

## SVARTLAMON: A MODEL OF URBAN-SCALE SUSTAINABILITY AND COMMUNITY INNOVATION IN NORWAY

Bintang Noor Prabowo<sup>1,2\*</sup>

\*) Corresponding author email : [bintangprabowo@lecturer.undip.ac.id](mailto:bintangprabowo@lecturer.undip.ac.id), [bintang.n.prabowo@ntnu.no](mailto:bintang.n.prabowo@ntnu.no)

- 1) Department of Civil and Planning, Diponegoro University, Semarang
- 2) Department of Civil and Environmental Engineering, Norwegian University of Science and Technology, Trondheim

### Abstract

*The Svartlamon district of Trondheim, Norway, as a pioneering example of community-driven sustainability within an urban experimental framework, is investigated in this paper. Municipal authorities have assigned Svartlamon as a special area for testing innovative sustainable urban living solutions, thus making it a unique case study in integrating social, environmental, and financial sustainability at the local level. By means of comprehensive case studies, this study investigates several projects carried out in Svartlamon, including green building projects such as the Eksperimentboliger, waste management systems, participatory community governance models, urban agriculture, sustainable transportation programs, community-operated renewable energy installations, and educational and cultural events meant to raise environmental awareness and community cohesion. The results of Svartlamon experiment provided insight into how well community-driven initiatives might generate significant environmental benefits and improve social ties in urban environments. These projects not only help to lower the environmental impact by achieving better resource efficiency and waste reduction but also strengthen the resilience and sustainability of the urban community by encouraging active participation and involvement among the citizens. This paper addresses the scalability and replicability of Svartlamon's practices, thereby providing insightful guidance for urban designers and policymakers engaged in similar projects intended to include sustainability into urban development. The study emphasizes the possibility of localized, community-based initiatives in changing urban environments and implies that sustainable urban development in the twenty-first century depends on such methods.*

**Keywords:** *Urban experiment, land use, PLUS Change, urban FM, community-based initiatives*

### INTRODUCTION

In the heart of Trondheim, Norway, lies Svartlamon, an area that stands out as a beacon of community-driven sustainability and urban experimentation (Hemmersam et al., 2015; Jiang et al., 2022). Established in the 1990s as a response to impending development pressures that threatened its historical fabric, Svartlamon was designated by the municipal government as an "urban ecological experimental area" (Hemmersam et al., 2015). This unique status has allowed Svartlamon to become a living laboratory where innovative approaches to urban living, sustainability practices, and community governance are not only imagined but actively implemented and lived by its residents (Bratuškins et al., 2020; Hemmersam et al., 2015). The area's development into a sustainable urban district highlights its potential to serve as a model for other cities facing similar challenges of urbanization, sustainability, and community engagement (Anttiroiko, 2016; Hemmersam et al., 2015).

Parallel to the local efforts in Svartlamon, broader initiatives like the PLUS Change project, funded by the European Union's Horizon Europe research and innovation programme, aim to address urban challenges on a grander scale (Medeiros, 2022; Tian et al., 2023). The PLUS Change project focuses on developing and disseminating innovative strategies for land use and urban planning that prioritize sustainability, resilience, and community welfare (Picken, 2013; Tian et al., 2023). This project aligns with the broader EU goals of transforming urban environments into inclusive, safe, resilient, and sustainable spaces (Saad-Sulonen, 2012; Tian et al., 2023). Svartlamon's experiences and experiments provide valuable insights into the practical application of these ideals (Hemmersam et al., 2015; Tian et al., 2023), making it a pertinent case study within the scope of PLUS Change objectives.

The objectives of this article are to explore and document the sustainability practices at Svartlamon, to assess their impacts on both the local environment and

the community, and to understand how these practices align with and contribute to the goals of the PLUS Change project. By doing so, this article aims to provide a comprehensive overview of Svartlamon as an exemplary model of sustainable urban development that other cities might learn from (Dyer et al., 2017; Hemmersam et al., 2015). The exploration will not only highlight the successes and challenges faced by the Svartlamon community but also examine the scalability and transferability of its practices to different urban contexts within Europe and beyond (Hemmersam et al., 2015; Ibama et al., 2022). Through this study, we seek to contribute to the ongoing dialogue on sustainable urban development and to reinforce the importance of community-driven initiatives in achieving broad-scale urban sustainability goals.

### **Svartlamon: An overview**

Svartlamon's journey from a threatened district on the brink of redevelopment to a vibrant experimental urban area (Figure 1.) exemplifies the power of community activism and innovative urban planning (Hemmersam et al., 2015; Jiang et al., 2022). This transformation has not only preserved the unique character of the area but also turned it into a model for sustainable urban development (Bratuškins et al., 2020).



**Figure 1.** Triangular area of Svartlamon, source: <https://trondheim2030.no/2016/05/11/hva-na-svartlamon/>

### **Historical Development of Svartlamon**

Svartlamon's history is marked by its origins as a traditional working-class neighborhood in Trondheim (Anttiroiko, 2016; Hemmersam et al., 2015). In the early 1990s, the area faced significant redevelopment pressures that threatened to displace its residents and alter its character (Hemmersam et al., 2015; Tian et al., 2023). In response, the residents mobilized a grassroots movement aimed at preserving the neighborhood (Hemmersam et al., 2015; Medeiros, 2022). Their efforts were recognized by the city of Trondheim, which in 1997 officially designated Svartlamon as an experimental urban district for sustainable living (Hemmersam et al., 2015; Picken, 2013). This designation stemmed from a growing recognition of the

need to explore alternative urban development models that prioritized ecological and social sustainability over mere economic gain (Hemmersam et al., 2015; Saad-Sulonen, 2012). The experimental status granted to Svartlamon allowed for the implementation of novel practices in urban development and governance, turning the area into a living research project (Dyer et al., 2017; Hemmersam et al., 2015). It became a site where sustainable architectural innovations, community-driven land use planning, and alternative living arrangements could be tested and refined in real-world settings (Hemmersam et al., 2015; Ibama et al., 2022).

### ***Svartlamon's Unique Legal and Social Framework***

The legal framework that underpins Svartlamon's status is unique in the Norwegian context (Hemmersam et al., 2015; Vasileiou et al., 2018). The area is managed by a local development association, the Svartlamon Housing and Urban Renewal Association, which operates under a mandate from the Trondheim Municipality (Alhusban et al., 2021; Hemmersam et al., 2015). This association is tasked with preserving the architectural and historical integrity of the area while promoting sustainable development practices (Hemmersam et al., 2015; Wnuk et al., 2011). The legal arrangements ensure that the land is owned by the municipality but leased on very favorable terms to the association, which then administers it according to the community's sustainability goals (Klingberg et al., 2021). This framework facilitates a high degree of community autonomy in decision-making regarding land use, building renovations, and new constructions, subject to the overarching goal of environmental sustainability (Fraisl et al., 2020). The model represents a pioneering approach to urban governance, where city authorities and local communities collaborate closely to achieve shared objectives (Hemmersam et al., 2015; King et al., 2021).

### ***Demographics and Infrastructure***

Today, Svartlamon is home to a diverse population of about 200 residents, including artists, families, students, and activists, all drawn by the community's alternative lifestyle and commitment to sustainability (Hemmersam et al., 2015; Woods et al., 2022). The demographic diversity of the area is a cornerstone of its vibrant community life, contributing to a rich cultural scene and a strong sense of communal identity (Aldrich & Meyer, 2015; Hemmersam et al., 2015). The infrastructure in Svartlamon is tailored to support sustainable living (Hemmersam et al., 2015; Moczek et al., 2021). It includes features such as communal gardens, which provide residents with fresh produce and serve as communal gathering spaces; eco-friendly buildings that utilize recycled materials and green technologies; and shared facilities that reduce the

need for private ownership of resources. The area also emphasizes pedestrian and bicycle-friendly pathways, minimizing the reliance on cars and thus reducing the urban carbon footprint (Kumar & Sarma, 2016).

## SVARTLAMON AS CASE STUDY OF SUSTAINABILITY

### *Green Building Projects*

At the core of Svartlamon's architectural innovation is the Eksperimentboliger (Figure 2.), designed by Nøysom Arkitekter, alongside other green building initiatives that serve as benchmarks for sustainable construction (Bratuškis et al., 2020; Hemmersam et al., 2015; Jiang et al., 2022). These projects prioritize the use of recycled materials, energy-efficient designs, and substantial community involvement in both planning and execution (Anttiroiko, 2016; Hemmersam et al., 2015; Tian et al., 2023). For instance, the Eksperimentboliger utilizes reclaimed wood and other recycled materials, significantly reducing the carbon footprint associated with construction (Hemmersam et al., 2015; Medeiros, 2022; Picken, 2013).



**Figure 2.** The five self-built houses in Svartlamon, source: <http://www.eksperimentboliger.no/>

The environmental impact of these projects extends beyond mere construction; they serve as educational platforms for both residents and visitors, demonstrating practical applications of sustainable building techniques (Dyer et al., 2017; Hemmersam et al., 2015; Saad-Sulonen, 2012). The community's involvement in these projects not only enhances their sustainability literacy but also fosters a sense of ownership and responsibility towards their living environment.

### *Waste Management Systems*

Svartlamon has developed comprehensive recycling and composting programs that emphasize community participation and effective system management (Alhusban et al., 2021; Hemmersam et al., 2015; Wnuk et al., 2011). These programs are designed to minimize waste and promote recycling behaviors

among residents, featuring community-operated recycling stations and composting facilities that handle organic waste (Fraisl et al., 2020; Klingberg et al., 2021). The involvement of the community in the daily management of these systems ensures their operational effectiveness and sustains high levels of participation (King et al., 2021; Woods et al., 2022). The evaluation of these waste management initiatives shows a notable reduction in waste sent to landfills and an increase in recycled materials (Aldrich & Meyer, 2015; Hemmersam et al., 2015; Moczek et al., 2021). These environmental benefits are complemented by educational outcomes, as residents learn the importance and techniques of waste separation and reduced consumption.

### *Community Governance Models*

The Svartlamon Housing and Urban Renewal Association exemplifies community-based governance in urban development (Bocken et al., 2018; Hemmersam et al., 2015; Xu et al., 2020). This body is responsible for overseeing all development projects within Svartlamon, ensuring they align with the community's sustainability goals (Hemmersam et al., 2015; King et al., 2021; Socheath et al., 2019). It facilitates a participatory decision-making process that engages a wide spectrum of the community, from long-term residents to newer members (Hemmersam et al., 2015; O'Brien & Howard, 2016). The impact of this governance model is profound, maintaining the affordability and sustainability of housing while fostering an inclusive community environment (Boateng et al., 2016; Hemmersam et al., 2015; Shiratina et al., 2023). However, the model faces challenges, such as balancing diverse community interests and ensuring the long-term viability of its governance structure (Eshete et al., 2022; Hemmersam et al., 2015; Suwerda et al., 2018).

### *Urban Agriculture Initiatives*

Urban agriculture is a pillar of Svartlamon's sustainability practice, with numerous community gardens and small urban farms (Hemmersam et al., 2015; Yoda et al., 2014). These initiatives not only provide fresh produce to the community, enhancing food security and reducing food miles but also strengthen community bonds. The gardens are communal spaces where knowledge and skills are shared, enhancing social cohesion. Despite their success, these agricultural initiatives encounter challenges such as resource management, particularly in balancing water usage and optimizing land use, and dealing with seasonal variations that affect crop yields.

### *Renewable Energy Projects*

Community-operated solar power installations in Svartlamon illustrate the community's commitment to

energy independence and sustainability (Hemmersam et al., 2015; Hoppe & Lulofs, 2011). These installations provide a significant portion of the community's energy needs, reducing reliance on external power sources and fostering environmental stewardship (Bibri & Krogstie, 2020; Hemmersam et al., 2015). The technical and financial challenges associated with deploying and maintaining these systems are significant, requiring continuous community investment and technical expertise to ensure their effectiveness and durability (Firmansyah et al., 2022; Hemmersam et al., 2015).

### ***Educational and Cultural Programs***

Svartlamon hosts various sustainability workshops and cultural festivals that play a crucial role in promoting environmental awareness and community participation (Hemmersam et al., 2015). These events are not only educational but also vital for enhancing community spirit and cohesion (Hemmersam et al., 2015; Senior et al., 2021). They provide a platform for sharing knowledge on sustainability practices and celebrating the community's cultural diversity. The effectiveness of these programs in fostering long-term environmental awareness and behavior change is a testament to their importance. However, organizing these events often requires substantial effort and resources, highlighting the need for sustainable funding and volunteer management strategies.

Through these diverse initiatives, Svartlamon not only demonstrates the feasibility of integrated sustainability practices in urban settings but also highlights the challenges and complexities involved (Senior et al., 2021). Each case study underscores the potential for replicable models of community-driven sustainability, offering valuable lessons for other urban areas aspiring to integrate similar practices.

### **Discussions**

The exploration of Svartlamon's diverse sustainability practices presents a compelling narrative about the potential of integrated community-driven approaches to foster urban sustainability (Bratuškina et al., 2020; Hemmersam et al., 2015; Jiang et al., 2022). This discussion synthesizes the findings from the case studies, evaluates their scalability and replicability, and considers the implications for urban planners and policymakers within the framework of the PLUS Change project (Anttiroiko, 2016; Hemmersam et al., 2015; Tian et al., 2023).

### ***Synthesis of Findings from the Case Studies***

The case studies from Svartlamon reveal a complex yet effective ensemble of sustainability practices that are deeply rooted in community participation and ecological stewardship (Hemmersam et al., 2015; Medeiros, 2022; Picken, 2013). From green building projects like the Eksperimentboliger to

comprehensive waste management systems and innovative community governance models, each initiative contributes uniquely to the sustainability and resilience of the urban environment (Dyer et al., 2017; Hemmersam et al., 2015; Saad-Sulonen, 2012). These practices not only enhance ecological sustainability by reducing environmental impacts and promoting resource efficiency but also bolster social resilience through enhanced community engagement and social cohesion (Hemmersam et al., 2015; Ibama et al., 2022; Vasileiou et al., 2018). The urban agriculture initiatives underscore the community's commitment to self-sufficiency and reduced ecological footprints (Alhusban et al., 2021; Hemmersam et al., 2015; Wnuk et al., 2011). Similarly, renewable energy projects and cultural programs at Svartlamon not only support sustainable development goals but also empower the community, fostering a culture of sustainability that permeates various aspects of daily life (Fraisl et al., 2020; Hemmersam et al., 2015; Klingberg et al., 2021).

### ***Scalability and Replicability of Svartlamon's Practices***

While the sustainability practices at Svartlamon have demonstrated significant success within their specific context, the scalability and replicability of these practices pose several challenges (Hemmersam et al., 2015; King et al., 2021; Woods et al., 2022). The unique legal and administrative framework of Svartlamon, coupled with its strong community governance structure, may not be directly transferable to other urban contexts where regulatory environments and community dynamics differ significantly (Aldrich & Meyer, 2015; Hemmersam et al., 2015; Moczek et al., 2021). However, elements of Svartlamon's approach, such as its emphasis on local participation, the integration of sustainability into cultural and educational activities, and the use of public spaces for communal benefit, offer valuable models that can be adapted to different settings (Hemmersam et al., 2015; King et al., 2021; Kumar & Sarma, 2016). The key to replicability lies in tailoring these practices to local conditions, ensuring alignment with broader urban policies, and fostering partnerships between communities, local governments, and stakeholders (Hemmersam et al., 2015; Xu et al., 2020).

### ***Implications for Urban Planners and Policymakers***

The findings from Svartlamon provide critical insights for urban planners and policymakers engaged in the PLUS Change project (Anttiroiko, 2016; Hemmersam et al., 2015; Tian et al., 2023). The project aims to develop innovative land use and urban planning strategies that promote sustainability and resilience across European cities (Anttiroiko, 2016; Tian et al., 2023). Svartlamon's model illustrates the potential of community-driven initiatives to significantly contribute to these goals.

Urban planners can draw on Svartlamon's experiences to design flexible policy frameworks that facilitate community involvement in sustainability initiatives. By creating enabling environments that support such grassroots activities, cities can enhance their adaptability and resilience to environmental and social challenges. Policymakers can also use these insights to develop guidelines that encourage the replication of successful practices like those observed in Svartlamon, ensuring that urban sustainability is both a top-down and a bottom-up process. Moreover, the integration of Svartlamon's practices into the PLUS Change framework can help articulate a more comprehensive approach to sustainable urban development that balances ecological, economic, and social objectives (Anttiroiko, 2016; Hemmersam et al., 2015; Tian et al., 2023). This can lead to more robust and inclusive urban policies that not only address immediate environmental concerns but also foster long-term community well-being and resilience.

### Conclusions

This study has systematically explored the Svartlamon district, a pioneering urban-scale experiment in Trondheim, Norway, that integrates sustainability into its fabric through innovative and community-driven approaches. The detailed examination of Svartlamon's various sustainability practices has revealed their significant contributions to urban sustainability, providing a model for community engagement and environmental stewardship that can inspire and inform other urban areas. Svartlamon stands out as a successful example of how urban areas can foster sustainability from the ground up. The community's initiatives in green building, waste management, community governance, urban agriculture, sustainable transportation, renewable energy, and educational programs illustrate a comprehensive approach to sustainability that encompasses environmental, social, and economic dimensions. These initiatives have not only reduced the environmental impact through improved waste management and energy efficiency but have also enhanced community cohesion and local self-sufficiency, making Svartlamon a vibrant and resilient urban space.

The experience of Svartlamon offers several actionable insights for other cities aiming to incorporate sustainability into their urban planning and development strategies, such as (1) Foster Community Engagement: Cities should create mechanisms for active community participation in sustainability initiatives. This can be facilitated through supportive policy frameworks that encourage local governance and public involvement in decision-making processes, (2) Implement Flexible Policy Frameworks: Urban planners should develop flexible and adaptive policies that allow for

experimental and grassroots initiatives. Such policies can accommodate innovative practices that might not fit into traditional planning models, (3) Promote Integrated Sustainability Practices: Cities should aim to integrate various sustainability practices across different sectors, including housing, transportation, energy, and waste management, to create synergistic effects that enhance overall urban sustainability, and (4) Support Educational and Cultural Programs: Urban areas can benefit from fostering educational and cultural programs that promote sustainability awareness and community spirit. These programs are crucial for long-term behavioral change towards more sustainable lifestyles.

Svartlamon provides a valuable case study in the potential for urban districts to lead in sustainability through community-driven initiatives. The lessons learned from Svartlamon's approach can guide other cities in developing strategies that not only address environmental challenges but also strengthen community bonds and improve the overall quality of urban life. By adopting and adapting these practices, cities can move towards more sustainable, resilient, and inclusive urban futures.

### Acknowledgment

The research conducted and presented in this article forms part of the author's responsibilities as an ambassador for the PLUS Change project, which is funded by the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101081464. The views and opinions expressed in this article are those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA).

### REFERENCE

- Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American Behavioral Scientist*, 59(2), 254–269.
- Alhusban, A. A., Alhusban, S. A., & Alhusban, M. A. (2021). How the COVID 19 pandemic would change the future of architectural design. *Journal of Engineering, Design and Technology*, 20(1), 339–357.
- Anttiroiko, A.-V. (2016). City-as-a-platform: The rise of participatory innovation platforms in Finnish cities. *Sustainability*, 8(9), 922.
- Bibri, S. E., & Krogstie, J. (2020). The emerging data-driven Smart City and its innovative applied solutions for sustainability: The cases of London and Barcelona. *Energy Informatics*, 3(1), 5.
- Boateng, S., Amoako, P., Appiah, D. O., Poku, A. A., & Garsonu, E. K. (2016). Comparative analysis of households solid waste management in rural and urban Ghana. *Journal of Environmental and Public Health*, 2016(1), 5780258.
- Bocken, N. M. P., Schuit, C. S. C., & Kraaijenhagen, C. (2018). Experimenting with a circular business model: Lessons from eight cases. *Environmental Innovation and Societal*

- Transitions*, 28, 79–95.
- Bratuškis, U., Zaleckis, K., Treija, S., Koroļova, A., & Kamičaitytė, J. (2020). Digital information tools for urban regeneration: Capital's approach in theory and practice. *Sustainability*, 12(19), 8082.
- Dyer, M., Corsini, F., & Certomà, C. (2017). Making urban design a public participatory goal: toward evidence-based urbanism. *Proceedings of the Institution of Civil Engineers-Urban Design and Planning*, 170(4), 173–186.
- Eshete, A., Haddis, A., & Mengistie, E. (2022). *Renewable energy generating technologies from solid waste improve urban waste management system in Asella town, Arsi zone, Oromia regional state, Ethiopia*.
- Firmansyah, A., Dharmawan, L., Kriswatriyono, A., & Wulandari, Y. P. (2022). Environmental Management System Toward Sustainable Development Goals Achievement Base on Community Empowerment in Peri-Urban. *IOP Conference Series: Earth and Environmental Science*, 950(1), 12067.
- Fraisl, D., Campbell, J., See, L., Wehn, U., Wardlaw, J., Gold, M., Moorthy, I., Arias, R., Piera, J., & Oliver, J. L. (2020). Mapping citizen science contributions to the UN sustainable development goals. *Sustainability Science*, 15, 1735–1751.
- Hemmersam, P., Martin, N., Westvang, E., Aspen, J., & Morrison, A. (2015). Exploring urban data visualization and public participation in planning. *Journal of Urban Technology*, 22(4), 45–64.
- Hoppe, T., & Lulofs, K. R. D. (2011). Project management and institutional complexity in domestic housing refurbishment with innovative energy solutions. A case study analysis. *World Renewable Energy Congress, WREC 2011*.
- Ibama, B., Tari, E., & Henderson, B. S. (2022). Adopting participatory planning paradigm in rivers state: a catalyst or an impedance to effective community planning. *Int J Hydro*, 6(3), 95–100.
- Jiang, H., Geertman, S., & Witte, P. (2022). Planning first, tools second: Evaluating the evolving roles of planning support systems in urban planning. *Journal of Urban Technology*, 29(2), 55–77.
- King, A. C., Odunitan-Wayas, F. A., Chaudhury, M., Rubio, M. A., Baiocchi, M., Kolbe-Alexander, T., Montes, F., Banchoff, A., Sarmiento, O. L., & Bälter, K. (2021). Community-based approaches to reducing health inequities and fostering environmental justice through global youth-engaged citizen science. *International Journal of Environmental Research and Public Health*, 18(3), 892.
- Klingberg, S., van Sluijs, E. M. F., Jong, S. T., & Draper, C. E. (2021). Can public sector community health workers deliver a nurturing care intervention in South Africa? The Amagugu Asakhula feasibility study. *Pilot and Feasibility Studies*, 7, 1–13.
- Kumar, M., & Sarma, S. K. (2016). Searching for the middle path in microfinance delivery. *Social Change*, 46(4), 512–525.
- Medeiros, E. (2022). Urban participatory planning approaches in capital cities: the Lisbon case. *European Planning Studies*, 30(6), 1144–1161.
- Moczek, N., Voigt-Heucke, S. L., Mortega, K. G., Fabó Cartas, C., & Knobloch, J. (2021). A self-assessment of European citizen science projects on their contribution to the UN Sustainable Development Goals (SDGs). *Sustainability*, 13(4), 1774.
- O'Brien, C., & Howard, P. (2016). The living school: The emergence of a transformative sustainability education paradigm. *Journal of Education for Sustainable Development*, 10(1), 115–130.
- Picken, F. (2013). From designed spaces to designer savvy societies: the potential of ideas competitions in willing participation. *Environment and Planning A*, 45(8), 1963–1976.
- Saad-Sulonen, J. (2012). The role of the creation and sharing of digital media content in participatory e-planning. *International Journal of E-Planning Research (IJEPR)*, 1(2), 1–22.
- Senior, C., Salaj, A. T., Vukmirovic, M., Jowkar, M., Kristl, Ž., Palella, B. I., Alonso, R., & Lezcano, G. (2021). *The Spirit of Time-The Art of Self-Renovation to Improve Indoor Environment in Cultural Heritage Buildings*. <https://doi.org/10.3390/en14134056>
- Shiratina, A., Wardhani, N. K., Sabtika, V., & Mamahit, D. A. (2023). IMPLEMENTATION OF GREEN MARKETING TO MAINTAIN SUSTAINABILITY WASTE BANK BUSINESS. *ICCD*, 5(1), 519–522.
- Socheath, M. A. M., KOVIN, C., & SINTHUNAWA, C. (2019). Local community engagement as a pathway toward sustainable development through higher education institutions (HEIs) in Cambodia. *Cambodia Journal of Basic and Applied Research*, 1(2), 9–32.
- Suwerda, B., Handoyo, S. R., & Kurniawan, A. (2018). Determinant Factors for Managing Sustainable Waste Bank in Bantul Urban Areas. *Sanitasi: Jurnal Kesehatan Lingkungan*, 10(1), 37–44.
- Tian, L., Liu, J., Liang, Y., & Wu, Y. (2023). A participatory e-planning model in the urban renewal of China: Implications of technologies in facilitating planning participation. *Environment and Planning B: Urban Analytics and City Science*, 50(2), 299–315.
- Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, 18, 1–18.
- Wnuk, K., Regnell, B., & Berenbach, B. (2011). Scaling up requirements engineering—exploring the challenges of increasing size and complexity in market-driven software development. *Requirements Engineering: Foundation for Software Quality: 17th International Working Conference, REFSQ 2011, Essen, Germany, March 28-30, 2011. Proceedings 17*, 54–59.
- Woods, S. M., Daskolia, M., Joly, A., Bonnet, P., Soacha, K., Liñan, S., Woods, T., Piera, J., & Ceccaroni, L. (2022). How networks of citizen observatories can increase the quality and quantity of citizen-science-generated data used to monitor SDG indicators. *Sustainability*, 14(7), 4078.
- Xu, Y., Yin, F., Xu, W., Lee, C.-H., Lin, J., & Cui, S. (2020). Scalable learning paradigms for data-driven wireless communication. *IEEE Communications Magazine*, 58(10), 81–87.
- Yoda, R. M., Chirawurah, D., & Adongo, P. B. (2014). Domestic waste disposal practice and perceptions of private sector waste management in urban Accra. *BMC Public Health*, 14, 1–10.