Community Innovation Based on Learning A New Paradigm for Sustainable Development in the Digital Age

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Received: August 11, 2026 **Revised**: August 11, 2026 **Accepted**: August 27, 2026

Abstract

Rapid economic, social, environmental, and technological transformations have created increasingly complex challenges for communities, requiring them to strengthen their capacities for learning, adaptation, and locally driven innovation. Community innovation should therefore be understood not merely as the adoption of new technologies, but as a social process through which local knowledge, community resources, participation, collaborative learning, networks, and digital technologies are integrated to address local needs and enhance sustainable development. This academic article aims to analyze and synthesize the concept of learning-based community innovation and to examine the interrelationships among local wisdom, collaborative learning, knowledge networks, digital technologies, and sustainable development. Based on this synthesis, the article proposes the Learning-Based Community Innovation Paradigm for Sustainable Development, comprising five interconnected components: (1) Local Wisdom and Community Capital, (2) Collaborative Learning, (3) Knowledge and Network Integration, (4) Digital Empowerment, and (5) Community Innovation. Participation, community ownership, and partnership function as enabling mechanisms throughout the process, while sustainable development constitutes its ultimate goal. The proposed paradigm positions learning as the central mechanism through which communities transform local wisdom, experience, information, and resources into knowledge and innovation. Digital technology, in this framework, serves

as an enabling tool that expands access to knowledge, strengthens networks, and enhances community capabilities rather than replacing local knowledge. The article argues for a shift from viewing communities as passive recipients of innovation toward recognizing them as active learning and innovation creators. Such a shift can strengthen communities' capacities to determine their own development pathways, respond to changing conditions, and generate context-sensitive innovations that contribute to economic resilience, social inclusion, responsible resource management, and long-term sustainable development.

Keywords: Learning-Based Community Innovation, Collaborative Learning, Digital Empowerment, Community Innovation, Sustainable Development

Introduction

The world today faces rapid and complex changes in economic, social, environmental, and technological aspects, resulting from globalization, the transition to a digital society, climate change, demographic changes, and the volatility of the global economic system. These changes directly impact the lives and development of communities, presenting them with challenges in resource management, economic security, preserving local wisdom and identity, and balancing development with conservation. Within this context, communities cannot simply remain passive recipients of external development; they must enhance their capacity to learn, adapt, and create development approaches tailored to their own conditions. Community innovation thus plays a crucial role as a mechanism to enable communities to adapt and create change from within. This encompasses not only the invention of new technologies but also social, economic, cultural, environmental, and management innovations arising from the integration of knowledge, local wisdom, modern technology, and public participation. This process empowers communities to solve problems, create opportunities, and improve their quality of life based on their existing context and resources, aligning with the concept of sustainable development that aims to create a balance between the economy, society, and the environment.

The emergence of community innovation is not the result of technology or individual creativity alone. But it is a social process in which learning is an important basis. Each community is made up of social, cultural, historical relationships. and different beliefs When members face problems together A sense of belonging and a desire to create change can lead to collaborative thinking. Exchange experiences, experiment and find new ways to deal with

problems. Community innovation can therefore arise and be developed through cooperation. learning together and adaptation to the specific context of the area Advances in digital technology have also changed the way communities access information, learn, and communicate. and create a significant network Technology is therefore not just a tool for increasing work efficiency. Instead, it is transforming economic, social structures and patterns of human interaction. Schwab (2017) describes it as the Fourth Industrial Revolution, driven by key technologies such as artificial intelligence. internet of things and new digital technology It is creating structural changes to the way we live, work and society. For communities, the key challenge is not just access to technology. It is the ability to connect technology and information with the wisdom, experiences, and learning processes of local people. So that technology becomes an empowering tool rather than a factor that determines the direction of community change. This trend is related to the transition from development determined from the outside (Top-down Development) to creating more innovation from the grassroots (Bottom-up Innovation), community innovation in the future should grow from the resource base. Local wisdom, culture, way of life and social capital of the community Meanwhile, the government sector should adjust its role from setting guidelines to supporting and empowering. To allow communities to own their own innovation processes This concept reflects the change in the status of communities from recipients of knowledge and innovation to learners. knowledge creator and innovators This is an important basis for development that can be sustained in the long term.

From such context Community innovation in the digital age needs to focus on the learning process as a mechanism that connects local wisdom. Participation, networks, modern knowledge and technology together Leading to community innovation based on learning (Learning-Based Community Innovation) which views that the sustainability of innovation does not depend on the newness of technology alone. But it depends on the community's ability to learn together. Manage and expand knowledge network link and use technology appropriately in their own context This article therefore aims to analyze and synthesize the concept of learning-based community innovation. The relationship between local wisdom Collaborative learning, networks and digital technology as well as proposing a community innovation paradigm based on learning for sustainable development in the digital age To provide a framework for developing communities to be able to continuously learn, adapt, and create innovations from their internal potential.

Community innovation based on learning: Concepts and development foundations.

Community innovation is a process arising from a community's ability to think, solve problems, and create new approaches appropriate to its own context. It relies on local resources, knowledge, wisdom, cooperation, and the participation of community members as a foundation. This type of innovation is not limited to new inventions or technologies, but encompasses the creation of new models in economics, society, culture, environment, and management that appropriately meet the needs of the community. Therefore, the creation of community innovation should consider both the community's existing resources and the processes that enable those resources to develop into something new.

In the social dimension, each community has unique characteristics stemming from the relationships, culture, history, beliefs, and shared experiences of its members. When a community faces problems or changes, a sense of shared ownership and the desire to create change can lead to the search for new approaches to solving problems. Community innovation, therefore, does not originate from the ideas of a single individual, but is a social process driven by cooperation, collaborative learning, and adaptation to the local context. Wheatley (2006) describes a community as a living system capable of creating change and innovation when its members have good relationships, trust each other, support each other, and have space for open communication. Under this concept, social relationships are not merely a contextual component of development, but a mechanism that enables the exchange of knowledge and the coordination of cooperation. And creating new things from within the community (Wheatley, 2006).

Public participation is another important element that enables communities to develop their learning potential and create innovation. Participation provides opportunities for members to have a voice, a role, and a sense of shared ownership in the development process, unlike the top-down development model where citizens merely follow predetermined guidelines. In an open process, members can fully contribute their knowledge, experience, and potential to participate in thinking, decision-making, and innovation creation. In addition to relationships and participation, learning networks also play a crucial role in transforming information and experiences into applicable knowledge. Anan Sakvoravich

(2018) emphasizes the role of information and learning networks at the community level, viewing the community's ability to use information for decision-making, exchanging ideas, and creating innovation through various communication channels as essential conditions for community development in the new context. However, having information alone is insufficient; if the community lacks understanding and collaborative learning processes, such information may not lead to changes in practice.

Based on this concept, Learning-Based Community Innovation is a process in which communities collaboratively learn from wisdom, experience, information, and knowledge both internally and externally, and then apply that knowledge through exchange, participation, experimentation, and joint improvement. To create new approaches to problem-solving and improving quality of life appropriate to their own context, this concept emphasizes viewing communities as creators of knowledge and innovators rather than merely recipients of knowledge or technology from outside. Therefore, the key foundation of community innovation based on learning comprises social relationships, trust, participation, knowledge exchange, learning networks, and the community's adaptability. These elements serve to connect the community's existing resources with new knowledge and enable continuous innovation. This process also forms the basis for building upon local wisdom, creating collaborative networks, and applying digital technology for sustainable development.

Indigenous knowledge, collaborative learning, and networks are crucial for community innovation.

Local wisdom is a vital knowledge asset of communities, accumulated through experience, learning, and continuous adaptation to economic, social, and cultural environments. This knowledge is not merely valuable as a heritage from the past; it can be further developed and applied to new contexts. Kanok Wongtrahan (2012) suggests that community economic development should integrate creativity with local wisdom to add value to goods and services. Creativity does not necessarily mean high-level technology, but rather the adaptation of traditional resources and knowledge to meet contemporary needs. In addition to creating economic value, it also helps preserve the community's identity. However, possessing local wisdom alone is insufficient for innovation if that knowledge is not continuously transmitted, exchanged, and developed. Knowledge management at the community level therefore plays a crucial role in collecting, transmitting, and developing

existing knowledge to suit the present and future contexts. This is not merely about storing knowledge in documents or databases, but about making knowledge dynamic through interaction between experts, learners, and practitioners in the area, as well as transmitting it from generation to generation and adapting it to changing circumstances. In this dimension, local wisdom transforms from existing knowledge into knowledge capital that can create new value through community learning processes.

Collaborative learning is essential to this process. Because it allows members to share, experiment with, and improve their diverse experiences and knowledge, learning networks serve as spaces connecting people and knowledge in various forms, including professional groups, farmer groups, youth groups, community organizations, and online networks. Learning does not occur solely through receiving knowledge from experts, but rather through discussion, debate, experimentation, and collaborative knowledge development. This approach is more flexible and appropriate to local contexts than top-down knowledge transfer. Therefore, networks do not merely coordinate resources or support activities; they are mechanisms that enable knowledge to flow between individuals, groups, and various sectors. Anan Sakvoravich (2018) emphasizes the importance of information and learning networks at the community level, pointing out that the ability to use information for decision-making, exchanging opinions, and two-way communication among members, as well as between the government and the community, can open new avenues for innovation. Learning networks thus act as mechanisms connecting internal community knowledge with external knowledge, resources, and experiences, while still allowing the community to choose and adapt them appropriately to its own context.

This concept is related to the transition from top-down development to bottom-up innovation. Maitree Intusut (2018) suggests that community innovation should grow from internal resources. Regardless of whether it be local wisdom, culture, way of life, social relationships, or social capital, the state and external agencies should empower rather than dictate, so that communities own their own innovation processes. This perspective means that innovation is not about adopting ready-made models from outside, but about integrating local knowledge with new knowledge through collaborative learning and collaborative networks.



Figure 1. The community innovation process.

Therefore, local wisdom, collaborative learning, and collaborative networks are interconnected components in the community innovation process. Local wisdom serves as the knowledge base, collaborative learning acts as the process of developing and expanding knowledge, while networks connect knowledge, resources, and stakeholders.

Community innovation in the digital age and sustainable development.

The digital transformation has significantly changed the community innovation process. Digital technology plays a role not only as a communication tool or marketing channel, but also expands opportunities for accessing information, exchanging knowledge, networking, and managing community resources and activities more efficiently. In this context, technology can empower communities to learn, adapt, and develop innovations that respond to economic, social, and environmental changes, especially when communities can connect modern technology with their existing knowledge and wisdom.

In the economic dimension, digital technology opens up opportunities for communities to develop new channels for production, marketing, and consumer access, as well as create added value from local resources and wisdom. Applying creativity in conjunction with traditional knowledge allows communities to create products and services that meet market demands while maintaining their local identity and values. Creating value

from their own resource base leads to self-reliance, economic strength, and long-term sustainability for communities.

In the environmental dimension, community innovation plays a role in helping communities adapt appropriately to changes in natural resources and climate. Problems such as drought, floods, food insecurity, and resource degradation all push communities to develop new ways of managing their resources. Ostrom (1990) proposed that communities can manage shared resources effectively through local rules and participation. Collaborative decision-making, such as water allocation, irrigation system management, or forest resource conservation, reflects the fact that sustainable innovation does not necessarily have to come solely from external technology, but can also arise from learning and collaborative management by people in the area (Ostrom, 1990).

In the digital age, innovation cannot rely solely on knowledge and resources within the community, but requires the connection of knowledge, experience, and expertise from various sectors. Chesbrough's (2020) concept of Open Innovation points out that developing innovation in today's world requires collaboration from diverse stakeholders, including providing opportunities for users and communities to participate in the development process. Since the knowledge and resources necessary for creating innovation are distributed across many sectors, connecting and integrating that knowledge is a crucial factor in creating innovations that can effectively respond to the needs of users and different contexts (Chesbrough, 2020). Therefore, community innovation development in the digital age should prioritize the use of technology as a tool to empower learning rather than viewing technology as the goal of development. That is, technology should help communities access knowledge, exchange experiences, analyze data, connect networks, and develop solutions appropriate to themselves. At the same time, the choice of technology should not deprive communities of their ability to determine their own development direction, but should encourage communities to build upon existing wisdom and resources with new knowledge. This process makes technology a facilitator of learning and innovation, rather than a replacement for community knowledge.

When linking community innovation with the concept of sustainable development, it can be seen that sustainability does not mean only economic growth, but must create a balance between the economy, society, and the environment under the Sustainable Development Goals (SDGs). Community-based innovation plays a crucial role in linking

global goals with local implementation, as it can appropriately address the diverse problems and needs of each area. Furthermore, community innovation can be directly linked to the goals of poverty eradication, sustainable production and consumption, ecosystem conservation, and building strong communities.

From the above synthesis, the author believes that the relationship between digital innovation and sustainable development should not be explained in a direct sense as technology leading to development, but should be considered through the process of community learning and participation. That is, digital technology, access to and exchange of knowledge, collaborative learning, networking, community innovation, and sustainable development. This process reflects that technology can only truly create value for a community when the community can select, use, and adapt technology to suit its own wisdom, resources, needs, and context. Therefore, community innovation in the digital age is not about bringing as much technology as possible into the community, but rather about building the community's capacity to learn and use technology meaningfully, in order to enhance its potential in managing problems, creating economic opportunities, conserving natural resources, and fostering continuous social cooperation.

A learning-based community innovation paradigm for sustainable development.

The concept of community innovation, local wisdom, collaborative learning, collaborative networks, digital technology, and sustainable development leads to the “Learning-Based Community Innovation Paradigm for Sustainable Development” to create a process in which communities can transform their existing knowledge capital and potential into innovations that respond to changes in the digital age, with learning as the central mechanism connecting the various components. This paradigm is based on the idea that community innovation does not start from external technology or knowledge, but from the internal potential of the community, namely local wisdom, culture, way of life, resources, and social capital, which is consistent with the Bottom-up Innovation concept, which gives communities ownership of the innovation process and allows external agencies to support and empower rather than dictate the direction of development. At the same time, the relationship, trust, and participation of members are important conditions that allow knowledge to be exchanged and developed into the creation of new things. It can be divided into 5 important

components: (1) Local Wisdom and Community Capital, which are the sources of knowledge and initial resources for creating innovation; (2) Collaborative Learning; (Collaborative Learning) which serves to connect the experiences, knowledge and ideas of members through exchange, experimentation and joint improvement; (3) Knowledge and Network Integration which helps to connect knowledge within the community with knowledge, resources and expertise from outside; (4) Digital Empowerment which uses technology as a tool to access, manage and exchange knowledge, as well as expand the community's network and opportunities; and (5) Community Innovation which is the result of bringing the knowledge and potential of the community to develop new approaches to solving problems and creating value.

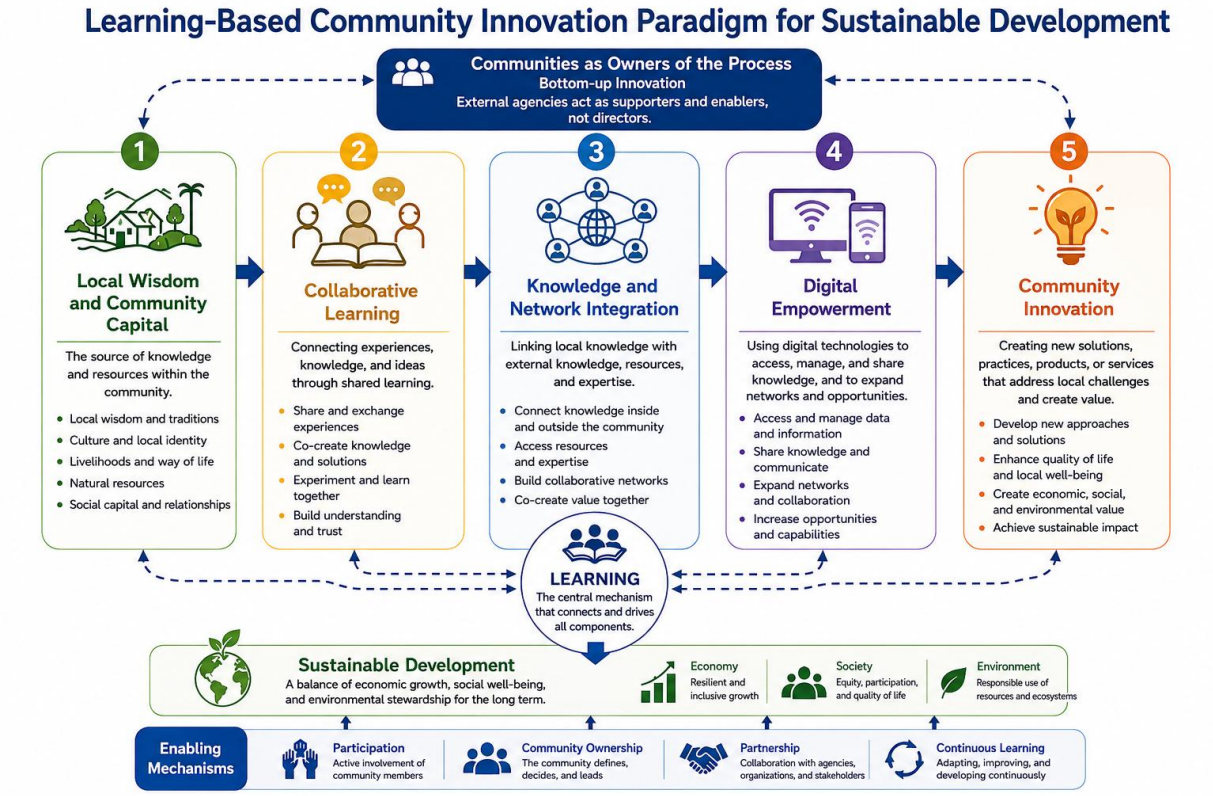


Figure 2. Community Innovation Paradigm Based on Learning for Sustainable Development.

In this process, participation, community ownership, and partnership serve as supporting mechanisms that connect all components. Participation empowers members to play roles from defining the problem and exchanging knowledge to experimenting with new approaches, evaluation, and scaling up. Ownership ensures that innovations align with local

needs and have a chance of long-term sustainability. Collaborative networks provide communities with access to a wider range of knowledge and resources.

Another crucial component is knowledge management. Community wisdom and experience can only become the foundation of innovation when they are continuously collected, transferred, exchanged, and built upon. Knowledge management at the community level is therefore not just about preserving data, but about bringing knowledge to life through interaction between experts, learners, and practitioners, as well as adapting knowledge to changing situations. Thus, learning is a mechanism that allows existing community capital to connect with new knowledge and continuously develop into innovation. The ultimate goal of this paradigm is sustainable development, encompassing economic strength, social justice and participation, and the responsible use and management of natural resources. Community innovation thus serves as a mechanism to link global development goals with local-level operations. Because it can be adapted to the different problems, resources, and capabilities of each area,

the novelty of the paradigm lies not in any single element, but in reorganizing the relationships between these elements. Learning is positioned as a central mechanism between the community's existing resources and innovation creation, and digital technology is used as a empowering tool, not the starting point of innovation. In other words, communities don't achieve sustainability simply because they have more technology, but because of their ability to learn collaboratively, manage and build upon existing knowledge, connect networks, and select technology that aligns with their own context. The learning-based community innovation paradigm therefore proposes a shift in perspective from "Community as Innovation Receiver" to "Community as Learning and Innovation Creator," or from communities as recipients of innovation to communities as learners and creators of innovation. This is a crucial foundation for development that enables communities to determine their own direction, adapt, and build their own sustainable future.

Conclusion

Community innovation is a crucial mechanism for empowering communities to cope with and adapt to economic, social, environmental, and technological changes in the digital age. Creating innovation leading to sustainable development doesn't depend solely on bringing external technology or knowledge into the community. Instead, it must begin with

recognizing the inherent potential and resources within the community, including local wisdom, resources, culture, way of life, social relationships, and the experiences of its members. These resources should then be developed and built upon through a continuous learning process. This aligns with the concept of grassroots innovation, where the community owns the development process and external sectors act as supporters and empowerers. Learning is therefore a key mechanism connecting the community's existing resources with innovation creation. This occurs through the exchange of experiences, the transfer and enhancement of wisdom, the use of data, experimentation, adaptation, and collaborative learning among members. Relationships, trust, and participation are essential conditions for the flow of knowledge and its development into new approaches to problem-solving. Simultaneously, collaborative networks connect knowledge and resources both within and outside the community, ensuring that innovation isn't an isolated process but a co-creation between the community and relevant stakeholders. In the digital age, technology plays a vital role in increasing access to information, exchanging knowledge, building networks, and developing new models for managing community problems. However, technology should not be viewed as the goal of development, but rather as a tool to empower communities to learn and create innovation effectively. Opening up spaces for communities, users, and various sectors to participate in innovation.

Synthesizing concepts, this article proposes a Learning-Based Community Innovation Paradigm for Sustainable Development, consisting of five interconnected components: (1) Local Wisdom and Community Capital, (2) Collaborative Learning, (3) Knowledge and Network Integration, (4) Digital Empowerment, and (5) Community Innovation. Participation, community ownership, and partnership serve as supporting mechanisms throughout the process, with sustainable development as the ultimate goal. The essence of this paradigm is a shift in perspective from communities as innovation receivers to communities as learning and innovation creators, with learning as the central mechanism for transforming community wisdom, experience, data, and resources into knowledge and innovation, while digital technology empowers and expands capabilities. It is not intended to replace the knowledge and wisdom of the community.

Therefore, sustainable community innovation development in the digital age should focus on creating learning and innovation communities that can learn from existing resources, embrace new knowledge, connect networks, use technology appropriately, and participate in determining their own development direction. When communities can own both

the learning process and the innovation process, the resulting innovations are more likely to be relevant to the context, meet the needs of the people, and lead to economic strength, social justice, and balanced resource management—the foundation of sustainable development in the long term.

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