



Achieving social innovation in the digital age: A case study of microbusiness

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ARTICLE INFO

Keywords:

Social innovation
Service ecosystem
Digitalization
O2O commerce
Micro enterprises cluster
Service platform

ABSTRACT

This study explores the feasibility of micro-enterprise cluster applications in online-to-offline service platforms to better understand the impact of social innovations and information and communications technology (ICT) capabilities in the digital age. We tried to discover the factors that affect micro-enterprises' social innovations and sustainable development outcomes. The qualitative data analysis method is summarized using exploratory data analysis. This study reveals that the key drivers of social innovation for microbusiness clusters are shared value proposition and actor engagement, as per the multiple cases through interviews and observations. This study emphasizes that online-to-offline (O2O) e-commerce is an important part of service platforms, especially in the application of microbusiness clustering social innovation, because social innovation can impact their sustainable development by enhancing their ICT ability, which can also increase the application level of service platforms. The sustainable development of micro-business is one type of sustainable transformation. There are four types of social innovations in microbusiness clusters: the Branding model, the customer interaction mode, the collaboration and profit sharing mode, and the sustainable development mode. The driving forces of the social innovations of microbusiness are frugal-driven, socially driven, and sustainability-driven forces.

1. Introduction

In recent years, technology and the mobile Internet have rapidly transformed traditional business models worldwide. Experts predict continued growth in global e-commerce sales, with a rate of 9.4% in 2024, which is expected to slow slightly to 8.6% in 2025. The Asia-Pacific region has become the world's largest digital economic market, providing small and medium enterprises (SMEs) with tremendous business opportunities and job openings (Jasmine, 2019). To survive and thrive in the digital economy, digital transformation and the innovative online-to-offline (O2O) business model are something SMEs cannot neglect. Digital transformation and the O2O business model are the key components underpinning economic prosperity and growth in the Asia-Pacific region and will shape and drive the development of innovative new businesses and SMEs.

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<https://doi.org/10.1016/j.ijis.2024.12.003>

Received 4 January 2024; Received in revised form 2 August 2024; Accepted 9 September 2024

Available online 11 December 2024

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Recently, more and more attention has been given to the study of micro-enterprises because individuals or micro-enterprises play a very important role in the prosperity of a country or locality. Most micro-enterprises epitomize new start-ups or special social conditions. Accordingly, the research objective will focus on the micro-enterprises. In addition, micro-enterprise clusters are a good way to guide micro-enterprises' growth. In this work, a cluster refers to a group of microbusinesses.

Research on clusters has significantly increased since the early 1990s. Porter (2000) suggests that a cluster denotes a geographic concentration of interconnected companies and institutions within a specific domain; this phenomenon can further stimulate local prosperity and development. Porter and Stern (2001) also propose that information technology can increase a company's competitive advantage. Clusters serve as catalysts for potential advantages by identifying both the necessity and opportunity for innovation. The study's context is rooted in an administrative authority-counseling project in Taiwan, which has received funding and consulting services support from Taiwan's administrative authorities (Chen et al., 2021). The Taiwan's administrative authority has significant experience in using clusters to assist with developing microbusinesses. Collaboration within clusters and using O2O commerce marketing help microbusiness improve sales channels. For example, online and offline marketing can allow continuous circulation of merchandise. Accordingly, this article explores the factors that influence social innovation in microbusiness clusters and how to promote their sustainable development.

Social innovation encompasses revolutionary ideas that bring about significant transformations in systems, addressing challenges in social, cultural, economic, and environmental realms. These innovations have a lasting impact on the perceptions and behaviours of individuals in specific areas (Pol and Ville, 2009). Sustainable and impactful social innovation is characterized by its ability to bring about systemic changes, influence perceptions, and act as a catalyst for social change (Miller et al., 2021). Based on service-dominant logic, social innovation can be seen as the reorganization of various resources in the process of value co-creation to create new resources that benefit the network of actors. Therefore, understanding the value co-creation has evolved into an essential part of social innovation, and social innovations have never been as highly valued as they are today.

E-commerce has greatly changed the innovation methods of SMEs and the competitive landscape of the retail industry, allowing retail SMEs in the small commodity market to innovate and achieve internationalization; however, insights into facilitating the sustainable development of SMEs remain unfruitful (Liu and Si, 2022). The next generation of digital technologies plays a key role in creating more inclusive societies, economies and empowering businesses. In the face of digital transformation, stakeholders' responses to changes and opportunities are critical to accelerating sustainable growth and value creation in a more inclusive and resilient society (Ordoñez De Pablos, 2023). While the conventional belief is that achieving sustainable competitiveness and economic development is connected primarily to the macroeconomic level, there is a growing understanding that the accumulation of wealth and competitiveness occurs at the microeconomic level within an economy (Ivanovic et al., 2010). However, studies on achieving sustainable development from a microenterprise perspective are relatively insufficient. To fill the above research gaps, this paper explores social innovations regarding the reorganization of firm service platforms, service ecosystems, and value co-creation. Hence, the question "How should a focal company interact with other entities in the O2O service platform?" is central to this perspective.

This study analyzes the use of clustering toward O2O commerce service platforms, to promote and guide social innovations and achieve sustainable development goals. In other words, this article explores how sustainable development can be achieved through co-creation in social innovation. The clustering of micro-enterprises mentioned in this study case, in the digital transformation process, administrative authority guidance is crucial, and it is also one of the factors for the success of O2O commerce service platforms in social innovation. To explore the feasibility of microbusiness cluster applications in O2O commerce and understand the impact of social innovations on the sustainable development of microbusiness clusters, we initially attempt to identify solutions from the service platform perspective. Moreover, this study explores the driving factors of social innovations. Considering these concerns, our research questions are as follows:

- (1) What characteristics define O2O service platforms within microbusiness clusters?
- (2) How do grassroots innovations drive the adoption and effectiveness of O2O service platforms in microbusiness clusters?
- (3) How do social innovations within microbusiness clusters contribute to sustainable development through O2O service platforms?

2. Literature review

This section reviews the literature on social innovation, service platform and O2O commerce, service ecosystem and value co-creation, and sustainable development, focusing on microbusiness clusters.

2.1. Social innovation

Social innovation is a tripartite framework comprising the service ecosystem, service platform, and value co-creation (Babu et al., 2020). In this context, Lusch and Vargo (2014) argue that an expanded view of social innovation should underscore actor-to-actor networking, resource liquefaction, density creation, and resource integration to facilitate the co-creation of values that can lead to the success and sustainability of social innovation. This perspective is further supported by Voorberg et al. (2015), who contend that participation is essential for social innovation. Additionally, existing research emphasizes the application of innovative, practical, and sustainable market-based methods through a vast network of business-to-business relationships (Gupta, 2017). Therefore, business acumen and excellent management can be considered drivers of successful and sustainable social innovation.

Social innovation focuses on learning about the innovation and management of enterprises, and its strategy is cultivating social

entrepreneurs with innovative spirit (Frumkin, 2002). However, due to their public benefit nature, many social enterprises are mostly micro-enterprises. Therefore, micro-enterprises play an important role in the academic research of social innovation. Micro-enterprises' role in providing services and creating social change by addressing emerging community needs is becoming increasingly important (Shier and Graham, 2013). Due to their frequent engagement with the community, micro-enterprises have a deep understanding of community needs, and they can identify and implement appropriate interventions in the form of social innovation (Shier and Hand, 2014).

Social innovation often occurs between these three sectors, such as commercial companies, as well as non-profits and government organizations that develop, promote, and share ideas and technologies, which can play an important role in providing innovative solutions to some social and environmental issues (Salim and Ellingstad, 2016). This enables companies to leverage external and technological ideas in their own business while allowing others to use their unused ideas, explicitly applying innovation to social and environmental improvement through business actions (Chesbrough, 2006). For example, in 2016–2019, the European Union launched a huge program to support the growth and expansion of digital social innovation (European Union, 2018). Digital social innovation is a form of collaborative innovation within the social sphere. It engages innovators, users, communities, and actors who utilize digital technologies to collaborate and create knowledge and solutions jointly. The goal is to address various social needs and challenges, including social, environmental, cultural, and other challenges. In addition, Mair and Gegenhuber (2021) put forward the call for open social innovation. They address that social innovation is to reshape collective action driven by digital technology, regardless of its format, such as alliances, building multi-stakeholder networks, or adopting collaborative models of collective impact. Therefore, this paper adopts the tripartite framework of social innovation of service ecosystem, service platform and value co-creation (Babu et al., 2020).

2.2. Service platform and O2O commerce

2.2.1. Service platform

In this study, we look at the service platform as a digital platform. Digital platforms are technologically mediated and enable interactions between user groups while allowing them to perform defined tasks (Cusumano et al., 2019). Bonina et al. (2021) state that digital platforms have strong flexibility and openness to enable innovation, generate new value sets and impact the development of innovative organizations. A “digital platform and ecosystem” is open and evolving. If properly managed, it can adapt, integrate, and reconfigure the resources of member companies to meet the changing needs of market and ecosystem members (Nambisan et al., 2019).

The success of digital platforms is followed by a shift toward innovation platforms, which act as “a basis upon which other companies can build complementary products, services or technologies”, and the technological architecture of innovation platforms contains modules that act as “accessible innovation capabilities” (Gawer, 2014). Chase (2015) proposed platforms as innovative ecosystems characterized by business, openness, symbiosis, dynamism, and interactivity. Innovative ecosystems also affect company strategies and performance by increasing profitability, shortening time-to-market, enhancing market access, and improving new product development (Bouncken et al., 2018).

The network effect of a digital platform increases the viability of its businesses and ecosystems. The network effect refers to the fact that the value of a product increases with the number of users and is a characteristic of many digital products (Adner et al., 2019). According to Katz and Shapiro (1985), network externalities can be categorized into direct and indirect network effects. Direct network effects are the value generated through the direct influence of a certain number of actors on platform quality. Indirect network effects refer to the values created based on the propagation of a standard (e.g., a system). Indirect network effects lead to economically significant increases in market concentration (Dubé et al., 2010). Network effects can lead to one company dominating the entire market, which usually has the largest user base (Parker and Van Alstyne, 2005). Many companies offer free basic versions of their products to build a user base and benefit from network effects (Tidhar and Eisenhardt, 2020). Using a free strategy, the network effect amplifies the leader's advantage over the followers. Free policy leads to more revenue (including market dominance) for the leader than for the follower, but only when free strategies are used. This shows that, in our environment, stronger network effects and free policies benefit only the market leader (Boudreau et al., 2022).

Achieving a service platform is inseparable from its components. Starting with specific ICT-enabled properties that benefit community networks, and then expanding sustainability, scale, and scope based on collaborative and partnership networks. Piccaud-Bello et al. (2022) argue that system design and new product design in innovation ecosystems are paramount. Specifically, this can be implemented through the co-design and production of new destination service products by different actors and the adaptation of current products and technologies by managers of public sector organizations to make existing ecosystems innovative.

2.2.2. Online and offline commerce

As technology applications such as Mobile Cloud, social networking and big data analysis mature, the combination of online and offline “online-to-offline” or even “offline-to-online” is rapidly emerging as one of today's hottest technology trends. O2O initially centered around online and offline marketing interactions. Companies utilized online research to drive consumers to make offline purchases and offered online coupons in physical stores. The introduction of online ordering also encouraged consumers to place orders online and pick up products at physical locations, guiding them to visit physical stores with the opportunity for additional purchases. Therefore, O2O can be defined as providing a seamless shopping experience between online business and offline physical stores through any connected device (Sambamurthy et al., 2012), whether the consumer places an order in a physical store or the user completes the order payment online, its core value is to provide an integrated consumer experience.

In recent years, ICTs have continued to advance, and new business models integrating online and offline sales channels have emerged. The O2O business model has become more complex, mainly focusing on four key concepts (Tsai et al., 2013): (1) Mobile to Business (Online to Mobile, O2M) for Mobile E-commerce; (2) a reverse trend called “Offline To Online”, guiding customers from physical stores to online purchases, contributing to the development of an omnichannel sales concept; (3) using big data for analyzing customized O2O sales; (4) introducing technologies like augmented reality or radio frequency identification (RFID) into physical retail environments, leading to the development of digital O2O sales—all falling under the O2O category.

The execution function class of the O2O mode can be divided into three types: (1) Platform O2O: Using the network platform for short-term projects or long-term brand promotion to create a virtual and real integrated network platform (Chen, 2020); (2) Mobile and services O2O: Extending from virtual networks or mobile devices to the business model and pulling consumers back from physical stores to virtual consumption (Thompson et al., 2022); (3) Entertainment and activities O2O: Using mobile apps, FB fan groups, LBS (location-based service), AR (augmented reality), VR (virtual reality) and WeChat account to allow consumers to interact with stores, with the main purpose of creating topics, improving short-term performance, or simply branding (Kim et al., 2013). Furthermore, the O2O mode is a multi-level composite ecosystem constantly developing toward diversification and will evolve into platform, outsourcing, direct-operated, cooperative, regional, vertical and other types in the future. The degree of vertical integration is also an important variable that distinguishes the type of O2O mode (Wan et al., 2020). Consequently, the O2O modes from the service function perspective are divided into four types: (1) platform O2O, (2) mobile and services O2O, (3) entertainment and activities O2O, and (4) vertically integrated O2O.

Offline and online sales channels serve different functions and possess distinct features. The following provides an overview of the actual comparison results. Traditional offline sales channels include trading, distribution, and communication features to support marketing activities (Peterson et al., 1997). In contrast, online sales channels refer to organizations or individuals using computing and communication data equipment to conduct transactions via the Internet. Transactions through online sales channels are not confined by business hours or location restrictions. However, customers cannot immediately pick up goods after placing an order; instead, they can designate a shipping location. Customers generally have a lower level of trust in the transaction security of online sales channels. Furthermore, customers using online sales channels can acquire more information about merchandise, swiftly browse many products, or compare prices on the webpage. Sellers can record customer transaction information and website shopping behaviour via computer systems. Online stores also have greater flexibility in offering product discounts, organizing promotional events, and providing more updated information (Zeng et al., 2016). However, online stores cannot provide prompt answers and after-sales services. Compared with physical sales channels, sales channels are less convenient and have a lower degree of trust. Moreover, compared with physical sales channels, online stores can save more on store rents, operational, inventory, and personnel costs. However, customers can experience merchandise first-hand at physical stores and have access to live onsite services.

Online and offline integration refers to the use of the Internet to share or promote a variety of commercial information, maintain business relationships, and conduct commercial transactions to jointly create profits, and it has become an important method for enterprises to generate profits (Hanson, 2000). There are two types of online and offline integration: the first is from offline to online sales channels, which mainly emphasize Internet marketing, merging or acquiring online businesses, and Internet businesses. The second type is from online to offline sales channels, which mainly consist of intervening product manufacturing, purchasing, logistics and distribution, and retail sales channels. Expanding into offline sales channels from online sales channels is to increase accessibility, expand the customer base, and increase visibility. When online sales channels expand into physical stores, the objective is to increase customer exposure to the brand to gain customers' trust (Zeng et al., 2016).

Compared with purely online or offline enterprises, online and offline integration will bring more advantages and is very important for enterprises. The benefits of online and offline include: cost reduction, generating profits, sharing information, diversifying risk, increasing consumer trust, providing differentiated services, accessing financial leverage, and expanding products and markets (Hanson, 2000). In addition to factors associated with online systems, enterprises that have integrated online and offline operations must also consider their impact on the operation of existing physical stores (Lin, 2016). Social media may serve as a core asset value for successful innovation, enhancing the efficiency and effectiveness of the innovation process through knowledge creation. This is achieved by reducing the risk of negative spillover and increasing knowledge stocks within the partnership (Papa et al., 2018).

Consequently, microbusinesses should be aware of environmental changes and emerging technology trends and discern opportunities to transform into brick-and-mortar through new business opportunities to fit into the mainstream.

2.3. Service ecosystem and value co-creation

2.3.1. Service ecosystem

The term “ecosystem” originates from biology, which mainly refers to the ability of organisms in the natural world to interact with each other and regulate the environment. The overall composition of natural organisms and their living environment is an ecosystem. Vargo and Lusch (2010) first proposed the concept of “service ecosystem”, which combines the concept of ecosystem with the service dominant logic (S-D logic), follows common beliefs and integrates interactively, enabling actors to exchange services and resources indirectly or directly, to facilitate mutual value creation. This system concept explores how all interdependent actors in the commercial market create value (Vargo and Lusch, 2011), so the definition of a service ecosystem has a clear concept. A service ecosystem is defined as a system where actors form resource integrators, forming a self-regulating and self-sufficient system that creates value through shared institutional logic and service exchange processes with each other (Frow et al., 2014). Akaka et al. (2023) mentioned that actors play the role of resource integration in both “supply” and “demand” in the service ecosystem, and the current service provision also determines service needs.

Actors serve as the core guiding principle by collecting resources, providing resources, integrating resources, and providing service exchange, interaction, and sharing with other actors. Recently, companies have started to focus on interactions with consumers, and the concept of service ecosystems has gradually influenced the whole ecosystem, including all actors and stakeholders (Vargo and Lusch, 2010). However, the main characteristics of value propositions to satisfy stakeholders are: (1) uniqueness: outperforming competitors' propositions; (2) measurability: using money to quantify value and price; and (3) sustainability: execution must be sustained over time (Xie et al., 2016). For example, if a company offers a value proposition for personalized services, through design, research and development, and participatory activities, the value of the additional services can be increased beyond the value of the product itself, thus expanding into a new area.

Vargo and Lusch (2011) stated that value co-creation is a dynamic process, since value is created through customer engagement and service exchange. The purpose of value co-creation is to increase value, and the way to co-create value is to integrate the actors' resources into the value creation system to achieve better value creation. Because the actors are governed by shared values, their behaviour is shaped by these values and norms, creating a synergy that in turn leads to value resonance. These agreements and norms guide actors to collaborate and enable businesses to provide better services to their customers (Xie et al., 2016). A core issue of value co-creation is how to integrate the resources of customers into the value co-creation process to achieve resonance (Becker et al., 2023). It is difficult for businesses to fully access and have customers' personal resources at their disposal. The interaction between businesses and customers is the fundamental way of creating value together, and value co-creation is formed through the heterogeneous interaction between customers and businesses. In addition, engagement platforms are defined as "physical or virtual touchpoints designed to provide structural support for the exchange and integration of resources and thereby co-creation of value, between actors in a service system" (Vargo and Lusch, 2004). Accordingly, we introduce the actor's engagement perspective in this article to replace the one-way logic behind the business-centered approach.

2.3.2. Value co-creation

In service-dominant logic, value propositions are dynamic mechanisms that are co-created to adjust how resources are shared in service ecosystems (Frow et al., 2014), and actors invite each other to participate in services (Chandler and Lusch, 2015). Value propositions are a reciprocal integration of resources between actors and a coordination mechanism that seeks equal exchange (Kowalkowski et al., 2017). There are many innovative value propositions that actors can experiment with and develop. As a value balancing and coordination mechanism, value propositions influence the selection of prospective actors by the original actors and shape market interactions and the integration of new resources within various service systems (Frow et al., 2014).

S-D logic suggests that all actors involved in a service exchange pursue the same purposeful value co-creation and are involved in the same resource integration and service delivery activities (Xie et al., 2016; Akaka et al., 2023). The general actor orientation encompasses both individual actors (e.g., individual consumers) and collective actors formed by a group of individuals (e.g., companies, countries) (Becker et al., 2023). Vargo and Lusch (2004) indicate that all actors need to consolidate resources, engage in service exchange and co-create value, through direct or indirect service exchange, all actors benefit, manage and evaluate through their institutional arrangements and form interdependent relationships. New services should be added to benefit from shared data resources (Haki et al., 2022). The nature of platforms is to connect, interact and transact, and the nature of value co-creation is that stakeholders interact through platforms to continuously co-create value (Van Alstyne et al., 2016). Value is a joint function of supplier and customer actions and is always generated by co-creation (Vargo and Lusch, 2017). The network enables two-way interactions between customers and service providers, but also supports and enables value co-creation interactions between different participants in the network (Beirão et al., 2017). Mobile payments enable residents to participate more effectively in the economy, facilitate consumption upgrades, and provide them with more ways of social networking (Wu et al., 2023).

2.4. Microenterprise clusters and sustainable development

The definitions of microbusiness employees differ worldwide. In Taiwan, it adheres to the guidelines set by the Small and Medium Enterprise Administration (SMEA), and the economic affairs authority of Taiwan, specifying that microbusinesses have fewer than 20 employees in the manufacturing industry and five in the service industry. These businesses may operate from homes or farms. Microbusinesses play a pivotal role in the initial stages of enterprise formation and can be found in both developed and developing countries, spanning rural and urban areas (Zapata Campos et al., 2023). Therefore, microbusiness generally refers to enterprises with fewer than five employees. According to the survey results of a report of the economic affairs authority of Taiwan, the number of microbusinesses in Taiwan reached 106 million in 2021, accounting for 88.79% of the total enterprises. These enterprises are sources of a region's employment opportunities and economic growth. In the development of the world economic system, microbusiness and SMEs promote growth in their respective industries (Ståhlbröst, 2013).

In developing countries, thriving micro and personal enterprises play a central role in driving economic development, fostering employment growth, and reducing poverty. In developed countries, they contribute to fostering innovation and the development of new businesses. Nevertheless, due to their vulnerability, microbusinesses face challenges accessing resources beyond their reach. Their small size makes survival challenging, yet innovation remains crucial despite constraints such as limited resources, low competencies, and a lack of vision (Jayeola et al., 2022).

To overcome these issues, clusters are formed. Most microbusinesses and SMEs operate in the same or interrelated fields, typically centralized in specific geographic areas. These geographic characteristics promote the formation of clusters. Additionally, the economic affairs authority of Taiwan provides impetus to clusters of microbusinesses with no more than five employees and provides them with the counseling program Micro and Personal Business Care and Support. In this study, clusters from Taipei, Taichung, Taichung,

Yilan, and Kaohsiung also participated in the counseling program in Taiwan. To overcome small company size and insufficient resources and funds, the clustering of microbusinesses plays a complementary role between members.

Research on clusters has significantly increased since the early 1990s. For instance, [Porter \(2000\)](#) identifies a cluster as a geographic concentration of interconnected companies and institutions in a particular domain. He complements that a cluster affects a company's competitive advantages by (1) increasing its productivity, (2) guiding the direction and pace of innovation, and (3) stimulating the conformation of new business, which also enlarges and reinforces the cluster itself. Therefore, being part of a cluster enables the company to be more productive, access more information, use technologies, coordinate or cooperate with related companies, and stimulate improvement to achieve better performance.

In situations where capital is limited, micro-enterprises often rely on government financial support if they cannot sustain their continued development through collaborative clustering. [Jayeola et al. \(2022\)](#) underscored the pivotal role of the government in their research, stating, "The government should actively encourage and effectively guide social capital and resources to participate in the development of the financing environment for micro-enterprises and provide them with efficient services". This highlights the government's critical importance in coordinating and regulating financing models for micro-enterprises.

Systematic innovation toward a more sustainable socio-technical system is increasingly understood as "transformation" ([Smith et al., 2010](#)). [Avelino and Grin \(2017\)](#) argue that "sustainable transformation" refers to "a fundamental transformation toward a sustainable society in response to some of the tenacious problems facing contemporary society". Sustainable transformation requires systematic innovation in specific subsystems and beyond individual systems, including transformations of different scales and innovation across long-term systems. Therefore, the transformation is the result of "co-evolution".

3. Methodology

3.1. Case study approach

A case study involves the comprehensive collection of data about specific individuals or groups, followed by an in-depth analysis and explanation of the causes and consequences of a particular problem. This qualitative research method entails describing relevant facts of individual cases, aiming to understand the objective facts and the subjective interpretation of the research object. The primary function of a case study is to present a problem situation, facilitating the exploration of feasible solutions ([Yin, 2009](#)).

Case studies are particularly suitable for investigating research issues that are relatively new in the current field, have not been extensively studied, lack a clear theory, and involve problems derived from real-world environments. This research method is well-suited for this study. Explanatory case studies, in particular, elucidate the causes and processes of phenomena through individual cases, assessing the explanatory power of guiding theories in data collection and analysis ([Yin, 2009](#)).

Interpretive analysis plays a key role in understanding the meaning of qualitative data, especially textual data. The objective is to comprehend what the research subject said and did, and the reasons behind their actions and statements, thereby clarifying the behaviour of the research subject. Researchers in this context must organize, interpret, and explain various primary and secondary data collected, offering reasonable interpretations that may vary depending on the chosen theoretical perspective ([Myers, 2019](#)). Consequently, the approach employed in this study leans toward explanatory case studies.

3.2. Research design

This study aims to explore social innovations for sustainable development that influence O2O service platforms in microbusiness clusters. In addition, we would like to analyze the driving forces for social innovations and the mechanisms of social innovations. Additionally, we analyze how social innovations impact the sustainable development of microbusiness clusters. The research conceptual framework is shown in [Fig. 1](#). The findings are based on data collected through interviews, observations, secondary data, and expert meetings.

This study adopts three elements of realist theory, namely, context-mechanism-outcome analysis techniques ([Avelino and Grin,](#)

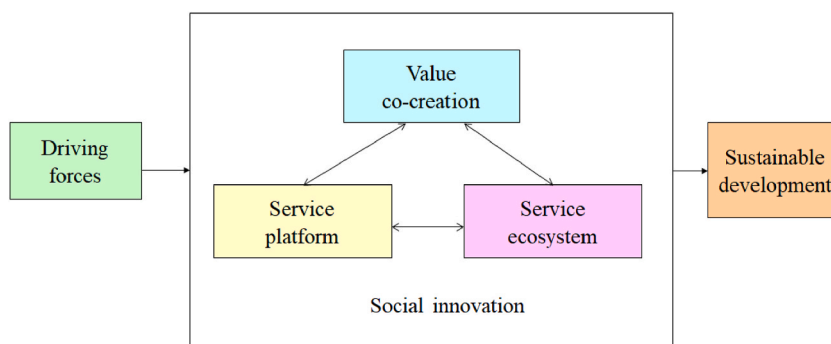


Fig. 1. Conceptual framework.

2017; Yin, 2009), and conducts a case analysis to understand the driving factors and results of microbusinesses' social innovation. As elaborated by Felin et al. (2012), micro-foundations do not necessarily relate to individuals but rather represent explanations at a lower analytical level. Hence, in this article, we take the focal firms as the micro-foundations (i.e., the base level) to explain them and other actors in the service ecosystem.

The theoretical sampling method was used in this study. In order to achieve the purpose of the research, cases are selected for in-depth interviews based on the following criteria: (1) The business purpose or concept of the company covers O2O platform and ICT application; (2) Enterprises that have been operating for more than three years and have good business performance; (3) Microbusiness clusters that have won awards from administrative authority units.

3.3. Data collection and analysis

In this study, we employed a comprehensive data collection and analysis strategy to investigate the impact of social innovations and O2O commerce on micro-enterprises. Data gathering was conducted through several methods, primarily focusing on direct interactions with the subjects of our study. We conducted seven in-depth interviews with owners and managers of micro-enterprises within three distinct micro-enterprise clusters across Southeast Asia, identified for their significant engagement with O2O commerce platforms. These interviews were carried out between January and March 2022 to ensure the relevance and timeliness of the data, with each session lasting about an hour and covering topics such as the integration of social innovations and the operational impacts of O2O commerce.

To complement these interviews, two focus group discussions were held in June 2022, each including six active users of O2O platforms from the micro-enterprise sector. These discussions aimed to gather collective insights on the challenges and benefits associated with O2O commerce models, enhancing the depth of the qualitative data collected. Additionally, an expert panel comprising three academic scholars specializing in digital economics, a legal expert on commerce regulations, and an industry representative from the O2O sector convened on November 21, 2016. This panel discussed critical issues regarding the use and impact of O2O in micro-enterprise clusters and the relationship between O2O and grassroots innovation, thereby helping to validate the research framework and refine the study's focus based on expert critiques.

Secondary data analysis was integral to this study, incorporating cluster counseling reports, mid-term and final presentations, and proposals from the clusters, dating from 2016 to 2022. These sources provided a historical context and supported the primary data, offering a broader perspective on the evolution of O2O commerce and its implications for micro-enterprises. All data from interviews, focus groups, and expert discussions were transcribed verbatim within three days of collection to preserve accuracy. Interviewers reviewed and modified transcripts as needed to clarify ambiguous responses, thereby enhancing the reliability and validity of the data. Thematic analysis was used to identify recurring themes and patterns, while statistical tools were used to analyze quantitative elements from secondary sources. Observations during cluster meetings and interviews further enriched our understanding of cluster dynamics and helped validate responses concerning cluster interactions.

3.4. Case briefings and research objects

According to Yin's (2009) definition, the case study is a practical survey method. When the boundary between the phenomenon studied and real life is unclear, the current investigation is conducted through various evidence sources. Therefore, this case study data includes secondary and interview data. The effectiveness of the sampling is based on choosing information-rich cases for an in-depth study. Therefore, the research team entrusted the colleagues in relevant units to select the network with successful integration cases. The seven clusters' codes, major commodities, and number of members are shown in Table 1. We provide a brief description of the microbusiness clusters as follows.

E1 is a cluster formed by 15 high-quality handicraft and digital technology enterprises from the Yilan and Hualien districts. The cluster members have rich co-market experience, with the ability to not only plan and implement festival sales activities or new product launch promotions, but immediately reach consensus among enterprises, creating new channels and expanding business revenue.

M1 gathers 15 famous souvenir brands to develop the souvenir industry by deepening local characteristics and enhancing industrial competitiveness. They successfully promoted characteristic souvenirs in Taichung. The cluster members are important members of the Taichung Gift Association, verified by the Taichung Municipal Authority. They share information and resources and improve and promote their products' features.

Table 1
Interview objects and their coding.

Code	Number of Members	Major Commodities
E1	15	handicrafts
M1	15	food-based souvenirs
M2	16	food-based souvenirs
N1	15	food-based souvenirs
N2	15	handicrafts
S1	18	organic goods
S2	15	wedding-related industries

M2 is a cluster formed by 16 members mainly engaged in food commodities and IT services. They provide counseling to assist cross-industry collaboration and accelerate innovation in application services and merchandise improvements. The three main value propositions of M2 are arts, humanities, and creativity. They welcome all micro-entrepreneurs to create a creative cluster and achieve better business results through cooperation, clustering, and co-marketing.

N1 has 15 members, and their main commodities are food-based, especially souvenirs. Their main value propositions included business value management through collaborative platforms and the number of products added. The leader helps members create and identify their market position, target customers, a unified business model, and pricing strategies.

N2 focuses on knowledge-intensive enterprises to search for and encourage original microbusiness development and to strengthen their innovation and operational characteristics. With 15 cluster members, N2 assembles the specialties of the members to promote and achieve new business opportunities and share the goal of sustainable development. They strongly promote cross-industry exchanges and business facilitation and welcome members to participate in exchange associations. The members enhance their commonalities or complement each other by combining unique and innovative ideas with digital marketing knowledge and sharing important information.

S1 has 18 cluster members, and they promote organic goods and advocate health. Their value propositions were achieved by positioning Mage as the main brand axis of the cluster. The focal firm assists its members in achieving co-marketing and unified management to save costs such as marketing, human resources, and time. They thus pay attention to traceability to increase consumer trust and loyalty and optimize members' brand image and business model, thereby enhancing business value.

S2 is the only cluster with members engaged in the same field—wedding related industries. There are 15 members in S2. Due to members' common understanding and work attitudes, they can cooperate and support each other, although the cluster is small and members have different fields of expertise.

4. Findings and discussions

4.1. Four execution types of O2O service platforms in microbusiness clusters

Regarding the service platform, we reviewed the execution types of O2O service platform and identified four types of O2O service platform in microbusiness clusters: (1) Platform O2O (Chen, 2020): clusters set up websites to sell products and attract customers to the physical store or fair to buy goods, e.g., the S1 cluster; (2) Mobile and services O2O (Thompson et al., 2022): visitors buying products in the marketplace or in the store feel satisfied and subsequently purchase through the Internet, e.g., the E1 cluster; (3) Entertainment and activities O2O (Kim et al., 2013): through the Facebook page, word of mouth is used to attract customers to purchase, tested merchandise is deemed to the linking of customers, and then use the network to rebuy, e.g., the S2 cluster; and (4) Vertical integration O2O (Wan et al., 2020): firms in a composite ecosystem, constantly developing toward diversification, evolving into the platform, and fair visitors or customers scanning QR codes to join their Line@ and participate in store discount activities, thus guiding consumers to the market for repurchase, e.g., the M1 cluster.

The O2O e-commerce operation should first pursue optimizing the user's experience and the economy of scale effect caused by expanding the customer base. By applying the following four data analysis tasks: data description, pattern recognition, quantitative forecasting, and optimization, continuous optimization of the brand, information, items, prices, word of mouth, orders, payment, and logistics can be carried out. The long-term focus will be mainly on the development of new customers, the cost of developing new customers, revenues generated by the transactions of existing customers, the cost of maintaining existing customers, and the maintenance rate of existing customers (Zeng et al., 2016). Due to differences from traditional cost structures, once e-commerce operations reach an economy of scale, the natural step for further development is to pursue the economy of scope through data capabilities. In other words, when the existing customer base is sufficiently large, expansion in scope to related areas is guided by data. The targeting of existing customers has a similar effect as traditional cross-selling does.

In summary, this study regards O2O commerce as a service platform and divides it into four models, which are helpful in interpreting the service's content of micro-enterprises' social innovation.

4.2. Key drivers of social innovations in the microbusiness cluster

4.2.1. Integrated value proposition

The core value proposition of focal firms plays an important role in leveraging their actors' strengths, consensus, and enthusiasm through the generation and operation of service ecosystems based on service-dominant logic. This study revealed that based on the service-dominant logic, implementing the value proposition of core business innovation not only enhances internal resource integration, but also optimizes the external service delivery system of the service ecosystem, and strengthens the performance of core enterprise. This study uses the O2O research model of researchers (Chen, 2020; Thompson et al., 2022; Kim et al., 2013; Wan et al., 2020) to analyze the use of O2O by service platform in micro-enterprise. We found four types of micro-enterprise cluster O2O grassroots innovations for which one of the key drivers (determinants) is "value proposition". Suggesting social innovation, along with the integrated value proposition of actors, can promote sustainable development. Type 1: Platform O2O, value proposition plays an important role in influencing the cluster members, especially if this type needs to bring customers from the online market to the offline market. Type 2: Mobile and services O2O, integrated value proposition assists members in physical marketing activities and brings customers to the Internet. Type 3: Entertainment and activities O2O, collective value proposition instructed members to operate online fan pages. Through social word-of-mouth communication, customers place orders and feel good after receiving goods and then use the

Internet to purchase. Type 4: Vertical integration O2O, E1 clustering is an example of combining the actors of the vertical supply chain. Connecting with co-shared value proposition, this cluster allows customers who come to the market to scan the QR code to join their line@, participate in-store discounts, and direct consumers to rebuy online.

Our above findings are consistent with those of [Chandler and Lusch \(2015\)](#), who suggested that “value propositions help to coalesce layers or subsystems of actors” and that these subsystems can help to clarify the self-regulating mechanisms of different services and values. In addition, our finding that value co-creation starts with value proposition is consistent with extant research. For example, [van Doorn et al. \(2010\)](#) suggested that ensuring engagement activities through action-formation mechanisms is key to the success of the overall service system and depends on the actors’ motives to engage, which leads to engagement properties. In other words, without actor engagement, no resource integration occurs, and no value can be co-created ([Storbacka et al., 2016](#)). Academic discussions about the role of leaders in the O2O environment have expanded to the digital service ecosystem environment. This study provides strategic significance for practitioners who want to spread O2O service platforms. Therefore, the integrated value proposition is an important decisive factor in using the O2O service platform.

4.2.2. Actors’ engagement through ICT application

The impact of the actors’ participation in the O2O service platform includes the frequency of communication between partners, experience accumulation and learning, actual investment in cooperation projects, and the degree of science and technology application. For example, microbusinesses participate in industry association’s business exchange meetings and one-to-one counseling activities through business opportunity meetings to improve company visibility, increase business sales and understand relevant channels. Through partner enterprises and products developed by the company and then selling products combined with the new technology management system, the company’s service system is convenient to operate. [Griffin \(2015\)](#) posits that social capital, which is embedded in the ties that constitute the structure of a network, helps facilitate and shape the innovation process of micro-entrepreneurs. Our findings are consistent with these studies.

Our findings are also consistent with those of [Sun and Wei \(2019\)](#), who indicated that designing effective resource integration for actor engagement and value co-creation is crucial because they enable the emergence of service systems ([Böhmman et al., 2014](#)) that foster innovation. Especially, this enables a broader perspective for the design of sustainable service systems, which evolve around an engagement platform ([Vargo and Lusch, 2004](#)) as a major facilitator for highly co-created services ([Patrício et al., 2018](#)).

4.2.3. Actors’ value co-creation

From the data of informants, such as N1, E1, and S1, we understood the problems in which the actors were involved and must solve together through the shared value proposition. The core firms create a value proposition, which is the commitment agribusinesses in the cluster make to the project. They then engage in service exchanges of the service ecosystem. During the processes of resource exchange, trade, and adaptation in the resource network, core firms and actors collaborate, link resources, and trade via value networks as well as progress toward their project goals. This finding is consistent with the fact that the success of internal corporate ventures is contingent upon their ability to adjust these value propositions as the venture develops ([Covin et al., 2015](#)).

Value co-creation is critical to successful sustainable development because it is where trust is earned and motivation and engagement are achieved. These activities (including the shared value propositions) create strategic alliances and make actors willing to go through changes that may seem difficult at the initial stage of cooperation. To find a specific solution that can be implemented, it is important that the ideas and concepts have been achieved throughout the process of value co-creation led by the focal firms so that when the government project leaves, the implementation of the cluster will be as easy as possible. All these keywords emphasize the focal firm and the actors involved and the importance of value co-creation in social innovations.

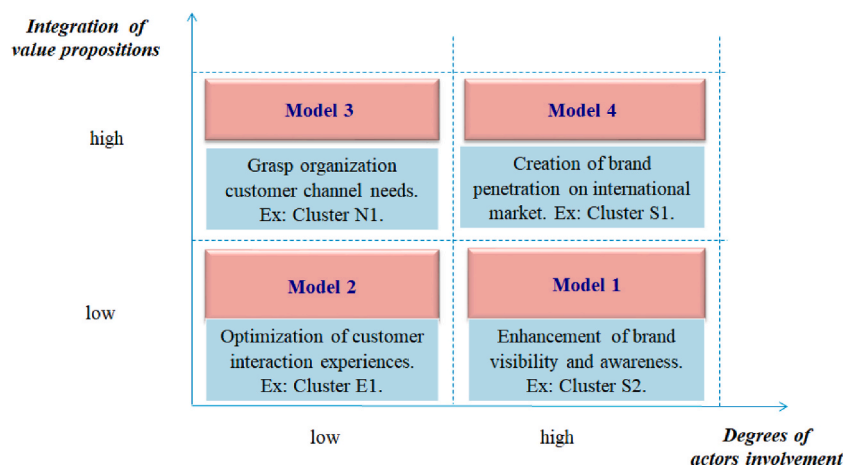


Fig. 2. The four types of social innovations in the microbusiness cluster.

4.3. Social innovations impact on the sustainable development of microbusiness cluster

4.3.1. Four types of social innovations

The social innovations in this study mean the reorganization of various resources in the process of value co-creation to create new resources that benefit the network of actors, and create a sustainable development of microbusiness. Some micro-enterprises reflect that the impact is due to the subsequent focus on research and development. It is the accumulation of experience and learning that consequently extends to the cooperation and development of enterprises outside the cluster through the introduction and information sharing of the cluster members. In addition, through the exhibition to understand the manufacturer cooperation opportunities, the cluster manufacturers themselves have taken the initiative to reach out to leaders and work with them to develop innovative products.

The data shows that most clusters have experienced growth, highlighting the importance of social innovations. Numerous clusters have successfully increased their annual revenue and engaged in various marketing activities, including exhibition marketing, participation in international exhibitions, and product branding. Accordingly, the microbusiness cluster social innovation types are as follows (Fig. 2):

- (1) Brand mode: Enhancement of brand visibility and awareness. S1 heightens its members' product image by adding a cat character onto product packages, and S2 is the only cluster whose members are engaged in the same field—wedding related industries.
- (2) Customer interaction mode: Optimization of customer interaction experiences. These clusters are innovative (e.g., S1), whether internal innovation or cross-group innovation.
- (3) Collaboration and profit sharing mode: Grasp organization customer channel needs. The basic principle of group formation is cooperation and sharing. Counseling consultants and leaders achieve this purpose through the cluster (e.g., N1).
- (4) Sustainable development mode: The clusters' goal is sustainable development. Through the creation of brand penetration on the international market, sharing knowledge, heterogeneous joint marketing, common brand, product innovation, cross-group cooperation, development of groups to share the economy, and grassroots finance to promote innovation, creative micro-businesses organize fund-raising campaigns. The root of the concept of a sustainable future is thus to develop local characteristics of the economy through O2O commerce to develop local industries (e.g., S1).

4.3.2. Driving forces of social innovations

The results of social innovations driving force analysis from the service platform perspective are as follows.

(1) Frugal-driven Forces

The frugal innovation dimension includes scarcity-driven innovation, cost-driven innovation, and deskilling. Details are as follows:

(a) Scarcity-driven force: In this study, E1, located in Yilan Township, lacked resources. Interview and secondary data showed that E1 uses O2O to guide customers who visited the fair and to rebuy online. (b) Cost-driven force: The research object is cost-driven innovation, using clustering for co-innovation branding, selling channels, etc. For example, E1, M1, M2, and N2 have physical selling channels or exhibition methods to help members sell goods, and N1, S1, and S2 are co-brand-based. All clusters in this study are entity-oriented and then transfer to network sales. (c) Deskilling force: From the interview and other information, the lack of offline-to-online skills is evident. Group counseling way to help members improve O2O skills includes: e-commerce management capacity; capability of launching and selling products on e-commerce platforms; social media fan page management; use of Google Analytics; and use of digital marketing tools (LINE@).

Additionally, other skills include the following: (a) Brand: product brand design, collaboration on brand marketing, co-branding, and brand image enhancement. (b) Product: improve product packaging, cooperative innovation of product, product packaging design, repackaging design, innovative product design, and collaborative design. (c) Marketing: Co-marketing with other actors.

(2) Socially-driven Forces

The socially-driven dimension includes the economic development of the local community and minority empowerment. Regarding the economic development of the local community, the clusters are formed in their respective regions. For minority empowerment, each group has its own participation of ethnic minorities and women. Accordingly, the object of this study is social innovation. To assist the economic development of local communities and minority empowerment, the government offers counseling for establishing websites, contributes to O2O integration, and encourages the switch of the bustling local economy from offline to online. Moreover, this model creates a virtuous circle, turning it into an offline-to-online-to-offline model.

(3) Sustainability-driven Forces

The sustainability-driven dimension includes eco-efficiency and pollution. Regarding eco-efficiency, S1 products are mostly organic goods that match the requirements of eco-efficiency. Sustainability-driven innovation means creating eco-efficiency and reducing pollution, so with the online as the starting point, the actual experience of the project will have to be offline, such as S2's activity in the wedding industry. A comprehensive driving forces analysis is shown in Table 2.

From the point of view of the clustering industry, this study uses ICT capability to create O2O service platform results that can be

combined with China's industrial chain concept and become a clustered industry for micro-enterprise social innovations (Patricio et al., 2018). The intersections of the three dimensions described above have important common characteristics: the process is always accompanied by the ICT application of new service platforms concerning user needs and behaviour, new ways of value co-creation, and new service ecosystems. In the process that characterizes the adoption and diffusion of social innovation, new value co-creation is produced.

The structural empowerment of many small e-commerce sellers on the service platform can significantly positively improve the entrepreneurial performance of microbusinesses. The empowerment of resources assembled on the platform has an intermediary effect on microbusiness performance, which can better empower the service platform, providing guidance and reference for microbusiness to realize its own growth. The sustainable development of microbusinesses requires O2O commerce as a service platform in their social innovations, including integrated value propositions and actors' engagement. Therefore, the sustainable development of micro-business clusters results from co-evolution (Ståhlbröst, 2013).

In summary, based on the case analysis framework of this paper, we proposed the spotlights and process of microbusiness cluster social innovation as shown in Fig. 3.

Driven by social networking, social media EC, and microbusiness service platforms emerge as mechanisms for social innovation, inspiring social system integration and growth. Consumers capitalize on the new opportunities offered by social media to engage socially through the Internet. These interactions deliver and generate a certain amount of value for both businesses and consumers (Hossain et al., 2020). Based on the findings, this research proposes the following propositions:

Proposition 1. Through the driving force of social networking, the aim is to inspire microbusinesses in O2O clusters to leverage the synergies between social media ecosystems and micro-business service platforms. Ultimately, the goal is to achieve the integration and growth of the social system (Fig. 4).

5. Conclusions and suggestions

5.1. Conclusion

This study finds key drivers in social innovation for microbusiness clusters, which are shared value proposition and actor engagement, as per the multiple cases through interviews and observation. This study emphasizes that O2O e-commerce is an important part of the service platform, especially in the application of microbusiness clustering social innovation, because social innovation could impact their sustainable development by enhancing their ICT ability, which can also increase the application level of service platform. Sustainable development of microbusiness is one type of sustainable transformation. There are four social innovations of microbusiness clusters: the Branding model, the customer interaction mode, the collaboration and profit sharing mode, and the sustainable development mode. The driving forces of the social innovations of microbusiness are frugal-driven, socially-driven, and sustainability-driven forces.

How the social innovations impact the sustainable development of microbusiness clusters? In response to this question naturally arises with the use of O2O service platform models since they represent dynamic creation based on strategic alliance and social innovation, and create an environment in which changes often occur in response to social and economic developments. Sustainable development of microbusiness requires O2O commerce as a service platform for social innovation, including integrated value propositions and actor engagement. Hence, to enhance the ICT capabilities of microbusinesses, resources assembled on the service platform have an intermediary effect on O2O operation performance, which can better empower the platform to provide guidance and assistance from social innovations to realize its own growth.

5.2. Theoretical implications

This study provides a framework for government and industrial organizations to understand the driving factors that micro-businesses adopt O2O service platforms and social innovation, and can be used as a tool to enhance microbusinesses' sustainable development. In addition, the results can help the government guide local microbusinesses to join the networks and cluster, so as to enhance the overall competitiveness of local microbusinesses.

This study reveals the driving factors of social innovation and its impact on the sustainable development of microbusiness clusters, illustrating how sustainable and impactful social innovation emerges and influences systemic change (Miller et al., 2021). It

Table 2
Different driving forces of social innovation of microbusiness cluster.

Driving Forces	Scheme/Cases examples
Frugal-driven forces	Scarcity-driven innovation (E1) Cost-driven innovation (E1, M1, M2, N2) Deskilling (None)
Socially-driven forces	Economic development of local community (All cases) Minorities empowerment (All cases)
Sustainability-driven forces	Eco-efficiency (S1) Pollution (S2)

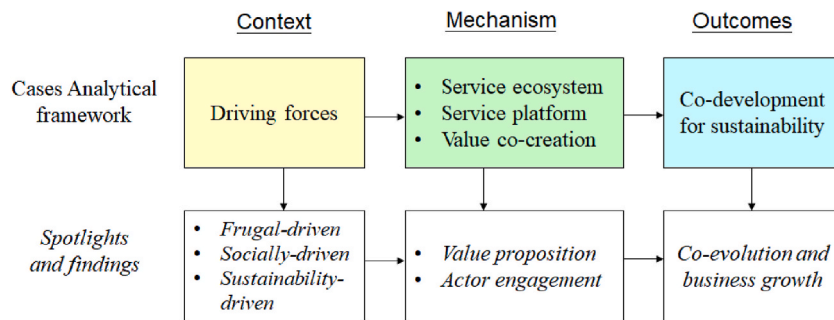


Fig. 3. The spotlights and process of microbusiness cluster social innovation.

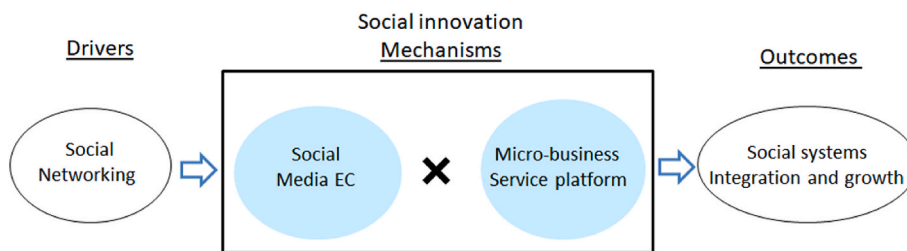


Fig. 4. The process of micro-business in social innovation mechanism

particularly highlights the additive effect of social media in this process.

As mentioned in the study by [Cusumano et al. \(2019\)](#), digital platforms, which serve as service platforms, enhance network effects, thereby increasing the survivability of businesses and ecosystems. This study reveals that social innovation service platforms encompass integrated value propositions and participant engagement, where co-evolution brings about sustainable effects. This is consistent with the research of [Bonina et al. \(2021\)](#), emphasizing that digital platforms possess robust flexibility and openness, enabling innovation, generating new value sets, and influencing the development of innovative organizations.

Previous research findings suggest that identifying the necessity and opportunities for innovation could serve as a potential catalyst ([Chen et al., 2021](#)). [Chen et al. \(2018\)](#) elucidate the necessity for consensus and collaboration in cluster innovation actions, as well as the role of the focal firm. In this study, despite the relatively limited resources of microbusiness clusters, we discovered that the ultimate goal of achieving sustainable development for microbusinesses could be realized through participation in O2O service platforms and social innovation facilitated by clusters. Consistent with the viewpoint proposed by [Porter \(2000\)](#), clusters have the potential to enhance performance. The comprehensive impact of collaborative efforts within the microbusiness service ecosystem can be strengthened.

This research holds significant implications for the study of e-commerce, particularly in the areas of O2M and digital O2O, contributing to the theoretical understanding of SMEs in the e-commerce domain. This study found that microbusiness clusters pay attention to traceability to increase consumer trust and loyalty and optimize members' brand image and business model, thereby enhancing business value. This aligns with [Hossain et al. \(2020\)](#) research, which states that customers who trust suppliers more can make secure purchases through social networks and mobile shopping, ensuring a peaceful and sustainable shopping environment. The synergies identified in this study between the social media ecosystem and microbusiness service platforms fill a research gap in the literature on the sustainable development of SMEs ([Liu and Si, 2022](#)).

5.3. Practical implications

Microbusinesses in Taiwan feature products, technology, and services of high quality, and with the flexibility to swiftly adapt to local conditions, they have the potential to lay down a successful foundation in the O2O's foreign market if they can partner with local businesses. Hence, we suggest that microbusinesses collaborate with e-commerce service platforms, draw on the resources of industry associations, refer to the needs of the local market and e-commerce service platform suggestions when planning product categories, and develop suitable brands based on the conditions of the local market.

The demand for O2O service platform talent in microbusinesses grows day by day, and actively introducing specialized management talent will facilitate global marketing and bring new operating models. We suggest that the administrative authority consider providing microbusinesses looking to penetrate foreign markets with grants or salary subsidies when they hire or recruit foreign and domestic talent with backgrounds in O2O cross-border e-commerce management. This will aid microbusinesses in reinforcing themselves with professionals who have knowledge of local market trends.

5.4. Future research directions and research limitations

The execution and achievement of social innovation and co-development activities can be followed up in the future to confirm the findings of this study. In addition, attention should be given to the after-sales customer service of the service platform. This work is innovative because after e-commerce is purchased, the attributes of this stage and the relationship between retailers and consumers can receive special attention.

This study has several limitations that should be noted when interpreting the findings. First, the sample used in this study is dominated by micro-enterprise clusters, which is insufficient to make broad generalizations. Second, the research sample may have regional restrictions. Therefore, the generalization of the results to other clusters of different types may be limited.

Ethics statement

Not applicable because this work does not involve the use of animal or human subjects.

Declaration of competing interest

The authors declare no conflicts of interest.

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