



Key characteristics of social innovation towards sustainable development: A case study of social innovation projects in Central Thailand

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Abstract

Social innovation is a new strategy that organizations worldwide emphasize using as a tool to address issues that respond to the needs of society and create positive changes in the dimensions of society, economy, and the environment. This research aims to identify the characteristics of social innovation that align with sustainable development approaches in Thai society. The study examined 15 social innovation projects specifically chosen to receive budgetary support from the Social Innovation Driving Unit of Central Thailand for the fiscal years 2022 and 2023 to develop social innovation. A purposive sampling method was used to select 30 key informants, including project leaders and experts. Data were collected using documents and in-depth interviews. Content analysis was then used to interpret and categorize the collected data. The research results indicated 5 essential components of being a social innovation: (1) responsiveness to real societal needs, (2) novelty, (3) transdisciplinary and collaborative network support, (4) commercial scalability, and (5) value creation in the social, economic, and environmental dimensions. Furthermore, the research highlighted the intrinsic values generated by applying innovation, leading to positive social impacts that support sustainable development, such as promoting health and well-being, fostering equity in opportunities and income, conserving, and enhancing the value of local cultures, conducting environmentally friendly operations, establishing community role models utilizing clean energy, and disseminating best practices to other communities. Organizations interested in social innovation for sustainable business and community development should integrate these five characteristics into their social innovation project frameworks, thereby perpetuating the pursuit of sustainable development goals.

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Introduction

Confronted with escalating global challenges, the confluence of social innovation and sustainability has arisen as crucial paradigms for effecting transformative change. Social innovation, delineated as the systematic formulation of inventive solutions to societal challenges and sustainability, encapsulating the integration of environmental, economic, and social considerations for long-term well-being (Murray et al., 2010; United Nations, 2015), collectively represents a dynamic approach to addressing the multifaceted issues confronting contemporary societies. Understanding the characteristics that define social innovation and sustainability is essential for unraveling the complexities of their interplay and harnessing their potential for lasting positive impact.

From the significance of social innovation, the United Nations (2022) has set innovation as one of the 17 Sustainable Development Goals (SDGs) that all sectors aim to achieve together by 2030. The issue of innovation has been specified in goal 9 (SDG 9): Promoting sustainable industry and innovation has three main areas: infrastructure, industry, and innovation; this goal aims to focus on comprehensive and sustainable industrial development.

In Thailand, business organizations accord significance to social innovation, while governmental initiatives underscore a commitment to innovation development. Notably, the 20-year National Strategic Plan (2018–2037) has been instituted to advance innovation, emphasizing its role in enhancing the country's competitiveness within the contemporary global economic and societal milieu (National Economic and Social Development Council [NESDC], 2018). The imperative of innovation is further articulated in the 13th National Economic and Social Development Plan (2023–2027), which advocates for the acceleration of economic development in Thailand by transitioning from a manufacturing-driven economy to an innovation-centric model, thereby aligning with principles of sustainable development (National Economic and Social Development Council [NESDC], 2023). The National Innovation Agency (NIA) is pivotal in advancing innovation in Thailand. Its core missions include establishing and improving the national innovation system to enhance sustainable value, facilitating accessibility and utilization of innovation infrastructure, and enhancing the innovative skills of target groups. The agency supports the development of beneficial innovation business mechanisms for the public and local communities, emphasizing social innovation

through the utilization of the Social Innovation Driving Unit (SID) across various regions. The SID is strategically deployed to cultivate and enhance innovation capabilities for entrepreneurs and communities while allocating resources to impact innovation development sustainably in designated areas. (National Innovation Agency, 2022).

However, the study of social innovation in Thailand remains limited, particularly in exploring the characteristics of social innovation within the context of Thai society. This includes understanding the components or features of social innovation in Thailand and how these characteristics contribute to problem-solving and sustainable societal development.

Therefore, in this research, we are interested in exploring the key characteristics of social innovation that align with sustainable development in the context of Thai society. It scrutinizes 15 social innovation projects conducted by community enterprises, social enterprises, and limited companies, supported by budget allocations from the Social Innovation Driving Unit of Central Thailand for fiscal years 2022 and 2023.

This research aims to construct a comprehensive model delineating the characteristics of social innovation towards sustainable development that is universally applicable across a spectrum of organizations, encompassing governmental entities, the corporate sector, civil society, small and medium-sized enterprises (SMEs), community enterprises, social enterprises, and diverse foundations. The results of this research will benefit various organizations by employing the key characteristics of social innovation as a framework for developing innovation based on the issues and context of Thai society, leading to sustainable development in alignment with the United Nations development guidelines.

Moreover, this study presents valuable in-depth insights for academics and practitioners interested in knowledge development in social innovation, serving as a foundation for future research endeavors.

Literature Review

Several key characteristics mark social innovation as a dynamic force driving positive societal change. Firstly, a fundamental aspect of social innovation lies in its ability to generate transformative solutions to complex social challenges. This transformative nature is highlighted by the work of Portales (2019), who describes social innovation as a process that leads to significant shifts in the status quo, signifying the response to unmet needs and offering new perspectives and approaches that go beyond

incremental change. This characteristic distinguishes social innovation from routine problem-solving and showcases its potential to address needs by introducing innovative ideas that can reshape societal norms and structures.

Secondly, social innovation is often characterized by its emphasis on sustainability and long-term impact. According to Novikova (2022); Satalkina and Steine (2022), sustainable social innovations endure and create lasting positive effects on communities. This implies a forward-looking approach that considers a solution's environmental, economic, and social dimensions to ensure its viability over time. The focus on sustainability underscores the intention of social innovation to address immediate challenges and contribute to enduring positive change, fostering resilience and adaptability within communities.

Furthermore, social innovation is inherently participatory and inclusive. As Kim (2022) noted, engaging various stakeholders, including community members, local governance, and policymakers, is crucial to social innovation processes. The collaborative nature of social innovation ensures diverse perspectives are considered, leading to more comprehensive and contextually relevant solutions. This participatory characteristic enhances the effectiveness of social innovations. It fosters a sense of collective ownership and shared responsibility among stakeholders, contributing to innovative solutions' overall success and sustainability. The involvement of diverse stakeholders, including government agencies, businesses, non-profits, and local communities, has been recognized as essential for generating holistic and sustainable solutions (Liu & Martens, 2023; Zikargae et al., 2022). This collaborative approach fosters a collective intelligence that combines various perspectives and expertise to address multifaceted social challenges. Additionally, scholars have explored the role of social networks and partnerships in facilitating the diffusion and scaling of social innovations, emphasizing the interconnectedness of actors in the social innovation ecosystem (Pel et al., 2020). Moreover, the emphasis on inclusivity is a key characteristic that has gained prominence in the discourse on social innovation.

The role of social innovation in sustainable development emerges as a catalyst for positive change in communities. By addressing societal needs through novel approaches, social innovation aligns with the sustainable development goals (SDGs) by contributing to economic, social, and environmental advancements. Moreover, integrating social innovation into sustainable development agendas has been identified as a strategic

imperative (Fucci, 2022). This approach ensures that social innovations address immediate societal needs and contribute to sustainable development's broader and more enduring goals.

Sustainable development is a multifaceted concept that has gained prominence in the global discourse on socio-economic progress. It refers to a development approach that seeks to meet present needs without compromising the ability of future generations to meet their own needs. Rooted in the Brundtland Commission's seminal definition in 1987, sustainable development integrates economic, social, and environmental dimensions to create a harmonious and enduring trajectory for societies. As Renganathan and Davues (2023) articulated, the SDGs further exemplify this holistic perspective, addressing issues ranging from poverty, inequality, climate change, environmental degradation, health, and other global challenges.

The Sustainable Development Goals (SDGs) consist of 17 goals, which are as follows: No poverty (SDG 1), Zero hunger (SDG 2), Good health and well-being (SDG 3), Quality education (SDG 4), Gender equality (SDG 5), Clean water and sanitation (SDG 6), Affordable and clean energy (SDG 7), Decent work and economic growth (SDG 8), Industry, innovation and infrastructure (SDG 9), Reduced inequalities (SDG 10), Sustainable cities and communities (SDG 11), Responsible consumption and production (SDG 12), Climate action (SDG 13), Life below water (SDG 14), Life on land (SDG 15), Peace, justice, and strong institutions (SDG 16), and Partnerships for the goals (SDG 17) (United Nations, 2022).

The SDGs are a global blueprint for addressing the world's most pressing challenges and fostering a sustainable future for all. United Nations envision this principle with 17 interconnected goals spanning various dimensions: poverty, inequality, climate action, and peace. These goals represent a collective commitment to achieving 5 main dimensions: economic, social, environmental, peace, and partnership progress by 2030 (United Nations, 2015). One pivotal aspect of the SDGs is their universality, applying to all countries, irrespective of their economic status. This inclusivity underscores the collaborative nature of sustainable development, emphasizing the shared responsibility of the global community. The transformative potential of the SDGs is reflected in their emphasis on leaving no one behind and prioritizing marginalized and vulnerable populations. Achieving these goals requires collective action, informed policy-making, and innovative solutions addressing the root causes of poverty, inequality, and environmental degradation (United Nations, 2022).

Methodology

The analysis of the characteristics of social innovation constitutes a qualitative research study that provides an overview of key components reflecting the nature of social innovation in response to sustainable development trends within the context of Thai society. The research adopts a purposive sampling approach for targeted social innovation projects, which have received budgetary support for social innovation development from the Social Innovation Driving Unit of Central Thailand for the fiscal years 2022 and 2023.

In selecting projects for analytical units, we studied the details of 24 projects from progress reports and specifically targeted projects until only 15 projects remained, following the criteria as follows: (1) the projects had an innovative concept; (2) operational outcomes of the projects aligned with indicators; (3) initial-phase project results were delineated, supported by empirical evidence indicating the establishment of sustainability across social, economic, and environmental dimensions; and (4) key informants were willing to provide in-depth information during the research period.

Participants

The identification of key informants adhered to purposive sampling, guided by specific criteria: (1) possession of comprehensive knowledge about the project and sustained active engagement of project developments; (2) convenient access to in-depth information relevant to the research; and (3) a voluntary and enthusiastic willingness to collaborate in supplying data. Within the research framework, the primary data sources comprise 15 project leaders and 15 project experts, ensuring a comprehensive representation. This approach yielded a total of 30 key informants.

Data Collection

The research data were systematically collected during the period spanning from May to November 2023. The methodological approach involved a comprehensive examination of reports detailing the progress of 15 social innovation projects initiated by entrepreneurs. The content analysis encompassed various facets, including the project's contextual background, the social innovation processes, success indicators, project outcomes, and the social impacts elicited by the respective projects, as presented in [Table 1](#).

Table 1 Details of 15 social innovation projects

Code	Social Innovation Project	Details of Social Innovation Project	Type of Organizations	Type of Innovation
SID-01	Automated hydroxyl radical disinfection fumigation system for ambulance Code of Area: A1-BKK [Bangkok]	It is an innovation for healthcare personnel and emergency medical service workers. It can kill bacteria and fungi in the air at a high level, helping prevent infections and promoting health and safety in the workplace. It reduces the cleaning time, lowers cleaning expenses, and minimizes chemical usage compared to traditional methods of disinfecting emergency medical service vehicles.	LC	PDI
SID-02	Cultural data collection to enhance the potential in creating community-based tourism routes Code of Area: A2-BKK [Bangkok]	It is an innovation in collecting and compiling data for community tourism. It utilizes the concept of developing a digital cultural data management system to enhance efficiency in systematic data storage. It promotes the development of tour guide skills in youth, generates additional income for the community, fosters a sense of unity, and contributes to preserving local culture.	SE	PCI
SID-03	Strengthening the monitoring system for managing wild elephants and community-based tourism Code of Area: B1-CTI [Chanthaburi]	It is an innovation in addressing the systemic problem of wild elephants by developing the leadership capacity of community members. It fosters community participation, establishes volunteer groups to monitor wild elephants, and reduces economic losses caused by elephants damaging crops and affecting people in the community. Additionally, it helps raise awareness of the conservation of forest areas for a sustainable environmental system.	CE	PCI

Table 1 continued

Code	Social Innovation Project	Details of Social Innovation Project	Type of Organizations	Type of Innovation
SID-04	Eco-print fabric Code of Area: C-TRT [Trat]	It is an innovation in printing fabric using local wisdom, leaves, and natural materials from the region. The production process is environmentally friendly, following the principles of a circular economy. It promotes knowledge in fabric printing and establishes a collaborative process within the community, fostering pride and creating additional income for the people in the community.	CE	PDI
SID-05	Solar-powered electric boats for community-based tourism Code of Area: D-SPB [Suphanburi]	It is an innovation in eco-friendly tourist boats, helping generate income for the community while reducing fuel costs for tourist boats. This innovation also reduces pollution that contributes to global warming, such as odor and smoke, and decreases noise pollution compared to traditional fuel-powered boats. Additionally, it contributes to the conservation of water-based tourism, fostering a better economy and environment for the community.	CE	PDI
SID-06	Online clothing repair and customization services, and fashion product manufacturing from recycled materials Code of Area: A3-BKK [Bangkok]	It is an innovation in online platform services for customizing and repairing old or damaged clothing, adding value to clothing and fabric scraps by transforming them into accessories and valuable items. This initiative promotes customization and clothing repair skills, provides employment for local tailors, and contributes to reducing fashion waste and leftover materials.	SE	PCI
SID-07	Vegetable jelly Code of Area: E-KRI [Kanchanaburi]	It is an innovation in transforming community organic vegetables into vegetable jelly, elevating community vegetables into health products that people of all ages and genders can consume. This innovation also raises the income level of farmers in the community.	CE	PDI
SID-08	Skincare products made from spirulina seaweed Code of Area: F-CBI [Chonburi]	It is an innovation in developing skin scrub salt products using locally sourced ingredients, including Spirulina Powder from cultivating Spirulina algae using carbon dioxide from a thermal power plant. This initiative creates additional income for the community, making the production process environmentally friendly.	CE	PDI
SID-09	NIR technology to check the quality of durian meat Code of Area: A4-BKK [Bangkok]	It is an innovation that uses NIR Technology to develop a quality inspection device for durian flesh, allowing the assessment of results through mobile phones. This innovation helps address issues of low-quality durians, such as under-ripeness, lack of sweetness, and uneven ripening. It contributes to reducing the waste of underripe and low-quality durians while also increasing income for small-scale durian growers.	LC	PDI
SID-10	Upper limb Bilateral training device with a symmetrical force transmission mechanism for stroke patients Code of Area: G-SRI [Saraburi] H-PTE [Pathum Thani]	It is an innovation of physical therapy equipment for patients with stroke. It features a real-time force detection system, aiding in rehabilitating both arms for patients. This device addresses the shortage of physical therapy equipment in the area, reducing travel expenses for patients to receive physical therapy at hospitals. It enhances the efficiency of patient care, serving a larger number of patients.	LC	PDI
SID-11	Automatic solar cell insect trap Code of Area: B2-CTI [Chanthaburi]	It is an innovation in clean energy that helps trap insects in fruit orchards, reducing agricultural losses. It assists farmers in increasing income by selling pesticide-free agricultural products, providing an alternative for insect control using clean energy, thereby minimizing the use of agricultural chemicals and their environmental impacts.	CE	PDI

Table 1 continued

Code	Social Innovation Project	Details of Social Innovation Project	Type of Organizations	Type of Innovation
SID-12	Application for access to health services for the visually impaired Code of Area: A5-BKK [Bangkok]	It is a service innovation for visually impaired individuals to access efficient healthcare services through an online platform. It helps address issues related to reading medication labels and provides various health recommendations, resulting in an improved quality of life for visually impaired individuals.	LC	PDI
SID-13	Metal sculpture from recycled paper Code of Area: I-SPK [Samut Prakan]	It is an innovation in paper art using the paper mâché technique. It incorporates recycled paper waste from the community to add value and create metal sculptures from paper waste. These durable artworks are used for decorating homes and workplaces and serving as gifts and souvenirs. Additionally, It provides training to promote skills in crafting metal sculptures from paper waste, contributing to additional income for community members.	CE	PDI
SID-14	Food waste bank Code of Area: A6-BKK [Bangkok]	It is a process of waste management innovation for food scraps in urban communities. It motivates exchanging food waste for consumer goods, promotes knowledge in organic composting, and establishes organic fertilizer production points from community food scraps. This innovation fosters the active participation of children and youth. It builds a network of organic fertilizer production points, contributing to reducing food waste, a significant contributor to global warming.	CE	PCI
SID-15	Designing local food sets for creative tourism Code of Area: A7-BKK [Bangkok]	It is an innovation in creating value and added worth for local food, fostering community participation among local businesses, and promoting income generation for entrepreneurs. This initiative is a revival and extension of local food culture, attracting community tourism through the charm of traditional flavors.	SE	PDI

Note: PDI stands for Product Innovation: This refers to new products or services that meet the needs of target groups, consumers or the market, PCI stands for Process Innovation: This involves the application of new ideas or methods in the production or service processes to improve efficiency and effectiveness in operations, CE refers to Community Enterprise, SE refers to Social Enterprise, and LC refers to Limited Company

Source: Phuangprayong and Noonin (2023)

In addition to document reviews, primary data acquisition was executed through in-depth interviews conducted with key informants. This subset of participants comprised project leaders and project experts. The interviews, guided by a semi-structured interview guide, delved into nuanced inquiries regarding social innovation. Special attention was given to identifying attributes propelling these projects toward fostering sustainable development. The triangulation of document reviews and in-depth interviews enhanced the robustness and comprehensiveness of the data collection process, ensuring a multifaceted exploration of the social innovation landscape under investigation.

Data Analysis

This research comprises two analytical focal points: (1) the characteristics of social innovation; and

(2) the consistency between the characteristics of social innovation and sustainable development. Upon gathering all the data, a content analysis was conducted, categorizing significant content according to the framework of analysis based on the concept of social innovation. The research then provides an overview of all 15 projects.

Results and Discussion

The analysis of the social innovation characteristics revealed that each project shares common elements, the 5 crucial characteristics of social innovation. This finding underscored the presence of a shared framework among the diverse projects, highlighting their commitment to essential aspects of social innovation, as depicted in [Figure 1](#).

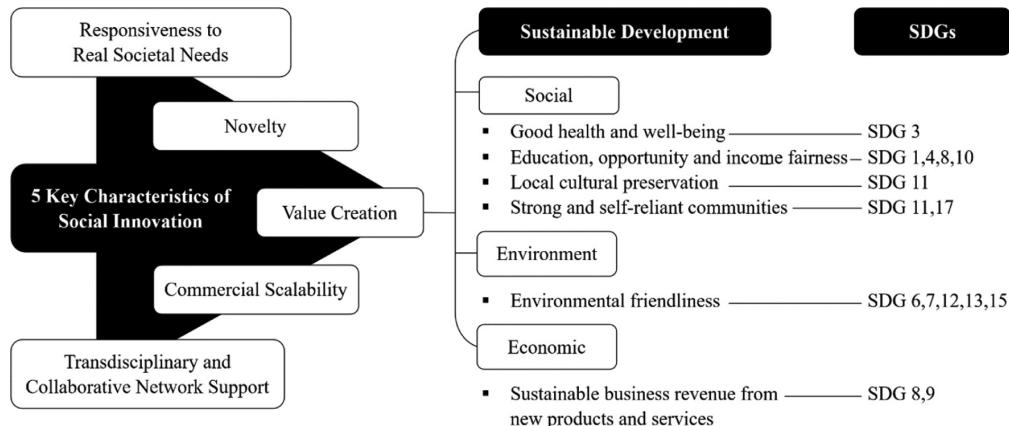


Figure 1 5 Key characteristics of social innovation towards sustainable development

Responsiveness to Real Societal Needs

The research findings revealed that all 15 social innovation projects highlight operational activities indicating social innovation. Entrepreneurs emphasize positive social impacts resulting from innovation and address social problems in line with the context of the area. This process begins with the participatory involvement of stakeholders to collectively identify shared problems, integrating innovative concepts or new problem-solving methods. These become tools to respond to the challenges and needs of stakeholders or target groups. The process of studying problems and developing social innovation is reflected through the framework of social innovation development, consisting of 9 steps:

Step 1: Exploring the problem — Investigating the problems and needs of stakeholders.

Step 2: Identify the problem — Project briefing, listening to stakeholders' feedback, and identifying the real problem.

Step 3: Collaborative design — Gathering stakeholders' opinions to collaboratively design social innovation that addresses problems and needs.

Step 4: Social innovation development — Managing budgets and procuring materials and equipment for production and social innovation development.

Step 5: Training — Training stakeholders on innovation usage.

Step 6: Test — Implementing innovation experiments on target groups.

Step 7: Evaluation — Monitoring and evaluating the results of innovation usage.

Step 8: Improvement — Gathering feedback data for iterative improvement.

Step 9: Launching — Disseminating results and marketing activities for product launch.

The process of social innovation development is shown in [Figure 2](#)

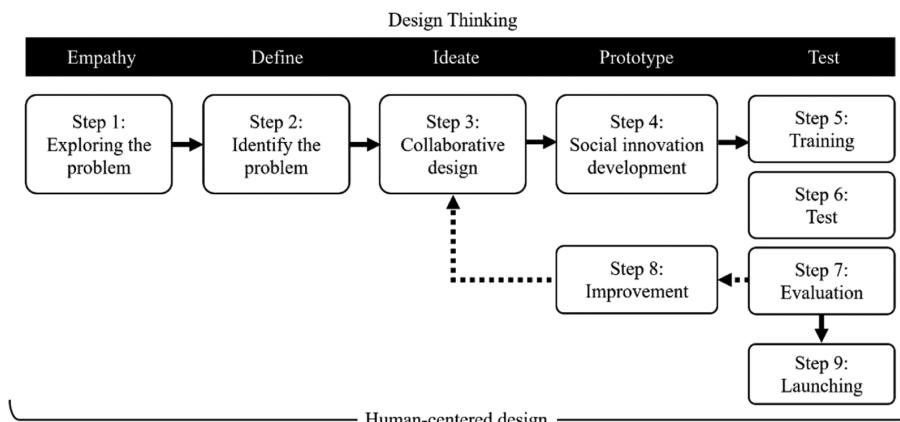


Figure 2 9 Steps of social innovation development

This process aligns with the design thinking concept by the Hasso Plattner Institute of Design (2018), focusing on creative problem-solving processes with a human-centered design approach. It involved starting the design process by understanding problem situations and deeply understanding human perspectives. Data on relevant user experiences were collected throughout the process to develop designs that best meet the needs of users or target groups. (Portales, 2019; The Hope Institute, 2017)

Novelty

Discussing novelty as an indicative characteristic of social innovation denotes the inclination towards creative thinking and the design of innovations to address societal issues through unconventional approaches (Portales, 2019; TEPSIE, 2014;). In analyzing the degree of novelty, considering factors such as organizational knowledge, technology, and the development timeline, it was found that most social innovation projects fall into the category of level 4, i.e., “new to an organization” (7 projects), and level 5, i.e., “new to a market” (6 projects). Notably, there are only 2 projects classified at level 6, indicating “new to an industry.” The results showed an inverse relationship between the degree of novelty in social innovation and the complexity of the knowledge and technology employed in developing these innovations, as depicted in **Figure 3**.

The study aligns with the categorization of innovation levels outlined in the British Standard Institution’s innovation management framework (BSI, 2015). This framework classifies the spectrum of newness into 9 levels. The research findings indicated that the innovation

levels can be discerned by considering the degrees of knowledge, technology, and the time expended in the innovation development process. Specifically, social innovation projects are categorized at level 4, denoting “new to an organization,” and level 5, signifying “new to a market,” predominantly emanating from initiatives of community enterprises (CE) and social enterprises (SE). These entities represent a subset of small-sized organizations characterized by limitations in human resources, technological knowledge, and financial resources.

As revealed in the study by Jintana & Puripanik (2019), there needs to be more knowledge in business management among community enterprise entrepreneurs, as they limit financial resources, have inadequate market-seeking capabilities, and generate insufficient income from their operations. Support should be directed towards enhancing marketing knowledge and promoting innovation in community enterprises by creating value-added products and services.

With the constraints, entrepreneurs in this group actively seek knowledge and financial support from external public and private organizations to develop profitable products and services through social innovation. Their projects often address specific issues within their target groups, utilizing local knowledge, wisdom, and community technologies. Drawing inspiration from similar areas, these entrepreneurs adapt strategies to initiate and sustain social innovation concepts, focusing on developing new products, services, and processes. These initiatives tend to address local problems using new approaches that leverage local knowledge, inherit local wisdom, and utilize existing community technologies.

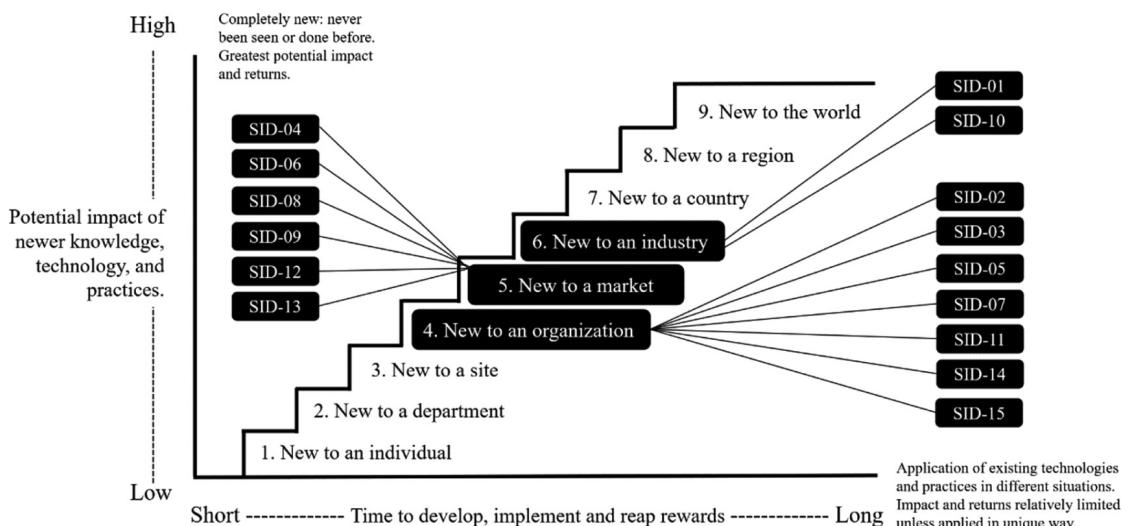


Figure 3 The spectrum of newness of social innovation projects in Central Thailand

For example, the project SID-05 (Solar-powered electric boats for community-based tourism) was developed based on a pilot study of solar-powered electric boats in a community in Ratchaburi province, where convenience was sought. The initiative originates from a common issue concerning noise and smoke generated by tourist boats, prompting the need for an environmentally friendly alternative. These findings align with TEPSIE (2014) examined perspective on social innovation, emphasizing that the novelty of social innovation does not need to be entirely new but must be new to the stakeholders involved and adapt to the local context, varying according to each region's social and cultural contexts.

Moreover, the study results indicated that social innovations by limited companies are classified as level 6, new to an industry. This classification stems from each organization's expertise and technological capabilities, surpassing those of community enterprises. Organizations that develop innovations using knowledge directly related to the innovation's technology can advance into creating higher-level social innovations.

For instance, social innovation projects such as SID-01(Automated hydroxyl radical disinfection fumigation system for ambulance) represent initiatives developed by companies specializing in scientific and experimental engineering. Similarly, the project SID-10 (Upper limb Bilateral training device with a symmetrical force transmission mechanism for stroke patients) is a venture crafted by a company with expertise in the production of medical instruments and equipment.

Transdisciplinary and Collaborative Network Support

The research findings indicated that the knowledge utilized in innovation development relies on transdisciplinary knowledge, spanning various disciplines, including technology, engineering, social science research, project management, marketing, arts, and product design knowledge. Furthermore, successful innovation requires collaboration from diverse networked organizations, encompassing government agencies, educational institutions, private sectors, and civil society, to support knowledge, budget, and public relations aligned with the project's goals. Likewise, the study by Satalkina and Steine (2022) emphasized transdisciplinary collaboration and cross-sectoral cooperation as crucial characteristics of 21st-century social innovation. Similarly, a study by Razmak and Bélanger (2016) revealed that emerging business innovations often originate from a single concept. However, achieving success in business innovation

necessitates undergoing various sequential processes and stages, all rooted in transdisciplinary knowledge.

The research underscores the significance of creating an environment conducive to transdisciplinary collaboration and knowledge-sharing. It emphasizes the need for partnerships between state, academic, private, non-profit, and community sectors to facilitate the cross-pollination of ideas and resources (Liu & Martens, 2023; The Hope Institute, 2017; Zikargae et al., 2022). This research also resonates with the evolving landscape of innovation, where collective expertise from diverse fields is recognized as a key driver for transformative social innovations.

The findings highlight that successful social innovation depends on creating new ideas, strategic integration, and application of knowledge throughout the innovation process, aligning with the principles of transdisciplinary.

Commercial Scalability

Another crucial aspect indicating social innovation is its ability to scale up and commercialize. The research findings revealed that all 15 social innovation projects possess strategies to leverage and expand their innovations sustainably, ensuring acceptance by communities and society, garnering public attention, being marketable, and economically beneficial. This is in line with Smith (2010) who described the definition of innovation as an invention introduced to the market commercially, leading to dissemination and societal acceptance.

Moreover, the results are also supported by the study by Carayannis et al. (2021), which described the development process of social innovation as creating new pathways to address unmet societal needs and challenges. Effective social innovations must demonstrate the capacity to scale commercially and distribute benefits, generating positive societal impacts on a broader scale. This is consistent with the study by Bolzan et al. (2019), emphasizing the importance of network collaboration in scaling up social innovations for sustainable financial impacts, and in alignment with the study by Marradi and Mulder (2022), which indicated that a growth-oriented strategy propelled by social impact and economic value creation processes could facilitate the broadened dissemination and application of innovations to address societal issues. This approach allows for cross-contextual benefits in various geographic areas.

Value Creation and Sustainable Development

Creating value in the social, economic, and environmental dimensions constitutes a pivotal indicator of social innovation. This assessment is derived from the post-implementation impact of innovations when piloted in specific areas. Research findings indicated that, within the comprehensive context of 15 social innovation projects, value can be generated across economic, social, and environmental dimensions, in alignment with the principles of The Triple Bottom Line (Elkington, 1998) and driving to achieve SDGs, as detailed in **Table 2**.

Social dimension

The research findings revealed that, collectively, across 15 social innovation projects, significant value has been generated for the development of individuals and communities. This is manifested through cultivating awareness and promoting behaviors to minimize societal

and environmental impacts. The projects actively support using clean energy, reducing chemical pesticides in fruit orchards, minimizing fashion-related textile waste, and decreasing the disposal of paper and food waste. The target groups involved in these initiatives exhibit intrinsic motivation, recognizing and valuing themselves. Additionally, efforts have been made to reduce disparities in accessing healthcare services for patients and visually impaired individuals, fostering inclusivity in the healthcare sector (e.g., SID-01, SID-10, and SID-12). These initiatives further focus on promoting access to knowledge to develop professional skills, encouraging lifelong learning, and facilitating fair income sources within the community (e.g., SID-02, SID-03, SID-04, SID-06, and SID-13). This aligns to enhance the quality of life for the target groups and ensure good health, safety in daily life, and security in the workplace (e.g., SID-01 and SID-03).

Table 2 15 Social innovations toward sustainable development and SDGs

Code	Social Innovation Project	Sustainable Development			SDGs
		Social	Economic	Environment	
SID-01	Automated hydroxyl radical disinfection fumigation system for ambulance	✓	✓		SDG3, SDG8, SDG9, SDG17
SID-02	Cultural data collection to enhance the potential of creating community-based tourism routes	✓	✓		SDG1, SDG4, SDG8, SDG11, SDG17
SID-03	Strengthening the monitoring system for managing wild elephants and community-based tourism	✓	✓	✓	SDG1, SDG3, SDG4, SDG15, SDG17
SID-04	Eco-print fabric	✓	✓	✓	SDG1, SDG4, SDG15, SDG17
SID-05	Solar-powered electric boats for community-based tourism	✓	✓	✓	SDG1, SDG6, SDG7, SDG11, SDG13, SDG17
SID-06	Online clothing repair and customization services and fashion product manufacturing from recycled materials	✓	✓	✓	SDG1, SDG4, SDG8, SDG12, SDG13, SDG17
SID-07	Vegetable jelly	✓	✓	✓	SDG1, SDG3, SDG8, SDG15, SDG17
SID-08	Skincare products made from spirulina seaweed	✓	✓	✓	SDG1, SDG8, SDG13, SDG17
SID-09	NIR technology to check the quality of durian meat	✓	✓	✓	SDG1, SDG8, SDG13, SDG17
SID-10	Upper limb Bilateral training device with a symmetrical force transmission mechanism for stroke patients	✓	✓		SDG3, SDG8, SDG9, SDG10, SDG17
SID-11	Automatic solar cell insect trap	✓	✓	✓	SDG3, SDG7, SDG8, SDG13, SDG17
SID-12	Application for access to health services for the visually impaired	✓	✓		SDG3, SDG10, SDG17
SID-13	Metal sculpture from recycled paper	✓	✓	✓	SDG1, SDG4, SDG8, SDG12, SDG13, SDG17
SID-14	Food waste bank	✓		✓	SDG3, SDG4, SDG11, SDG12, SDG13, SDG17
SID-15	Designing local food sets for creative tourism	✓	✓		SDG1, SDG8, SDG11, SDG17

Moreover, these social innovation projects empower self-reliant communities by fostering networks for knowledge exchange and collaboration among the government, private sector, and civil society. They contribute significantly to preserving and transmitting cultural heritage, ensuring its relevance in contemporary times (e.g., SID-02, SID-05, and SID-15).

These social innovation projects transcend traditional development paradigms. They preserve cultural heritage, foster environmental consciousness, and promote the creation of self-sufficient and collaborative communities. The research findings provided valuable insights into the far-reaching impacts that social innovation can have on human and community well-being. In alignment with the findings by Ghiga et al. (2020), it was observed that community-based social innovations yield positive outcomes for the target groups across various dimensions, including mental health, quality of life, and well-being. These innovations contribute to the accumulation of knowledge and the development of varied social skills. The findings by Moscibrodzki et al. (2022) demonstrated the positive impacts of social innovation on fostering community inclusivity, building resilient communities, bolstering morale among residents, fostering collaboration between the public and private sectors, generating employment, and improving community infrastructure.

Economic dimension

The research findings underscored the substantial economic value of the social innovation projects. This value is epitomized by sustained economic growth achieved through equitable income distribution among target groups and members of community enterprises. Notably, residents experience significant supplementary income, fostering financial empowerment (e.g., SID-02, SID-04, SID-05, SID-08, and SID-13). Efforts to streamline work processes and reduce task duration contribute to cost savings and enhance operational efficiency (e.g., SID-01 and SID-10). The innovative prototypes can be further developed into commercial products, generating business revenue (e.g., SID-04, SID-08, SID-11, SID-13, and SID-15). Consequently, businesses derive income from new products and services, creating value and additional benefits across the entire value chain, from upstream to downstream. The research underscores the transformative impact of social innovation on local economies and the whole value chain, demonstrating the potential for economic growth and value creation.

These findings are consistent with the study by Bacq et al. (2016), which described that social innovation directly impacts economic sustainability by fostering entrepreneurial activities and inclusive economic development. Initiatives that empower marginalized communities through skill development, access to financial resources, and the creation of innovative business models contribute to poverty alleviation and economic resilience. Similarly, the study conducted by Martinez et al. (2017) illustrated that conducting business based on the principles of social innovation, incorporating novel concepts emphasizing collaboration, organizational knowledge, and opinions between the business and societal sectors, plays a significant role in propelling business growth concurrently with addressing societal challenges.

Environmental dimension

The research findings revealed that the social innovation projects have generated significant environmental value. This is evidenced by communities' access to sustainable and environmentally friendly energy sources. The projects contribute to reducing greenhouse gas emissions, curbing pollutants such as odors, smoke, and oil residues that contribute to global warming, mitigating noise pollution, and minimizing the use of agricultural chemicals and their environmental impacts (e.g., SID-05, SID-08, and SID-11).

Furthermore, waste and by-products from the production processes undergo value addition, equating to reducing the quantity of waste introduced into environmental systems (e.g., SID-06, SID-13, and SID-14). The community and societal environmental systems are maintained and balanced, preserving forested areas and wildlife and safeguarding natural resources (e.g., SID-03 and SID-04). This holistic approach contributes to environmental conservation and ensures the sustainability of ecosystems on a global scale for the benefit of future generations. This approach results in developing products and services aligned with the BCG Economy framework.

These findings resonate with Hargreaves et al. (2017), who emphasized social innovation, extending its influence on environmental sustainability by promoting eco-friendly practices and technologies. Initiatives that integrate renewable energy sources, waste reduction strategies, and sustainable agriculture demonstrate the potential of social innovation to mitigate environmental degradation. Similarly, the study conducted by Hariram et al. (2023) delineated that Eco-friendly practices

encompass a range of initiatives to reduce environmental impact. This includes strategies for minimizing carbon emissions, conserving natural resources, and promoting sustainable production and consumption. For instance, companies are increasingly investing in renewable energy sources, adopting circular economy models, and implementing waste reduction strategies to align with environmental sustainability goals.

The overall benefits or values derived from all 15 social innovation projects align with sustainability. This alignment is consistent with Portales (2019), who described the characteristics of social innovation as the ability to respond to unmet needs or provide novel solutions that differ from traditional approaches. Such innovations stem from creative thinking, and social innovations are expected to bring lasting societal changes. Similarly, a study by Satalkina and Steine (2022) emphasized the essential features of social innovation as addressing societal challenges and responding to the needs of society by creating value or generating socially beneficial impacts for sustainable development beyond existing paradigms, necessitating interdisciplinary collaboration.

Furthermore, the findings highlight that social innovation goes beyond merely offering new ideas; it requires a strategic and sustainable societal transformation. The perspective supports that successful social innovation produces tangible societal benefits and positive impacts.

Conclusion and Recommendation

This research identifies the key characteristics of social innovation, consisting of (1) responsiveness to real societal needs, (2) novelty, (3) transdisciplinary and collaborative network support, (4) commercial scalability, and (5) value creation in the social, economic, and environmental dimensions. These findings are novel in the context of Thai society, as these characteristics collectively describe innovation that focuses on problem-solving and local community development to create social value for social, environmental preservation, and economic stability. It fosters community engagement, enhances adaptive capacity, and instils a sense of collective responsibility. Through a comprehensive analysis of 15 initiative social innovation projects, it becomes evident that the inherent traits of social innovation contribute significantly to sustainable development and play a significant role in achieving SDGs.

We recommend that business organizations, community enterprises, social enterprises, and other relevant entities with a mission to develop innovation to meet societal needs should apply the framework “5 Key Characteristics of Social Innovation” as a guideline in social innovation development. This framework is associated with the entire process of social innovation development, starting from thorough problem exploration to introducing social innovations to the market for sustainable commercial expansion.

Furthermore, government entities with responsibilities for promoting social innovation and entrepreneurial development, such as the National Innovation Agency (NIA), Department of Agricultural Extension, Department of Community Development, the Office of Social Enterprise Promotion (OSEP), the Office of SMEs Promotion (OSMEP) should use the research findings to establish policies promoting social innovation, such as applying them as criteria for budget considerations to support entrepreneurs in social innovation development. Furthermore, these findings can be used to judge social innovation projects in local, national, and international competitions. In addition, related organizations should provide support to enhance the capabilities of community-level entrepreneurs and social entrepreneurs, ensuring that they possess the necessary skills and knowledge, including expertise in technology and marketing, to foster innovative thinking in social innovation development and elevate the level of innovation for more efficient and effective problem-solving and societal development.

Moreover, it is advisable to integrate the principles of social innovation into local policy frameworks, facilitating the localized development of social innovations. This is to ensure that social innovations are efficiently and effectively utilized, serving their intended purposes, and driving the achievement of sustainable development goals.

For future research, the 5 key characteristics of social innovation should be applied as a framework to study the nature of social innovation in different contexts, and quantitative research methods should be used to test the conceptual framework in exploring these aspects further.

Conflict of Interest

The authors declare that there is no conflict of interest.

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