Potential scenario of sustainable tourism through women's empowerment: A SMIC-Prob scenario analysis for Penglipuran Village, Bali, Indonesia

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Abstract

Penglipuran Village is a popular destination for tourists seeking to experience the essence of Bali. Known for its environmentally friendly settlement, Penglipuran is distinguished by its orderly and symmetrical buildings, each with a uniform main gate called *Angkul-Angkul*. The community places great value on upholding the honor of women in Bali. The objective of this research is to evaluate the potential scenarios that could empower women in the tourism industry and determine the sensitivity of scenarios that drive tourism sustainability in Penglipuran Village. This was achieved using the SMIC-Prob Expert model. The analysis identified three main priority scenarios: (1) working as usual, (2) improving side businesses, and (3) changing the profession. The results indicate that the scenario combination with the highest probability is "110," with an opportunity size of 0.138. This combination, where women continue to work as usual (*PrimJob*) and focus on the improvement of side businesses (*SidePrim*), is the best option for women tourism actors to support the sustainability of tourism in Penglipuran Village. Sensitivity analysis, measured by elasticity, identifies *SidePrim* as the "prime mover" or main driver of tourism sustainability. By implementing improvements in side businesses, women's involvement in tourism can significantly contribute to achieving future goals alongside stakeholders and the government.

Keywords: Probability of scenarios, SMIC-Prob analysis, Sustainable tourism, Woman

JEL Classification: A13, C25, J16, L38, Z32

INTRODUCTION

Bali has long been renowned for its significant tourism potential, further enhanced by the warmth and welcoming nature of its people (Wonderful Indonesia, 2021). Tourism potential is often linked to economic contributions and foreign exchange earnings in countries pursuing sustainable development, including Indonesia. As a result, tourism development is prioritized primarily as a means of promoting economic growth (Kaburak & Suparno, 2022). Globally, Bali's remarkable success in the tourism industry has become almost legendary in itself (Hidayat & Saskara, 2024). The development of

tourism has transformed Bali into a premier destination for tourists (Dharma & Pradana, 2022). In recent years, tourism villages have gained immense popularity as travelers have shifted their interests from urban to rural tourism (Nurtanio & Brahmantyo, 2021).

One of the tourist attractions that exemplifies Bali's vibrant cultural heritage and was recognized as the cleanest village in the world in 2016 is Penglipuran Village. This village is part of Bayung Gede Village, Kintamani District, Bangli Regency, Bali. A distinctive feature of the village is the architecture of its traditional houses, which are uniform and neatly arranged from the main gate to the downstream area of the village (Rachmawati et al., 2024).

Various tourism activities are available in Penglipuran Village, as demonstrated by the Labor Force Participation Rate (TPAK) in Bangli Regency over the last three years (2019-2021), which averaged 83.47%, the highest in Bali, compared to Bali's overall average of 73.88% (BPS, 2022). Penglipuran Village is also an environmentally friendly residential complex characterized by symmetrical buildings and uniform main doors called *Angkul-Angkul* (Yasmine et al., 2021). The uniqueness and beauty of this rural setting should be optimally utilized to enrich the tourist experience and support the sustainability of Penglipuran Village (Muliawan et al., 2023).

The residents of Penglipuran Village uphold cultural values that respect women. For example, village regulations prohibit polygamy, and men who violate this rule are punished by being exiled to an area known as *Karang Memadu* (Astara et al., 2023). Women in Penglipuran Village are respected and protected in their daily activities and social interactions, and it is common for them to participate and have a voice in community life.

Shirmohammadi et al. (2023) discuss how women's participation in the tourism sector contributes to their empowerment. Furthermore, the perceptions of women in tourism and women's entrepreneurship are crucial factors in predicting the empowerment of women within the tourism industry. We agree that women represent a higher proportion in the tourism industry, particularly in sectors such as retail, culinary, and cultural awareness, compared to men. Therefore, it is essential to recognize the role of women in management as a key factor in supporting the sustainability and success of the tourism industry (Pryanka & Saskara, 2023). Women are a vital subject that cannot be overlooked in tourism. Previous research by the UNWTO has highlighted the tourism sector's great potential in empowering women from various backgrounds. It was found that 54% of the global tourism workforce is female, with a gender pay gap that is lower compared to other sectors, along with a higher proportion of women in leadership positions (UNWTO, 2019).

In Penglipuran Village, women have a significant influence on both tourism and the local economy (Sutrisna et al., 2020). Women run most tourism businesses in the village, and their participation not only supports the development of the village but also provides opportunities for them to explore and develop their empowerment and abilities (Wirdawati et al., 2024). Women's participation in the tourism industry is evaluated based on the extent to which they are psychologically, politically, and socially empowered. The presence of women in leadership roles within the tourism industry can positively influence the attractiveness of tourist destinations (Khadijah, 2022).

However, the tourism sector remains shaped by gender identification. Gender, as a cultural system, defines women's identity and determines their role in the division of labor, power at work, and leisure (Candra et al., 2023). Women still face numerous challenges in participating in tourism, including barriers to entering the industry and

factors that affect their continued engagement (Rasanjali et al., 2021). The concept of sustainable tourism development requires consideration of three interconnected aspects: ecological, social, and economic. Balancing these elements is crucial for success, and the advancement of sustainable tourism will be more effective when all stakeholders are involved (Abuselidze & Devadze, 2021).

Sustainability in tourism development is closely tied to the important role of women as key actors in the industry. Gradual transformations in the tourism sector have been identified as contributors to economic growth and development in Bali (Iswara et al., 2023). Tourism is recognized as a service industry where visitor satisfaction is key to success (Ertac & Tanova, 2020). Therefore, to achieve sustainable tourism, it is crucial to empower women, as they play a frontline role in creating positive visitor experiences, which, in turn, can increase repeat visits (Andayani et al., 2017).

In Penglipuran Village, sustainable tourism practices consider environmental, economic, and socio-cultural aspects for both the present and future (Saskara et al., 2024). It is essential to analyze strategies that maintain women's role and potential in the village's tourism sector, ensuring their sustained participation amidst the challenges of a growing urban market. (Suartika, 2018). Scenario analysis will be conducted to evaluate scenarios that may be unsuitable for women's roles in tourism sustainability. This research is crucial for developing policy recommendations that support and strengthen women's contributions to sustainable tourism in Penglipuran Village (Elshaer et al., 2021). This approach should be applied across all types of tourism activities, and responsibility for this does not lie solely with the industry. It requires collaboration from domestic and international tourists, local communities, governments, and other stakeholders (Cahyani et al., 2024).

METHODS

This study was conducted in Penglipuran Village, Bangli Regency, Bali, throughout 2024, with the aim of designing a sustainable tourism strategy model that accounts for uncertainty. Researchers employed two primary approaches: a survey targeting a sample of respondents and a Focus Group Discussion (FGD) involving 20 stakeholders connected to the sustainability of tourism in Penglipuran Village. The combined results of these two methods were then used to inform the development of a model using the SMIC-Prob-Expert method.

The SMIC-Prob-Expert method is a tool used to estimate the probabilities of various scenarios in order to identify the likelihood of different activities or events taking place (Fauzi, 2019). This method calculates a combined score for various scenarios, assessing whether each activity can be realized. The combination of scenarios is determined by the number of times a specific combination, $r = 2^n$, is observed. Women involved in tourism provided their opinions through FGDs and questionnaires, helping to identify potential scenarios for sustainable tourism in Penglipuran Village. These opinions contributed to the identification of various event scenarios, which can be expressed as: $H = (e_1, e_2, \ldots e_n)$, where $e_1 - e_n$ through e_n represent different events or activities.

The FGD also establishes the simple probability ($P(i)$) and the conditional probability for each scenario, expressed as:

$P = (i / j)$ = Probability of scenario i if scenario j is realized...................................... (1)

$P = (i / \overline{j})$ = Probability of scenario i if the scenario does not realize........................... (2)

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The SMIC-Prob-Expert method also requires certain conditions for each opportunity to function, which are:

$$0 \leq P(i) \leq 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

$$P(i/j)P(j) = P(j/i) = P(ij) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$P(i/\bar{j})P(j) + P(i/\bar{j})P(\bar{j}) = P(i) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.....(5)$$

The method uses quadratic models to identify the optimal score for different scenario combinations. This process involves an objective function that represents the desired outcome and considers the probability of each scenario. The equation used is:

$$\min \sum_{ij}^{n} \left[P\left(\frac{i}{j}\right) P(i) - \sum_{k=1}^{r} t(ijk)\pi_k \right]^2 + \sum_{ij}^{n} \left[P\left(\frac{i}{j}\right) P(\bar{j}) - \sum_{k=1}^{r} s(ijk)\pi_k \right]^2 \ldots\ldots\ldots(6)$$

Subject to the constraints:

$$\sum_{k=1}^{r} \pi_k = 1, \text{ and } \pi_k \geq 0 \text{ for all k}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ldots(7)$$

In this equation, π_k represents the scenario where k is sought to minimize the solution. The variable $t(ijk)$ equals 1 if events i and j occur in scenario k and 0 otherwise. Similarly, $s(ijk)$ equals 1 if event i occurs but event j does not in scenario k; conversely, $s(ijk)$ equals 0 if event i does not occur but event j does in scenario k.

This method ranks opportunities based on their score, with the highest-scoring opportunities listed first. It also measures the sensitivity of each opportunity to changes using the following formula:

$$e_{ij} = \frac{P(i)\Delta P(j)}{P(j)\Delta P(i)}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots(8)$$

The research follows the stages illustrated in Figure 1, beginning with scenario development and hypothesis formulation, followed by data collection through surveys and FGDs. The data are then processed and analyzed to determine the most probable scenarios for sustainable tourism in Penglipuran Village.
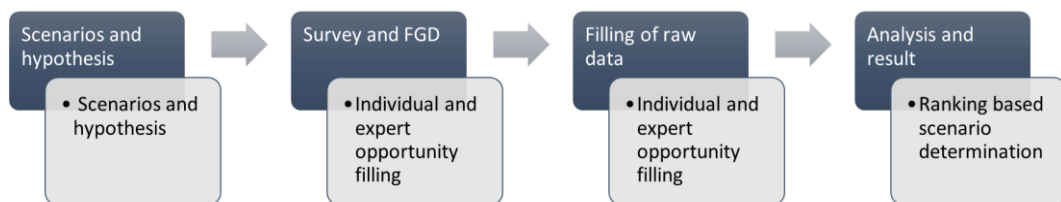

Figure 1. SMIC-Prob analysis stages

The FGD results provide estimates of the likelihood of various scenarios occurring based on the clarity and persuasiveness of participants' ideas. The SMIC-Prob-Expert method applies a series of steps to analyze uncertainty and generate different possible scenarios.

RESULTS AND DISCUSSION
The SMIC-Prob analysis was used to identify and assess the probability of different scenarios involving the actions of women in Penglipuran Village's tourism sector. Based on the questionnaire results aligned with the Focus Group Discussions

(FGD), three scenarios were identified for women's empowerment sustainability in Penglipuran Village's tourism. These scenarios include women continuing their primary roles in tourism, enhancing side businesses in addition to their main jobs, and shifting away from the tourism sector to other professions.

In addition to scenario identification, bibliometric network analysis is used to explore the relationships between women's empowerment, tourism sustainability, and other influencing factors. Figure 2 visualizes these connections, highlighting key research themes and publications that support the study's findings.
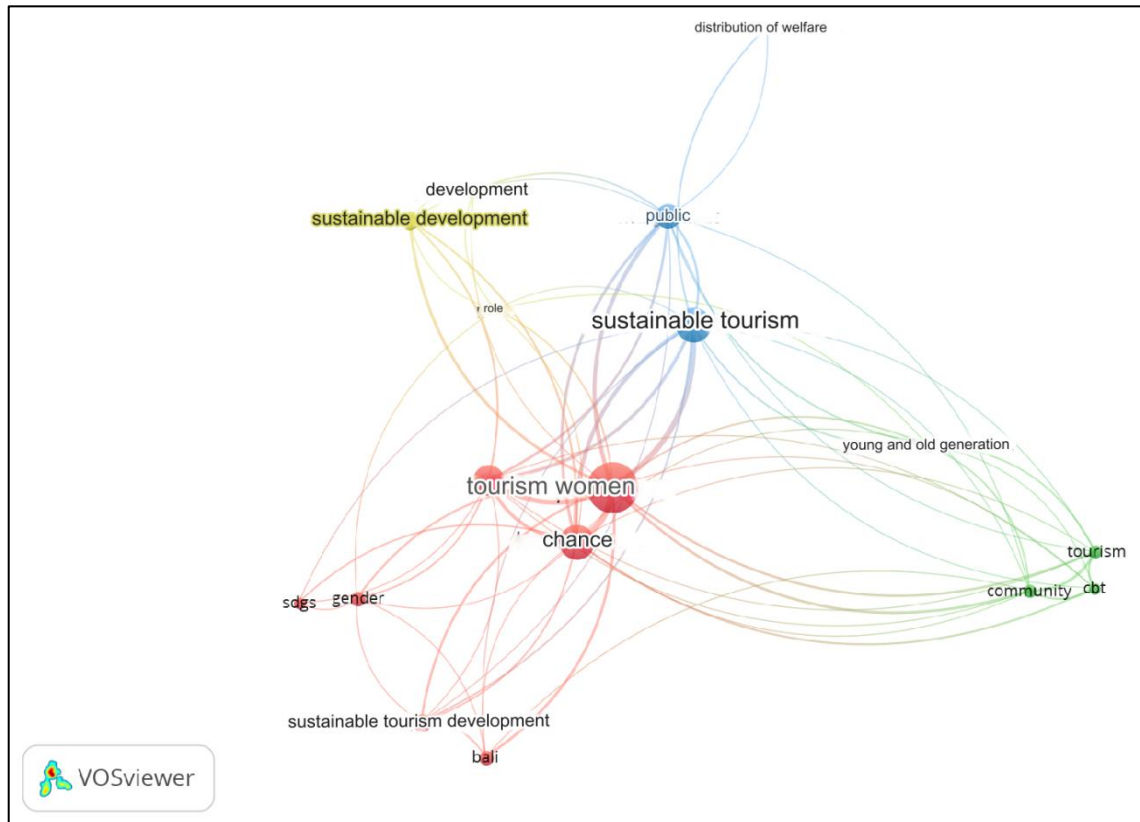

Figure 2. Bibliometric networks.

The visualization shows a strong relationship between "tourism women" and "sustainable tourism," indicating that women's involvement plays a vital role in tourism sustainability. Other interconnected elements, such as "development" and "community," also emerge as significant, further reinforcing the link between women's empowerment and sustainable tourism. The analysis suggests that the scenario in which women enhance their participation in side businesses holds the greatest potential to support sustainable tourism.

Scenarios for determining women's possibilities in tourism sustainability

The SMIC-Prob analysis begins by converting raw data into more accurate and reliable net data, which helps identify potential scenarios for sustainable tourism (Godet et al., 2004). Figure 3 demonstrates the results of this calibration process, where the probabilities of various scenarios related to tourism sustainability are adjusted. The focus of this analysis is on women's empowerment in Penglipuran Village, aiming to determine the most viable actions that can contribute to successful sustainable tourism.

	Probabilities
1 : PrimJob	0.5
2 : SidePrim	0.75
3 : LeftJob	0.4

	Probabilities
1 : PrimJob	0.542
2 : SidePrim	0.707
3 : LeftJob	0.519

(a)   (b)

Figure 3. Raw data (a) and net data (b) simple probabilities (Pi)

In Figure 3, the transition from raw data to net data is evident. Initially, the probability of the "Working as Usual" scenario was 50% (0.5), which increased slightly to 54.2% (0.542) after calibration. On the other hand, the probability of the "Improvement of Side Business" scenario decreased from 75% (0.75) to 70.7% (0.707). Another observed change was in the "Change of Profession" scenario, where the probability increased from 40% (0.4) to 51.9% (0.519).

Further analysis of the net data indicates that the scenario with the highest probability of success is the "Improvement of Side Business," where women in Penglipuran engage in more supplementary income-generating activities to support sustainable tourism. In contrast, the scenario with the lowest probability of success is the "Change of Profession," suggesting that a shift away from tourism is less likely to contribute to the village's sustainable tourism goals.

Figure 3 shows that while opportunities like continuing to work in tourism have become more likely, the likelihood of success for others, such as changing professions, has decreased. The net conditional probability data presented in Figure 4 further illustrates the chances of different scenarios being realized or not realized within the framework of sustainable tourism in Penglipuran Village.

	PrimJob	SidePrim	LeftJob
1 : PrimJob	0.542	0.548	0.478
2 : SidePrim	0.714	0.707	0.537
3 : LeftJob	0.457	0.394	0.519

	PrimJob	SidePrim	LeftJob
1 : PrimJob	0	0.53	0.612
2 : SidePrim	0.699	0	0.891
3 : LeftJob	0.592	0.82	0

(a)   (b)

Figure 4. Net data for conditional opportunities: Realized (a) and not realized (b)

Figure 5 presents eight possible scenario combinations used to rank potential outcomes, where "n" corresponds to the three key scenarios identified in this study. Each combination of scenarios is represented by "1" or "0," indicating whether a specific scenario occurs (1) or does not occur (0). For example, the first combination, "111" (where all three scenarios occur), has a probability of 0.139 (13.9%), indicating that it is less likely for all scenarios to be implemented together.
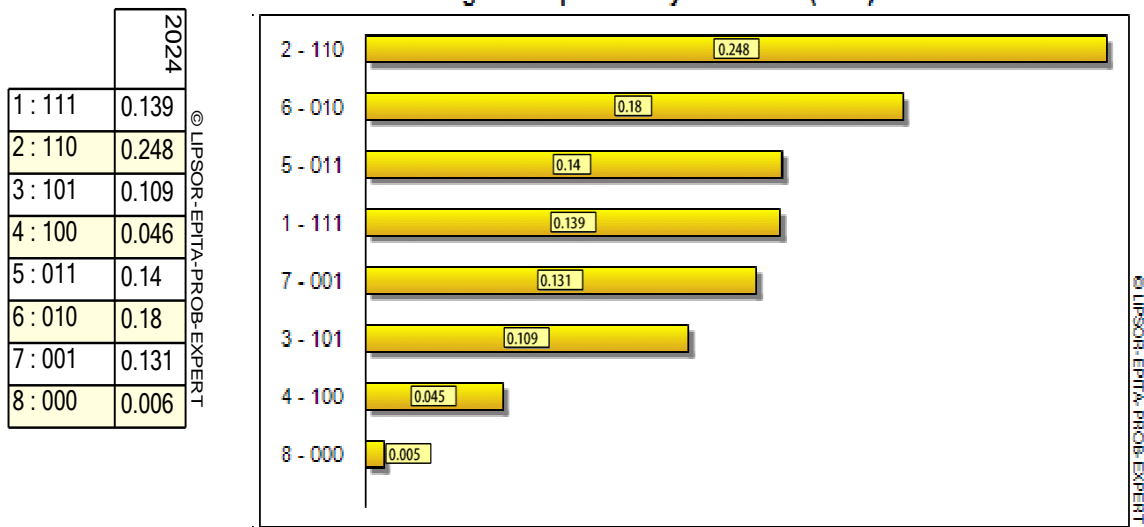
(a)   (b)

Figure 5. Probability of various scenarios (a) and order of scenario combinations based on the number of chances (b)

The combination with the highest probability is combination 2, "110", with a probability of 0.248 (24.8%). This means that in this scenario, women tourism actors are likely to continue working as usual (PrimJob) while also enhancing their side businesses (SidePrim), such as offering traditional Balinese clothing rentals, accommodations, and restaurant services. This combination was found to have the greatest potential for supporting sustainable tourism in Penglipuran Village.

This result aligns with the findings from the Focus Group Discussions (FGD) and in-depth interviews conducted with women tourism actors and stakeholders in Penglipuran Village. It reflects the fact that women predominantly manage the tourism sector in Penglipuran, which is supported by ongoing training and development programs. These programs, offered by both government and private institutions, focus on the development of Micro, Small, and Medium Enterprises (MSMEs), enhancing skills, improving management capabilities, and providing funding to strengthen women's economic roles in the tourism industry.

Ongoing training and development programs are crucial in supporting women's participation in the tourism sector by enhancing their skills, fostering entrepreneurship, and promoting empowerment. This is consistent with the findings of Alserhan et al. (2023), López-Gómez (2023), and Zaidi et al. (2024).

The other scenario combinations have high probabilities, with combination 6, "010" (18%), and combination 5, "011" (14%), following behind, which indicates a significant likelihood for women to focus on side businesses while reducing their involvement in primary jobs or changing professions. Conversely, combination 8, "000," with a probability of 0.006 (0.6%), shows the lowest likelihood, meaning none of the identified scenarios are expected to occur together in that case.

Figure 6 illustrates the impact of one scenario being realized or not realized on the likelihood of other scenarios. The two tables show how each scenario influences the others, depending on whether it occurs or not.
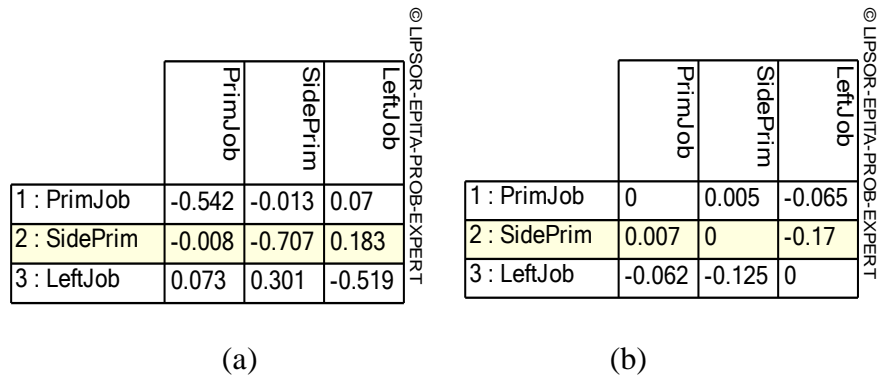
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	PrimJob	SidePrim	LeftJob
1 : PrimJob	-0.542	-0.013	0.07
2 : SidePrim	-0.008	-0.707	0.183
3 : LeftJob	0.073	0.301	-0.519

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	PrimJob	SidePrim	LeftJob
1 : PrimJob	0	0.005	-0.065
2 : SidePrim	0.007	0	-0.17
3 : LeftJob	-0.062	-0.125	0

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(a)   (b)

Figure 6. Impact of the realized scenario (a) and impact of the not realized scenario (b) on other scenario opportunities

In Figure 6a, which represents the impact of realized scenarios, if the third scenario ("Change of Profession") is realized, it has a negative impact on the first scenario ("Work as Usual") and the second scenario ("Improvement of Side Businesses"). This suggests that if women decide to leave their tourism-related jobs, it decreases the likelihood of them continuing their current work or expanding their side businesses.

In contrast, if the second scenario ("Improvement of Side Businesses") is realized, it has a positive impact on the third scenario ("Change of Profession"). This means that women who focus on expanding their side businesses are less likely to leave the tourism industry entirely, as their increasing engagement in tourism makes them more committed to staying in the sector.

Figure 6b shows the impact of not-realized scenarios. If the second scenario (SidePrim) is not realized, it negatively impacts the third scenario, making it more likely that women might consider leaving the tourism sector. On the other hand, when side businesses thrive, women are less likely to change professions, as they are more invested in their roles within tourism.

This analysis demonstrates that the realization of SidePrim (Improvement of Side Businesses) is critical for sustaining women's engagement in the tourism industry. Women who experience growth in their tourism-related businesses are less likely to leave their jobs, highlighting the importance of supporting initiatives that enable them to develop side businesses. Conversely, if side businesses fail to grow, women may consider leaving the tourism sector, which would negatively affect tourism sustainability in Penglipuran Village.

These findings align with studies by Dan et al. (2024), Golian (2017), and Samad & Alharthi (2022), which emphasize that side businesses, such as agritourism and local crafts, provide supplementary income streams essential for economic stability and sustainability in the tourism sector. This additional income helps women manage financial risks and reinvest in their primary tourism ventures. Furthermore, engaging in side businesses allows women to develop key entrepreneurial skills, such as risk-taking and proactive adaptability, which are crucial for business success. These skills also contribute to psychological empowerment and enhanced self-efficacy, encouraging women to participate actively in the tourism industry. Additionally, side businesses that involve community-based tourism initiatives not only strengthen individual women's economic empowerment but also socially empower their communities, contributing to broader sustainable development goals.

Analysis of sensitivity scenarios driving women in tourism sustainability

Figure 7 presents the elasticity analysis as part of the SMIC-Prob analysis, which measures the sensitivity of various outcomes to changes in the different scenarios. The final column shows the absolute elasticity values for each scenario (calculated by horizontally summing the values), indicating the overall influence of each scenario as a "prime mover" in the sustainable tourism system being studied. Conversely, the final row shows the vertical summation, which represents the specific scenario or conditional action being evaluated.

	PrimJob	SidePrim	LeftJob	Absolute value
1 : PrimJob	1	-0.493	-0.633	1.126
2 : SidePrim	-0.833	1	-1.575	2.409
3 : LeftJob	-0.706	-0.811	1	1.518
4 : Absolute value	1.54	1.305	2.208	_

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Figure 7. Elasticity of scenarios

From the table, it is evident that the "Improvement of Side Businesses" (SidePrim) scenario is the most influential, with a high elasticity value of 2.409. This means that the sustainability of tourism in Penglipuran Village is largely dependent on this scenario. The high elasticity indicates that supporting women in developing side businesses is crucial for driving sustainable tourism **w**omen's active engagement in tourism, particularly by expanding side businesses, is key to their empowerment, improving their economic position, and enhancing gender equality in the community.

The "Change of Profession" (LeftJob) scenario, with an elasticity of 2.208, also shows significant influence. However, its negative impact on other scenarios suggests that encouraging women to remain in the tourism sector is important. In contrast, the "Work as Usual" (PrimJob) scenario, with an elasticity of 1.126, has the least influence, indicating that continuing without any changes in the current roles will not contribute as much to the sustainability of tourism in the village.

In summary, the elasticity analysis highlights that focusing on the "Improvement of Side Businesses" scenario is essential for achieving long-term sustainability in Penglipuran Village's tourism industry. This scenario acts as a prime driver for progress, helping women enhance their roles in tourism and leading to broader community and economic development.

Table 1 compares different SidePrim scenarios, indicating their potential based on whether the scenario is realized (denoted by "1") or not realized (denoted by "0"). The results show that the potential for sustainable tourism is significantly stronger when the SidePrim scenario—focusing on improving women's side businesses—is achieved. This underscores the importance of realizing this scenario for the long-term sustainability of tourism in Penglipuran Village.

Table 1. Recapitulation of opportunities for each scenario

Number	PrimJob	SidePrim	LeftJob	Chance
2	1	1	0	0.243
5	0	1	1	0.160
4	1	0	0	0.139
8	0	0	0	0.124
7	0	0	1	0.112
1	1	1	1	0.105
6	0	1	0	0.063
3	1	0	1	0.036
	0.523	0.571	0.413	1.000

From a policy perspective, it is necessary to identify and support scenarios with high potential, like SidePrim, to ensure sustainable tourism in the mid-to-long term. The accuracy in choosing the right scenario will directly impact future tourism policies in Penglipuran. By expanding women's businesses, the sustainability of tourism will not only benefit individuals but will also contribute to the broader development of the village.

In Table 1, the SidePrim scenario where women continue their primary tourism jobs while also improving side businesses has the highest probability of success, with a chance of 24.3%. This indicates that the greatest potential for sustainability arises when women engage in both main tourism work and side ventures like traditional clothing rentals or culinary businesses. In comparison, scenarios where women either stop their primary jobs or leave the tourism sector altogether show lower probabilities of success. For example, scenarios where women leave their main jobs but focus on side businesses still show considerable potential. Still, scenarios where they leave both the tourism sector and side businesses are less likely to contribute to sustainability.

These findings suggest that focusing on enabling women to enhance their side businesses, in addition to their regular jobs, presents the greatest opportunity for sustainable tourism development in Penglipuran. The realization of this scenario can also inform future policy decisions, ensuring that tourism remains a viable and sustainable economic driver for the village.

Based on Table 2, the opportunity for improving side businesses presents the most significant potential if realized. This demonstrates the vital role women play in supporting tourism sustainability through various means. Furthermore, improving side businesses will help challenge the traditional stigma surrounding women by showcasing those who are able to enhance their standard of living across social, cultural, economic, and other domains while actively contributing to the sustainability of tourism.

Table 2. Commercial realization comparison

Number	Scenario Combinations	SidePrime Chance = 1	Number	Scenario Combinations	SidePrime Chance = 1
1	"111"	0.105	2	"110"	0.243
3	"101"	0.036	4	"100"	0.139
5	"011"	0.16	6	"010"	0.063
7	"001"	0.112	8	"000"	0.124
	Amount	0.413		Amount	0.569

In Table 2, the commercial realization comparison provides insight into different scenario combinations where "SidePrime Chance = 1." The alternative scenario with the

greatest influence, identified through a sensitivity analysis, is related to the improvement of side businesses, as shown in Figure 8.

The sensitivity analysis in Figure 8 highlights that the most influential alternative scenario for tourism sustainability is the one related to the improvement of side businesses.
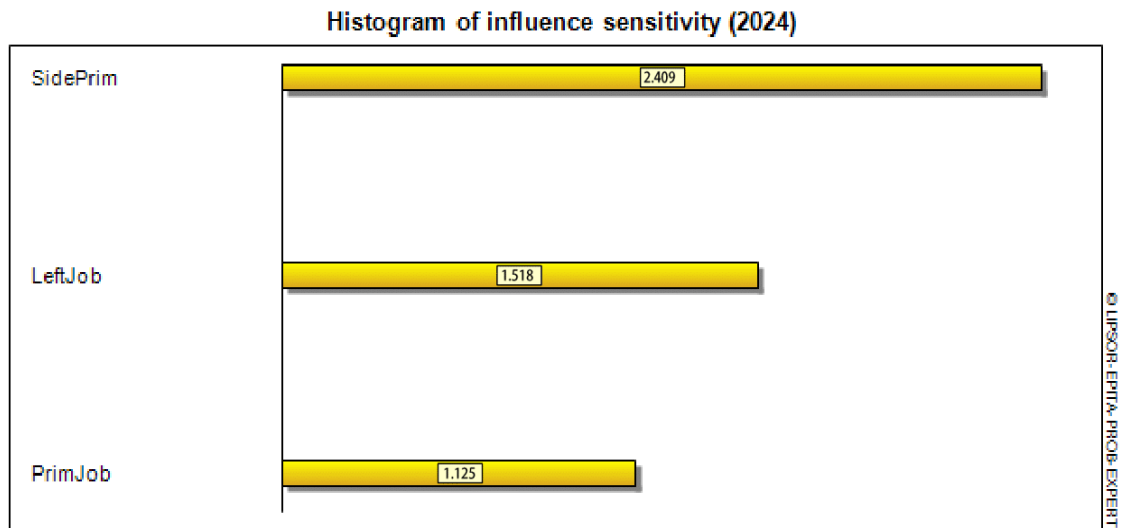

Figure 8. Sensitivity analysis for influence policy alternatives

Figure 9 shows a sensitivity analysis histogram highlighting the scenario with the highest level of dependence: "Changing Profession." This scenario reflects challenges such as limited opportunities for growth, feelings of stagnation, dissatisfaction with the work itself, or issues related to company culture and management.
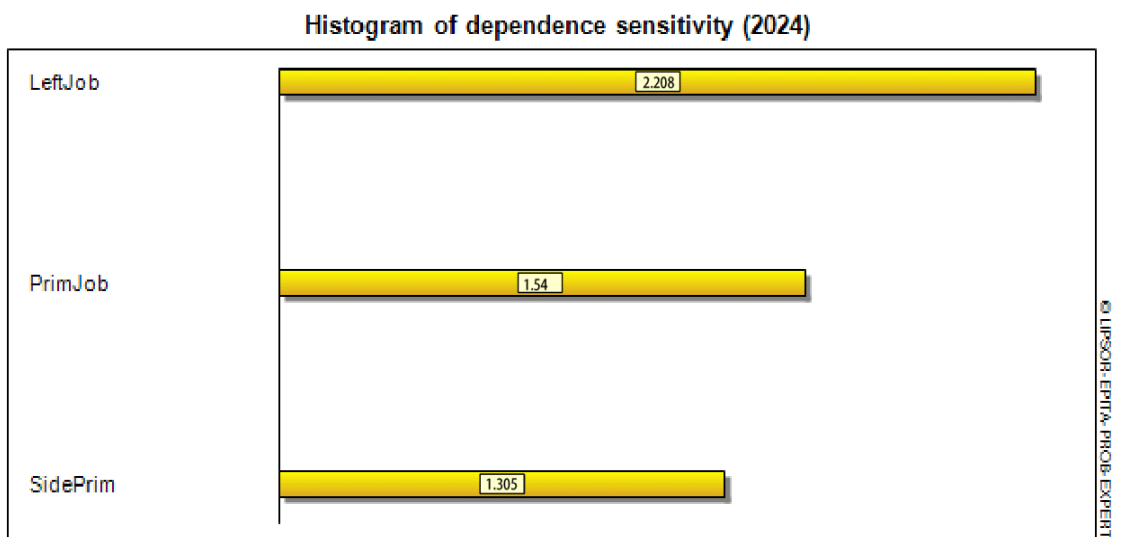

Figure 9. Sensitivity analysis for policy alternatives that have a dependency

Based on the sensitivity analysis results, the "Changing Profession" scenario exhibits the highest dependence, with a score of 2.205. This indicates that this scenario's success is highly reliant on the effectiveness of other alternative scenarios. The histogram in Figure 9 further illustrates that improving conditions for professional transitions, especially for women in tourism, is complex and requires coordination across multiple sectors.

Furthermore, addressing the "Changing Profession" scenario is closely linked to other policy alternatives, such as the "Improvement of Side Businesses." Together, these three scenarios form a comprehensive policy framework aimed at enhancing women's empowerment in tourism while adhering to sustainability principles. The role of women as key actors in tourism businesses is critical, and their empowerment should be a priority in policy development.

The findings are consistent with previous studies that highlight the significant impact of women's empowerment on tourism development and broader socio-economic benefits. Women's participation in the tourism sector not only supports economic growth and poverty reduction but also promotes gender equality through entrepreneurship. Training, education, and financial support are essential in helping women establish and sustain tourism businesses, while policies must mainstream gender issues within tourism to achieve sustainable development. Additionally, challenges such as gender-based discrimination and financial barriers need to be addressed to allow women to fully contribute to the sector (Gutierrez, 2023; Joy et al., 2023; Pavlović et al., 2022; Rahman & Shah, 2023; Singh et al., 2023).

CONCLUSION AND RECOMMENDATIONS

Conclusion

Focusing on the improvement of side businesses is the most effective pathway for achieving sustainable tourism in Penglipuran Village, Indonesia. Through detailed analysis, researchers identified the development of side enterprises as the most promising strategy, with a 24.8% probability of success compared to other scenarios, including the "prime mover" scenarios. This strategy aligns with the collective goals of stakeholders and the government, emphasizing economic benefits and women's empowerment. By tailoring this approach to the specific needs of the Penglipuran community, the development plan becomes both effective and socially responsible.

However, further research is needed to account for regional variations within the Klungkung Regency. Socio-economic conditions, local customs, and even the personalities of residents may differ significantly across districts. For example, women in remote areas might focus on self-development rather than side businesses, while communities with strong artistic traditions could benefit from promoting craft workshops for tourists. The proposed scenarios, therefore, need refinement to address these regional nuances, ensuring successful implementation in diverse communities.

To build on these findings, future research on sustainable tourism in Penglipuran Village and similar destinations should involve a broader range of experts. Economists could offer insights into market trends and financial feasibility, while social scientists could contribute their expertise on cultural preservation and community engagement. Integrating socio-economic and cultural factors into scenario analysis will enable the development of comprehensive strategies and policies that foster systemic sustainability in tourism across various regions.

The findings of this research suggest a clear policy direction: prioritizing women-led tourism enterprises and support networks to empower women in Bali's tourism sector. This can be achieved by creating a supportive environment for women-led businesses and providing essential resources and training. Women's leadership in implementing sustainable tourism practices will benefit both the environment and local communities. Initiatives such as promoting eco-friendly practices, reducing waste, and preserving cultural heritage are key. Additionally, fostering community-driven efforts

and collaborating with local organizations can help develop women's empowerment programs that are aligned with their unique needs and priorities. This approach ensures the relevance, sustainability, and lasting impact of these initiatives.

In conclusion, this research provides a strong foundation for advancing sustainable tourism in Penglipuran Village. By focusing on the improvement of side businesses and recognizing the importance of regional adaptation, we can work together to create a more inclusive and equitable tourism sector in Bali, where women are empowered to thrive and contribute to sustainable development.

Recommendations

Future research in Penglipuran Village should focus on socio-economic impact analysis, technological innovation, and the comparison of tourism sustainability strategies. Additionally, exploring innovative product development, identifying barriers, and analyzing global market opportunities will be important. Prioritizing and supporting women-led businesses is crucial for enhancing women's empowerment in Bali's tourism sector. This can be achieved by providing training programs, fostering collaborative networks, advocating for gender equality, and promoting sustainable practices.

Policymakers, including government entities and stakeholders, should prioritize gender-responsive policies, allocate funding, and create a supportive environment for women entrepreneurs. Promoting sustainable tourism and regularly monitoring and evaluating initiatives will be essential for empowering women in Bali's tourism sector. These efforts are vital for ensuring both women's empowerment and the sustainability of Bali's tourism industry.

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