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The Occupational Transformation of Coastal Fishers in Advancing Coastal Economic Sustainability: A Case Study in Sanur, Bali

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The Occupational Transformation of Coastal Fishers in Advancing Coastal Economic Sustainability: A Case Study in Sanur, Bali

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Abstract: The increase of economic and environmental pressures in coastal areas have caused many fishermen to switch from traditional livelihoods to the tourism sector. This study aims to analyze the factors that influence the transformation of traditional fishermen's jobs in the coastal area of Sanur, Bali, in the context of sustainable tourism development. A quantitative approach using logistic regression was used to analyze the relationship among socio-demographic, economic, and tourism factors and the decision to change occupations. The results imply that higher levels of education, ownership of tourism-related assets, and more intense interaction with the tourism environment increase the likelihood of fishermen transforming their occupations. Conversely, older fishermen tend to be more resistant to changing their traditional livelihoods. These findings emphasize the importance of social and economic readiness in supporting sustainable transitions in the coastal economy. This research contributes to the transformation of economic structures and economic development, which in turn has policy implications on the formulation of community-based tourism policies.

Keywords: occupational; transformational; fisher; sustainability; logistic

Introduction

Coastal areas-economic transformation in tourism development is increasingly becoming a major concern, particularly in developing countries that rely on tourism as the drive for economic growth. Recent studies portray that tourism expansion in coastal areas not only drives local economic growth but also triggers significant changes in the use of space, economic structures, and the livelihoods of coastal communities, including traditional fishing communities (Santoso, 2025; Balsas, 2024). These changes often put coastal communities in an adaptive position, requiring them to adjust to the evolving new economic dynamics.

Indonesia, as an archipelago with an extensive coastline, makes the process of coastal economic transformation increasingly complex and relevant to be studied. Bali, as a major national tourism destination and one of Southeast Asia's international tourism hubs, offers a unique empirical context. Bali's success in developing coastal-based tourism makes it a space for interaction between modern economic activities and traditional livelihoods. This condition makes Bali an important social laboratory to understand how coastal communities—particularly fishermen—respond to, adapt to, and transform their livelihood strategies in the face of the pressures and opportunities generated by tourism (Utama et al., 2024; Banela & Kitsou., 2023). Tourism development in Bali is also marked by the dynamics and fluctuations in the number of tourist visits, which are increasingly influenced by the digitalization process (Prastyadewi et al., 2023). This condition intensifies tourism activity in coastal areas and creates both opportunities and economic adaptation pressures for local communities.

Sanur, as one of Bali's oldest tourist areas, which has been developing since the 1960s, represents the dynamics of long-term coastal transformation. This area has undergone a gradual transformation from a traditional fishing village to a tourist destination with modern

infrastructure and diverse service activities. This transformation has not only impacted the physical changes of the coastal area but has also created complex socio-economic dynamics for the local community. Traditional fishermen face the changes in access to coastal resources, the increasing spatial competition, and new skill demands that affect the sustainability of their livelihoods (Stacey et al., 2021).

Despite the literature indicates that tourism can positively contribute to local economic growth through job creation and income increase, these benefits are not always evenly distributed at the local community level. Recent studies assert that traditional coastal communities often face structural barriers in accessing tourism economic opportunities, such as capital limit, ownership of productive assets, and human resource capacity (Brida et al., 2016; Scheyvens, 2011). This condition indicates that the success of tourism development is not solely measured by economic growth, but also by the extent to which local communities are able to participate and adapt to the economic structure changes that are occurring.

A number of empirical studies demonstrate that the transformation of fishermen's jobs from the fisheries sector to tourism or related services does not happen automatically. This process is influenced by a combination of social, economic, and institutional factors, such as age, education level, productive assets ownership, and the intensity of exposure to tourism activities (Stacey et al., 2021; Wibowo et al., 2024; Allison & Ellis et al., 2001). However, most of these studies still focus on specific contexts outside of Indonesia or examine the livelihood diversification in general, without specifically analyzing the determinants of fishermen's job transformations in coastal areas with high levels of tourism development like Bali.

Even though research on coastal community livelihood transformation continues to grow, there is still limited empirical evidence explaining the factors that influence fishermen's decisions to switch jobs in coastal areas-based tourism in Indonesia. Specifically, the interaction between fishermen's individual characteristics and their ownership of livelihood assets in driving or hindering the process of job transformation has not been extensively studied systematically. This condition implies a significant research gap that needs to be filled, especially in rapidly developing tourism destinations like Sanur, Bali. Therefore, this research is relevant to identify the main determinants of fishermen's occupational transformation using the Sustainable Livelihoods Framework as an analytical approach, which has been proven effective in several recent studies for understanding the dynamics of adaptation and diversification of coastal communities' livelihoods (Nayak et al., 2019; Béné et al., 2017; Harker et al., 2022). The findings of this research are expected to expand the body of literature related to livelihood transitions in coastal areas as well as serve as an empirical basis to formultae inclusive and sustainable coastal tourism policies.

Concept and Hypothesis

Economic transformation refers to the changes in the composition of economic sectors within a region which is characterized by a shift of resource allocation from low-productivity sectors toward sectors with higher value-added and productivity. In contemporary literature of development economics, this process is generally understood as a gradual shift from the dominance of the primary sectors, such as agriculture and fisheries, toward the secondary and especially the service-based tertiary sectors (Herrendorf et al., 2014; McMillan, Erumban, & de Vries, 2024). The initial framework on structural transformation proposed by Lewis and Kuznets remains relevant as a theoretical foundation, but the latest empirical developments emphasize that this process is heavily influenced by the local context and institutional structures of the region (Rodrik, 2024).

In the tourism context, structural transformation exhibits characteristics that differ from those observed in conventional industrial sectors. As a service-based sector, tourism is strongly embedded in cross-sectoral linkages and interacts dynamically with primary sectors such as fisheries and agriculture (Herrendorf et al., 2020; Torres & Momsen, 2004). These interactions may be complementary, for instance through the development of marine tourism and creative economies that utilize local natural and cultural resources (Hall, 2001). However, tourism

expansion may also generate competitive dynamics, particularly in coastal areas where competition over space, labor, and natural resources can intensify between tourism and traditional livelihood sectors (Bavinck et al., 2017). Therefore, the impact of tourism on the local economic structure highly depends on the development patterns and adaptive capacity of the local community.

The latest tourism literature affirms that tourism development has multidimensional consequences for local communities, encompassing economic, social, and environmental dimensions. The economic impacts include job creation, income increase, and infrastructure improvement, while the social impacts relate to changes in social structure, cultural values, and power relations at the community level. On the other hand, environmental pressures such as coastal ecosystem degradation and land use change also become issues which gain more attention in sustainable tourism studies (Brida et al., 2016; Hall & Williams, 2019).

The fisheries sector is one of the most vulnerable traditional sectors in this transformation process. Recent studies portray that fishing communities face multiple layers of pressure due to the natural resources degradation, climate change, and increasing competition among economic sectors in coastal areas (FAO, 2022; Freduah et al., 2017). In the tourism context, fisheries and tourism build a complex and multidimensional relationship. Tourism has the potential to open up opportunities for livelihood diversification for fishermen through the involvement in marine tourism, sea transportation services, and culinary businesses based on fishery products. However, the success of this transition is heavily influenced by individual and structural factors, such as access to capital, education level, productive assets ownership, and social and institutional networks (Kimbu et al., 2022; Stacay et al., 2021). Based on these recent theoretical developments and empirical findings, this study formulates the following hypotheses.

H1: Age negatively influences the probability of fishermen's job transformation.

Age differences influence individuals' ability to respond to changes in the economic structure of coastal areas. Recent studies demonstrate that younger fishermen tend to be more adaptable towards new job opportunities outside the traditional fishing sector because they have a higher learning capacity, greater flexibility, and better risk tolerance. Research in coastal areas of China, South Asia, and Southeast Asia consistently find that younger age groups have a stronger tendency to switch jobs compared to older fishermen, who are generally more tied to conventional livelihood patterns (Liu & Liu, 2016; Pham & Saizen, 2023; Holland & Norman, 2020).

H2: Education level positively influences the probability of fishermen's job transformation.

Education level plays a significant role in shaping the adaptive capacity of fishermen amidst the growing tourism-based coastal economy. Higher education enables individuals to access information, improve skills, and expand social networks which are relevant to the service and tourism sectors. Various empirical studies indicate that fishermen with higher levels of education have a greater chance of switching to non-fishing jobs because they are able to meet the skill demands and work standards in the tourism sector. This finding is supported by studies in Bangladesh, South Korea, and Vietnam, which confirm that education enhances labor mobility and accelerates job transitions in coastal regions (Bhowmik et al., 2021; Sahi, 2025; Dar et all., 2024; Macusi et al., 2021).

H3: The ownership of assets related to tourism positively influences the probability of fishermen's job transformation.

The ownership of productive assets related to tourism activities is a key factor in driving the fishermen's job transformation. Assets such as tourist boats, homestays, or tourism-related businesses provide an economic foundation that allows fishermen to reduce their dependence on fisheries resources. The latest studies portray that fishermen who own or control tourism assets are better able to diversify their livelihoods and transition toward service-based economic activities. Empirical evidence from Indonesia and other coastal regions shows that access to

tourism assets significantly increases the chances of successful job transformation for fishermen (Kimbu et al., 2022; Hatidja & Sulana, 2025; Masri et al., 2024; Allison & Ellis et al., 2001).

H4: Exposure to tourism activities positively influences the probability of fishermen's job transformation.

The intensity of fishermen's exposure to tourism activities contributes to shape their economic orientation and aspirations. More frequent interaction with tourists, tourism business entities, and service markets enables fishermen to gain new knowledge, upgrade their service skills, and identify alternative economic opportunities outside the fisheries sector. Recent research promotes that exposure to tourism contributes to the acceleration of livelihood diversification and drives job transformation toward the service sector. Studies in Vietnam and Indonesia assert that fishermen with high levels of exposure to tourism activities show a greater tendency to engage in sustainable job transformation (Kimbu et al., 2022; Dar et all., 2024; Allison & Ellis et al., 2001).

Method

This study employs a quantitative approach with a cross-sectional design to analyze the factors influencing the fishermen's job transformation in Sanur coastal area. The quantitative approach was selected as this study aims to empirically and measurably examine the relationship between independent and dependent variables within a specific time period. The cross-sectional design is commonly used in socio-economic research to capture the conditions and characteristics of respondents at a single point in time and to statistically observe the relationships between variables (Creswell & Creswell, 2018).

This research was carried out in the coastal area of Sanur, South Denpasar District, Bali, Indonesia. Sanur was selected as the research location because it is a long-established coastal tourism area that still maintains the presence of a traditional fishing community, so that providing a relevant context to examine the dynamics of fishermen's livelihood transformation due to tourism development.

The research population covered all active and former fishermen residing in the coastal area of Sanur. The sampling technique used was purposive sampling, considering that this research requires respondents with specific characteristics and experiences directly related to the phenomenon of job transformation. The utilization of purposive sampling is considered appropriate in social research that focuses on specific groups and aims to obtain information relevant to the analysis objectives (Etikan et al., 2016).

The respondent criteria include: (1) residing in the Sanur coastal area for at least 10 years to ensure that they have the understanding of local socio-economic dynamics and tourism development; (2) having worked or is working as a fisherman for at least 5 years to ensure respondents to have sufficient experience in fishing activities; (3) being between 25 and 65 years old as the productive age group who have economic decision-making capacity; and (4) being willing to participate in the research. The establishment of these criteria aims to improve the empirical validity of the collected data.

The sample size of this research was 120 respondents which was determined by considering statistical adequacy and population limitations. In regression analysis, this sample size met the general principle of sample adequacy, which is a minimum of 5–10 times the number of independent variables being analyzed, thus allowing for stable parameter estimation and reliable interpretation of the results (Hair et al., 2019).

Data collection was carried out using a structured questionnaire which was constructed based on the Sustainable Livelihoods Framework. This framework was utilized because it is able to comprehensively explain how the combination of livelihood assets—human capital, social capital, physical capital, financial capital, and natural capital—influences fishermen's adaptation strategies and job transformation decisions (Scoones, 2015; Béné et al., 2017). The operational definitions of the research variables are presented in Table 1. The collected data were then

analyzed using inferential statistical analysis techniques to examine the influence of each independent variable on the fishermen's decision to transform their occupations. The operational definitions of the variables used in this research are presented in Table 1.

Table 1. Operational Definitions of Variables

Variable	Operational Definition	Measurement
Occupational Transformation (Dependent)	Current occupational status of the respondent	1 = transformed into a non-fishing occupation; 0 = still working as a fisher
Age	Respondent's age in years	Years
Education	Highest level of formal education completed	1 = senior high school or above; 0 = primary or junior high school
Ownership of Tourism Assets	Ownership of productive assets related to tourism	1 = owns asset(s) (homestay, tourism boat, food stall); 0 = does not own
Tourism Exposure	Intensity of exposure to tourism activities	Hours of interaction with tourism activities per week (continuous)

This study employs a binary logistic regression model to analyze the determinants of occupational transformation. Logistic regression is appropriate because the dependent variable is dichotomous. The model used is specified as follows:

$$\text{Ln}\ (1-PP) = \beta 0+\beta 1X1+\beta 2X2+\beta 3X3+\beta 4X4+\varepsilon \quad (1)$$

Where:

P = probability of occupational transformation

β_0 = constant

$\beta_1, \beta_2, \beta_3, \beta_4$ = regression coefficients

X_1, X_2, X_3, X_4 = independent variables

ε = error term

Result and Discussion

The descriptive analysis uncovers a varied range of characteristics among respondents that reflect the fisher population in Sanur. The age distribution shows that the majority of respondents are within the working-age group, with an average age of 45.3 years (SD = 11.7). This trend is indicative of the demographic composition of fishing communities, which are often comprised of middle-aged individuals; this is in line with existing literature highlighting that fishing careers require a build-up of experience and skills over time. Regarding educational background, 35% of respondents attended primary school, 28% junior high school, 32% senior high school, and 5% pursued higher education. This distribution points to a relatively low level of educational achievement, which is a typical characteristic of traditional fishing communities in Indonesia. These results are consistent with the findings of Allison & Ellis (2001), who noted that educational levels in traditional fishing communities tend to be low.

Prior to interpreting the logistic regression results, several diagnostic tests were conducted to ensure the model's validity. Linearity Test:

The Box-Tidwell test shows that the logit transformation of the dependent variable and continuous variables have a linear connection ($p > 0.05$ for all variables).

Multicollinearity Test: The education variable had the highest value of 2.34, while all independent variables had Variance Inflation Factor (VIF) values below 5. This suggests that the model does not seriously address multicollinearity.

Outlier Test: Three observations had residual values higher than 2.5, according to standardized residual analysis. These observations were kept, nonetheless, as additional analysis revealed that their impact on model estimations was negligible.

Table 2. Results of the Logistic Regression Model Estimation

Variable	Coeffisient (β)	Std. Error	Wald Chi-Square	p-value	Odds Ratio	95% CI
Constant	2.145	1.234	3.024	0.082	8.538	-
Age	-0.045	0.019	5.521	0.021**	0.956	[0.922, 0.992]
Education	1.273	0.452	7.946	0.005**	3.571	[1.472, 8.667]
Income	0.000021	0.000013	2.538	0.112	1.000	[0.999, 1.000]
Tourism Asset Ownership	1.854	0.487	14.529	0.000***	6.386	[2.460, 16.582]
Household size	0.213	0.148	2.072	0.152	1.238	[0.927, 1.653]
Tourism Exposure	0.072	0.033	4.679	0.031*	1.075	[1.007, 1.147]

Note: *p < 0.05; **p < 0.01; ***p < 0.001

Goodness of Fit Model:

-2 Log Likelihood: 128.456

Cox & Snell R^2: 0.387

Nagelkerke R^2: 0.518

Hosmer-Lemeshow Test: $\chi^2 = 6.234$, p = 0.62

Age and Occupational Transformation among Fishers

The research findings captured that age influenced negatively and significantly the likelihood of fishermen in the Sanur coastal area tranforming to non-fishing occupations. The negative regression coefficient value indicated that the increasing age tends to decrease fishermen's chances of shifting from the traditional fishing sector to non-fishing jobs. This finding demonstrated that demographic factors, particularly age, played a significant role in shaping fishermen's ability to adapt to changes in the coastal economic structure influenced by tourism development.

This finding aligns with numerous empirical studies in the past five years that assert younger fishermen have a greater tendency to conduct livelihood diversification and job transformation. Studies in coastal regions of China portrayed that younger age groups were more responsive to new economic opportunities because they had higher flexibility and willingness to learn (Ma et al., 2022). Demographic characteristics play an important role in shaping the adaptive capacity of small-scale fishers in responding to livelihood changes. Evidence from coastal communities in South-Eastern Bangladesh shows that older fishers face greater difficulties in adopting new livelihood strategies due to declining physical capacity, limited skills diversification, and lower access to alternative employment opportunities. These constraints reduce their ability to respond effectively to environmental and economic pressures, thereby limiting occupational mobility and slowing livelihood adaptation processes within fishing households (Alam et al., 2021).

Similar results were reported by Sultana and Thompson (2007), who discovered that younger generations of fishermen were more likely to transition to the service sector and non-fishing economic activities compared to the older generations. In addition, Dar et all., (2024) assert that older age often presents a barrier to accessing new training, technology, and job opportunities in coastal regions, thereby slowing down the job transformation process. On the whole, these findings strengthen the findings of this research that age structure is a key factor in the fishermen's job transformation process. Therefore, coastal economic development policies need to consider a more inclusive approach for older fishermen, such as adaptive training programs and job transition schemes that are suitable for their capabilities.

Education and Occupational Transformation among Fishers

The analysis results indicated that education level positively and significantly influenced the likelihood of fishermen's job transformation in the coastal area of Sanur. The positive

regression coefficient value and an odds ratio of 3.571 indicated that fishermen with a high school education or higher had more than three times opportunities to switch to non-fishing jobs compared to fishermen with only a primary education. This finding demonstrated that education served as a structural factor that strengthened the fishermen capacity to respond to the changing dynamics of the coastal economy, which was increasingly influenced by the development of the tourism sector.

This research finding is consistent with a number of empirical findings over the past five years, which affirm that education enhances the adaptability and labor mobility of coastal communities. Studies in coastal communities in Bangladesh showed that individuals with higher levels of education have more tendency to conduct job adaptation and livelihood diversification outside the traditional fishing sector (Deb & Aque, 2016). Educational attainment plays a critical role in facilitating occupational transitions within coastal communities by enhancing access to non-fisheries employment opportunities. Empirical evidence shows that higher levels of human capital significantly increase the likelihood of livelihood diversification and occupational mobility among fishing households (Cinner et al., 2018; Roscher et al., 2022). These findings suggest that education functions as a key enabling factor in reducing dependence on capture fisheries and supporting structural transformation in coastal economies.

Moreover, Sarker et al. (2023) reported that education strengthened the adaptive capacity of coastal communities in the face of economic pressures and environmental risks, enabling them to pursue more stable alternative economic opportunities. Similar findings were delivered by Dar et all (2023), who confirmed that education level was a key factor in improving fishermen's access to training, skills development, and non-fishing employment opportunities in coastal areas of Vietnam. Overall, these findings support the results of this study that education was an important determinant in the process of fishermen's occupational transformation, as it increased flexibility, broadened livelihood options, and strengthened the economic resilience of the coastal community in Sanur.

Ownership of Tourism Assets and Occupational Transformation among Fishers

The research results indicated that the ownership of tourism-related assets positively influenced and became the most significant factor in the likelihood of fishermen's job transformation in the coastal area of Sanur. The high regression coefficient value and the odds ratio of 6.386 indicated that fishermen who owned tourism assets—such as homestays, tourist boats, or other tourism-related businesses—were more than six times more likely to switch to non-fishing jobs compared to fishermen who did not own such assets. This finding portrayed that tourism assets served as both economic and strategic capital, strengthening the fishermen’s ability to enter new economic sectors outside of traditional fishing.

This finding is in line with various empirical studies in the past five years that confirm the importance of owning productive assets in driving livelihood diversification for coastal communities. Research in Indonesia showed that access to and control over tourism assets played an important role in increasing adaptive capacity and the success of livelihood transitions in coastal communities (Suradja et al., 2024). Another study also found that the utilization of tourism-based physical assets significantly strengthened the ability of coastal households to develop more stable alternative income sources (Allison & Ellis et al., 2001).

In addition, research in other coastal areas indicates that communities with greater access to tourism assets and resources tend to be able to diversify their livelihoods more quickly and effectively. Kimbu et al. (2022) emphasized that the ownership and control of tourism assets increased the opportunities for local community involvement in the service and tourism sectors, while Masri et al. (2024) showed that community physical resources and material assets were determining factors for successful livelihood transformation in developing coastal destinations. Overall, these findings reinforce the results of this study that ownership of tourism assets is a key determinant in the fishermen's occupation transformation process.

The policy implications of these findings suggest that coastal economic development programs need to be focused on improving fishermen's access to ownership of tourism assets, through capital support, facilitation of asset ownership or management rights, and business management training. The approach is important to promote the more inclusive and sustainable job transformation for the coastal community of Sanur.

Tourism Exposure and Occupational Transformation among Fishers

The findings indicate that exposure to tourism has a positive and significant effect on the probability of occupational transformation among fishers ($\beta = 0.072$, $p < 0.05$). An odds ratio of 1.075 suggests that each additional hour of exposure to tourism activities per week increases the likelihood of occupational transformation by 7.5%. This underscores that the intensity of fishers' interactions with tourism activities—whether through engagement with tourists, tourism operators, or coastal economic activities—enhances their orientation toward non-fisheries occupations.

Theoretically, this finding is in line with the Tourism-Led Livelihood Diversification Framework, which posits that exposure to tourism fosters new economic aspirations, expands local knowledge, and opens up access to alternative livelihood opportunities (Kimbu et al., 2022). Increased exposure enables fishers to learn about tourism service standards, business opportunities, and market dynamics, ultimately strengthening their likelihood of occupational transition.

Studies in coastal Vietnam demonstrate that exposure to tourism plays an important role in accelerating livelihood diversification by improving market literacy and expanding social networks (Dinh et all., 2024). Research in Indonesia by Allison & Ellis et al., (2021) similarly found that frequent interactions between coastal communities and the tourism sector increase the probability of transitioning from natural resource–based occupations to service-based livelihoods. In addition, Masri et al. (2024) observed that tourism exposure enhances "livelihood opportunities" by improving service, communication, and entrepreneurial skills. Taken together, these insights suggest that tourism exposure not only provides observational learning but also serves as a source of social and cognitive capital that enables adaptive occupational transformation among fishers. Policy implications include the need to expand fishers' direct engagement in tourism activities through destination-based training, business partnerships, and coastal tourism incubation programs.

Conclusion

This study successfully identifies and analyzes the determinants influencing occupational transformation among traditional fishers in Sanur's coastal area in relation to coastal economic sustainability. The key conclusions are as follows:

Age is a significant factor with a negative effect on the likelihood of occupational transformation. Younger fishers are more inclined to shift into tourism-related occupations, reflecting their higher adaptability and flexibility.

Education has a positive and significant effect on occupational transformation. Fishers with at least senior high school education have 3.57 times higher odds of transitioning, underscoring the importance of human capital in structural livelihood change.

Ownership of tourism assets is the most influential determinant, with an odds ratio of 6.39. This emphasizes the importance of access to capital in facilitating entrepreneurial engagement in the tourism sector.

Tourism exposure positively and significantly affects occupational transformation, highlighting the role of social learning and network effects in shaping livelihood transitions.

This study employs a cross-sectional design, so it is not yet able to capture the dynamics of fishermen's job transformation over time on a continuous basis. Moreover, the research focus which is limited to the Sanur coastal area—which has relatively advanced tourism characteristics—means that the results of this study cannot yet be fully generalized to other

coastal regions with different conditions. This research also relies on respondent perception-based data, which potentially contains subjectivity bias.

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