

# Strategic Management of Post-Disaster Socioeconomic Recovery in the Industrial Revolution 4.0 Era

Management of Post-Disaster Socioeconomic Recovery

1755

Rifai<sup>1\*</sup>, Andy Fefta Wijaya<sup>2</sup>

<sup>1</sup>Department of Public Administration, Faculty of Administrative Sciences, Universitas Brawijaya; Malang, Indonesia

<sup>2</sup>Department of Jakarta Campus Administration, Faculty of Administrative Sciences, Universitas Brawijaya; Jakarta, Indonesia

\*Corresponding Author E-Mail: rifai2000rifai98765@gmail.com

Submitted:  
November 20, 2025

Revised:  
January 21, 2026

Accepted:  
March 28, 2026

Published Online:  
March 31, 2026

## ABSTRACT

Socioeconomic recovery constitutes a crucial and strategic component of post-disaster management, grounded in the principle of building back better and safer. In the era of the Industrial Revolution 4.0, rapid and dynamic changes driven by information technology often produce field conditions that do not fully align with existing technical guidelines. This study aims to formulate a proposed model for socioeconomic recovery that integrates digital technology without disrupting administrative procedures while substantively achieving recovery objectives. This study employs a qualitative case study approach focusing on post-disaster communities in the era of the Industrial Revolution 4.0, utilizing interviews with Disaster Management Agencies, followed by thematic analysis. The findings indicate that technology utilization, such as promoting fostered products through digital marketplaces, can strengthen enabling, empowering, and protecting stages of community development. Moreover, locally based approaches emphasizing local issues, authority, and accountability enhance program relevance and sustainability. The study concludes that effective reform requires strengthening networking and partnerships through Public-Private Partnership schemes and fostering pentahelix collaboration among government, business, community, academia, and media actors.

**Keywords:** Community Empowerment, Disaster Management, Industrial Revolution 4.0, Pentahelix Collaboration, Public-Private Partnership, Socioeconomic Recovery.

## INTRODUCTION

Disaster management at the national level continues to face fundamental challenges, particularly limited capacity in implementing emergency response, rehabilitation, and reconstruction, as well as low levels of public and institutional awareness regarding the importance of Disaster Risk Reduction (*Pengurangan Risiko Bencana*/PRB). The integration of PRB into development planning has not been fully optimized due to differing perceptions of disaster risk often confined to emergency response, alongside institutional, human resources, and financial constraints (Tanesab, 2020). The National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional*/RPJMN) 2015–2019 explicitly set a target to reduce the disaster risk index in high-risk growth centers through strengthening the capacity of central and local governments and communities; however, its implementation has encountered structural and operational obstacles.

The legal framework for disaster management is comprehensively regulated. Law Number 24 of 2007, particularly Article 57, stipulates that post-disaster management includes rehabilitation and reconstruction. Articles 58 and 59 further state that

**JIMKES**

Jurnal Ilmiah Manajemen  
Kesatuan  
Vol. 14 No. 2, 2026  
pp. 1755-1766  
IBI Kesatuan  
ISSN 2337 – 7860  
E-ISSN 2721 – 169X  
DOI: 10.37641/jimkes.v14i2.4604

rehabilitation encompasses socio-economic and cultural recovery, while reconstruction aims to improve social, economic, and cultural conditions. These provisions are reinforced by BNPB Regulation Number 17 of 2010 concerning Guidelines for the Implementation of Rehabilitation and Reconstruction, which emphasizes that the economic aspect includes socio-economic and cultural recovery to stimulate local economic growth such as agriculture, trade, industry, tourism, and banking while the social aspect involves restoring socio-cultural structures, local wisdom, interreligious and intercultural relations, and community social life.

Despite this comprehensive regulatory framework, the implementation of socio-economic recovery remains problematic. Conceptually, social and economic dimensions are interrelated. In practice, assistance programs are often implemented separately and lack synergy (Harbusiuk et al., 2024; Rozikin, 2024). Resilience-based initiatives are not fully integrated with socio-economic mentoring programs, and there is limited distinctiveness in assistance models for disaster-affected communities. Engagement with the private sector, universities, and Regional Apparatus Organizations remains suboptimal, creating risks of program duplication and weak sustainability. Furthermore, the development of information technology-based databases and partnership networks is still at an early stage, while program governance requires strengthening to ensure accountability, sustainability, and alignment with PRB objectives (Nahtigal, 2022).

In this context, the interrelationship among institutional capacity, community participation, multi-stakeholder partnerships, and the effectiveness of socio-economic recovery constitutes a key determinant of successful rehabilitation and reconstruction (Ngulube, 2024; Ahmed et al., 2025). The principle of building back better and safer underscores community empowerment through the stages of enabling, empowering, and protecting as the foundation of recovery. However, a research gap persists between the normative mandates established in Law Number 24 of 2007, BNPB Regulation Number 17 of 2010, and the RPJMN 2015–2019, and their practical implementation in the field, particularly regarding the absence of an integrative and adaptive socio-economic recovery model grounded in partnership and resilience.

In the era of the Industrial Revolution 4.0, digital technology and the Internet of Things (IoT) offer opportunities to enhance governance efficiency, expand market access for community products, and strengthen local economic networks. Nevertheless, as argued by Karnawati (2017), this revolution also poses challenges, including labor displacement and heightened competency demands. Therefore, socio-economic recovery strategies must not only restore post-disaster conditions but also enhance long-term competitiveness and resilience. Based on these considerations, this study aims to examine the effectiveness of post-disaster socio-economic and cultural recovery programs from a community empowerment perspective, analyze the implementation of enabling, empowering, and protecting principles within rehabilitation and reconstruction processes in accordance with existing regulations, and formulate an alternative partnership-based socio-economic recovery model to strengthen local resilience, autonomy, and accountability in disaster-affected areas.

## **LITERATURE REVIEW**

### **Post-Disaster Socio-Economic Recovery**

Song et al. (2017) argue that regional recovery plans have not been adequately implemented with sustainable recovery principles. The study identifies several challenges, including the lack of reliable baseline data due to the destruction and burial of geological and socio-economic information, planning without a rational information base, and an excessive focus on economic development that neglects future vulnerabilities. The vision and goals of recovery were primarily centered on poverty alleviation, while environmental sustainability received minimal attention. Community participation in planning remained low, stakeholder coordination was limited, and monitoring and evaluation were constrained by time. The study concludes that sustainability in recovery remains unmet, with district-level recovery showing better quality than city-level initiatives.

Recommendations include prioritizing sustainability in vision and goal setting, developing comprehensive databases and planning techniques, designing diverse regulations tailored to local governance, enhancing social and institutional learning, and strengthening multi-level government integration.

Sou (2019) highlights that resilience-focused recovery often marginalizes the socio-cultural needs of disaster-affected communities. The study argues that resilience alone is insufficient for sustainable recovery. Programs must address not only adaptation but also mitigation and hazard avoidance. Existing disaster recovery frameworks are criticized for being overly descriptive and narrowly instrumental, overlooking social and cultural dimensions. The case of Cochabamba illustrates the need to reconceptualize recovery to reflect the values and needs of affected populations rather than merely returning to pre-disaster vulnerability. Progressive recovery emphasizes moving forward rather than simply “bouncing back”, promoting a more resilient and sustainable post-disaster trajectory.

### **Policy Reform**

Public policy faces increasingly complex challenges, with political intervention and bureaucratic reform central to decision-making (Inkina, 2019; Head, 2024). While ideally encompassing formulation, implementation, and evaluation, existing frameworks are often insufficient (Sandfort & Moulton, 2014; Knill et al., 2024). Policy reform is needed to assess outcomes, redesign programs, and determine whether policies should continue, be revised, or replaced. According to Banha et al. (2022), policy change may be incremental, involve the creation of new statuses, or result from major changes such as elections. U.S. models of policy change, including the cyclical, evolutionary, and backlash (zigzag) theses, explain shifts driven by public-private engagement, advocacy coalition interactions, external changes, and stable system parameters.

Several theoretical approaches guide policymaking. Comprehensive rational theory assumes decision-makers weigh costs and benefits to select policies that maximize goals, requiring consensus, clear objectives, alternative identification, and consequence foresight (Andrews, 2017; Ghimire, 2024). Second-best rationality, based on Arrow's Impossibility Theorem, acknowledges that democratic decision-making cannot yield a single optimal solution (Hall, 2023; Demir, 2023). Discontinuous incremental theory emphasizes gradual policy adjustments and shared responsibility, while bounded rationality notes that limitations in information, cognition, and time lead decision-makers to seek satisfactory rather than optimal solutions (Simon, 1990).

In the context of post-disaster socio-economic recovery policies in Indonesia, policy changes reflect the discontinuous incremental approach. Existing policies still refer to Law 24 of 2007 on Disaster Management and Government Regulation 21 of 2008 on Disaster Management Implementation, which are currently under revision. Recovery policies cover both physical and socio-economic dimensions, but physical recovery has predominated, while socio-economic recovery requires strengthening to avoid marginalization. Socio-economic dynamics in disaster-affected areas are evolving, necessitating incremental adjustments to anticipate new challenges, particularly in the era of Industry 4.0. Policies are adapted to recent socio-economic phenomena without comprehensive overhauls, focusing on continuous improvement to ensure responsiveness, relevance, and effective recovery.

### **RESEARCH METHODS**

This study employs a qualitative descriptive approach with a case study design focusing on post-disaster communities as the primary unit of analysis. The case study design is selected to enable an in-depth understanding of the dynamics of social, economic, and cultural recovery within real-life contexts, including the interactions among stakeholders involved in rehabilitation and reconstruction processes. The research population consists of key stakeholders who play direct and indirect roles in post-disaster recovery, including the National and Regional Disaster Management Agencies (*Badan*

Penanggulangan Bencana Daerah/BPBD), local government officials, community leaders, affected households, and program facilitators. Informants are selected purposively based on their involvement, experience, and knowledge regarding recovery policies and program implementation. Accordingly, this study does not aim to achieve statistical generalization; rather, it seeks to generate a comprehensive and contextualized understanding of community empowerment processes within the broader framework of resilience and sustainable development.

Data collection is conducted using multiple techniques to ensure a holistic and in-depth exploration of the research problem. First, in-depth interviews are carried out to explore the perspectives, experiences, and evaluations of informants concerning the planning and implementation of rehabilitation and reconstruction activities. Second, Focus Group Discussions (FGDs) are organized to capture collective perceptions, social dynamics, and shared learning processes that emerge within the community context. Third, document analysis is undertaken to examine relevant regulations, recovery plans, policy documents, and program reports to understand the normative and administrative foundations underlying recovery initiatives. In addition, direct field observations are conducted to assess the implementation of recovery activities, particularly those related to social, economic, and cultural dimensions, thereby enabling the researcher to verify the alignment between policy design and on-the-ground practices.

Data analysis is conducted using thematic analysis to identify patterns, categories, and overarching themes emerging from interviews, FGDs, observations, and documentary sources. The analytical process begins with data transcription, followed by open coding, categorization, and theme development related to empowerment processes (enabling, empowering, and protecting), institutional capacity, community participation, and partnership mechanisms. To ensure the credibility and validity of the findings, this study applies triangulation across data sources and methods by systematically comparing information obtained from different informants and techniques. The analytical results are subsequently synthesized with community empowerment and resilience frameworks to develop an alternative model of post-disaster socio-economic recovery that is more participatory, inclusive, and sustainable.

## RESULTS

### Effectiveness of Socio-Economic Recovery Programs

Referring to Regulation of the Head of the BNPB Number 11 of 2008 concerning Guidelines for Rehabilitation and Reconstruction, Letter G stipulates that socio-economic and cultural recovery constitutes efforts to restore the functioning of social, economic, and cultural activities and/or institutions in disaster-affected areas. This provision is reinforced by Regulation of the Head of BNPB Number 06 of 2017, particularly Article 5 Letter G, which emphasizes that one of the core principles in the implementation of rehabilitation and reconstruction is the enhancement of capacity and self-reliance. The primary legal basis for the Socio-Economic-Cultural Recovery Program is also grounded in Law Number 24 of 2007 on Disaster Management, especially Article 58 letter g regarding socio-economic-cultural recovery and Article 59 letter f concerning the improvement of social, economic, and cultural conditions, as well as Government Regulation Number 21 of 2008, particularly Articles 56 and 71. Accordingly, the operational implementation of the recovery program refers back to the provisions stipulated in BNPB Regulation Number 11 of 2008, Letter G, including the indicators and scope of Socio-Economic-Cultural Recovery activities as presented in Table 1.

Table 1. Social-Economic Aspect

Aspect	Achievement Indicators
Social	Implementation of social and religious activities
	Functioning of social and religious institutions
	Increasing the number of participants in social and religious activities
Economic	Implementation of production and distribution activities for goods of economic value, both by individuals and institutions

Aspect	Achievement Indicators
	Implementation of economic transactions both in and outside the market, both by individuals and institutions
	An increase in the production and distribution of goods of economic value, both by individuals and institutions
	An increase in the number of community members and/or economic institutions involved in the production and distribution of economic goods
	Implementation of cultural activities such as arts and traditional ceremonies
Culture	An increase in the number of community members and cultural institutions involved in cultural activities

To achieve the established indicators, the planning and technical requirements of the socio-economic and cultural recovery program must begin with the preparation of a comprehensive technical plan. At a minimum, this plan should encompass the targeted social, economic, and cultural activities and institutions; the problems encountered; available resources; implementation scenarios, mechanisms, and technical procedures; financing plans; and the responsible implementing bodies. The preparation of this technical plan is undertaken by the BPBD in coordination with relevant institutions, agencies, or departments according to their respective mandates. Furthermore, the implementation mechanisms and technical procedures must consider the characteristics, conditions, and specific circumstances of disaster-affected communities and adhere to other relevant regulations established by the competent authorities. This structured and context-sensitive planning approach emphasizes that post-disaster recovery planning must integrate institutional coordination, local context analysis, and resource mapping to ensure effective and sustainable outcomes (Khan & Han, 2023; Okunola, 2025).

With regard to implementation and organization, the socio-economic and cultural recovery program is carried out by BPBD with the support of relevant institutions, agencies, or departments within their respective authorities. Recovery activities are conducted through advocacy and counseling services, the provision of assistance to stimulate economic activities, and training programs aimed at enhancing the capacity of affected communities. When the program covers more than one regency or municipality, coordination is undertaken by BPBD in collaboration with the Provincial Government and/or BNPB. If the program spans more than one province, coordination is conducted by BNPB. Throughout its implementation, socio-economic and cultural recovery activities must uphold the principle of justice. This emphasis on coordinated governance and participatory capacity-building argues that effective community empowerment requires institutional collaboration and the active involvement of local stakeholders to foster sustainable development outcomes (Marin-Gonzalez et al., 2022).

In practice, socio-economic recovery initiatives have not always met expectations and may inadvertently prioritize administrative compliance over substantive, mission-oriented recovery and empowerment efforts. The failure of recovery and/or empowerment programs often stems from insufficient consideration of community needs. Many institutions encounter difficulties in adequately understanding the social conditions of a given community. Consequently, the limited availability of accurate and contextual information constrains the design and implementation of programs that genuinely address the problems and needs of disaster-affected populations.

### **Implementation of Empowerment Principles**

The meaning of capacity enhancement, self-reliance, and functional restoration in the post-disaster context can be examined through the perspective of community empowerment. Ontologically, empowerment refers to the process of developing the potential, strength, and authority of citizens or communities so that they become more capable and autonomous than before. Within this framework, socio-economic recovery essentially constitutes a series of systematic efforts aimed at revitalizing the social, economic, and cultural potential of communities affected by disaster situations (Keraminiyage & Piyatadsananon, 2013). Consequently, empowerment for disaster

victims becomes both essential and urgent. Krantz (1971) and Saleh et al. (2022) define empowerment as a social action process that promotes the participation of individuals, organizations, and communities toward increasing individual and collective control, political efficacy, quality of life, and social justice. This definition underscores that empowerment is not merely a form of assistance but rather a transformative social process that strengthens the position and capacity of communities.

Based on this understanding, empowering disaster victims in the social and economic spheres is crucial to ensure that they function as active subjects in post-disaster recovery programs rather than passive objects of intervention. Conceptually, the term empowerment derives from the word “power,” which is closely associated with authority. Power is often interpreted as the ability to influence or direct others to act according to one’s will, regardless of their own interests, and is therefore related to notions of influence and control (Li et al., 2022; Ahmad & Islam, 2024). In the context of empowerment, however, this meaning shifts from domination toward the strengthening of capacities that enable individuals and communities to determine their own life choices and developmental trajectories.

The community empowerment approach further emphasizes the importance of autonomous local communities as self-organizing systems. Through such an approach, individuals are positioned as subjects of development who possess both the right and the capability to participate in shaping their future and social life (Nikkhah & Redzuan, 2009; Ellikkal & Rajamohan, 2025). Community empowerment thus represents a concrete manifestation of capacity building, oriented toward strengthening human resources through institutional development from the central to the village level, alongside socio-economic advancement and the provision of infrastructure and supporting facilities. This process also incorporates the development of the 3P system: mentoring that mobilizes active community participation, counseling that responds to and monitors social change, and services that ensure the appropriate distribution of both physical and non-physical resources in accordance with community needs (Saripudin et al., 2022; Edelman, 2023).

Operationally, the concept of empowerment reflects two complementary tendencies. The first refers to the process of granting or transferring a portion of power, strength, or capability to individuals or communities in order to enhance their autonomy, which may be reinforced through the development of material assets and organizational capacity as foundations for independence. The second emphasizes processes of stimulation, encouragement, and motivation through dialogue, enabling individuals to develop the awareness and capacity necessary to make independent life choices. Although these two tendencies may appear contradictory at their extremes, in practice, effective empowerment often requires a reflective and dialogical process prior to the tangible transfer of authority or capacity enhancement.

### **Alternative Partnership-Based Recovery Model**

Understanding the reality of a community is neither simple nor linear. Community empowerment facilitators often become unconsciously trapped in their own assumptions, values, and conceptual frameworks, thereby directing assisted communities according to external perspectives rather than the communities’ own beliefs and lived experiences. Within the discourse of empowerment, learning processes must therefore be grounded in the principles of “start with what people know” and “start with what people have.” These principles emphasize that any intervention should build upon existing knowledge, capacities, and local assets rather than imposing externally designed solutions. Community empowerment, in this sense, represents an effort to elevate the dignity of groups that remain constrained by poverty and underdevelopment. Its ultimate aim is to enable communities to become self-reliant and capable of shaping their own developmental trajectories. As Kartasmita (2013) and Horokholinska et al. (2025) argue, empowerment can be understood from three interrelated dimensions: enabling, empowering, and protecting, each of which contributes to strengthening community capacity in a comprehensive manner.

Table 2. Alternative Model Outline

Category	Local Issues	Local Autonomy	Local Accountability
Enabling (creating an environment that allows the community's potential to grow)	a. Efforts to build rapport with the community by studying their profile and characteristics.	a. Involving local/community leaders, especially in existing decision-making models.	a. Conducting evaluative studies on previous empowerment programs, especially those related to sustainability efforts.
	b. Conducting assessments or social mapping to identify information and potential related to socio-economic activities (before and after events).	b. Identifying the capacity of local institutions to autonomously manage programs and understand their decision-making patterns.	b. Evaluating challenges faced by the community in developing past programs, particularly regarding whether they were positioned as subjects or objects in the program.
Empowering (strengthening the community's potential)	a. Designing and implementing learning models based on assessment or social mapping results, promoting social learning within the community; includes daily evaluations for improvement.	a. Providing training and capacity-building for local institutions to manage programs independently, involving local businesses and universities to strengthen local governance.	a. Strengthening representation of community elements within formal and informal leadership regarding program accountability as responsibilities shift to the community for program sustainability.
	a. Encouraging local initiatives to conduct independent monitoring and evaluation and develop instruments aligned with local program issues.	a. Encouraging local institutions to formulate "rules of the game" to ensure programs benefit the entire community, not specific groups.	a. Promoting transparent and participatory accountability, including accessible complaint channels for reporting errors or irregularities in program implementation.
Protecting (protecting the weak from exploitation and supporting sustainability)			

Based on Table 2, the first dimension, enabling, refers to the creation of a conducive environment that allows community potential to emerge and develop. It begins with the recognition that every individual and every community possesses inherent capacities that can be nurtured. No society is entirely powerless; rather, limitations often stem from structural barriers that restrict opportunities for growth. The second dimension, empowering, goes beyond creating a favorable climate by actively strengthening community capacities through concrete measures, including the provision of resources, access to opportunities, and institutional support. The third dimension, protecting, ensures that vulnerable groups do not become increasingly marginalized when confronted with stronger actors. Protection does not imply isolation or exclusion from broader interaction, as such measures would further weaken disadvantaged groups. Instead, it seeks to prevent unequal competition and the exploitation of the weak by the strong. Together, these three dimensions provide a normative and operational framework for empowerment-oriented development (Barton-Hulsey et al., 2023; Prabawati & Frimawaty, 2025).

Importantly, community empowerment should not generate dependency on charitable or short-term assistance programs. Its ultimate objective is to cultivate self-reliant, capable communities that can pursue sustainable improvements in their quality of life. Central to this process is the enhancement of community participation in decision-making processes that affect their own lives and collective future. Empowerment is therefore closely linked to the strengthening and practice of democracy. Friedmann (1992) emphasizes that the empowerment approach, as a foundation of alternative development, prioritizes autonomy in decision-making within territorially organized communities, local self-reliance (though not autarky), participatory democracy, and experiential social learning. In the context of socio-economic recovery programs, this perspective implies that implementation models should be reoriented toward community-based learning processes that emphasize “learning by doing” and social learning. Selvarajan (2022) and Cazcarro et al. (2022) show that recovery initiatives must avoid “dependency-creating” patterns and instead promote empowering approaches rooted in intensive community involvement and contextual learning.

In essence, post-disaster socio-economic recovery constitutes a community empowerment process aimed at revitalizing and developing the potential of affected populations based on local issues and contextual realities. The ultimate goal extends beyond local economic revival to include the strengthening of community resilience in the face of future disasters. A resilient community is characterized by two key attributes: safety and the capacity to rebound. This means that individuals and communities are able, at a minimum, to plan, organize, and implement protective and recovery measures to mitigate disaster impacts and restore their social, spiritual, and material conditions. Accordingly, communities must be positioned not as objects of development programs, but as subjects of their own development efforts, guided by the principles of enabling, empowering, and protecting, and grounded in local perspectives. To optimize socio-economic recovery outcomes, monitoring and evaluation frameworks should likewise be embedded within this empowerment model, supported by mentoring roles and local partnerships that adhere to the principles of enabling, supporting, and protecting, thereby ensuring sustainable and resilience-oriented development.

## **DISCUSSION**

The findings of this study, which conceptualize post-disaster socio-economic and cultural recovery as a community empowerment process grounded in the principles of enabling, empowering, and protecting, are strongly corroborated by existing literature. Song et al. (2017) and Widiastuti et al. (2022) demonstrate that recovery planning following the Wenchuan Earthquake lacked sustainability due to weak socio-economic data foundations, an excessive emphasis on economic growth at the expense of environmental and social dimensions, and limited community participation. These shortcomings parallel the argument advanced in this study that recovery programs frequently become administrative and infrastructure-oriented, thereby neglecting substantive empowerment and social learning processes. The emphasis by Gai et al. (2022) on comprehensive databases, stakeholder coordination, and institutional learning aligns with the present study’s recommendation for social mapping, participatory planning, and locally accountable governance mechanisms within an empowerment-based recovery framework.

Furthermore, Sou (2019) reinforces this perspective by critically examining resilience-based recovery frameworks that marginalize socio-cultural dimensions. Her contention that recovery should not merely “bounce back” but rather “move forward” socially and culturally resonates with the empowerment paradigm, which positions communities as active subjects rather than passive objects of development. The inclusion of social and cultural recovery indicators such as the functionality of social institutions, participation in cultural practices, and community engagement reflects Sou’s (2019) call to reconceptualize recovery beyond technical resilience toward a transformative process encompassing values, identity, and collective learning. This perspective substantiates the

study's proposition that sustainable socio-economic recovery must integrate local knowledge systems, cultural traditions, and participatory decision-making processes.

From a policy standpoint, the imperative to reform post-disaster recovery policies may be interpreted through the lens of policy change theories. Inkina (2019) and Sandfort and Moulton (2014) argue that policy processes should extend beyond formulation and implementation to include continuous evaluation and reform. In the Indonesian context examined in this study, the predominance of physical reconstruction over socio-economic empowerment underscores the necessity of policy recalibration. Drawing upon Anderson's framework as cited in Wiyoto (2005), changes in disaster recovery policy may be characterized as discontinuous incrementalism, wherein existing legal instruments such as Law Number 24 of 2007 and Government Regulation Number 21 of 2008 are maintained while being progressively adjusted to accommodate emerging socio-economic realities.

Such incremental adaptation is consistent with Simon's (1990) concept of bounded rationality, which posits that policymakers operate under constraints of information, time, and cognitive capacity, leading them to pursue satisfactory rather than optimal solutions. The limited availability of reliable post-disaster data and the dynamic needs of affected communities, as also highlighted by Song et al. (2017), render fully rational-comprehensive planning impracticable. Consequently, recovery policies evolve through iterative learning, partial revisions, and pragmatic adjustments rather than through sweeping, rationally comprehensive reforms.

Integrating the sustainability concerns articulated by Song et al. (2017), Sou's (2019) socio-cultural critique of resilience discourse, and the policy reform perspectives of Wiyoto (2005) and Simon (1990), the empowerment-based recovery model proposed in this study offers a coherent and theoretically grounded framework. By situating socio-economic recovery within a participatory, learning-oriented, and locally accountable structure, policy reform can transcend infrastructure-centered rehabilitation and move toward sustainable community resilience rooted in social, economic, and cultural strengthening.

## **CONCLUSION**

The findings of this study highlight that socio-economic recovery in post-disaster contexts should not be treated separately from physical recovery. Recovery programs are most effective when implemented as an integrated "single program package," where socio-economic impacts are assessed alongside physical reconstruction. The study emphasizes that socio-economic recovery is fundamentally a community empowerment process, guided by the stages of enabling, empowering, and protecting, while being locally grounded to address community-specific issues, autonomy, and accountability. Additionally, the findings suggest that leveraging digital platforms, such as IoT-based applications and e-commerce platforms like Bukalapak, Shopee, and Tokopedia, can support both the administrative and substantive goals of recovery programs. Strategic partnerships through Public-Private Partnership (PPP) models, involving all elements of the pentahelix, are recommended to ensure collaborative and sustained recovery efforts. Furthermore, timely aid provision is crucial; early assistance can significantly enhance self-sufficiency and livelihoods, while delayed support may diminish empowerment outcomes. Training beneficiaries as Disaster Information Agents (AGIB) also creates an additional layer of community resilience, transforming recipients into local change agents for disaster risk reduction.

The implications of these findings indicate that post-disaster socio-economic recovery must prioritize both immediate relief and long-term empowerment, integrating local knowledge, participation, and digital tools to maximize impact. Limitations of the study include its reliance on case-based observations from selected Indonesian disaster sites, which may affect generalizability to other regions or disaster types. Future research is recommended to examine the scalability of integrated recovery models, the long-term effectiveness of digital platforms in sustaining local livelihoods, and the role of structured

mentoring through the pentahelix framework in enhancing resilience. By situating socio-economic recovery within a participatory, digitally enabled, and policy-aligned framework, recovery programs can move beyond dependency-oriented interventions toward sustainable community resilience that strengthens social, economic, and cultural capacities.

**FUNDING STATEMENT:** This research did not receive any specific grant from funding agencies in the public, commercial, or not - for - profit sectors.

**CONFLICTS OF INTEREST:** The author declares no conflict of interest.

**DECLARATION OF GENERATIVE AI STATEMENT:** During the preparation of this work, the author(s) used ChatGPT, Grammarly, and Turnitin in order to assist with language refinement, grammar checking, and originality verification. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

## REFERENCES

- [1] Ahmad, I., & Islam, M. R. (2024). Empowerment and participation: Key strategies for inclusive development. In *Building strong communities: Ethical approaches to inclusive development* (pp. 47–68). Leeds: Emerald Publishing Limited.
- [2] Ahmed, M., Raza, M. Y., Malik, N. A., & Malik, A. (2025). Climate-resilient agriculture (CRA): Pathway to sustainable development. In *Climate Resilient and Sustainable Agriculture: Volume 1: Adaptation and Mitigation Strategies* (pp. 185–212). Cham: Springer Nature Switzerland.
- [3] Andrews, C. J. (2017). Rationality in policy decision making. In *Handbook of public policy analysis* (pp. 187-198). London: Routledge.
- [4] Banha, F., Flores, A., & Coelho, L. S. (2022). A new conceptual framework and approach to decision making in public policy. *Knowledge*, 2(4), 539–556.
- [5] Barton-Hulsey, A., Collins, S. C., Therrien, M. C., Biggs, E. E., Romano, M., & Coltellino, B. (2023). Augmentative and alternative communication services during the COVID-19 pandemic: Contextual determinants of the parent–speech-language pathologist partnership. *American Journal of Speech-Language Pathology*, 32(6), 2889–2907.
- [6] Cazcarro, I., García-Gusano, D., Iribarren, D., Linares, P., Romero, J. C., Arocena, P., ... & Cadarso, M. Á. (2022). Energy-socio-economic-environmental modelling for the EU energy and post-COVID-19 transitions. *Science of the Total Environment*, 80(5), 5329-5335.
- [7] Demir, F. (2023). Evidence-based policy-making: Merits and challenges. In *Global Encyclopedia of Public Administration, Public Policy, and Governance* (pp. 4524–4536). Cham: Springer International Publishing.
- [8] Edelman, N. L. (2023). Trauma and resilience informed research principles and practice: A framework to improve the inclusion and experience of disadvantaged populations in health and social care research. *Journal of Health Services Research & Policy*, 28(1), 66–75.
- [9] Ellikkal, A., & Rajamohan, S. (2025). AI-enabled personalized learning: empowering management students for improving engagement and academic performance. *Vilakshan-XIMB Journal of Management*, 22(1), 28–44.
- [10] Gai, A. M., Sir, M. M., & Maulida, R. R. (2022). Influence analysis of regional loans on basic infrastructure establishment to recover economy during the Covid-19 pandemic in Sikka Regency, East Nusa Tenggara, Indonesia. In *IOP Conference Series: Earth and Environmental Science*, (pp. 5124-5143). Bristol: IOP Publishing.
- [11] Ghimire, B. R. (2024). Public policy and governance: Catalyzing local development and economic growth. *Journey for Sustainable Development and Peace Journal*, 2(2), 39–53.
- [12] Hall, A. (2023). Arrow’s impossibility theorem: Computability in social choice theory. Retrieved on October 24, 2025, from <https://arxiv.org/abs/2311.09789>.
- [13] Harbusiuk, V., Blikhar, V., Rudnichenko, Y., & Havlovska, N. (2024). Socio-economic security of the region in war conditions: Damage assessment, modelling of recovery paths and their regulatory support. *Social and Legal Studies*, 2(7), 149–161.
- [14] Head, B. W. (2024). Reconsidering expertise for public policymaking: The challenges of contestability. *Australian Journal of Public Administration*, 83(2), 156–172.
- [15] Horokholinska, I., Vaskul, S., & Kvik, A. (2025). Post-secular revitalization of religion: Ukrainian experience of social initiatives by churches as a moral alternative to the political theology of war. *Occasional Papers on Religion in Eastern Europe*, 46(1), 3–12.

- [16] Inkina, S. (2019). Bureaucratic reform and Russian transition: The puzzles of policy-making process. *Palgrave Communications*, 5(1), 1-15.
- [17] Karnawati, D. (2018). Foreword by Dwikorita Karnawati for the journal of the international consortium on landslides. *Landslides*, 15(8), 1457-1458.
- [18] Kartasasmita, G. (2013). *Managing Indonesia's transformation: An oral history*. Singapore: World Scientific.
- [19] Keraminiyage, K., & Piyatadsananon, P. (2013). Achieving success in post-disaster resettlement programmes through better coordination between spatial and socio-economic/cultural factors. *International Journal of Disaster Resilience in the Built Environment*, 4(3), 352-372.
- [20] Khan, N. U., & Han, H. (2023). Linking local collaborative governance and public service delivery: Mediating role of institutional capacity building. *Humanities and Social Sciences Communications*, 10(1), 1-10.
- [21] Knill, C., Steinebach, Y., & Zink, D. (2024). How policy growth affects policy implementation: Bureaucratic overload and policy triage. *Journal of European Public Policy*, 31(2), 324-351.
- [22] Krantz, D. L. (1971). The separate worlds of operant and non-operant psychology. *Journal of Applied Behavior Analysis*, 4(1), 61-73.
- [23] Lemishko, O., Davydenko, N., & Shevchenko, A. (2022). Strategic directions of the economic recovery of post-war Ukraine. *Journal of Innovations and Sustainability*, 6(2), 10-19.
- [24] Li, Z., Pestourie, R., Lin, Z., Johnson, S. G., & Capasso, F. (2022). Empowering metasurfaces with inverse design: Principles and applications. *ACS Photonics*, 9(7), 2178-2192.
- [25] Marín-González, F., Moganadas, S. R., Paredes-Chacín, A. J., Yeo, S. F., & Subramaniam, S. (2022). Sustainable local development: Consolidated framework for cross-sectoral cooperation via a systematic approach. *Sustainability*, 14(11), 6601-6612.
- [26] Nahtigal, M. (2022). EU recovery plans, inclusive knowledge economy and overcoming regional disparities. *Lex Localis-Journal of Local-Self Government*, 20(4), 1171-1189.
- [27] Ngulube, N. K. (2024). Building back better together: Exploring community engagement in post-disaster recovery efforts—a review. *Journal of Multidisciplinary Research Advancements*, 2(2), 138-149.
- [28] Nikkhah, H. A., & Redzuan, M. (2009). Participation as a medium of empowerment in community development. *European Journal of Social Sciences*, 11(1), 170-176.
- [29] Okunola, O. H. (2025). Beyond institutional silos: Rethinking multilevel disaster risk governance in Africa a decade into the Sendai Framework implementation. *International Journal of Disaster Risk Science*, 16(3), 321-332.
- [30] Prabawati, A., & Frimawaty, E. (2025). Strategies for strengthening partnerships in circular economy-based plastic waste management. *Applied Environmental Science*, 3(1), 61-76.
- [31] Rozikin, M. (2024). Multi-stakeholder communication and coordination systems in post-disaster socio-economic recovery collaboration. *Jurnal Studi Komunikasi*, 8(2), 287-304.
- [32] Saleh, A., Mujahiddin, M., & Gunawan, M. D. (2022). Optimizing corporate social responsibility funds for community empowerment and regional planning in urban slums. *International Journal Reglement & Society (IJRS)*, 3(3), 203-209.
- [33] Sandfort, J., & Moulton, S. (2014). *Effective implementation in practice: Integrating public policy and management*. John Wiley & Sons.
- [34] Saripudin, S., Hubeis, M., & Yusnita, N. (2022). The effect of the implementation of Partnership and Community Development (PK and BL) and self-reliance of community partners on community income. *Devotion: Journal of Research and Community Service*, 3(14), 2625-2634.
- [35] Selvarajan, P. (2022). The impact of remedial teaching on improving the competencies of low achievers. *International Journal of Social Science & Interdisciplinary Research*, 11(01), 283-287.
- [36] Simon, H. A. (1990). Bounded rationality. In *Utility and probability* (pp. 15-18). London: Palgrave Macmillan.
- [37] Song, Y., Li, C., Olshansky, R., Zhang, Y., & Xiao, Y. (2017). Are we planning for sustainable disaster recovery? Evaluating recovery plans after the Wenchuan earthquake. *Journal of Environmental Planning and Management*, 60(12), 2192-2216.
- [38] Sou, G. (2019). Sustainable resilience? Disaster recovery and the marginalization of sociocultural needs and concerns. *Progress in Development Studies*, 19(2), 144-159.
- [39] Tanesab, J. P. (2020). Institutional effectiveness and inclusions: Public perceptions on Indonesia's disaster management authorities. *International Journal of Disaster Management*, 3(2), 1-15.
- [40] Widiastuti, T., Ningsih, S., Prasetyo, A., Mawardi, I., Herianingrum, S., Robani, A., ... & Hady, A. F. (2022). Developing an integrated model of Islamic social finance: Toward an effective governance framework. *Heliyon*, 8(9), 910-920.

