



Integrating the SLOC Framework: Systemic Design for Scalability Strategies in Rural Indonesia

Dhientia Andani¹

¹ Universitas Prasetiya Mulya, Tangerang, Banten, 15339, Indonesia
dhientia.andani@prasetiyamulya.ac.id

Abstract. In regions like rural Indonesia, the unique nature resulting from limited global economic and technological engagement demands bespoke solutions over generic ones. This research focuses on the transformative potential of design for rural Indonesian communities, offering critical insights for similar developmental endeavors. By employing the Small, Local, Open, and Connected (SLOC) framework in tandem with design thinking, the study aims to gauge the efficacy of systemic design strategies in promoting scalable local growth. Data was gathered through in-depth interviews and observations in Temanggung, Central Java, supplemented with desk research. The results underscore that marrying Design Thinking with the SLOC approach adeptly navigates complex systemic relationships, viewing communities as integral parts of a broader ecosystem. Collaborations between design professionals and local villagers proved essential in unraveling systemic intricacies, thereby crafting sustainable strategies rooted in local capacities. The SLOC technique excels in leveraging relationships, dependencies, and diverse elements to instigate scalable regional shifts. This highlights the designer's cardinal role as a conduit for sustainable rural progress and community well-being, offering valuable direction for community developers tackling socio-ecological challenges. Future investigations might venture into the applicability of these methods across varied rural landscapes, deepening our understanding of Design's influence on multifaceted societal issues.

Keywords: Systemic Design, Design Thinking, Rural Development, SLOC, Indonesia.

1 Introduction

Rural communities globally grapple with challenges like depopulation, economic decline, and environmental deterioration, leading many young residents to migrate to urban areas [1]. While abundant in natural resources, rural dwellers often face economic disadvantage and deteriorating environments [2, 3]. The multifaceted nature of these challenges has rendered traditional solutions inadequate. Consequently, there is growing interest in design as a remedy for rural issues [4].

Systemic design, which marries systems and design thinking, emerges as a promising solution to these challenges, aiming for systemic integration and addressing social complexity [5, 6, 7]. Researchers recommend guiding principles for systemic design, such as adopting a holistic view to understand linkages [8, 7], cultivating empathy and shifting mental models to facilitate change [7], and using an iterative, evolutionary approach [7, 8].

In rural settings, systemic design has proven to be highly effective in fostering sustainable development. Studies from China and Italy have highlighted its role in understanding rural complexities, encouraging innovative thinking and teamwork [9]. In Colombia, integrating engineering design with systemic techniques has been advocated to improve living conditions sustainably [10]. Systemic design is also seen as a way to utilize local resources for sustainable rural growth and to transform challenges into opportunities [11]. Moreover, there is a belief that it can help tap into the latent economic potential of rural areas [12].

Systemic design in Indonesia holds significant potential to propel rural development, even if it's an under-researched topic. The ethnographic design approach, which encourages understanding through empathy, can create solutions tailored to local challenges and promote sustainable living [13]. Community-based design introduces diverse ideas of progress, fostering inclusive rural innovations [14]. The participatory design method integrates democratic processes and acknowledges the roles of both formal and informal institutions in socioeconomic advancement [15]. Participatory co-design, inspired by local education philosophies, supports sustainable community growth [16]. Design culture, a form of participatory tool, identifies innate potentials to help build thriving rural communities [17].

The current research provides valuable knowledge on design methods in specific rural settings. However, it doesn't clearly show how these localized designs can be expanded or adjusted for different areas or groups. This is mainly because past research heavily focused on local knowledge and assets. There's an urgent need to determine how to broaden the use of these specific design methods without losing the importance of local resources. Additionally, there's not enough examination of the challenges arising from combining multiple fields and involving different participants. It's vital to study how holistic design strengthens rural areas, encourages local control, and possibly affects community involvement and choices.

This research aims to address disparities by studying systemic design techniques in rural areas using the SLOC (Small, Local, Open, Connected) framework. SLOC promotes small-scale, locally-customized, open systems that connect to wider networks, and envisions a society where local projects drive significant change. This approach offers insights into the development of sustainable, interconnected communities and highlights effective scaling strategies. SLOC also emphasizes the importance of recognizing and integrating local cultures, traditions, and practices in design, advocating for systems tailored to local needs [4].

The study explores the integration of the SLOC approach with systemic design methods to improve scalability and adaptability in rural Indonesian projects, with a focus on local ownership and community participation. It particularly reviews the case of Pasar Papringan in Temanggung, Central Java, which serves as an exemplary model of how systemic design can transform a community. The project at Pasar Papringan combined design expertise, indigenous knowledge, and environmental assets to rejuvenate the bamboo forest and revitalize the village's economic, cultural, and environmental aspects. By using Design Thinking and the SLOC approach, the team emphasized local culture and resources, ensuring every community member had a say. The market also connected with outsiders, broadening its reach and impact. This research involved a comprehensive ethnographic study, interviews with diverse stakeholders, and an analysis of secondary sources to understand the project's impact and the challenges of

applying localized design strategies broadly. The goal is to provide insights for those involved in rural development and design.

2 Finding

This Study employs a Case Study of Pasar Papringan, a Design-Driven Rural Initiative, for its analysis. The Pasar Papringan initiative is an excellent illustration of how systemic design can be utilized to address complex socioecological issues in rural areas. The initiative has established a sustainable market that has benefited the economic conditions of the community, preserved the local culture, and safeguarded the environment.

2.1 Case Study

To identify cultural differences in the efficacy of systemic design methods and to identify region-specific best practices. This article presents a compelling case study of Pasar Papringan in Ngadiprono Hamlet, a design-driven rural initiative in Indonesia. Pasar Papringan is a thematic market situated within a bamboo forest in Ngadiprono Hamlet, Central Java. Before the establishment of Pasar Papringan, the bamboo forest in Ngadiprono was neglected and used as a waste dump. This mismanagement led to environmental degradation and fostered negative attitudes among the locals. Pasar Papringan seeks to revitalize the bamboo forest, promote economic growth, and cultivate community pride. This is accomplished by promoting the use of bamboo forests, providing a venue for local farmers and entrepreneurs to market their goods, and facilitating cultural events and educational activities.

The International Conference on Village Revitalization (ICVR) played a crucial role in the history of Pasar Papringan. The ICVR event draws together activists, practitioners, intellectuals, and institutions to discuss issues pertaining to village revitalization. In addition to Pre-Conference Projects, the ICVR platform includes seminars, workshops, excursions, and exhibitions, among other activities. Spedagi, an Indonesian design initiative, began addressing the decline of rural villages caused by rapid urbanization. The first ICVR in 2014 occurred in Kandangan village, followed by the second event in August 2016 in Japan, which led to the Pre-Conference Project in Kelingan Hamlet, a precursor to Pasar Papringan in Ngadiprono Hamlet.

Spedagi founded Pasar Papringan in Kelingan with the goal of rejuvenating the Papringan area of Kelingan. This area was once a neglected, shadowy slum where residents dumped their waste. To address this, Spedagi not only preserved the bamboo garden but also transformed it into a market space. To implement this vision, Spedagi partnered with a local leader, entrusting him to engage the villagers in the transformation process. The market in Kelingan Hamlet did open successfully, but it soon closed due to internal disputes and resistance from landowners. This closure could be attributed to the local leader's decision to select participants based on personal ties. This might have led to biased information sharing and hindered broader community participation. It's worth noting that Spedagi, being an external organization, might not have had deep engagement with the locals yet. Nevertheless, the Pasar Papringan market found a fresh start in Ngadiprono. Both the Kelingan and Ngadiprono versions

of Pasar Papringan aim at village revitalization. However, in Ngadiprono, a local from the community collaborated directly with Spedagi. Pasar Papringan in Ngadiprono is a successful example of community-driven sustainable development that suitably represents its initiatives as a SLOC Scenario. It is a community-driven endeavor made possible by the collaboration of Spedagi designers, local villagers, and other allies. It has also contributed to the improvement of the economic well-being and cultural pride of the local community.

2.2 Holistic Systemic Design and Community-Centric Implementation

Design Thinking was employed to understand the community's needs and to devise solutions to their challenges. The Spedagi team conducted a location survey and engaged deeply with villagers to grasp their concerns. They pinpointed slum-like conditions and waste near residential areas, as well as the potential of the clustered bamboo forest. The initiative was routinely assessed to ensure alignment with community needs. This mirrored the iterative approach of design thinking, enabling continuous project enhancement.

The solution was realized through co-design, necessitating profound collaboration with villagers. Though the market in Kelingan began with a select group, the local leader in Ngadiprono, who initiated collaboration with Spedagi, sought consent from all residents of Ngadiprono. This inclusive method seemed to promote stronger ties and social capital. The villagers in Ngadiprono were involved in every step, from brainstorming to prototype and testing. Such involvement ensured that the community felt a sense of ownership over the solution, making it sustainable in the long run. Other than gaining villagers' consent, utilizing the bamboo field was also essential. While the bamboo field in Kelingan was leased for a year, Pasar Papringan Ngadiprono shared 5% of its profits with the landowners, reinforcing their sense of market ownership.

Beyond Spedagi's core team, Pasar Papringan Ngadiprono fostered collaborations with various entities, including private companies seeking financial support via CSR initiatives. Additionally, volunteers, hailing from regions within Indonesia and countries like India and Thailand, were instrumental in the project's evolution. It is also notable that local governmental involvement differed between the Kelingan and Ngadiprono markets. While Spedagi was somewhat hesitant to collaborate with the government in Kelingan, Ngadiprono's local leader pursued a more cooperative relationship with local authorities for developing Pasar Papringan Ngadiprono.

The approach taken epitomizes systemic design — crafting an encompassing solution that addresses root issues by considering the whole system, including the environment, social and economic dimensions, and cultural context. The strategy aimed to improve the environment, create economic avenues for the community, and safeguard local traditions. By employing systemic design, a holistic solution was fashioned to tackle the core challenges. Engaging with diverse stakeholders — from villagers and local government to private enterprises — ensured broad-based community backing and long-term sustainability.

2.3 Pasar Papringan's Exemplary Use of the SLOC Methodology

The SLOC (Small, Local, Open, Connected) approach has played a significant role in the development of Pasar Papringan, as evidenced by its alignment with important principles and its measurable impact on the community. Pasar Papringan's embrace of the "Small Community" aspect is exemplified by initiatives such as Spedagi, ICVR, and Ngadiprono Hamlet, which demonstrate how small, local endeavors can drive innovation and change. These initiatives highlight Pasar Papringan's commitment to fostering independent, sustainable communities by emphasizing its small-scale operations.

Moreover, the development of Pasar Papringan is consistent with the SLOC framework's emphasis on "Local Resources." This principle is exemplified by the market's strategy of maximizing local resources, specifically bamboo and stone. By utilizing readily available resources within the community, Pasar Papringan preserves the area's authenticity and reduces its reliance on external resources, a fundamental tenet of the SLOC scenario.

Pasar Papringan excels at "Enhancing Local Culture" is manifested in various forms, such as food, crafts, traditional ways of life, know-how, and more. However, this achievement is not only reflected in the presentation and promotion of this local culture to tourists. It is also evident in its successful reinterpretation of 'local culture' as an avenue to create a shared vision of the future, bridging differences across scales, levels, times, and communities [18]. Such expectations can help overcome uncertainty and garner support for new ideas, as seen in the case of Ngadiprono. Conversely, because these expectations are highly speculative, they can lead to disappointment and even conflict when unmet. Such unfulfilled expectations might have been a reason for the conflict in the earlier Papringan case.

Regarding being "Open to Outsiders," Pasar Papringan actively invites outsiders to the village through its local market and tourism destinations, nurturing interactions with and contributions from the outside world. In addition, the market relies on external funding to support business growth, demonstrating its receptivity to external assistance. Its marketing strategies, which include the Internet and social media, target visitors from outside the village by promoting businesses to a wider audience. The villagers' pride at the arrival of outsiders demonstrates their receptivity to diverse perspectives and experiences.

The connection between Pasar Papringan and larger networks exemplifies the "Connected" aspect of the SLOC scenario. This interconnectedness reflects the globalized network society, in which even small, local communities are linked to the larger world, from the local to the international level, via multiple networks. Partnerships with private companies and collaboration with local communities and organizations highlight the significance of horizontal and vertical connections between minor initiatives. This collaborative strategy magnifies their impact and contributes to Pasar Papringan's success as a compelling illustration of the SLOC approach in action.

3 Discussion: Systemic Design and SLOC Framework for Rural Development

This study seeks to answer an important question: "How can systemic design methodologies, particularly within the Small, Local, Open, and Connected (SLOC) context, effectively address the multifaceted challenges facing rural communities in Indonesia, promoting sustainable development while considering localities, community engagement, and scalability?"

The convergence of design and systems thinking has emerged as an effective strategy for addressing complex problems in the ever-changing landscape of problem-solving methodologies. The essence of this combined approach at Pasar Papringan lies in its structured procedure. It begins with a thorough examination of a complex situation, with the objective of deciphering underlying patterns, behaviors, and the interaction of various system elements. Models of systems thinking provide a useful lens for analyzing the extant context and relationships. The subsequent creative phase combines empathy, ideation, and prototyping to produce innovative solutions tailored to meet the requirements of a specific problem. This process also makes leveraging local resources possible in systemic design, from natural resources to indigenous knowledge and cultural traditions. This permitted the community to celebrate and preserve the authenticity of their local culture and reduce reliance on external resources. This finding supports the previous study's argument regarding the efficacy of the design approach to rural development [13, 14, 15, 16, 17].

Therefore, design serves a dual function at Pasar Papringan. First, it functions as a problem-solver, able to address a variety of rural issues. Second, design influences the aesthetics and sense of identity of rural communities through the creation of products, spaces, and initiatives that preserve and commemorate their cultural wealth. When the equilibrium of the dual role is achieved effectively, it generates a new conception of place that moves beyond isolation and positions itself as a pivotal node in a multifaceted network [4].

The SLOC approach then improves the scalability potential of the Pasar Papringan systemic design previously discussed. The SLOC scenario deftly bridges the divide between being rooted in a particular place and community and embracing global currents comprising ideas, information, people, commodities, and finances [4]. Thus, the endeavor that began as a small attempt paved the way for expansion and a greater impact. In the era of the networked society, 'small' is no longer infinitesimal, as small-scale entities weave expansive distributed systems that represent a novel interpretation of globalization. The project's accessibility to outsiders, including visitors and external funding sources, was essential to its expansion.

Internet and social media are among the modern technologies that have expanded its market reach. This highlights the importance of connectivity and openness in scaling up systemic design interventions. The collaborative approach, which involves partnerships with other organizations, emphasizes the importance of networking and connecting with comparable endeavors even further.

4 Conclusion

The combination of systemic design methodologies and the Small, Local, Open, and Connected (SLOC) framework, as exemplified by the case study of Pasar Papringan in Indonesia, provides a compelling solution to the multifaceted challenges rural communities. This study has emphasized a number of critical findings that demonstrate the viability of this strategy:

First, systemic design offers a comprehensive and organized approach to problem-solving in rural settings. Bringing together systems thinking and design thinking allows for an in-depth understanding of complex systems and the creation of innovative, context-specific solutions. It enables communities to address environmental and economic challenges, as well as to preserve and commemorate their cultural heritage.

The SLOC framework also provides a road map for sustainable rural development. It highlights the significance of small-scale, locally-adapted initiatives that are interconnected with larger networks. The accomplishments of Pasar Papringan in revitalizing the bamboo forest, enhancing economic conditions, and preserving local culture demonstrate the efficacy of this strategy. It also emphasizes the importance of being accessible to outsiders and interconnected with larger networks for scalability.

In conclusion, incorporating systemic design methodologies within the SLOC context is a promising strategy for addressing the complex challenges facing rural communities.

This strategy promotes sustainable development, empowers local communities, encourages community engagement, and offers a framework for scaling up successful interventions. As rural areas struggle with depopulation, economic decline, and environmental degradation, the lessons learned from Pasar Papringan and comparable initiatives can provide a path toward resilient, thriving, and interconnected rural societies. These principles must be embraced by policymakers, practitioners, and designers to herald in a new era of rural development that values local resources, cherishes cultural diversity, and promotes global sustainability. Given the rapid technological advancements globally, future studies could further expanding this framework to various rural settings, while explore how technology can support or hinder the application of this framework in rural context.

References

1. Jones, P.: Preface: Taking stock and flow of systemic design. *Systemic Design: Theory, Methods, and Practice*; Translational Systems, Sciences; Jones, P., Kijima, K., Eds (2018).
2. Jones, P.: Contexts of co-creation: Designing with system stakeholders. *Systemic design: Theory, methods, and practice* (2018): 3-52.
3. Barbero, S.: Local ruralism: Systemic design for economic development. *Systemic Design: Theory, Methods, and Practice* (2018): 271-291.
4. Manzini, E.: *Design, when everybody designs: An introduction to design for social innovation*. MIT press, (2015).
5. Cocklin, C., Bowler, L., & Bryant, C.: Introduction: sustainability and rural systems. *The Sustainability of Rural Systems: Geographical Interpretations*, 1-12, (2002).

6. Barbier, E. B.: Links between economic liberalization and rural resource degradation in the developing regions. *Agricultural economics* 23.3 (2000): 299-310.
7. Waldenström, C., and Erik W.: The natural resource turn: challenges for rural research and policy. *Journal of Rural and Community Development* 4.1 (2009).
8. Akama, Y. "Continuous re-configuring of invisible social structures.: Designing technology, work, organizations and vice versa, Vernon Press, Malaga (2015): 163-183.
9. Zang, D., Xie, Y., Barbero, S., & Pereno, A.: How Does Systemic Design Facilitate the Sustainability Transition of Rural Communities? A Comparative Case Study between China and Italy. *Sustainability*, 15(13), 10202, (2023).
10. Ramírez, M. C., Plazas, J., Torres, C., Silva, J. C., Caicedo, L. C., & González, M. A.: A Systemic Framework to Develop Sustainable Engineering Solutions in Rural Communities in Colombia: Case Study: Ingenieros sin Fronteras Colombia. *Systemic Practice and Action Research*, 25, 95-11, (2012).
11. Bicocca, M.: Rural development and sustainable innovation how systemic design approach can contribute to the growth of marginal regions. *Systems&design: beyond processes and thinking* (2016): 315-326.
12. Barbero, S., and Miriam B. "Systemic Design approach in policy-making for sustainable territorial development." *The Design Journal* 20.sup1 (2017): S3496-S3506.
13. Sudhiastiningsih, N. N. S. N., & Chadijah, S.: Design for Impact: Ethnographic Design Approach as Collaborative Design Model in Ngada Regency, East Nusa Tenggara, in *International Conference on Art Culture and Design*, Bandung, (2017).
14. Dewanggamanik, G.: Reimagining Other Narratives Navigating the Role of Design in Fostering the Cultures of Inclusive Innovation in Rural Indonesia, in *ICON ARCCADE 2021*, Bandung, (2021).
15. Malasan, P. L., Meirina T., and Muhammad I.: *The Role of Socio-technical Instruments in Craft and Design Practice in Indonesia*. (2020).
16. Utami, L. A., Lechner, A. M., Permanasari, E., Purwandaru, P., & Ardianto, D. T.: Participatory Learning and Co-Design for Sustainable Rural Living, Supporting the Revival of Indigenous Values and Community Resiliency in Sabrang Village, Indonesia. *Land*, 11(9), 1597, (2022).
17. Purwandaru, P., Utami, L. A., Ueda, A., & Ardianto, D. T.: Introduction of design culture as approach in endogenous regional development: a study case in farming community of Sabrang Village, Central Java, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 905, No. 1, p. 012070). IOP Publishing, (2021).
18. Borup, M., Brown, N., Konrad, K., & Van Lente, H.: The sociology of expectations in science and technology. *Technology analysis & strategic management*, 18(3-4), 285-298, (2006).
19. Alex, M. L. Ryan, J.: *Systemic Design: Two Canadian Case Studies*, vol. 7, no. 3, pp. 1-14, (2014).
20. Van der Bijl-Brouwer, M., and Malcolm. B.: Systemic design principles in social innovation: A study of expert practices and design rationales. *She Ji: The Journal of Design, Economics, and Innovation* 6.3 (2020): 386-407.
21. Battistoni, C., Giraldo Nohra, C., & Barbero, S.: A systemic design method to approach future complex scenarios and research towards sustainability: A holistic diagnosis tool. *Sustainability*, 11(16), 4458, (2019).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

