2024)

In the implementation of Bali's economic transformation, labor productivity is a key performance indicators, with a target of 239.9 million IDR per worker per year by 2045. However, the current data shows that from 2020 to 2022, labor productivity has declined-from 60.9 million IDR to 57.85 million IDR per worker annually (Statistics Indonesia, 2024). This downward trend requires urgent attention to identify the root causes and formulate appropriate solutions.

Labor productivity is a comparison between the output achieved and the labor input

over a specific time period (Tarancón et al., 2018;Kazaz and Acıkara, 2015). Therefore, increasing labor productivity is expected to elevate the workforce to middle-class workers (Hearne and and Lewis, 2024; Al Ayyubi, Devanto Shasta and and Prasetyia, 2023). According to the World Bank report pathways to middle-class jobs in Indonesia, middle-class workers are those who are free from the threat of poverty, with income sufficient to support four family members who consume a middle-class lifestyle, or 3.5 times the poverty line per capita, multiplied by four (Wihardja and Cunningham, 2021).

Furthermore, when examining labor productivity across the five main sectors that employ the most significant portion of the workforce in Bali, a disparity becomes evident. Labor-intensive sectors such as agriculture, trade, and manufacturing which absorb a significant number of workers still exhibit relatively low productivity levels. In contrast, the accommodation and food service sector, which serves as a proxy for the tourism industry, records the highest labor productivity among all sectors. This indicates a structural imbalance, where traditional sectors with high employment rates contribute less in terms of value added per worker. Such dependence on high-productivity but highly vulnerable sectors like tourism underscores the urgent need for a comprehensive strategy to improve labor productivity across the board and to ensure economic resilience in the face of future shocks.

This pattern of uneven productivity across sectors is also reflected in broader studies of tourism economies. Dorta-González and González-Betancor (2021), for example, found that while tourism industries may drive aggregate economic growth, subsectors such as accommodation and food services tend to exhibit significantly higher labor productivity and wage potential than others. These disparities reinforce the need for sector-specific interventions that go beyond generic labor policies.

This study builds upon recent findings in the literature, especially regarding labor productivity in tourism economies, foresight methods, and post-crisis recovery. Recent studies have analyzed productivity dynamics and policy responses in tourism-dependent economies. Sharma, et al., (2021) propose a resilience-based framework for post-COVID-19 tourism recovery, while (de Vries, Erumban and van Ark, 2021) highlight short-term disruptions with long-term sectoral implications. Advances in forecasting such as social network techniques used by (Fronzetti Colladon et al., 2019) and deep learning models by (Kim *et al.*, 2021) offer methodological precedent for foresight in tourism policy design. Utama and Indrajaya (2023) underscores the interplay of tourism, human capital, and openness in driving total factor productivity. Studies on labor vulnerability like those by Kalenkoski and Pabilonia (2022) and Japutra and Situmorang (2021) inform our contextual understanding, whereas global perspectives on systemic recovery and institutional influence (Ibn-Mohammed *et al.*, 2021) provide theoretical grounding for the MULTIPOL-informed policy approach.

While numerous studies have examined labor productivity and policy interventions in developing regions, most of them employ retrospective, quantitative methods that do not anticipate future economic shocks. Moreover, few studies focus on tourism-dependent economies such as Bali, where vulnerability to global crises like the COVID-19 pandemic remains high. There is also limited application of foresight-based policy tools, such as the MULTIPOL method, in the context of local labor productivity strategies. This creates a gap in methodological approach, geographic focus, and policy design integration that this study aims to address. This study offers novelty by integrating a participatory foresight method—MULTIPOL to develop labor productivity strategies that are adaptive to future socio-economic shocks. Unlike traditional productivity studies, it focuses not only on post-crisis recovery but also on proactive policy design to prepare for potential pandemic waves. Furthermore, it contextualizes labor transformation within a tourism-based economy, providing tailored pathways to build a resilient and future-ready middle-class workforce.

Based on the background, gaps in previous research, and the need for future-oriented strategies, this study aims to answer the following research questions:

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1) What are the key strategic scenarios for improving labor productivity in Bali Province in the post-pandemic period?
2) Which policy interventions are most effective under each scenario to support the transition toward a middle-class workforce?
3) What priority programs or actions should be implemented to enhance labor productivity sustainably across sectors?

Therefore, the aim of this study is to formulate strategies to improve labor productivity in Bali using a prospective approach. This effort is timely, especially considering Bali's ongoing demographic bonus, which will transition into an aging population by 2035, when the proportion of elderly residents is projected to be the fourth highest among Indonesian provinces (UNFPA Indonesia, 2014). Maximizing the demographic window through improved workforce quality and effective labor absorption is essential for sustaining productivity and long-term growth (Yudhoyono *et al.*, 2025).

2. Literature Review

New Institutional Economics

In addressing complex labor productivity challenges, particularly in regions with fragmented economic structures and heavy reliance on vulnerable sectors like tourism, the role of institutions becomes central. The New Institutional Economics (NIE) framework, as formulated by North (1990), Williamson (2000), and Ostrom (2005) emphasizes that economic performance is not determined solely by market forces or factor accumulation, but by the rules, incentives, and enforcement mechanisms that shape individual and organizational behavior. Institutions, both formal laws, policies, bureaucratic systems and informal norms, trust, cultural expectations, influence how efficiently resources are allocated and how actors respond to policy interventions.

This theoretical lens is especially relevant in analyzing labor productivity, where outcomes depend not only on the quality of human capital, but also on how institutions manage labor markets, deliver training systems, coordinate sectors, and regulate transitions. In weak institutional contexts, even well-designed policies may fail due to misalignment, low trust, or poor enforcement.

Empirical studies have reinforced this perspective. Agostino et al. (2020) show that in European manufacturing SMEs, regional institutional quality—measured through indicators such as rule of law and government effectiveness—has a statistically significant and positive effect on total factor productivity (TFP). They estimate that a one-point increase in institutional quality corresponds to an 8.8% rise in firm productivity, underscoring how enabling institutions enhance the return on both capital and labor inputs. Similarly, Pariboni and Tridico (2020) find that structural transformation in European economies is effective only when supported by robust institutional frameworks. Their study highlights that labor productivity growth across 25 countries between 1995 and 2016 was driven not just by investment and R&D, but also by institutional reform, particularly in labor market regulation and governance.

In the context of Bali, the implications are clear. The region's labor market is characterized by informality, sectoral vulnerability, and multi-level governance, where the alignment between provincial and district labor authorities remains inconsistent. Moreover, interventions in training, regulation, and workforce placement often operate in silos, limiting their long-term impact. By adopting a scenario-based policy design approach, this study incorporates NIE as a foundational lens to examine how different institutional configurations state-led, market-led, or hybrid, can shape the success of strategic interventions in enhancing labor productivity. This institutional perspective serves as the backbone for the MULTIPOL methodology applied in the study, allowing for a structured exploration of how policies and programs perform under varied institutional assumptions.

Labor Productivity Theory

Labor is a development actor who has an important role in the economy, which can influence productivity and economic growth (Alexandre, Bação and Veiga, 2022). Essentially, labor productivity can be influenced by two factors: capital accumulation and technological progress (Silva, Moutinho and Gaspar, 2024;Travaglini, 2010). These two elements, aside from increasing productivity, also have the potential tocounter the law of diminishing returns. Therefore, the growth process can occur from the interaction between the law of diminishing returns and technological progress (Park, 2005).

The relationship between labor productivity and economic growth can be explained through the neoclassical perspective of Solow (Korkmaz and Korkmaz, 2017). This theory is an extension of the Harrod-Domar growth theory, incorporating labor and technological progress as additional factors (Mulder et al., 2001). The difference between the Harrod-Domar growth theory and the neoclassical growth theory, aside from the aforementioned, is that the Harrod-Domar theory suggests the existence of constant returns to scale with fixed coefficients, while the neoclassical Solow growth theory explains the diminishing returns of labor and capital when analyzed separately (Kansakar, 1988;Boianovsky, 2015).

Labor Productivity Theory in the Agricultural Sector

Lewis' dualism theory explains that labor productivity in the agricultural sector tends to be low (Moeis et al., 2020; Hosseini, 2012). This is due to the low quality of labor, although the quantity of labor is relatively high. As a result, there is a surplus of labor, characterized by a marginal product of labor that is equal to zero. The condition of labor in the agricultural sector, as described above, indicates that the production function in the agricultural sector has reached a state where the law of diminishing returns applies (Diao and McMillan, 2018). Reducing the number of laborers will not cause a decrease in the amount of output produced. Conversely, increasing the number of laborers will not increase the output but will instead reduce total production. A growth process focused on the agricultural sector will result in higher incomes and a more equitable distribution of income, which in turn can reduce poverty levels (Brown and Haddad, 2020; Suryahadi, Suryadarma and Sumarto, 2006). When linked to the Lorenz curve, high growth in the traditional sector, i.e., agriculture, will push the Lorenz curve upward or toward the line of equality (Sadras and Bongiovanni, 2004; Fields, 1975; Islam and Yokota, 2008).

Labor Productivity Theory in the Industrial Sector

Lewis's development theory states that there is a high level of productivity in the industrial sector's inputs, including labor (Das and N'Diaye, 2013; Storesletten, Zhao and Zilibotti, 2019). The marginal product of labor in the industrial sector remains positive (Wang and Piesse, 2009; Islam and Yokota, 2008). Therefore, an increase in the number of workers in this sector will lead to a rise in production levels. On the other hand, a decrease in the number of workers in this sector will result in a decline in production levels within the sector. According to this theory, labor productivity in the industrial sector is relatively high. This is because the marginal product remains positive. When labor productivity is high, it leads to higher income levels and greater economic growth, which is driven by the industrial sector.

Growth process focused on the modern sector, namely the industrial sector, will result in a relatively unequal income distribution or income disparity. When related to the Lorenz curve, high growth originating from the industrial sector will cause the Lorenz curve to shift downward or away from the line of equality (Pauliuk, 2024; Maipita and Wahyudi, 2017).

3. Methods

3.1 Data Description

This study employed a qualitative approach using Focus Group Discussions (FGD) as the primary data collection method. The FGDs were organized to gather expert input in formulating policy scenarios, strategies, and action priorities using the MULTIPOL framework.

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The discussions were facilitated by the Regional Research and Innovation Agency of Bali Province and involved stakeholders from various sectors, including government institutions, labor unions, vocational education centers, and academia.

A total of 15 key informants participated in the FGDs. Participants were selected based on their expertise in labor policy, education, and economic development. The table below presents the characteristics of the FGD participants.

Table 1. Identification of Criteria in the Formulation of Policy Paths Using MULTIPOL

No	Stakeholders/ Group	Institution/ Affiliation	Position/ Role	No. of Participants
1	Government (Provincial)	Manpower Office, Education Office	Labor, planning, and education policy analyst	2
	Government (District/City)	Manpower Offices (Denpasar, Badung, Gianyar, Tabanan)	Representative of Head	4
2	Academia	Udayana University	Labor economist/ researcher	3
3	Labor organizations	KSPI Bali (Confedetation of Indonesian Trade Unions)	Representative Provincial Coordinator	1
4	Business Association	PHRI Bali (Hotel and Restaurant Association)	Representative Provincial Coordinator	1
5	Business Association	HIPMI Bali (Young Entrepreneurs Association)	Representative Provincial Coordinator	1
6	Regional Planning/ Research	Bappeda (Regional Development Planning) and BRIDA (Regional Research and Innovation Agency of Bali)	Strategic Planner/ Facilitator	3
	Total			15

The results of the FGD were documented, transcribed, and coded based on their relevance to the criteria, policies, and programs defined under the MULTIPOL methodology. These elements formed the basis for the prospective policy formulation and were later structured and analyzed using the MULTIPOL software.

3.2 Methods

This study adopted the MULTIPOL prospective analysis technique (Multi-Policy). MULTIPOL refers to "MULTI-criteria" and "POLicy" with an integrated participatory approach (Stratigea, 2013; Papadopoulou et al., 2025). The three main elements in MULTIPOL analysis are scenario, policy (policy direction), and actions (Fauzi, 2019; Wijayanto *et al.*, 2022). Scenario is a structured development that can be implemented in the future where the goals can be achieved. Policy is the strategies needed to support the scenario, meanwhile programs and actions are also known as policy measures or ways to achieve goals, which represent potential interventions aimed at the implementation of policies (Suasih et al., 2024; Rustini et al., 2023).

The potential policy pathways that can be developed based on these three main elements through MULTIPOL analysis are displayed in Figure 2.

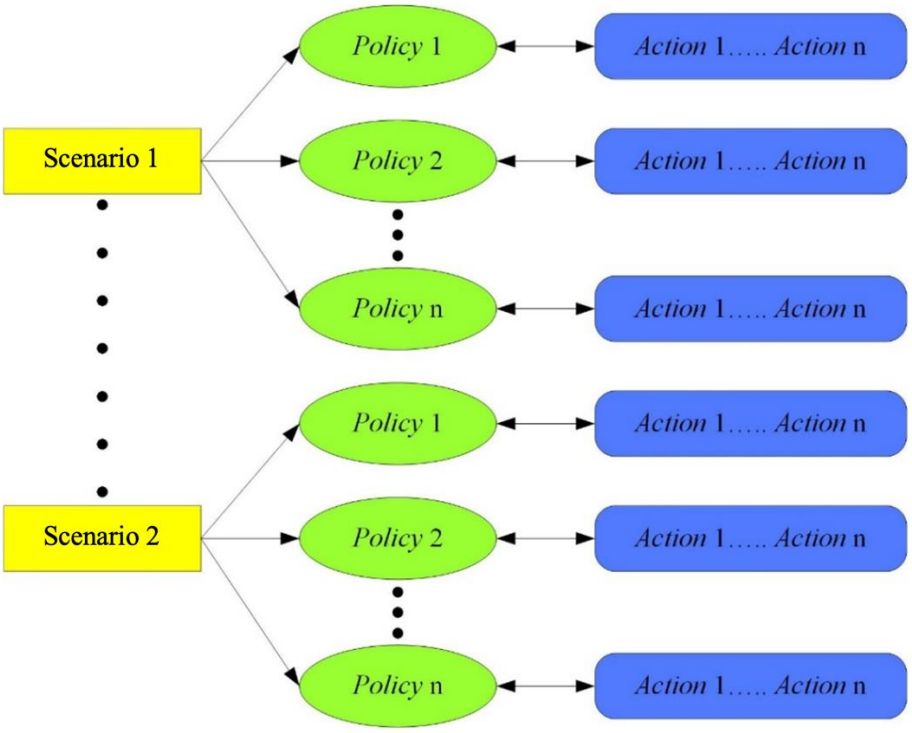

Figure 2. Potential Policy Pathways (Hierarchy Policy)
Source: (Fauzi, 2019)

The steps in the MULTIPOL analysis can be explained through five stages, as shown in Figure 3. The first and second stages involve the determination of scenarios, actions, policies, criteria, and weights, with this phase employing a participatory approach. MULTIPOL uses different weights for these three main elements, which distinguishes it from other multi-criteria approaches. The next stages (from the third to the fifth block) are the MULTIPOL instrument blocks, where the software determines the hierarchy of actions.

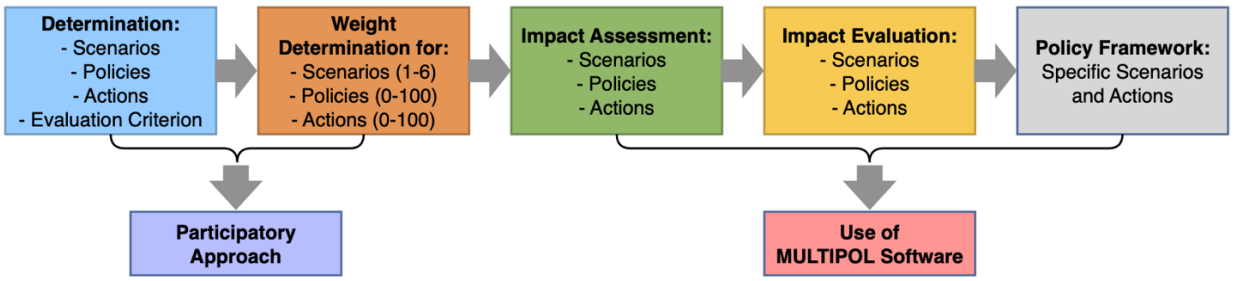

Figure 3. Stages of Using MULTIPOL
Source: Fauzi (2019)

Data collection is conducted through a Focus Group Discussion (FGD), where discussions are held to formulate the main elements of MULTIPOL and provide scores according to the MULTIPOL framework (Figure 4).

An ideal FGD is conducted by experts with a limited number of participants, this FGD was carried out based on those guidelines. The FGD was facilitated by the Regional Research and Innovation Agency of Bali Province, with participants including government institutions dealing with labor, labor associations, vocational training institutions, and academics.

This study is structured to systematically address its three research questions through a

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foresight-based methodology. The process begins by identifying key issues related to labor productivity decline in Bali, which are then translated into three research questions concerning strategic scenarios, policy interventions, and action programs. Data were collected through Focus Group Discussions (FGDs) involving stakeholders from government agencies, vocational institutions, labor unions, and business associations. These discussions generated inputs on plausible future scenarios, policy domains (education, labor regulation, wage policy), and practical actions (upskilling programs, curriculum reform, job fairs). Using the MULTIPOL method, stakeholders assigned weights to evaluation criteria such as productivity, income, and labor competence. The analysis produced scenario-based rankings of actions and policies, identifying which interventions are most impactful under various future conditions. The final outcome is a set of strategic, evidence-based policy pathways consisting of prioritized programs and actions tailored to government, human resource, and investment-led development scenarios.

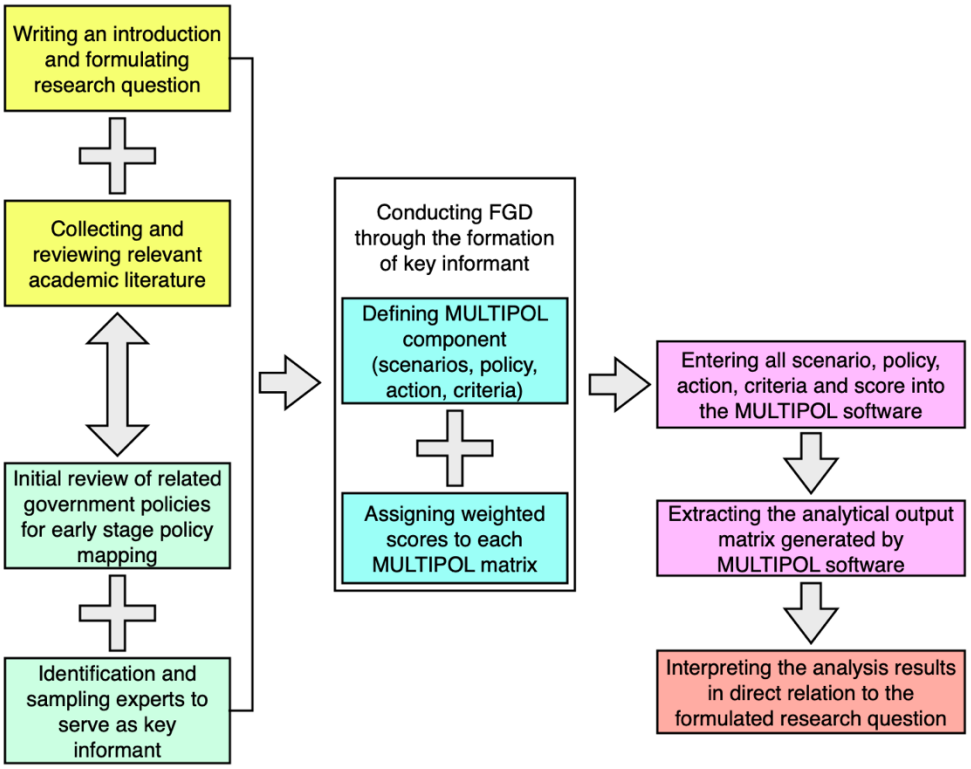

Figure 4. Research Framework
Source: Authors work

4. Results

Identification of Strategic Scenario for Labor Productivity

The results of the FGD and MULTIPOL formulation reveal three future-oriented strategic scenarios for enhancing labor productivity in Bali.

These scenarios were selected and validated during the FGD sessions. Several participants highlighted that the pandemic exposed structural weaknesses in labor adaptability and emphasized the urgency of integrating foresight in labor policy. One government official stated:

> *"We need to prepare policies not just for recovery but for resilience. The tourism sector will be hit again in future crises—we must be ready."* (FGD Participant – Bappeda Bali)

Another participant from PHRI Bali emphasized:
"Without strong government intervention, the private sector alone cannot fix the productivity issues—especially in informal and vulnerable labor segments."

Table 2. Identification of Criteria in the Formulation of Policy Paths Using MULTIPOL

No	Criteria	Code	Weight	Definition
1.	Income and Labor Productivity Improvement	produktif.L	6	Income is a key indicator for determining the class of workers (Fritsch and and Liedl, 2023), where income naturally stems from productivity (Cruz, 2023; Madsen, et al., 2024). Therefore, the goal of improving income and productivity becomes an important criterion.
2.	Investment growth	gro.inves	4	Investment is one of the primary sources of development and job creation (Wang et al., 2022; Nguyen, 2022).
3.	Labor Competency Improvement	kompetensi.L	5	To elevate the labor class, improving labor competency is also crucial, whether through education or training (Grosemans and De Cuyper, 2021; Yi and Park, 2024).

Policy Prioritization Under Each Scenario

Table 3. Identification of Policies in the Formulation of Policy Paths Using MULTIPOL

No	Policy	Code	Weight	Definition
1.	Wage regulation	polcy.upah	6	Regulations related to wages, such as minimum wages (Krozer et al., 2015; Eckardt, 2022; Samutpradit, 2024), additional income, and the provisions for their implementation.
2.	Policies Supporting Investment Facilitation	polcy.inve	5	Regulations related to investment facilitation, such as easing licensing and business management processes (Dinçkol eet al., 2023; Al-Banna, Mohamed and Menezes, 2024; Černe et al., 2024).
3.	Strengthening Education and Training Quality	polcy.edu	5	Policies related to improving labor competencies through education and training, including skilling activities and formal education systems (Schiff, 2022; McGrath and Yamada, 2023; Gavrel, Lebon and Rebière, 2016).
4.	Labor Regulations	polcy.tk	6	Labor regulations concerning worker protection provisions, rights, and general obligations of workers (Pandey, 2023; Drange et al., 2023).

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The MULTIPOL analysis evaluated four key policy domains under each scenario using weighted criteria. The results are presented in Table 6 of the paper. Across all scenarios, education and training policy consistently ranks highest, followed by labor regulations and wage policy.

These findings reflect consensus among FGD participants that education policy provides the most robust foundation for all scenarios. A representative from the provincial trade union emphasized the need for systemic reform that addresses inequality in skill access:

> *"Workers in informal sectors are often excluded from upskilling opportunities. Training must not be limited to formal employees—if we're serious about productivity, it has to reach the grassroots."* (FGD Participant – KSPI Bali Representative)

Priority Action Programs Supporting Labor Transformation

The next step in the implementation is to carry out various programs and activities related to labor, as outlined in Table 4.

Table 4. Identification of Programs/Actions to MULTIPOL Analysis

No	Programs/Actions	Code
1.	Evaluation of wage standards	eva.upah
2.	Investment promotion	prom.inves
3.	Bureaucratic reform to support business ease	refor.biro
4.	Technology transfer to SMEs (Small and Medium Enterprises)	trans.tekn
5.	Tax incentives	insent.tax
6.	Up-skilling and re-skilling of labor	skilling
7.	Reform of vocational and technical education curriculum	refor.klum
8.	Optimization of job fair programs	job.fair
9.	Labor protection	secure.tk
10.	Expansion of employment opportunities	perluasan

Considering that MULTIPOL is a scenario-based path policy formulation analysis technique, this study differentiates the analysis into three scenarios, as shown in Table 5.

The identification of criteria, policies, and actions then becomes the fundamental input in the MULTIPOL application for developing path policies based on the three scenarios: government intervention, human resource (HR) intervention, and investment optimization. Table 5 presents the results of the MULTIPOL analysis based on the scores for each policy and the average score, as well as the standard deviation obtained. The average score measures the overall performance of each action relative to the policy (or program relative to the policy), while the standard deviation value indicates the sensitivity of each action to the policy (Stratigea, 2013). In general, the best performance is indicated by a high average score and a low standard deviation. In MULTIPOL, the higher the position value, the better the performance of the action. However, actions with a relatively high standard deviation can still have a relatively good position, as long as they are supported by high scores for a particular policy. For instance, an action with moderate average scores but low standard deviation may be prioritized due to its consistent effectiveness across different policies. Conversely, high-scoring actions with significant variability might require further refinement to ensure stability in their outcomes. Ultimately, the MULTIPOL framework enables policymakers to balance performance and reliability when selecting interventions for scenario-based labor market strategies.

Table 5. Identification of Scenarios to MULTIPOL Analysis

No	Scenario	Code	Weight	Definition
1.	Intervention by the Government	gov.interv	6	The government is a key actor in the economy and development (Nguyen and Bui, 2022; Turnovsky, 1999), with the authority to intervene in improving labor productivity through various regulations and government programs. These interventions may include policy reforms, legal frameworks, and fiscal incentives aimed at improving labor market efficiency, ensuring job protection, and fostering an environment conducive to higher productivity (Li et al., 2020; Lee, 1996; Alexandre et al., 2022).
2.	Human Resource (HR) Intervention	sdm.inter	5	The HR intervention scenario specifically targets labor force competency, focusing on improving the skills and qualifications of workers. This includes up-skilling and re-skilling initiatives, enhancing vocational training, and implementing educational reforms to align the workforce's capabilities with the demands of the labor market, thus improving overall productivity (Li et al., 2020; Zuo et al., 2025; Ahmed, 2016).
3.	Investment Optimization	optml.inves	5	The optimization of investment scenario is aimed at boosting job creation and becoming a source of economic growth (Sumarno et al., 2022). This scenario focuses on attracting investments in sectors that can generate employment opportunities. It involves strategies like simplifying business permits, providing tax incentives, and offering support for small and medium-sized enterprises (SMEs) to improve infrastructure, technology, and production processes, which, in turn, increase labor productivity (Prasanna et al., 2019; Yahaya and Nadarajah, 2023) Larios-Francia and Ferasso, 2023).

As presented in Table 6, the highest score was achieved by the up-skilling and re-skilling workforce program. The labor protection program, although it has a small standard deviation, received a small score for each policy, thus occupying the lowest rank. FGD participants consistently emphasized the need for practical, outcome-oriented labor programs. As stated by a representative from the Provincial Manpower Office:

"We've seen too many training programs that end with certificates but no job. Reskilling must be demand-driven and tied to market needs."

Similarly, a trade union leader remarked:

"Job fairs should be part of an ecosystem, not a one-off event. Workers need

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continuous support, especially in rural and tourism-dependant areas."

Table 6. Evaluation Based on Actions and Policies for Moving Toward a Middle-Class Workforce

Code of Actions	Code of Policy				Mean value	Std. dev.	Rank
	polcy.upah	polcy.inve	polcy.edu	polcy.tk			
eva.upah	15,1	14,2	14,2	13,5	14,3	0,6	7
prom.inves	11,9	12,5	11,7	12,4	12,1	0,3	5
refor.biro	12	11,9	11,4	11,6	11,7	0,2	4
trans.tekn	13,9	13,4	13,8	13,2	13,6	0,3	6
insent.tax	11,6	11,2	10,7	10,6	11,1	0,4	3
skilling	16,3	16,5	16,8	16,9	16,6	0,2	10
refor.klum	13,9	14,1	14,5	14,6	14,3	0,3	8
job.fair	16,2	16,1	15,9	15,9	16	0,1	9
secure.tk	8,4	8,2	8,4	8,1	8,3	0,1	1
perluasan	11,4	11,2	10,8	11	11	0,3	2

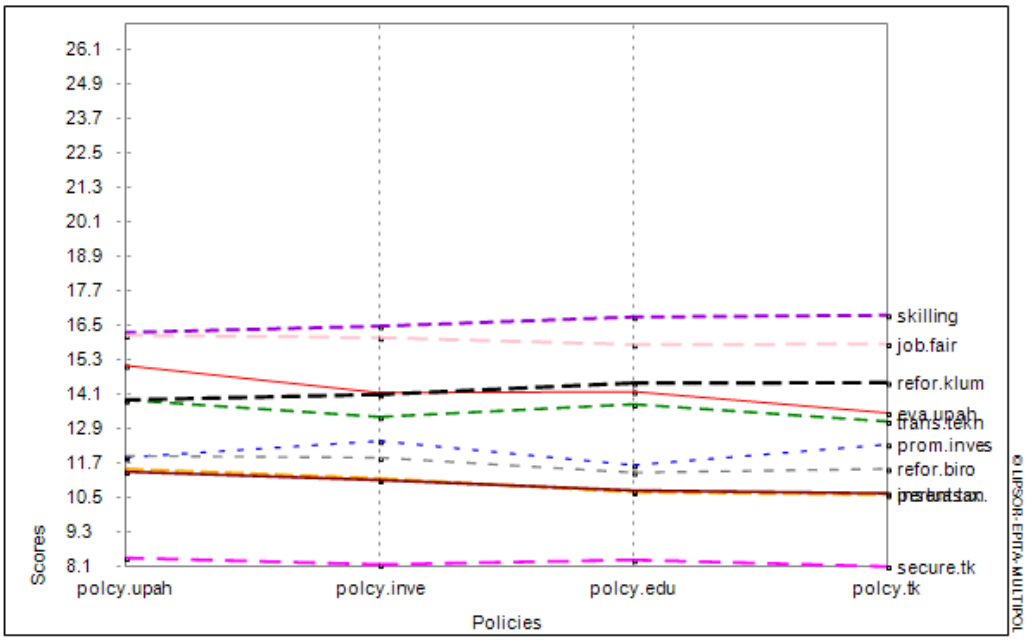

Figure 5. Linkage of Policy and Action (Closeness Map) Towards Middle-Class Workers

Each policy, of course, requires a program/action as its form of implementation. Figure 5 presents a profile map that links the scores for each program (actions) with the policies. Figure 5 illustrates that the re-skilling and up-skilling workforce programs are urgent across all policies, followed by the job fair program. In the wage policy, the minimum wage evaluation program is also important. For education and labor policies, curriculum reform programs are also prioritized. Reskilling and upskilling programs have emerged as fundamental pillars in productivity enhancement strategies, as supported by recent academic literature. Li (2024) demonstrates that integrated training initiatives within the Industry 4.0 framework foster the development of a "future-ready" workforce capable of adapting rapidly to automation and digital transformation. Similarly, (Pedota, Grilli and Piscitello (2023) found that the adoption of Industry 4.0 technologies—particularly digital ones—has significantly increased the demand

for ICT upskilling, even within non-ICT sectors of medium and large enterprises. These findings highlight that ICT skills development is not only a technical requirement but also a cross-sectoral necessity.

In the context of Bali's post-pandemic economic recovery, the implementation of structured training programs that focus on digital and ICT skills, alongside soft skills such as problem-solving and adaptability, is highly relevant. Such policies can facilitate the transition of workers from traditional tourism sectors to new technology-driven opportunities, aligning local competencies with global labor market demands. Therefore, integrating these training strategies into broader education and employment policy frameworks is essential for building a resilient and sustainable productivity ecosystem. Upskilling efforts serve not merely as reactive measures to economic shocks but as proactive tools for long-term structural transformation.

As mentioned earlier, MULTIPOL is a strategic formulation technique with a multi-scenario and multi-criteria approach.

Table 7. Policy Scores for Scenarios Towards Middle-Class Workers

Policy	Intervention by the Government	Scenario Human Resource (HR) Intervention	Investment Optimization	Mean	Std. Dev	Rank
Wage regulation	33,5	33,2	32,5	33,1	0,4	2
Policies Supporting Investment Facilitation	32,3	33,1	33,2	32,8	0,4	1
Strengthening Education and Training Quality	33,9	33,5	33,6	33,7	0,2	4
Labor Regulations	32,5	33,2	34	33,2	0,6	3

According to Table 7, it is evident that education policy scores the highest across all scenarios. Meanwhile, other important policies under the government intervention and human resources (HR) intervention scenarios include wage policy. Under the investment optimization scenario, another prioritized policy is labor/employment policy. When looking at the average across all three scenarios, the best-performing policy is education, followed by labor policy, wage policy, and finally, investment optimization. This dominance of education policy underscores its foundational role in building long-term workforce resilience, regardless of the chosen scenario. The strong performance of labor and wage policies under government and HR interventions suggests their immediate relevance in stabilizing informal and tourism-dependent employment structures. However, the lower ranking of investment optimization across scenarios indicates that while beneficial, it may require complementary measures to maximize its impact. These findings align with global evidence emphasizing education as a catalyst for adaptive labor markets, particularly in economies vulnerable to external shocks. Policymakers should therefore prioritize cross-sectoral integration of education initiatives while tailoring wage and labor policies to specific scenario needs for balanced, sustainable outcomes.

The complete synthesis of scenario-policy-action linkages derived from the MULTIPOL analysis is illustrated in Figure 6.

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Figure 6. Potential Policy Path and Programs Toward Middle-Class Workers
Source: Authors work

The discussion that follows interprets these results within the broader context of institutional, economic, and policy frameworks.

5. Discussion

Interpretation Strategic Scenarios for Labor Productivity

The identification of three strategic scenarios—government intervention, human capital development, and investment optimization highlights the complexity of Bali's labor transformation agenda. These scenarios are not mutually exclusive but interrelated. The dominant concern among stakeholders was the lack of long-term anticipation in labor policy, particularly in tourism-driven economies. This short-term focus often leads to reactive measures, such as emergency cash transfers during crises rather than proactive workforce development strategies. Such approaches fail to address structural vulnerabilities, including the seasonal nature of tourism employment and the lack of social protections for informal workers. Without long-term planning, tourism-dependent economies risk perpetuating cycles of instability, leaving workers exposed to global shocks such as pandemics or climate disruptions. Stakeholders should have pushed for adaptive policies that integrate forward-

looking methodologies, such as scenario planning, to anticipate shifts in labor markets and skills demand. Embedding these practices into policy design could transform tourism-dependent economies into more resilient and diverse systems.

This aligns with Sharma et al., (2021), who argue that post-pandemic recovery in tourism regions must be based on systemic resilience. The government intervention scenario echoes calls for state-led stabilization and stimulus measures, while the human capital scenario resonates with findings by (Yolles, 2024) that adaptive skills formation is key to regional recovery. Meanwhile, the investment scenario supports literature emphasizing enabling institutions and investment environments (Tang and Wang, 2004). In conclusion, Bali's labor market transformation demands an integrated strategy that combines government-led stabilization, human capital development, and targeted investment optimization. These three scenarios are interrelated, each addressing critical gaps in current labor policy, especially the chronic short-termism that leaves a tourism-dependent economy vulnerable to disruption. Government interventions provide immediate protection for informal workers, while human capital development builds long-term resilience through skills adaptation and workforce agility.

Meanwhile, investment optimization creates the institutional conditions needed to attract sustainable tourism-related businesses and diversify the local economy. The success of this approach depends on aligning short-term protection with strategic investments in education, training, and institutional capacity. By adopting a participatory insights toolkit, Bali can embed anticipatory thinking into labor policy design, ensuring readiness for future shocks. This methodology not only addresses Bali's unique challenges but also offers a transferable framework for other regions dependent on volatile industries. Ultimately, this convergence of strategies can drive a more inclusive, adaptive and economically stable future for tourism-driven labor markets. The inclusion of all three scenarios reflects Bali's hybrid economic structure, where formal and informal employment coexist, and where both top-down policy and bottom-up capacity building are needed simultaneously. The scenario framework provides a flexible lens through which future policy can be simulated and tested.

Evaluating Policy Interventions across Scenarios

The MULTIPOL results consistently place education and training policy at the top across all scenarios, reinforcing its role as a cross-cutting lever. Placing education and training policies at the forefront of all policy scenarios is critical because they serve as the foundation for workforce transformation across sectors, particularly in shifting reliance from tourism to more resilient industries. The COVID-19 pandemic exposed the vulnerabilities of tourism-dependent economies like Bali, where sudden disruptions left workers unprepared for alternative employment. By prioritizing education and upskilling, governments can equip workers with adaptable competencies such as digital literacy, green skills, and entrepreneurial skills that can be transferred to emerging sectors like technology, agriculture, or the creative industries. This proactive approach not only reduces immediate job losses during the crisis but also reduces long-term structural unemployment by fostering a future-ready, agile workforce. Additionally, targeted training programs aligned with regional economic diversification plans ensure that workforce development directly supports broader resilience strategies. Without this emphasis on education, recovery policies risk perpetuating cyclical instability, leaving communities exposed to future shocks. Therefore, embedding education and training as the foundation of all employment policy scenarios is not only strategic it is also an urgent imperative for sustainable post-crisis recovery and systemic economic resilience.

This supports earlier studies by (Fronzetti-Colladon et al., 2019; Crescenzi and Giua, 2020), which stress that skill alignment with industry demand is more impactful than regulation alone. The convergence of stakeholders on this point especially labor unions and business associations, shows that technical education is seen not only as a supply-side instrument, but as a social mobility enabler. However, other policies such as wage reform and

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regulatory streamlining remain context-dependent; they become more prominent under specific scenarios (government-led or investment-driven). This supports the argument of Stratigea (2013), who emphasizes the value of scenario-based prioritization in policy foresight. Policy effectiveness must also be seen through an institutional lens (North, 1990). As (Ibn-Mohammed et al., 2021) suggest, institutional quality shapes how well policies are implemented—not just how well they are designed. Bali's reliance on tourism and informal labor makes the institutional factor even more critical, particularly in monitoring, enforcement, and coordination between actors.

Interpreting Priority Actions for Labor Productivity

The most highly ranked actions are retraining programs, job fairs, and curriculum reform, reflecting pressing operational gaps in the current system. These are not entirely new recommendations, but their integration into the scenario-based model marks a methodological contribution. It highlights their critical role as immediate and actionable solutions to systemic labor challenges. While these interventions have previously been identified as important, their consistently high ranking in the scenario-based analysis suggests their universal applicability, whether under a government-led stabilization, human capital development, or investment optimization approach. This pattern suggests that regardless of broader policy direction, addressing skills mismatches and improving education-to-work pathways must be the operational backbone of any effective labor market transformation. The scenario framework elevates these actions beyond stand-alone solutions by demonstrating their synergistic potential: retraining programs deliver impact when paired with job fairs that connect workers to opportunities, while curriculum reform ensures these efforts are sustained through the formal education system. What makes these findings particularly compelling is that they go beyond theoretical policy debates, offering concrete, evidence-backed priorities that can be implemented even amidst resource constraints or political complexity. The model thus provides policymakers with a clear hierarchy of interventions where these top-ranked measures should receive immediate resource allocation and institutional support, while still being tailored to each scenario's specific emphasis on governance, skills development, or investment leverage.

The strong scoring of reskilling aligns with global findings post-COVID-19. For instance, Kalenkoski and Pabilonia (2022) emphasize that self-employed and informal workers were the hardest hit and are the least prepared for structural shifts. The need to move beyond ceremonial or certification-based training is echoed by the FGD participants. Moreover, actions such as job fairs and digital market matching platforms represent low-cost, high-impact interventions if institutionalized properly. These practical tools provide visible entry points for workers and employers and could reduce frictions in Bali's labor market. Their success, however, depends on sustained funding, employer coordination, and digital infrastructure—issues that often fall outside the scope of labor policy per se. The MULTIPOL results provide a concrete ranking of these programs under each scenario, enabling policymakers to simulate trade-offs under different future conditions. This contributes to the limited but growing literature on participatory foresight in labor policy (Cagnin et al., 2021).

6. Conclusion

The middle-class workforce in Bali Province faces significant challenges in improving its condition. Labor productivity in Bali remains relatively low compared to other regions. The transformation of Bali's economic structure in the post-pandemic era requires comprehensive efforts in multiple policy domains, especially in improving the quality and productivity of the labor force. Through a participatory foresight approach, this study outlines a structured analysis of the key pathways available to support labor transformation in a tourism-dependent region.

Three strategic scenarios were developed to guide policy formulation, government intervention, human capital development, and investment optimization. Each scenario

represents a distinct governance and institutional logic, and their relevance depends on future developments. In optimistic conditions marked by stable growth and effective intersectoral coordination, human capital and investment-led strategies are likely to be more effective. In contrast, under pessimistic conditions or during external shocks, strong government intervention will be needed to stabilize the labor market and protect vulnerable segments. Across all three scenarios, the most prioritized policies involved education and training interventions. These were perceived by stakeholders as universally applicable, regardless of scenario. This reinforces findings from international literature which highlight skill development as the most consistent determinant of productivity growth in developing regions.

The MULTIPOL analysis also identified several action programs with high impact and feasibility: upskilling and reskilling initiatives, labor market access programs such as job fairs, and curriculum reform in vocational and technical institutions. These actions respond to gaps in both supply and demand, and require alignment between government, industry, and educational institutions. This study not only provides strategic recommendations for Bali but also offers a replicable methodology for other economies exposed to similar vulnerabilities, particularly those with large informal labor markets and high dependence on tourism. By integrating foresight analysis into labor policy design, this research contributes to global efforts in developing resilient, inclusive, and future-ready workforce systems.

7. Implication of research

This study not only provides strategic recommendations for Bali but also offers a replicable methodology for other economies exposed to similar vulnerabilities, particularly those with large informal labor markets and high dependence on tourism. Its integration of participatory foresight into labor policy planning contributes to a broader global agenda of building resilient and inclusive workforce systems in the face of future socio-economic disruptions. By linking long-term scenario planning with practical action programs, this approach can inform global efforts in designing adaptive labor policies for sustainable development.

8. Limitation of study and future research

The study primarily focuses on policy and program identification within the context of Bali Province, which may limit the generalizability of its findings to other regions with different socio-economic structures. The MULTIPOL method, while robust in participatory planning, may also be constrained by the availability of high-quality stakeholder input and scenario validation data.

Authors' contributions and responsibilities

Ni Nyoman Reni Suasih: conceptualization and data analysis, I Nyoman Mahaendra Yasa: writing draft; Hubert Hieke: literature review, Jati Kasuma Ali: formulating research aim and method, Samsoo Sa-U: interpreting the results of data analysis; Vicente Manuel Luis Guterres: prepare research instrument (FGD).

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ORCID

Ni Nyoman Reni Suasih https://orcid.org/0000-0002-1992-4540
I Nyoman Mahaendra Yasa https://orcid.org/0009-0000-3810-5041
Hubert Hieke https://orcid.org/0009-0000-7179-2672
Jati Kasuma Ali https://orcid.org/0000-0002-4041-5468

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Samsoo Sa-U https://orcid.org/0000-0002-0181-4466
Vicente Manuel Luis Guterres https://orcid.org/0009-0007-7335-2380

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