



DEVELOPING THE YIN–YANG ADAPTIVE SOCIAL INNOVATION FRAMEWORK: INTEGRATING CULTURAL PRESERVATION AND DIGITAL TRANSFORMATION FOR SUSTAINABLE RURAL ENTREPRENEURSHIP

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Abstract

Purpose: Despite growing research on social innovation, existing studies largely examine entrepreneurial motivation, cultural preservation, and technology integration as independent factors, providing limited understanding of how these dimensions jointly foster sustainable rural entrepreneurship. This study addresses this gap by proposing the Yin–Yang Adaptive Social Innovation Framework, which adapts the complementary logic of the Yin–Yang concept to explain the dynamic interaction between cultural preservation and technology integration in community-based social innovation.

Design/methodology/approach: An explanatory Quantitative data from 231 active *Karang Taruna* members engaged in rural micro-enterprises were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM)

Findings: Necessity-driven motivation significantly strengthened cultural preservation and promoted social innovation, whereas opportunity-driven motivation positively influenced social innovation but had no significant effect on technology integration. Technology integration showed a significant negative effect on social innovation, indicating that digital transformation alone cannot ensure sustainable community innovation without alignment with local cultural values.

Originality: This study extends Transformative Social Innovation Theory by introducing the Yin–Yang Adaptive Social Innovation Framework as an integrative mechanism linking cultural preservation and technological transformation. It also provides empirical evidence from Indonesia's *Karang Taruna*, offering theoretical and practical insights for strengthening rural micro-enterprises and advancing the Sustainable Development Goals (SDGs).

Keywords: Social Innovation; Cultural Preservation; Technology Integration; Youth Entrepreneurship; Rural Micro-enterprises

**INTRODUCTION**

Social innovation has become an important strategy for addressing socio-economic challenges while promoting sustainable rural development. Unlike conventional innovation, social innovation emphasizes community participation, collaboration, and the mobilization of local resources to generate sustainable social and economic value (Goldstein et al., 2010; Avelino et al., 2019; Pel et al., 2020). Youth organizations play a strategic role in this process by strengthening local economies, reducing unemployment, and encouraging community resilience through entrepreneurship (Barnett & Brennan, 2006; Hollingshead, 2010; Lez'Er et al., 2019). Indonesia presents a significant opportunity to promote youth-led social innovation through its demographic bonus, with approximately 196.13 million productive-age citizens in 2025 and a dependency ratio of 44.33% (BPS, 2024). This demographic advantage can accelerate sustainable economic development if young people are equipped with entrepreneurial capabilities and supported as agents of social change (Hendratno et al., 2016;

Triansyah et al., 2023).

Entrepreneurial motivation has been widely recognized as an important driver of business creation and community development. Previous studies distinguish entrepreneurial motivation into necessity-driven and opportunity-driven entrepreneurship, with opportunity-driven entrepreneurs generally demonstrating stronger innovation capability and long-term business performance (Langevang et al., 2012; Baron et al., 2013; EIJDENBERG & MASUREL, 2013; Ephrem et al., 2021). Besides entrepreneurial motivation, technology integration improves business competitiveness and market access, whereas cultural preservation strengthens local identity and heritage-based entrepreneurship (Fernandez-Jardon et al., 2020; Fischer et al., 2021; Achille & Fiorillo, 2022). These findings indicate that entrepreneurial motivation, technology integration, and cultural preservation are important elements for sustainable community development.

However, existing studies remain fragmented. Most research investigates entrepreneurial motivation, technology integration, cultural preservation, or social innovation separately, providing limited understanding of how these factors interact within community-based entrepreneurship (Goldstein et al., 2010; Monroe-White & Zook, 2018). Moreover, technology adoption is often associated with high implementation costs and the potential erosion of local cultural values (Li et al., 2011; Sakdiyakorn & Sivarak, 2016), while geographical isolation and limited institutional support continue to constrain innovation in rural micro-enterprises (Kim & Jun, 2022). Although community enterprises create employment and strengthen local economies (Ruanggoon et al., 2024), little empirical evidence explains how youth organizations simultaneously preserve cultural identity and adopt digital technologies to sustain social innovation.

Theoretical perspective, Transformative Social Innovation Theory explains that sustainable social change emerges through community empowerment and institutional transformation (Pel et al., 2020). Nevertheless, the theory provides limited explanation of how communities balance cultural preservation with technological transformation. To address this limitation, this study introduces the Yin–Yang Adaptive Social Innovation Framework. Rather than adopting Yin–Yang solely as a philosophical concept, this study adapts its complementary logic into an analytical framework.



Originating from classical Chinese philosophy, Yin–Yang explains that seemingly opposing elements are complementary and mutually reinforcing rather than contradictory (Chen et al., 2010; Rudall et al., 2008). Accordingly, this study conceptualizes cultural preservation as the Yin dimension and technology integration as the Yang dimension, arguing that sustainable social innovation emerges from their dynamic balance rather than from prioritizing one dimension over the other (Li et al., 2011). Karang Taruna, Indonesia's largest community-based youth organization, provides an appropriate context for examining this framework. Through youth empowerment, community enterprises, and local economic initiatives, Karang Taruna integrates cultural preservation with entrepreneurial activities to strengthen rural development. The organization also promotes leadership development, community participation, and youth entrepreneurship while responding to the challenges of digital transformation (Fait et al., 2023; de Bruin et al., 2023; Bayraktaroğlu, 2020). However, empirical research examining the interaction between entrepreneurial motivation, cultural preservation, technology integration, and social innovation within Karang Taruna remains limited (Mydland & Grahn, 2012). Therefore, this study develops and empirically validates the Yin–Yang Adaptive Social Innovation Framework using an explanatory sequential mixed-methods approach. The framework integrates necessity-driven motivation, opportunity-driven motivation, cultural preservation, technology integration, and social innovation to explain sustainable rural entrepreneurship. This study contributes by extending Transformative Social Innovation Theory through an adaptive Yin–Yang perspective, enriching the literature on community-based entrepreneurship, and providing empirical evidence from rural Indonesia to support the Sustainable Development Goals (SDGs).

THEORETICAL FRAMEWORK

Yin–Yang Concept and Transformative Social Innovation Theory

Karang Taruna applies the Yin–Yang approach by combining cultural preservation (Yin) and technology integration (Yang) to create transformative social innovations that strengthen community empowerment. Cultural preservation enhances social identity and community cohesion, while technology catalyzes locally relevant innovation (Nyseth & Hamdouch, 2019). Technology integration supports social well-being and sustainable systemic change (Avelino et al., 2019; Echaubard et al., 2020). This approach is in line with Transformative Social Innovation Theory, which emphasizes social change through community empowerment and active participation. Transformative social innovation enables communities to address challenges by strengthening their capacities through collective learning and action leading to sustainable institutional change (Pel et al., 2020). In this context, cultural preservation plays a vital role in strengthening social identity, while technology catalyzes locally relevant innovation (Nyseth & Hamdouch, 2019). Meanwhile, collaborations between communities and other stakeholders including universities and the private sector drive sustainable social transformation (Schot & Steinmueller, 2018). Community-based innovation has been proven effective in addressing social challenges through grassroots learning and transformative action. Younger generation's entrepreneurial motivation can be influenced by the economic and social context. Cultural factors



also play an important role in shaping entrepreneurial motivation, especially in supporting self-expression and cultural preservation (Cheraghi, 2017). Necessity-driven motivation drives youth engagement in entrepreneurship to preserve local culture in Uganda (Langevang et al., 2012). The differences between necessity-driven motivation and opportunity-driven motivation influence youth entrepreneurial performance in South America and Europe (Arias et al., 2010). A study in the Democratic Republic of Congo revealed that necessity-driven motivation influenced youth entrepreneurial success by developing their psychological capital (Ephrem et al., 2021). Similar findings were also found in the Visegrad Group (V4) (Holienka et al., 2016). Necessity-driven motivation plays a significant role in youth entrepreneurial success but cultural and economic challenges can affect their behavior (Cheraghi, 2017; Ephrem et al., 2021).

H1: Necessity-driven motivation has a positive effect on cultural preservation
Necessity-driven Motivation and Social Innovation

Youth's entrepreneurial motivation has a strong relationship with social innovation. For example, economic and social motivations have been proven to play an important role in encouraging youth involvement in social entrepreneurship and engaging in improving community welfare (Faisal Riza et al., 2020). Young entrepreneurs with opportunity-driven motivation tend to create innovations, especially in dynamic social contexts and related to strong social relations (Ephrem et al., 2021; Langevang et al., 2012). Other studies show that social impact-based motivation is more dominant among innovative entrepreneurs. However, social media and community and family support also increase youth participation in social entrepreneurship, especially in rural communities (Guanah & Nwaebi, 2022). Therefore, youth's entrepreneurial motivation, both necessity-driven and opportunity-driven, becomes a major support for sustainable social innovation.

H2: Necessity-driven motivation has a positive effect on social innovation
Cultural Preservation and Social Innovation

Cultural preservation and social innovation can be seen in the work of young social entrepreneurs, who often leverage their cultural backgrounds to address pressing societal challenges by utilizing cultural heritage as a source of inspiration and motivation (Bublitz et al., 2021). Cultural preservation efforts strengthen cultural identity and encourage pro-social behavior, which triggers active participation in heritage conservation and fosters innovation (Chng & Narayanan, 2017). The integration of social media in cultural heritage management manages to increase public engagement that promotes innovative approaches to conservation (Liang et al., 2020). The interaction between cultural preservation and knowledge transmission plays a significant role in fostering social innovation by actively engaging academic and local communities (Lewincamp & Sloggett, 2016). Combining traditional cultural knowledge and innovative practices allows entrepreneurs to create solutions that not only address contemporary societal issues but also preserve and promote cultural values, resulting in more sustainable and impactful social change (Achille & Fiorillo, 2022).



H3: Cultural Preservation has a positive effect on Social Innovation
Opportunity-driven Motivation and Technology Integration

Opportunity-driven motivation and entrepreneurship training are important to integrating technology into startups, enhancing their readiness to engage in new ventures (Olugbola, 2017). Young entrepreneurs transform challenges into opportunities through technology. Technology-based entrepreneurship drives economic growth, independence, and innovation, as well as increasing self-efficacy and confidence in online ventures (van der Westhuizen & Goyayi, 2020). Technological innovation drives entrepreneurial growth by enabling opportunity discovery, particularly in SMEs, where education further strengthens the ability to utilize technological advances (Anderson & Parker, 2013). Social networks and access to technology shape entrepreneurial aspirations so that technology becomes a key factor in youth's entrepreneurial success (Langevang et al., 2012).

H4: Opportunity-driven motivation has a positive effect on technology integration
Opportunity-driven Motivation and Social Innovation

Opportunity-driven entrepreneurs are more likely to engage in social innovation by identifying unfulfilled societal needs and utilizing their entrepreneurial skills. Studies revealed that opportunity-driven motivation results in higher levels of innovation, problem-solving, and business success, as proven in Uganda, Malaysia, and the Democratic Republic of Congo (Langevang et al., 2012). Entrepreneurship education and training programs play a significant role in fostering leadership and social aspirations and strengthening the relationship between opportunity motivation and social innovation (G. Kim et al., 2020).

H5: Opportunity-driven motivation has a positive effect on social innovation
Technology Integration and Social Innovation

Technology integration provides a significant effect on social innovation by increasing knowledge and collaboration capabilities. Studies showed that technologies such as blockchain and social capital can enhance new product development and social innovation, especially in supply chains in Industry 4.0 (Benzidia et al., 2021). Higher digital transformation, supported by technology integration, increases social innovation capacity in countries with more advanced economic digitalization (Nagy & Somosi, 2022). The use of social media in new product development has been proven to accelerate innovation, especially in organizations that have high acceptance of new technologies (Fischer et al., 2021). Moreover, the development of technological capabilities plays a significant role in strengthening the social impact of technology-based social enterprises (Guatemala Mariano & Martínez Prats, 2023).



H6: Technology integration has a positive effect on social innovation.

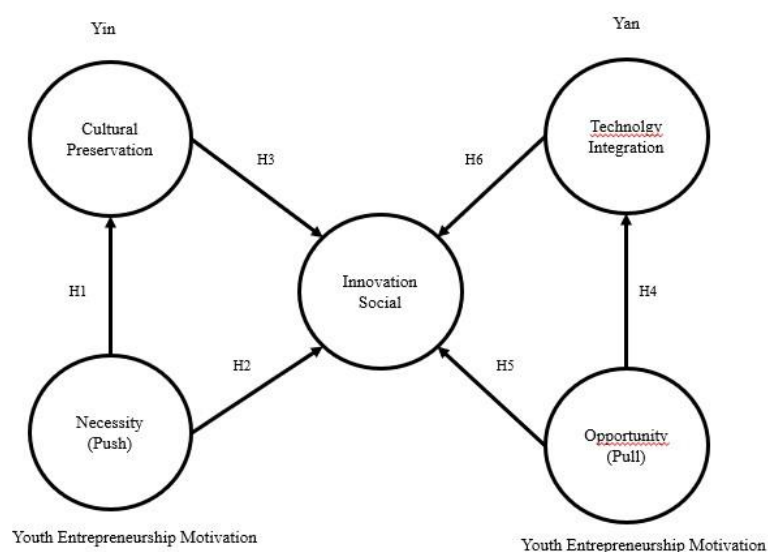


Figure 1. Social Innovation Framework

METHODOLOGY

Quantitative Study

The quantitative phase employed Partial Least Squares Structural Equation Modelling (PLSSEM) to examine the proposed research model. PLS-SEM was chosen because it is suitable for analysing complex models involving multiple latent constructs and for developing predictive research models (Sarstedt et al., 2017). Data were collected from July to September 2025 through an online questionnaire distributed using Google Forms. The target population consisted of active Karang Taruna members aged 18–45 years who managed or were involved in rural micro-enterprises. A snowball sampling technique was applied because no complete database of entrepreneurial Karang Taruna members was available, allowing respondents to recommend other eligible participants within their community networks (Parker et al., 2019). A total of 250 questionnaires were distributed, and after excluding incomplete responses, 231 valid questionnaires were analysed. The questionnaire included respondent information and measurement items for entrepreneurial motivation, cultural preservation, technology integration, and social innovation. Data were analysed using SmartPLS 3.0 by evaluating the measurement model (reliability and validity) and the structural model through path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and bootstrapping procedures (Sarstedt et al., 2017).



Table 1

Respondent profiles

Description	Characteristics	Frequency	Percent
Gender	Male	142	61.47%
	Female	89	38.53%
Education	Senior High School	137	59.31%
	Bachelor's degree	43	18.61%
	Master's degree	12	5.19%
	Others	39	16.88 %
Length of using member of < 1 years		31	29.12 %
Karang Taruna	> 2-5 years	153	53.35%
	> 5 years	47	17.53 %
Average Income /month < IDR 1 Million		94	87.9 %
Karang Taruna Business			
		> IDR 1 Million – IDR 2 Million	78 8.3 %
		> IDR 3 Million – IDR 5 Million	59 3.8%
Type of business in Karang Craft		78	33.76
Taruna	Food Culinary	85	36.80
	Fashion	22	9.53
	Tourism and culture	46	19.91

Source: Processed data, 2025

RESULTS AND DISCUSSIONS

Analysis of the measurement model

Analysis of the measurement model aims to examine the reliability and validity of the model (See Table 2). The results of the analysis consist of item report reliability, internal consistency reliability, and convergent validity. Estimates of factor loadings, composite reliability, and average variance were extracted with two outer loadings. In the first test, the indicator items were less than 0.7. Then, the researcher removed the item indicators and then retested them by fulfilling the outer loadings. This shows good reliability and validity of the model (Hair et al., 2017)



Table 2

Reliability and Validity of the model, Composite Reliability (CR), Average Variance Extracted (AVE)

Construct	Item	Outer Loadings 1	Outer Loadings 2	Composite Reliability (CR)	Average Variance Extracted (AVE)
Necessity (Push)	NM1	0.961	0.961	0.988	0.892
	NM10	0.893	0.893		
	NM2	0.937	0.937		
	NM3	0.959	0.959		
	NM4	0.927	0.927		
	NM5	0.913	0.913		
	NM6	0.968	0.968		
	NM7	0.977	0.977		
	NM8	0.977	0.977		
	NM9	0.928	0.928		
Cultural Preservation	CP1	0.391*		0.968	0.812
	CP2	0.891	0.896		
	CP3	0.930	0.933		
	CP4	0.909	0.917		
	CP5	0.858	0.869		
	CP6	0.916	0.910		
	CP7	0.544*			
	CP8	0.887	0.888		
	CP9	0.895	0.891		
Social Innovation	IS1	0.933	0.933	0.987	0.887
	IS10	0.963	0.963		
	IS2	0.896	0.895		
	IS3	0.923	0.923		
	IS4	0.968	0.968		
	IS5	0.967	0.967		
	IS6	0.964	0.964		
	IS7	0.957	0.957		
	IS8	0.917	0.917		
	IS9	0.929	0.929		



	OM1	0.187	0.187		
	OM2	0.170	0.170		
	OM3	0.207	0.207		
0.836	OM4	0.193	0.193	Opportunity (Pull) 0.968	
	OM5	0.188	0.188		
	OM6	0.145	0.145		
Technology	IT1	0.170	0.170		
	IT2	0.189	0.189	0.975	0.850
Integration	IT3	0.119	0.119		
	IT4	0.188	0.188		
	IT5	0.143	0.143		
	IT6	0.097	0.097		
	IT7	0.173	0.173		

Source: Processed data, 2025

The discriminant validity testing obtained a value of 0.901 for the cultural preservation variable, 0.9440 for the necessity variable (push), 0.914 for the opportunity variable (pull), 0.922 for the technology integration variable, and 0.942 for the social innovation variable. The five variables meet the requirements as presented in Tables 3 and 4.

Table 3

Discriminant validity

Variabel	Cultural Preservation	Necessity (Push)	Opportunity (Pull)	Technology Integration	Social Innovation
Cultural Preservation	0.901				
Necessity (Push)	-0.472	0.944			
Opportunity (Pull)	0.318	0.082	0.914		
Technology Integration	0.397	-0.308	0.112	0.922	
Social Innovation	0.085	-0.187	0.128	-0.165	0.942

Source: Processed data, 2025



Figure 2

Social Innovation Model

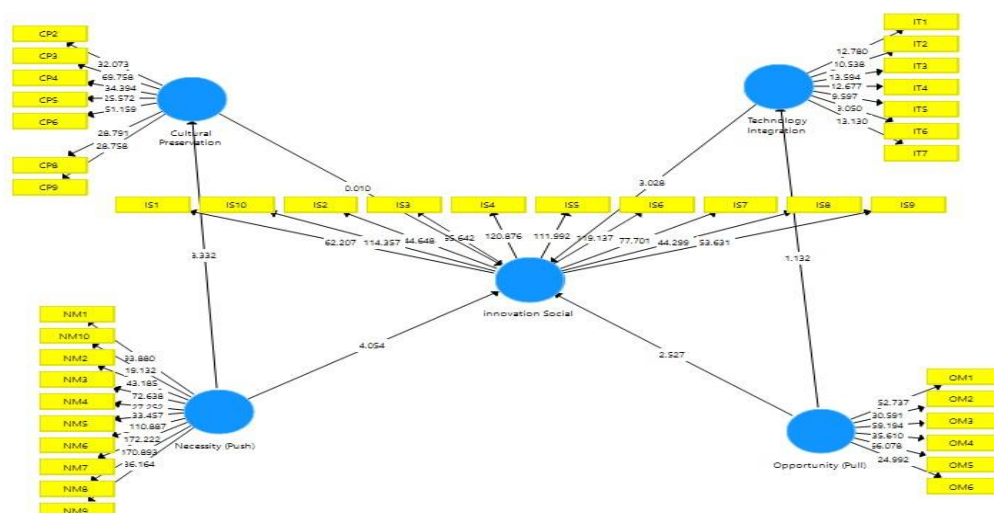


Table 4

Variable relation

Variable relation	Original sample (O)	Mean (M)	Standard Deviation (STDEV)	t-value	p-values	Hypothesis
Cultural Preservation→ social innovation	0.001	-0.002	0.077	0.010	0.992	Not Supported
Necessity (Push)→ Cultural Preservation	-0.472	-0.477	0.057	8.332	0.000	Supported
Necessity (Push)→ Social innovation	-0.286	-0.291	0.071	4.054	0.000	Supported
Opportunity (Pull)→ Technology Integration	0.112	0.114	0.099	1.132	0.258	Not Supported
Opportunity (Pull)→ Social innovation	0.182	0.182	0.072	2.527	0.012	Supported
Technology Integration→ Social innovation	-0.273	-0.278	0.090	3.028	0.003	Supported

Source: Processed data, 2025



Based on the results of the analysis, the tested variables have significant relationships. The necessity (push) factor has a significant influence on cultural preservation (t-value: 8.332, p-value: 0.000) and social innovation (t-value: 4.054, p-value: 0.000). This means that necessity drives communities to preserve traditions and initiate innovation to address social challenges (Flores-Gómez & Pérez-Villarreal, 2024; Torres-Ortega & Santamaria-Velasco, 2022). Opportunities (pull) also influence social innovation with a t-value of 2.527 and a p-value of 0.012, indicating that opportunities can drive social innovation. However, opportunities do not significantly drive technology integration (t-value: 1.132, p-value: 0.258), meaning that without adequate support, it is not enough for opportunities to drive technology adoption (Dzawoma, 2022; Eccarius & Chen, 2024). Technology integration has a significant influence on social innovation (t-value: 3.028, p-value: 0.003) meaning that the application of technology helps create more efficient and collaborative solutions for social innovation (Merlin-Brogniart et al., 2022). However, the relationship between cultural preservation and social innovation is not significant (t-value: 0.010, p-value: 0.992). This indicates that cultural preservation does not directly drive social innovation without additional interventions (Schensul, 2009).

Discussion

Karang Taruna manages to develop rural micro-enterprises using the Yin-Yang approach by combining cultural preservation (Yin) and technology integration (Yang) leading to significant social innovation. This not only strengthens community identity but also increases market reach and operational efficiency. In terms of cultural preservation, Karang Taruna emphasizes local traditions, namely building a sense of togetherness and identity among younger generations which can encourage their participation in entrepreneurial activities (Rudall et al., 2008). Maintaining cultural values while integrating modern practices can help maintain local identity in this globalization era (Li, 2015). Technology integration plays a significant role in improving operational efficiency and expanding market access, although rural areas often face challenges such as high costs and resource constraints (Rudall et al., 2008). Necessity-driven and opportunity-driven entrepreneurs highlight the importance of easily accessible technology in driving entrepreneurial activities (Chen et al., 2010). It can be said that this dual approach not only promotes the sustainability of local traditions but also drives economic growth through broader market participation.

CONCLUSION

Based on the results of the analysis, it can be concluded that the social innovation model based on the Yin-Yang approach implemented by Karang Taruna is effective in developing micro-enterprises in rural areas. Necessity-driven motivation and opportunity-driven motivation influence the success of social entrepreneurship. However, wider technology adoption faces challenges in terms of cost and cultural influences. A balanced strategy between cultural preservation and technology integration, as well as support from the government and other stakeholders, is needed to achieve long-term sustainability.



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