

Sustainability Analysis of the Creative Economy of Weaved Crafts: A Monte Carlo Model

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Abstract: The majority of individuals residing in Tigawasa Village, located in the Banjar District of Buleleng Regency in Bali, have been engaging in the traditional craft of bamboo weaving for many generations. This pastime is commonly practiced in nearly all households, engaging the majority of family members. It is crucial to conserve and enhance the village's significant capacity to make high-quality woven goods in order to maximize the community's welfare. This study investigates the assessment of the sustainability of the creative economy of woven bamboo crafts across various dimensions, including economic, social, environmental, institutional, and behavioral aspects. The research used Multi-Dimensional Scaling and Monte Carlo analysis, which are incorporated into the Rappfish software update. The investigation reveals that the sustainability index for the dimensions of economic, social, environmental, and entrepreneurial behavior falls within the moderate group. However, the softness factor is classified as less sustainable. To enhance the sustainability index of the creative economy of bamboo-woven crafts in Tigawasa Village, it is necessary to implement interventions that leverage factors in each dimension.

Keywords: Bali crafting, Traditional craft, Creative economy, Sustainability

INTRODUCTION

An economic era known as the creative economy, propelled by the industrial sector known as the creative industry, began to emerge in the 1990s as developed nations realized they could no longer rely solely on dominance in the industrial sector and instead needed to rely more on creative human resources (Azizah & Muhfiatun, 2018; Sari, 2013; Wahyuningsih & Satriani, 2019). Depending on their current capacities, nations grow their creative economic competences in different ways. This creative industry can grow in a number of ways, including by concentrating more on sectors such as (1) creative and cultural business fields (creative cultural industry); (2) creative business fields (creative industry); or (3) intellectual property rights like copyright (copyright industry) (Rongiyati, 2017; Setiansyah et al., 2021). The creative industries have a tremendously important part in Indonesia's economy. The creative economy's gross domestic product (GDP) was IDR 922.59 trillion in 2016. The GDP is expected to surpass IDR 1,000 trillion in 2017 and reach IDR 1,105 trillion in 2018.

The GDP of the creative economy sector increased between 2010 and 2017, there is a good trend in its contribution to the national economy (Setiansyah et al., 2021). The GDP of the creative economy and its contribution grew from IDR 526 trillion in 2010 to IDR 989 trillion in 2017 (Awalia et al., 2018). According to estimates, there was a positive trend in the nominal ADHB GDP for the creative

economy between 2018 and 2020. On the other hand, the GDP growth of ADHK in 2020 increased by -2.39 percent. The creative economy made the largest contribution to GDP through the food, fashion and handicraft industry subsectors of 75% in 2018, 2019 and 2020. Annually, the creative economy's total GDP is contributed by the culinary subsector on average by 42%, the fashion subsector by 18%, and the crafts subsector by 15%. According to the data, Indonesia has the capacity to grow a creative economy in each of these three subsectors.

The creative economy cannot exist without the creative industries. The government of Indonesia understands that the creative economy is the key to the country's economic growth and competitiveness in the global marketplace (Hidayat & Asmara, 2017). It emphasizes the production of goods and services using knowledge, skills, and originality as intellectual property (Mulyana & Sutapa, 2015; Sari, 2013). Human civilization has entered a previously unimaginable new realm of social interaction as a result of the transition from the agricultural era to the industrialization era, which was followed by the information age. These events were also marked by numerous new discoveries in the fields of information and communication technology and economic globalization. Cheaper and more efficient work, manufacturing, and distribution patterns have been produced by industrialization (Kurniawan & Aruan, 2021). Human productivity has increased due to the interconnectivity of new Information technological discoveries like the internet, email, SMS, and the Global System for Mobile Communications (GSM). People's personalities, lifestyles, and behaviors have changed as a result of globalization in the media and entertainment industries. People are now more taste-sensitive and critical of others, and the market has grown larger and more international (Adha et al., 2020; Kurniawan & Aruan, 2021).

The President has mandated the development of the creative economy for education units, business actors, creative communities, and communication media, as stated in Presidential Regulation of the Republic of Indonesia No. 142 of 2018 concerning the National Creative Economy Development Master Plan for 2018–2025. Every regional head in Indonesia, including Bali Province, has a duty to grow the creative economy based on their respective capacities. Bali's primary issue is that it depends too much on the tourism industry, making it susceptible to shocks (Rustini et al., 2022). Thus, in addition to promoting tourism, it may also help MSMEs and handicrafts into the export market. One of the initiatives to promote sustained economic competitiveness in the framework of the creative economy is the creation of creative cities (Irwansyah et al., 2023). The primary engine of the creative economy is creativity. Creativity must be fostered in a concept that allows the creative community to flourish. According to Putra and Astawa (2022), the creative economy is a fourth-wave economy focused on creativity, culture, cultural heritage, and the environment. The creative economy exemplifies innovative, sustainable economic growth.

The goal of sustainable development is to construct the world on the tenets of equality and sustainability in the social, economic, and environmental spheres (Griggs et al., 2013). Since sustainability is not a straightforward idea but rather a complicated one, there will be a lot of room for interpretation and variation (Pancawati, 2021). As the cornerstone of the development paradigm, sustainable development is evolving through the establishment of pillars based on development

typologies. Applications, game developers, music, architecture, visual communication design, fashion, crafts, culinary, interior design, product design, photography, advertising, publishing, performing arts, fine arts, television, and radio are just a few of the 17 different sub-sectors that make up the creative economy, according to the Ministry of Tourism and Creative Economy. Based on business fields, these seventeen sub-sectors are integrated with their parent economic sectors.

The creative economy in Buleleng Regency has the potential to thrive, particularly through the expansion of bamboo weaving in Tigawasa Village. Tigawasa, a traditional village located in the mountainous region of Banjar District, Buleleng Regency in North Bali, is known for its Baliaga culture. This village is widely recognized as a center for the production of bamboo products crafted through the art of weaving. Approximately 90% of the population are employed in the bamboo weaving industry, as indicated by data provided by the village head and stored in the village office. The inhabitants of Tigawasa village depend on the harvest from the bamboo plantation for their sustenance. The residents of Tigawasa village benefit financially from the substantial quantities of bamboo stalks generated by the village's bamboo forest. The predominant inhabitants of Tigawasa hamlet are artisans specializing in bamboo weaving, as well as cultivators of coffee, cocoa, and cloves. They engage in bamboo craftsmanship to support their economy throughout their busy agricultural routines, leisure time, and periods of waiting for the harvest, particularly for those who are only working in plantations. Initially, the main product of the woven bamboo crafts made by the Tigawasa villagers was *Gedeg Sokasi*, which is a square basket with a lid.

Bamboo weaving is an enduring enterprise, with some artisans regarding it as a uniquely cultural product of Tigawasa Village. This village takes pride in having the finest bamboo (reed) due to the generous contributions it receives. To optimize its direct impact on the community, it is crucial to sustain and enhance Tigawasa Village's creative economy centered around woven bamboo. It provides unique products and a wide range of cultural experiences (Sari et al., 2022). Conducting research is necessary in order to create a sustainability index for the creative economy of woven bamboo crafts. Researchers have mapped the sustainable features of the creative economy, taking into account the characteristics of the field (Azizah & Muhfiatun, 2018; Ibrahim et al., 2013; Irwansyah et al., 2023; Sururi, 2017). In order to determine the optimal strategy for sustaining and promoting bamboo weaving as a superior creative economic enterprise and as a unique characteristic of Tigawasa Village's bamboo woven products, it is essential to assess the sustainability of the bamboo woven creative economy and analyze the influential factors in each aspect.

Businesses in the creative industry use the sustainability index in accordance with general sustainable thinking. The creative economy incorporates the following dimensions: institutional, behavioral, social, environmental, and economic (Edwarsyah & Safrina, 2017; Muttaqin et al., 2023; Nurmalina, 2016; Sururi, 2017). The creative economy has the potential to incentivize commercial entities to promote their goods worldwide and enhance the competitiveness of domestic products in global marketplaces (Dian et al., 2021; Nindiani et al., 2022). The potential as a natural resource of woven bamboo in Tigawasa Village, Banjar

District, Buleleng Regency, Bali, can potentially be advantageous, particularly for the local economy. Through the creation of new jobs, raising people's incomes, lowering rates of poverty, changing consumer behavior, fortifying community ties, and promoting the growth of other industries, the creative economy of woven bamboo crafts can have an effect on the economy.

The analysis of the sustainability of the creative economy, especially bamboo crafts, has not received much attention from researchers. The results of the study Irwansyah et al. (2023) which explain the factors that affect the sustainability of bamboo crafts have not yet revealed their sustainability status. The results of this analysis of the sustainability of the creative economy will provide an overview of the sustainability status of bamboo crafts as seen based on economic, social, environmental, institutional and entrepreneurial behavior dimensions. Sustainability status is an important thing that can be guaranteed consideration in the development of the creative economy, especially bamboo crafts.

The purpose of this study is to evaluate the creative economy of bamboo-woven crafts in terms of sustainability. Aside from that, the sustainability of the bamboo-woven craft industry's creative economy depends on an analysis of the leverage factors in the institutional, behavioral, social, economic, and environmental domains. The study's conclusions offer suggestions for achieving the creative economy's sustainability as a pre-emptive and strategic move to uphold and advance sustainability. Lever attribute intervention measures are required to raise the sustainability index in the bamboo-woven crafts creative economy.

METHODS

Research Design

This study is quantitative and employs continuous analysis together with institutional, behavioral, social, environmental, and economic components (Fonseca, 2020). Documentation techniques, interviews, and questionnaires were used to obtain research data. The multi-dimensional scaling method combined with Monte Carlo analysis was the data analysis technique employed in the study. A study on the innovative economic uses of woven bamboo crafts was carried out in Tigawasa Village. Bamboo crafts from Tigawasa Village are an integral component of the community's culture and should be preserved. In Tigawasa Village, weaving is the primary source of income for the majority of the population. Because bamboo plants are of excellent quality, weaving with them can be a source of money for the community and ought to be encouraged.

Data Collection

Sustainable variables or indicators, which encompass environmental, economic, social, institutional, and entrepreneurial behavioral components, can be determined through literature reviews and expert conversations (in-depth interviews). The results of earlier studies on the sustainable evaluation framework are also the basis for determining sustainable indicators (Singh et al., 2009). Using purposive sampling, we specifically chose respondents who were authorities in the study's field. Expert respondents are chosen according to their level of knowledge in the

study's topic. The following factors were taken into account when choosing the expert respondents: (1) Possess appropriate experience in the field of study, (2) Be well-known, in a field of study, or possess a certain standing, and (3) Be highly credible, eager, and/or physically present at the study site.

Eight experts were involved based on the criteria above including: the Banjar District Government; the Tigawasa Village Government; the Bamboo Woven Craftsmen Group in Tigawasa Village; the Buleleng Regency Trade, Industry, Cooperatives, and SMEs Service; the Buleleng Regency Tourism; the Buleleng Regency Culture Service; and the art shop collector of Tigawasa Village bamboo woven crafts. Furthermore. The determination of attributes on each environmental, economic, social and institutional, and behavioral dimension is based on a score that reflects the sustainability conditions of the dimensions studied. The score range is determined based on criteria that can be found from the results of field observations and secondary flats. The score range ranges from 1-4 depending on the circumstances of each attribute which is interpreted ranging from not good to very good. Bad grades reflect the most unfavorable conditions for creative economy craftsmen of bamboo woven crafts in a sustainable manner, on the contrary, very good grades reflect the most favorable conditions. The score value of each attribute is analyzed in a multi-dimensional manner to determine the position of the sustainability of the craftsman's business relative to two reference points, namely the good point and the bad point. Table 1 shows that the sustainability assessment indicators are arranged in 5 dimensions (economic, environmental, social, institutional and behavioral) each of which has a value rating as the basis for the sustainability assessment framework for creative economy.

Table 1. Sustainability Assessment Indicators

No	Dimension	Indicators
1	Economy	unemployment rate; business and job opportunities; business partnerships; local economic independence; level of knowledge and skills; business at the managerial or management level; economic accessibility; economic institutions; degree of welfare in the community; degree of income in the community
2	Social	population, economic resources, patterns of community interactions, indigenous knowledge, conflict, educational resources, social resources; degree of community involvement
3	Environment	bamboo vegetation; conservation; land conversion rate; water availability; soil fertility; soil quality
4	Institutional	management; program existence; community institutions; planning for natural resource management; institutional completeness; completeness of regulations
5	Entrepreneurial Behavior	self-assurance; uniqueness; collaborations; product excellence; product diversity; and product innovation

Procedure Analysis

The Multi-Dimensional Scaling (MDS) approach (Kavanagh & Pitcher, 2004; Madyaratry et al., 2020; Suharno et al., 2019) and Monte Carlo analysis (Baró et al., 1995; Suharno et al., 2019), which is integrated in the Rapfish software modification,

were used to analyze the sustainability of creative economy craftsmen's businesses. The following phases are included in data analysis steps. First, selecting sustainability metrics through interpretive qualitative analysis in collaboration with stakeholders. Second, conduct sustainability evaluations using metrics derived from field research, literature reviews, and conversations with creative economy artisans. Third, sustainability analysis, which is integrated into the Rapfish software modification to become RAP-UEK (creative economic enterprise), using the Multi-Dimensional Scaling (MDS) method and Monte Carlo analysis (Ibrahim et al., 2013).

Based on a table of distances between objects, researchers can use MDS to create a "map" that illustrates the link between several things (Hidayanto et al., 2016). In order to illustrate the dependability of the analysis, Monte Carlo simulations provide a glimpse of the variability of the evaluations that are performed (Baró et al., 1995; Lee et al., 2019). Table 2 displays the sustainability index scale for enterprises owned by artisans in the creative industry. The impact of random error on determining the sustainability value of bamboo craftsmen's enterprises was evaluated using Monte Carlo analysis.

Table 2. Business Sustainability Index for Bamboo Woven Creative Economy Craftsmen

No	Index	Category	Sustainability Status
1	00.00–25.00	Not Good	Not Sustainable
2	25.01–50.00	Less	Less Sustainable
3	51.01–75.00	Sufficient	Sufficient Sustainable
4	75.01–100.00	Good	Sustainable

Source: Budiharsono (2005); Hardjomidjojo et al. (2016); Suharno et al. (2019)

Coordination analysis is carried out to determine the extent of the sustainability status for each dimension depicted in the kite diagram as seen in Figure 1.

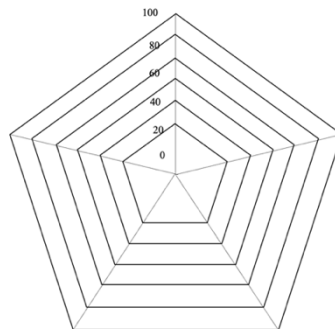


Figure 1. Kite Diagram for Sustainability Analysis of the Creative Economy of Woven Bamboo Crafts

RESULTS AND DISCUSSION

Economic Dimension of Sustainability

The following ten factors are included in the economic dimension in order to assess the sustainability of the bamboo woven crafts creative economy: (1) unemployment rate; (2) business and job opportunities; (3) business partnerships; (4) local economic independence; (5) level of knowledge and skills; (6) business at the

managerial or management level; (7) economic accessibility; (8) economic institutions; (9) degree of welfare in the community; and (10) degree of income in the community. The analysis's findings indicate that the bamboo craft creative economy sustainability index, which stands at 58.71 percent, falls into the quite sustainable group when considering the economic dimension. The analysis results are fairly satisfactory (<0.25), and the model that has been utilized is able to explain the condition by 94.8 percent, as indicated by the stress value of 0.141 and the R^2 value of 0.948 (see Table 3).

Table 3. Analysis of Index, Stress and R^2 on the Economic Dimension

	2D MDS Result		Rotated		& Flipped & Scaled	
Economic Sustainability	0.34	-0.01	0.248	0.233	58.71	8.72
Good	1.03	-1.07	1.483	-0.02	100.00	0.00
Bad	-1.08	1.05	-1.50	-0.02	0.00	0.00
Up	1.03	1.04	-0.01	1.465	50.01	50.00
Down	-1.08	-1.07	0.248	0.233	50.03	-50.00
Stress	0.14056		Iteration		Stress	Delta
Squared Correlation	0.94895		1		0.22156	9E+20
			2		0.22142	0.00014
Number of iteration	2					
Memory needed (words)	5622					
Return value (error if>0)	0					
Rotation angle (degrees)	-45.00332					

Source: MDS Output

In the economic dimension, the lever factors are the level of knowledge and skills and the managerial or business management level. In the future, stakeholders will need to intervene to improve the sustainability index. Figure 2 presents the complete results of the leverage analysis.

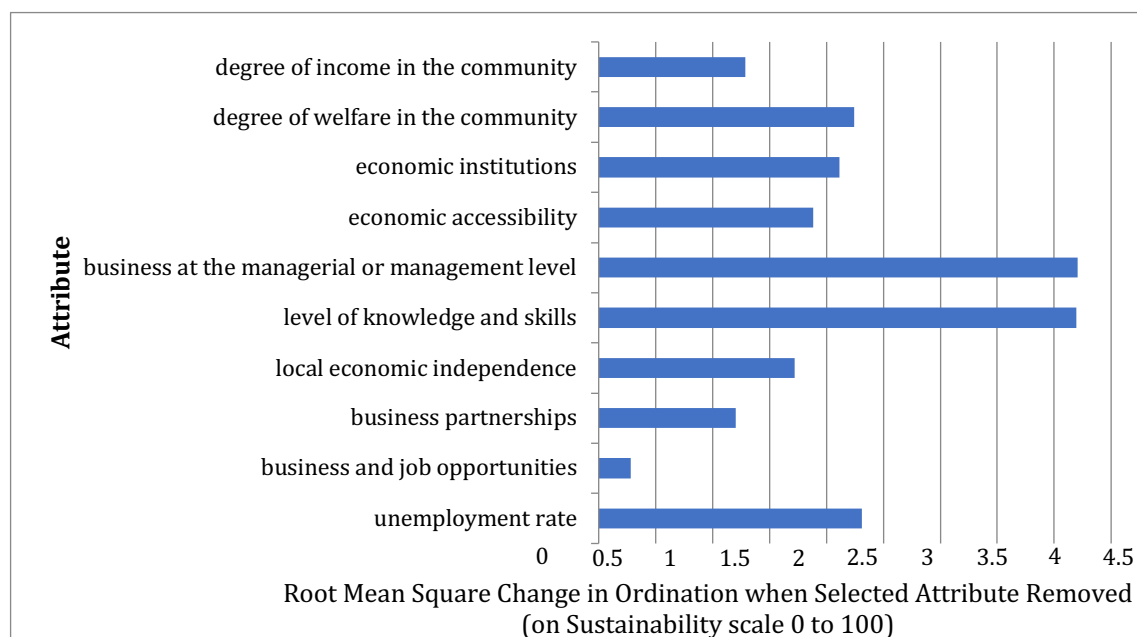


Figure 2. Results of Leverage Analysis in the Economic Dimension

In terms of the economic component, the knowledge and skill level, managerial qualities, and degree of business management are the most sensitive to the sustainability of the bamboo-woven creative economy. Enhancing the expertise and abilities of bamboo weavers is necessary to maintain the economic dimension's continuance. Addressing shortcomings in managerial and company management is also essential. Naturally, the productivity of artisans cannot be divorced from the economic component; consequently, these two characteristics will be crucial in raising the sustainability index of Tigawasa Village's bamboo-woven creative economy.

Social Dimension of Sustainability

Eight criteria are included in the economic dimension to assess the sustainability of the bamboo woven crafts creative economy: (1) population; (2) economic resources; (3) patterns of community interactions; (4) indigenous knowledge; (5) conflict; (6) educational resources; (7) social resources; and (8) degree of community involvement. The analysis's findings indicate that the bamboo craft creative economy sustainability score, which stands at 62.65 percent, falls into the quite sustainable category when considering the social dimension. With a stress value of 14.74 percent and an R² value of 0.944, the analysis results are fairly satisfactory (<0.25), and the model that was utilized can account for 94.4 percent of the situation. Table 4 and Figure 3 display the findings of the index, stress, and R² analyses.

Table 4. Analysis of Index, Stress and R² on the Social Dimension

	2D MDS Result		Rotated		& Flipped & Scaled	
Social Sustainability	0.35	0.53	0.491	-0.39	62.65	-9.49
Good	1.57	0.64	1.690	-0.12	100.00	0.00
Bad	-1.48	-0.35	-1.51	-0.12	0.00	1.78
Up	0.87	-1.00	0.523	1.216	63.62	50.00
Down	-0.84	1.38	-0.36	-1.57	35.89	-50.00
Stress	0.1475		Iteration		Stress	Delta
Squared Correlation	0.94362		1		0.29695	9E+20
			2		0.19785	0.0091
Number of iteration	3		3		0.19746	0.00039
Memory needed (words)	483800					
Return value (error if>0)	0					
Rotation angle (degrees)	17.99162					

In the social dimension, the lever factors are patterns of community relations, local wisdom, level of community participation, employment opportunities and population. This indicates that in the future, if the sustainability index needs to be improved, the factors of community relations patterns and local wisdom will need to be intervened by stakeholders. The complete results of the leverage analysis are presented in Figure 3.

The socially sensitive elements that determine the viability of the bamboo-woven creative economy include patterns of community relations and indigenous knowledge. The utility of bamboo weaving is significantly influenced by the pattern

of community interactions. Naturally, the strength of the weaving's uniqueness as a cultural legacy lies in its unity in diversity. The strength of the woven goods in Tigawasa village is the local knowledge, which the villagers rely on and trust. Throughout history, the precise beginning of bamboo weaving in Tigawasa village has been unknown. Everybody who currently dwells in the community said they discovered their parents had woven bamboo before, which they subsequently passed on to their kids and grandkids. Therefore, bamboo enterprises can strengthen linkages between communities (craftsmen) and emphasize local expertise as a feature of the bamboo crafts produced in order to boost the creative economy sustainability index.

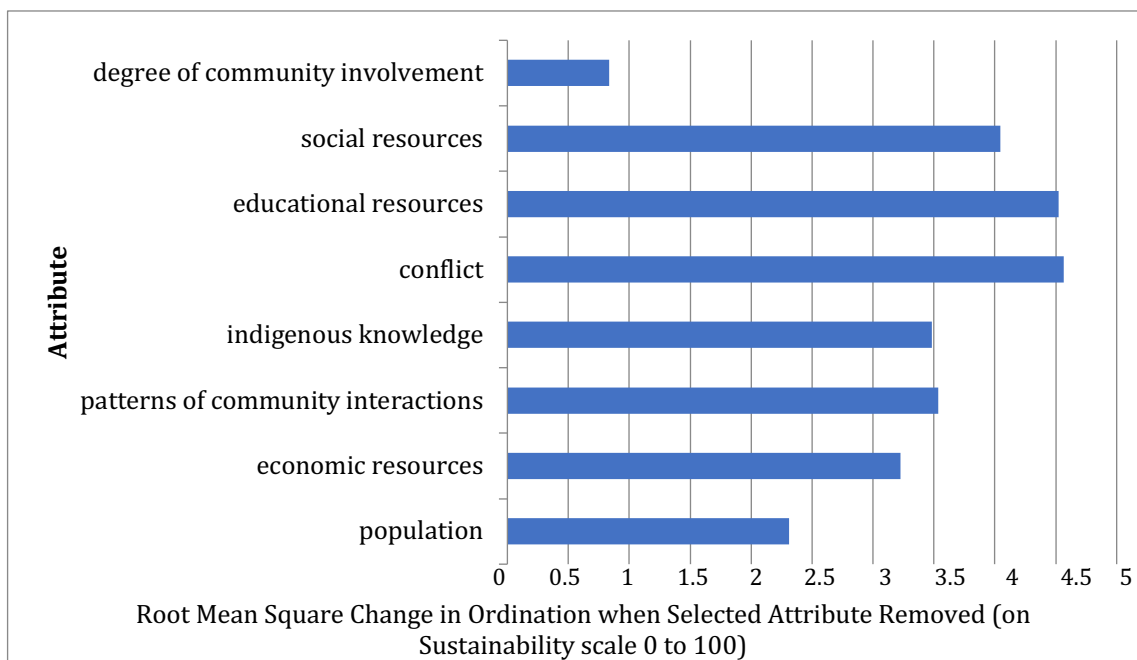


Figure 3. Results of Leverage Analysis on the Social Dimension

Environment Dimension of Sustainability

The creative economy of bamboo woven crafts, namely: (1) bamboo vegetation; (2) conservation; (3) land conversion rate; (4) water availability; (5) soil fertility; and (6) soil quality. The results of the analysis show that, based on the environmental dimension, the bamboo craft creative economy sustainability index of 63.16 percent is in the quite sustainable category. The stress value is 0.124 and the R^2 value is 0.967, indicating that the analysis results are quite good (<0.25) and that the model that has been used is able to explain the condition by 96.7 percent. The results of the index, stress, and R^2 analyses can be presented in Table 5.

The environmental sustainability of the bamboo-woven creative economy is mostly dependent on two factors: soil fertility and water availability. It is inevitable that the sustainability of bamboo as the primary material for woven crafts will be impacted by the continuous usage of land without any attempt to maintain the fertility of the land. We must take numerous steps to manage and fertilize the soil in order to keep it fertile for planting bamboo. However, the viability of the creative economy of bamboo-woven crafts in Tigawasa Village also depends critically on the availability of water. People currently rely on multiple springs that run via irrigation

canals erected across the town throughout the year to meet their daily requirements. But water flow decreases due to unpredictable climate change, particularly in the dry season. Land with enough water content will support the growth of bamboo plants with moist soil vegetation. It is imperative that stakeholders take action and address the delicate issue of water availability.

Table 5. Analysis of Index, Stress and R² on the Environment Dimension

	2D MDS Result		Rotated		& Flipped & Scaled	
Environmental Sustainability	-0.06	-0.15	0.075	-0.14	63.16	0.49
Good	-1.31	-0.32	1.340	-0.15	100.00	0.00
Bad	2.10	0.10	-2.09	-0.15	0.00	9.67
Up	-0.94	0.55	0.863	0.65	86.11	50.00
Down	1.68	-1.15	-1.52	-1.35	16.48	-50.00
Stress Squared Correlation	0.124955401		Iteration		Stress	Delta
	0.967364907		1		0.13207	9E+20
			2		0.11408	0.01799
Number of iteration	3		3		0.11341	0.00067
Memory needed (words)	4182					
Return value (error if>0)	0					
Rotation angle (degrees)	186.973846					

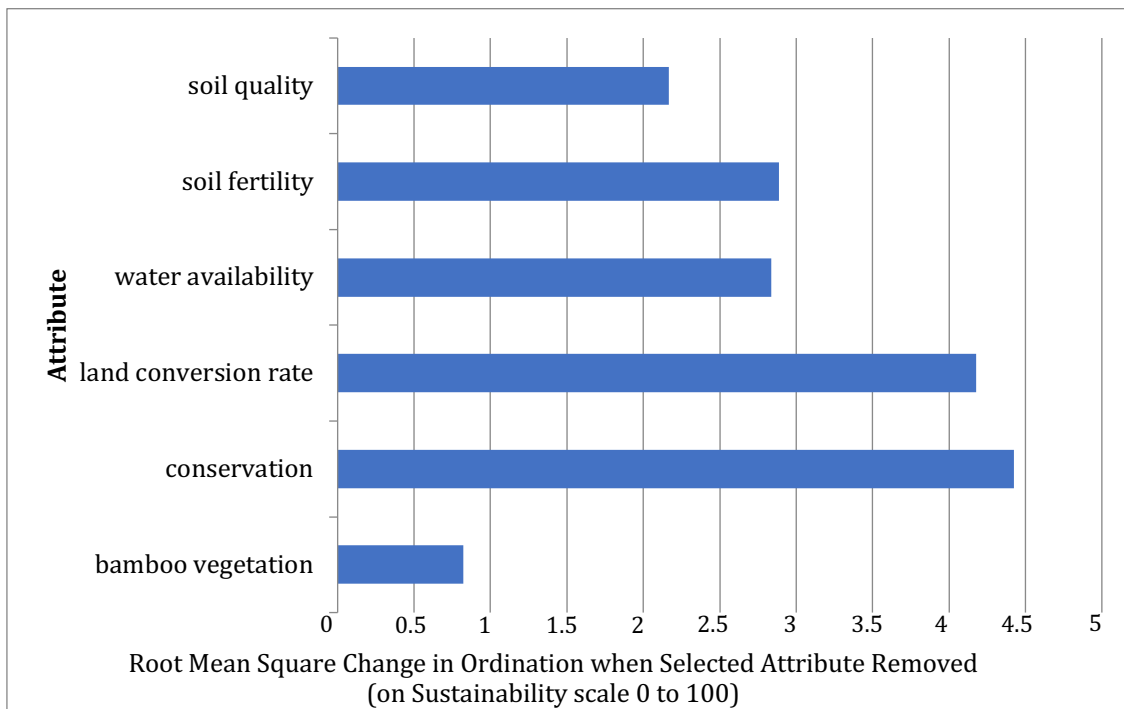


Figure 4. Results of Leverage Analysis on the Environmental Dimension

Institutional Dimension of Sustainability

Six criteria are used in the institutional dimension to assess the sustainability of the bamboo woven crafts creative economy. These criteria are: (1) management; (2) program existence; (3) community institutions; (4) planning for natural resource management; (5) institutional completeness; and (6) completeness of regulations. The analysis's findings indicate that the bamboo craft creative economy

sustainability index, which stands at 43.17 percent, falls into the less sustainable category when considering the institutional dimension. The analysis results are fairly satisfactory (<0.25), and the model that has been utilized is able to explain the condition by 96.2 percent, as indicated by the stress value of 0.124 and the R^2 value of 0.962. Table 6 displays the findings from the analysis of the index, stress, and R^2 .

Table 6. Analysis of Index, Stress and R^2 on Institutional Dimensions

	2D MDS Result		Rotated		& Flipped & Scaled	
Institutional Sustainability	0.62	-0.50	-0.54	-0.58	43.17	-22.21
Good	-1.34	-0.33	1.371	-0.14	100.00	0.00
Bad	2.01	0.11	-2.00	-0.14	0.00	8.21
Up	-0.97	0.54	0.893	0.662	85.83	50.00
Down	1.61	-1.08	-1.45	-1.27	16.31	-50.00
Stress	0.124039784		Iteration		Stress	Delta
Squared Correlation	0.962118566		1		0.13515	9E+20
			2		0.12008	0.01507
Number of iteration	3		3		0.11962	0.00046
Memory needed (words)	4182					
Return value (error if>0)	0					
Rotation angle (degrees)	187.494843					

In the institutional dimension, the lever factors are institutional completeness, completeness of regulations, management, community institutions and program existence. This indicates that in the future, if the sustainability index needs to be improved, then this factor needs to be intervened by stakeholders. The complete results of the leverage analysis are presented in Figure 5.

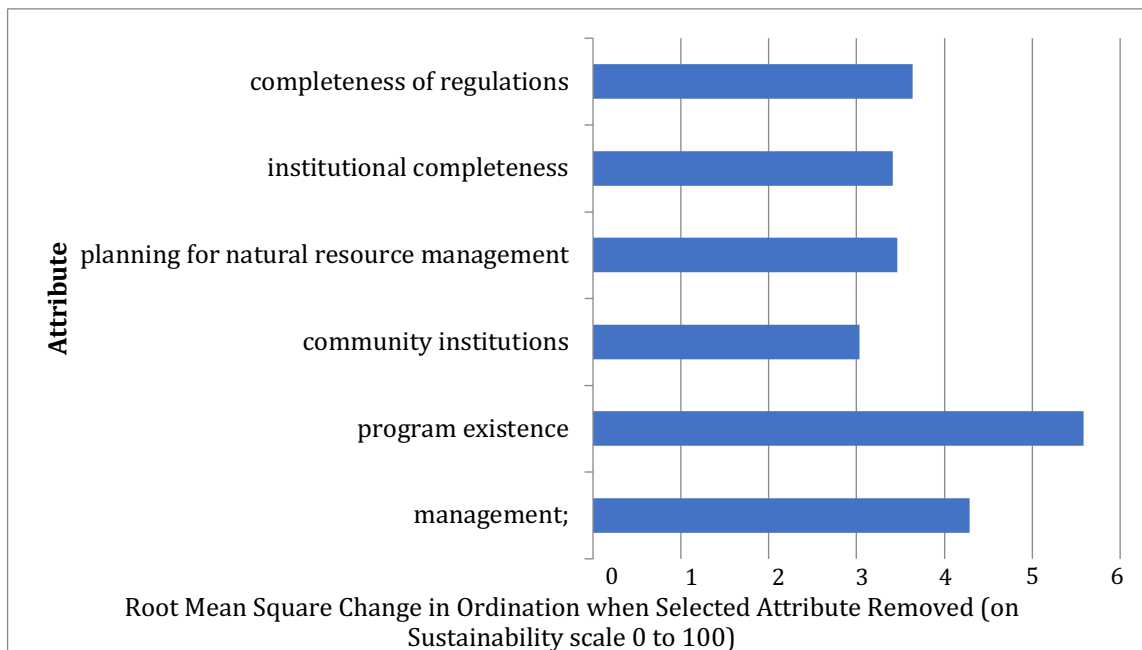


Figure 5. Results of Leverage Analysis on Institutional Dimensions

The most delicate component of the institutional dimension of the bamboo craft creative economy's sustainability is institutional completeness. In its early stages of development, craftspeople lack an institutional management platform for the business side of bamboo-woven crafts. This also becomes a problem when it becomes unable to carry out ordinary government-initiated tasks like counseling, training, and program support in an ideal manner. However, the marketing of handcrafted goods will also be influenced by the presence of institutions. A company that manages product marketing will see a significant increase in sales. The guarantee of economic continuity for artisans who weave bamboo will be one of the effects of the establishment of an institution. The organization turns into a formal platform for sharing the concept of bamboo crafts, making it extremely likely that sustainable commercial growth will be achieved.

Entrepreneurial Behaviour Dimension of Sustainability

Six criteria are used in the environmental component to assess the sustainability of the creative economy of bamboo-woven crafts: (1) self-assurance; (2) uniqueness; (3) collaborations; (4) product excellence; (5) product diversity; and (6) product innovation. The analysis's findings indicate that the bamboo craft creative economy sustainability index, which stands at 70.03 percent, falls into the quite sustainable group when considering the institutional dimension. The analysis results are fairly satisfactory (<0.25), and the model that has been utilized is able to explain the condition by 97.2 percent, as indicated by the stress value of 0.118 and the R² value of 0.972. Table 7 displays the findings from the analysis of the index, stress, and R².

Table 7. Analysis of Index, Stress and R² on Entrepreneurial Behavior Dimensions

	2D MDS Result		Rotated		& Flipped & Scaled	
Behavioral Sustainability	0.29	0.04	0.296	-0.01	70.03	7.25
Good	1.30	0.32	1.326	-0.15	100.00	0.00
Bad	-2.11	-0.11	-2.11	-0.15	0.00	9.95
Up	0.92	-0.55	0.841	0.660	85.89	50.00
Down	-1.69	1.17	-1.53	-1.37	16.84	-50.00
Stress	0.118280984		Iteration		Stress	Delta
Squared Correlation	0.972595215				1	0.11997
					2	0.10038
					3	0.09959
Number of iteration	3					0.00079
Memory needed (words)	4182					
Return value (error if>0)	0					
Rotation angle (degrees)	7.248330					

In the entrepreneurial behavior dimension, the lever factors are innovation, partnership and originality. This indicates that in the future, if the sustainability index needs to be improved, then this factor needs to be intervened by stakeholders. The most delicate characteristic of entrepreneurial activity when it comes to the long-term viability of bamboo craftsmen's creative economy is innovation. A product's ability to remain on the market will be impacted by intense competition that is becoming more ubiquitous. However, the range of goods that may be produced with bamboo will obviously be extremely constrained. Innovation is therefore required in the processing, manufacturing, packaging, marketing, and

distribution of products in order to be able to survive sustainably. The ever-widening market share can be reduced with a marketing plan that targets every market niche. To ensure that customers are happy with the product, innovations in the processing of bamboo as a fundamental material can be made. The complete results of the leverage analysis are presented in Figure 6.

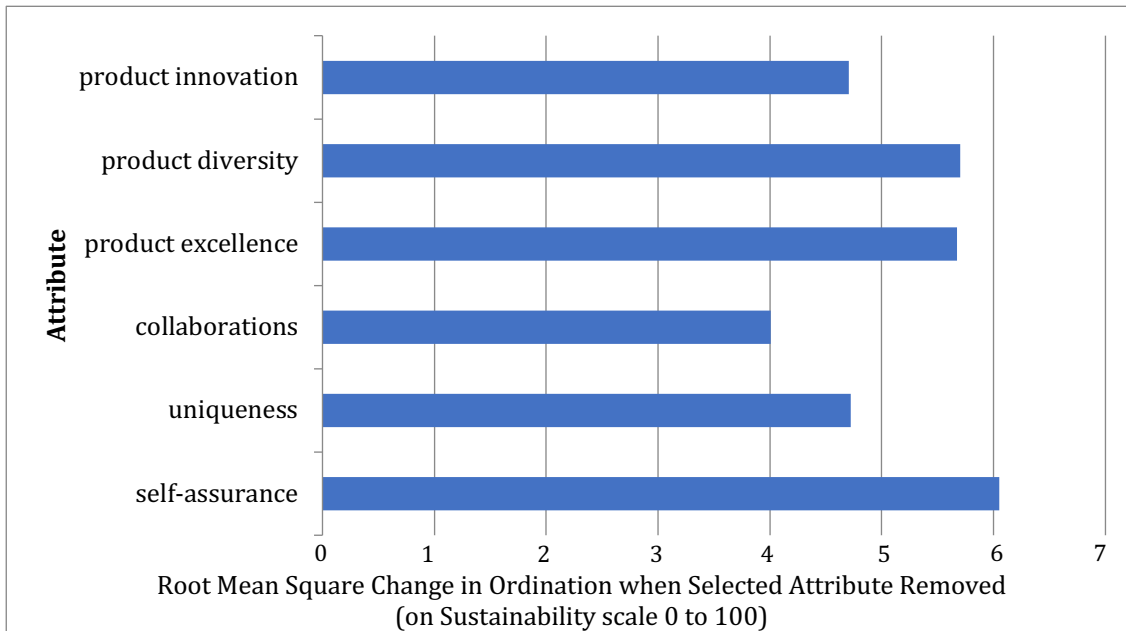


Figure 6. Results of Leverage Analysis on Institutional Dimensions

Monte Carlo Analysis

Monte Carlo analysis was carried out to test the uncertainty of the MDS analysis results. The results of the Monte Carlo analysis show that at the 95% confidence level each dimension does not have much difference (difference). The results of the MDS and Monte Carlo difference analysis are presented in Table 8.

Table 8. Calculation Results of the Difference in MDS and Monte Carlo Indexes

Sustainability Dimension	Sustainability Index		Margin
	MDS	Monte Carlo	
Economic	58.71	58.172	0.538
Social	62.65	61.475	1.175
Environment	63.16	62.788	0.372
Institutional	43.17	43.732	0.562
Entrepreneurial Behavior	70.03	68.659	1.371

The difference between the MDS and Monte Carlo sustainability indices is relatively small, showing that the analysis of the sustainability of the bamboo-woven creative economy in Tigawasa Village uses several of these attributes: 1) the error is relatively small in giving scores for each attribute, 2) the error is relatively low in variations in scoring due to differences in opinion, 3) MDS stability is high, 4) errors in entering data can be avoided, 5) high stress values can be avoided, 6) the proposed system has a high level of confidence, and this MDS method is quite good as a tool for analyzing the sustainability of the bamboo woven creative economy in Tigawasa Village (Figure 7).

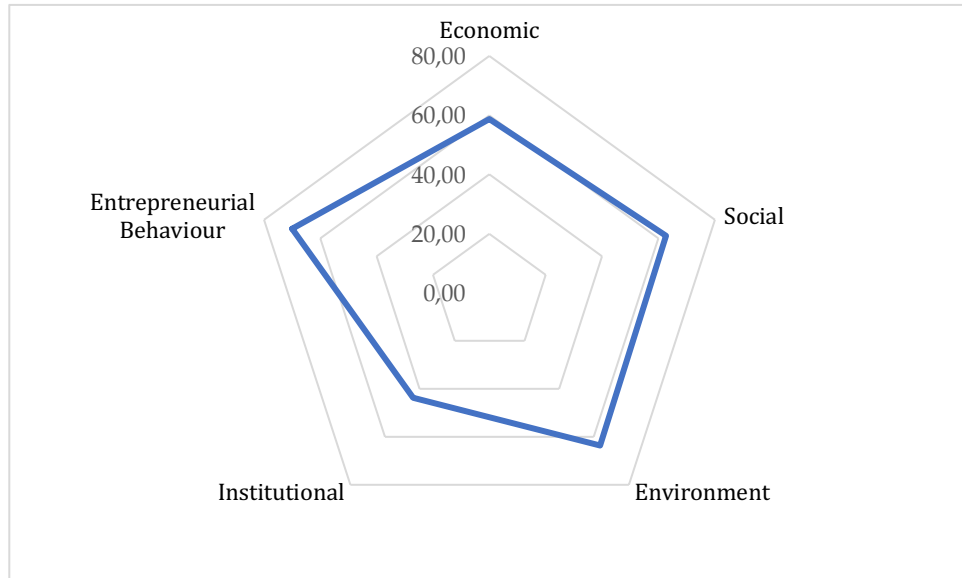


Figure 7. Kite Diagram for Sustainability Analysis of the Creative Economy of Woven Bamboo Crafts

CONCLUSION

The analysis results conclude that the creative economy of woven bamboo crafts in Tigawasa Village, Banjar District, Buleleng Regency is quite sustainable in terms of economic, social, environmental, and behavioral dimensions. Meanwhile, the institutional dimension is in the less sustainable index category. The sustainability of the creative economy of woven bamboo crafts is influenced by the level of knowledge and skills, as well as the managerial/business management level in the economic dimension. Leveraging factors in the social dimension for the sustainability of the creative economy of bamboo woven crafts are patterns of community relations, local wisdom, level of community participation, employment opportunities, and population. Leveraging factors in the environmental dimension for the sustainability of the creative economy of woven bamboo crafts are soil fertility, water availability, conservation, and land conversion rate. The leveraging factors in the institutional dimension for the sustainability of the creative economy of woven bamboo crafts include institutional completeness, completeness of regulations, effective management, community institutions, and the presence of programs. Leveraging factors in the entrepreneurial behavior dimension for the sustainability of the creative economy of woven bamboo crafts are innovation, partnership, and originality.

This research offers suggestions for the advancement of bamboo crafts, considering several factors such as institutions, behavior, society, environment, and economy. It emphasizes the government's role as a regulator, dynamisator, and facilitator. In the institutional realm, it is necessary to establish suitable rules to facilitate the development of the bamboo handicraft sector. These regulations should encompass quality standards, licensing procedures, and protection of intellectual property rights, in order to provide clear and supportive guidelines for the business. Furthermore, it is imperative to enhance the empowerment of local

communities by governmental assistance in establishing cooperatives or collaborative working groups for bamboo artisans. This would foster stronger cooperation, expand market access, and enhance economic sustainability.

Enhancing the education and training programs initiated by the government in the Behavior dimension can effectively enhance the technical and management expertise of bamboo craftsmen, so enabling them to manufacture superior quality goods. Furthermore, it is vital to advocate for the utilization of bamboo. An official initiative aimed at promoting public knowledge regarding the advantages of utilizing bamboo as an eco-friendly and renewable material has the potential to increase market demand. To address the social aspect, it is imperative to establish an Artisan Welfare Program that offers financial aid and healthcare services to bamboo artists, who frequently belong to marginalized areas. Enhancing community engagement in the growth of the bamboo handicraft business can be achieved by utilizing discussion forums, working groups, or partnership programs. This approach guarantees that the policies and programs implemented align with the specific requirements and goals of the local community.

In the environmental realm, it is imperative to enhance the management of natural resources by bolstering oversight of sustainable bamboo resource management, safeguarding bamboo forests, and ensuring that production practices do not cause harm to the environment. Consequently, by promoting Eco-Friendly Alternatives and receiving government assistance in technological development and innovation, the production of bamboo can become more efficient and environmentally friendly, thereby alleviating the strain on natural bamboo forests. Regarding the Economic dimension, the Government has the ability to enhance the availability of finance for bamboo craftsmen by implementing microloan programs or implementing specialized financing schemes specifically designed for creative enterprises. Moreover, it is imperative to ascertain and broaden potential markets for bamboo handicraft items by means of export marketing, engagement in trade exhibits, or the establishment of novel distribution channels that can augment artisan income and foster local economic progress. Realizing the sustainability of the creative economy is a strategic and preventive step to maintain and develop continuity. Intervention steps on lever attributes need to be taken to increase the sustainable index in the creative economy of bamboo-woven crafts.

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