

# Gaining the Initiative: User Entrepreneurial Process Driven by Innovation

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**Abstract:** With the development of Internet technology and the prosperity of platform economy, the phenomenon that users undertake innovative and entrepreneurial activities keeps emerging. User innovation and entrepreneurship are very important research streams in the field of innovation and entrepreneurship. User entrepreneurship is exactly opposite to traditional entrepreneurship. However, the existing research has not fully and deeply revealed the process mechanism of user entrepreneurship driven by user innovation, and lacks a holistic overview. Address to this, this study summarizes the connotation and classification of the entrepreneurial process driven by user innovation on the basis of systematically review the literature, then applies multiple theories to interpret the micro-process of entrepreneurship driven by user innovation, refines the research focus of "antecedent-process-result" variables, and finally constructs a holistic research framework of entrepreneurial process driven by user innovation. The research attempts to thoroughly reveal the entrepreneurial process mechanism driven by user innovation, and puts forward specific suggestions for future research in this field. The conclusion and prospect of the study are helpful to promote the entrepreneurial research driven by user innovation, and at the same time provide reference for making the relevant entrepreneurial policies to promote the transition of user innovators to user entrepreneurs.

**Keywords:** User innovation; User entrepreneurship; Innovation-driven entrepreneurship; Entrepreneurial process

**How to cite this paper:** Cen, W.  
Gaining the Initiative: User Entrepreneurial Process Driven by Innovation. *Management & Innovation*, 3(1), 1-15.  
<https://doi.org/10.61187/mi.v3i1.166>

## 1. Introduction

In recent years, the proliferation of digital platforms and open innovation ecosystems has significantly empowered users to commercialize their innovative products and services. This shift has given rise to user innovation-driven entrepreneurship, a phenomenon that exhibits distinct advantages in terms of business survival and growth potential [1-3]. As users increasingly emerge as pivotal actors in the innovation and entrepreneurial landscape, both academia and industry practitioners have devoted extensive attention to this evolving paradigm. A comprehensive review of scholarly literature indexed in major databases such as Web of Science and Scopus reveals a surge in research on "user innovation-driven entrepreneurship." Prestigious international journals—including AMJ, RP, ETP, JBR, and SEJ—have prominently featured contributions on this topic, underscoring its growing academic significance. Notably, while developed economies have witnessed a robust expansion of research in this domain, characterized by diverse theoretical and empirical investigations, the study of user entrepreneurship in developing economies remains in its nascent stages. This disparity highlights the need for further scholarly inquiry into the contextual contingencies that shape user-driven entrepreneurial processes in emerging markets. Given the increasing democratization of innovation and the transformative impact of digital technologies, it is imperative to explore how users in different economic and institutional environments navigate the transition from innovation to entrepreneurship, leveraging both individual capabilities and ecosystem resources.



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Traditional entrepreneurship often involves the pursuit of new projects and opportunities, followed by the development of product prototypes or solutions. In contrast, user innovation-driven entrepreneurship follows a different process. In this paradigm, users create product prototypes or innovative solutions to better address their personal needs. These products or solutions are then used and tested, revealing their commercial potential and related entrepreneurial opportunities, which eventually lead to the emergence of entrepreneurial ideas. Therefore, the process of user entrepreneurship is characterized by its "accidental" nature [4-6]. User entrepreneurship stems from user innovation, a phenomenon in which users innovate or improve products for commercialization due to unmet needs [4,7-8]. In fact, user innovators often choose to establish new businesses and become entrepreneurs in order to capitalize on macro conditions that support new business creation and leverage their knowledge, experience, and abilities [9-10]. User innovation and entrepreneurship are crucial practical activities that enable ordinary people to exercise their subjective initiative, implement the "double innovation" policy, and contribute to the goal of common prosperity. Since the 20th National Congress of the Communist Party of China, more and more ordinary people have embarked on the path of entrepreneurship, with greater opportunities and capabilities to achieve common prosperity through independent innovation and entrepreneurship. Furthermore, the progress of digital technology has greatly facilitated users in developing their entrepreneurial resources and opportunities via digital platforms and multi-stakeholder interactions [11,1-2], thereby increasing the feasibility of users becoming the main body of entrepreneurship.

Despite the clear theoretical connection between user entrepreneurship and user innovation, prior studies have not yielded conclusive or comprehensive evidence on the generalities or dynamics of the entrepreneurial process driven by user innovation [12-13]. Further research is likely to produce new concepts and propositions regarding user innovation-driven entrepreneurship [14,2]. To uncover important research findings, this paper reviews literature on user innovation and entrepreneurship published between 1986 and 2023. However, most existing research has focused primarily on specific impact factors of user innovation and entrepreneurship, as well as investigations into user entrepreneurial motivations and other related issues. As a result, research themes remain dispersed and the lack of a holistic overview on the mechanisms of the entrepreneurial process driven by user innovation remains a prevalent issue.

Atres to this, the present study undertakes a systematic review of the literature on user innovation and entrepreneurship. Its objective is to summarize the connotations and classifications of entrepreneurship within the context of user innovation. Multiple theories are subsequently applied to interpret the micro-process of entrepreneurship driven by user innovation. The study refines the research focus of "antecedent-process-result" variables and ultimately constructs a holistic research framework of the entrepreneurial process driven by user innovation. Through this research, we aim to thoroughly reveal the mechanism of the entrepreneurial process driven by user innovation and provide specific suggestions for future research in this field. The study's conclusions and prospects will facilitate the advancement of research on entrepreneurship driven by user innovation and, simultaneously, provide a reference for making relevant entrepreneurial policies that can foster the transition of user innovators to user entrepreneurs.

## **2. Theoretical Background**

### ***2.1. The connotation of the entrepreneurial process driven by user innovation***

#### **2.1.1. User innovation**

User innovation is defined by Von Hippel as a process in which innovation is incorporated by users of existing market products and services during their consumption process, in order to maximize efficiency in product and service consumption [15]. Rooted in

the expression of needs within the "muddling through" concept or open innovation paradigm [17], user innovation, also referred to as "lead user" innovation [16], has persisted over time. Currently, it is associated with the "lean startup" concept, a new paradigm for conducting business through active experimentation and customer and user feedback [18-19].

Numerous studies from various fields have highlighted the significance of user innovation [15-16,20-21]. In the petroleum industry, for instance, almost all significant innovations have been developed by user firms [22]. Additionally, users have created nearly 80% of important scientific instruments [23-24], as well as most significant innovations in the semiconductor processing [25] and sports equipment [26] industries. For internal use, a significant proportion of inventions in British firms have been made [27]. Literature on user innovation presents empirical evidence from different countries, such as the United States, the United Kingdom, Canada, and the Netherlands. Empirical studies show that users develop and modify products in proportions ranging from 6% to 40% [28]. All these findings emphasize that users are a driving force behind a considerable amount of innovation in today's world. According to Baldwin and Von Hippel [28], a shift from traditional producer innovation models to user and open collaborative innovation models is taking place. Therefore, users are becoming active participants in the value creation process, paving the way for user innovation-driven commercial entrepreneurship.

### **2.1.2. User entrepreneurship**

User entrepreneurship is defined by Shah and Tripsas [4] as "the commercialization of a product and/or service by an individual or group of innovative users of the product and/or service." This definition distinguishes user entrepreneurship from user innovation and non-user entrepreneurship, as it is based on the discovery of opportunities through personal needs and the subsequent commercialization of the modified product/service for others to use [8,29]. Research has shown that user entrepreneurship is increasing, with user entrepreneurs founding 10.7% of new ventures and 46.6% of innovation-based entrepreneurial firms surviving for five years in the United States [30]. Dissatisfied with existing products or services, users often modify them to meet their own needs, and when they realize the commercial value of their innovation, they begin their entrepreneurship journey, which is a result of their dissatisfaction [4,8]. These users are known as user entrepreneurs, who identify and develop commercial opportunities for their innovative solutions through multi-stakeholder interactions within user communities. The term "accidental entrepreneurs" was coined by Shah and Tripsas [4] to describe users who accidentally discover opportunities as consumers and then turn them into entrepreneurial ventures. These users gather resources and capabilities to commercialize their innovation.

Extensive research has been conducted to analyze the motives and conditions that lead to user entrepreneurship. User entrepreneurship occurs when users enjoy the initial product innovation, opportunity costs are low, and there are many small niche markets with uncertain demand [4,7]. Shah and colleagues have further suggested that user innovators are more likely to initiate the entrepreneurial process if the expected profit from commercializing their innovation exceeds their profit threshold as users [30]. Digital technology has played a significant role in facilitating the development and commercialization of user innovations, with users leveraging digital platforms and tools such as crowdfunding to lower entry barriers and create their own companies [31-32].

### **2.1.3. The entrepreneurial process driven by user innovation**

The process of traditional entrepreneurship is characterized by the pursuit and utilization of new projects and opportunities driven by entrepreneurial intention [33-34]. In contrast, user innovation-driven entrepreneurship is the opposite of traditional entrepreneurship, where entrepreneurial intention to commercialize innovative projects is gradually sparked by existing user innovation projects. User entrepreneurs start by modifying

and developing existing products and then discover, evaluate, and develop their commercial value [4-6]. Furthermore, unlike traditional entrepreneurship driven by economic benefits, user entrepreneurship is mainly driven by intrinsic motivation, with initial motivation mainly being driven by interest or the desire to meet their own needs. A typical characteristic of user entrepreneurship is that they often innovate and develop new products for personal use to overcome the problems or limitations of existing products and only later recognize potential entrepreneurial opportunities and decide to become entrepreneurs [5,35].

The user entrepreneurship process is initiated through user innovation, as indicated by previous studies [4,12]. Such innovation is triggered by users' encounters with problems, gaps, and contradictions related to products, services, or work, leading to unsatisfactory experiences and subsequent stress [36]. This psychological awakening prompts users to focus on the root cause of the problem and develop coping mechanisms for dealing with the associated emotions [29]. Lacking alternatives, users turn to innovation to solve problems and identify available entrepreneurial opportunities. During the innovation process, users modify or create new solutions to address the problematic products or services. These solutions gradually stimulate users' entrepreneurial intention to commercialize their innovative projects [6,35].

In contrast to the traditional entrepreneurship process, the user entrepreneurship process driven by user innovation is characterized by an inverse sequence. Rather than beginning with the pursuit of entrepreneurial opportunities, user entrepreneurship starts with the identification of existing user innovation projects before the recognition of entrepreneurial opportunities. Typically, users develop innovations and prototypes to solve their problems as users or improve the products they use. Only through the usage of their innovations, gaining experience, and sharing their ideas, do they recognize the potential for commercializing their innovation projects and relevant entrepreneurial opportunities later, followed by evaluating and utilizing these opportunities.

## ***2.2. Categorization of the entrepreneurial process driven by user innovation***

Two types of user entrepreneurship can be identified based on differences in innovation demand: professional-user entrepreneurship and end-user entrepreneurship [4,35]. In professional-user entrepreneurship, users identify unmet needs in their career and develop their own solutions based on their professional expertise. They may later establish their own company and enter the commercial market. End-user entrepreneurship, on the other hand, involves individuals who develop innovative solutions and prototypes to satisfy their daily needs or problems [35]. They share their solutions with others and take the opportunity to commercialize their innovation during the sharing process. This type of entrepreneurship generates economic value and also provides the enjoyment of entrepreneurship and the satisfaction of meeting needs [5]. In addition, Shah and other scholars have introduced a hybrid entrepreneurship type that aims to integrate the entrepreneurial features of both professional users and end-users [30].

Furthermore, three types of end-user entrepreneurship have been identified by Hamdi-Kidar and Vellera [35] based on the channels for user innovation diffusion. The first type is full end-user entrepreneurship, which involves commercializing innovation by creating firms and is currently the focus of most research. The second type is alternative end-user entrepreneurship, which aims to commercialize innovation through alternative channels and outcomes without creating firms. Finally, the third type is zero end-user entrepreneurship, which involves licensing innovation to established manufacturers or new entrants or others, including diffusing their innovations freely to the community, capturing no economic value from them.

## **3. Theoretical interpretation of the entrepreneurial process driven by user innovation**

### ***3.1. Lead user theory***

Lead user theory explains how certain users, due to their advanced needs and proactive problem-solving tendencies, become key contributors to innovation and entrepreneurial activities. Unlike traditional market-driven innovation, where firms predict customer needs, lead users identify and address unmet needs ahead of the market, often creating novel solutions that later gain broader commercial appeal [4,12]. The entrepreneurial engagement of lead users is driven by their deep domain knowledge and firsthand experience with product limitations [16,21]. These users are not only problem solvers but also early adopters of their own innovations, refining their solutions through iterative experimentation. Their unique positioning allows them to recognize emerging trends before mainstream consumers, making them well-equipped to pioneer new market opportunities [15,28,36]. From a problem-solving perspective, lead users integrate two critical dimensions of innovation: 'need knowledge' and 'solution knowledge' [37-38]. Their ability to precisely define problems based on personal experience enables them to develop highly functional solutions that align with specific consumer pain points. This intrinsic understanding allows user entrepreneurs to generate more innovative and market-relevant products compared to non-user entrepreneurs, whose innovations often stem from secondary market analysis rather than firsthand experiential insights [39-40].

Beyond individual expertise, lead users benefit from strong community embeddedness, which plays a pivotal role in their entrepreneurial process [4,41]. User communities serve as collaborative spaces for knowledge exchange, iterative feedback, and co-creation. Unlike non-user entrepreneurs who may rely on conventional market research, user entrepreneurs tap into these communities to validate ideas, access resources, and accelerate product development. The collective intelligence within such communities enhances the originality and feasibility of user-driven innovations, further differentiating them from firm-led or non-user entrepreneurial ventures [41-42]. Lead user theory underscores the transformative role of proactive users in innovation and entrepreneurship. Their dual capacity as problem identifiers and solution developers positions them at the forefront of entrepreneurial activity, where personal necessity drives the evolution of market-changing innovations.

### **3.2. Role identity theory**

Role identity theory provides a critical lens for understanding how user entrepreneurs develop, sustain, and reinforce their entrepreneurial activities through self-concept and identity alignment. This theory suggests that individuals define themselves by the roles they occupy, and these identities influence their behaviors, motivations, and emotional engagement in entrepreneurial endeavors [43].

User entrepreneurs distinguish themselves from traditional entrepreneurs by the deep connection between their identity as users and their entrepreneurial initiatives. Their journey often begins with a personal need or dissatisfaction with existing market offerings, leading them to innovate and subsequently transition into entrepreneurship [44,30]. Unlike conventional entrepreneurs, whose ventures are often guided by economic incentives, user entrepreneurs derive intrinsic satisfaction from problem-solving and the creative process, reinforcing their identity as both innovators and business owners [45,29]. The strength of an individual's entrepreneurial commitment is closely linked to the degree of alignment between their role identity and their entrepreneurial activities. When an entrepreneurial venture resonates with a person's core identity—such as seeing oneself as an inventor, a problem-solver, or a pioneer—it generates strong emotional engagement and long-term dedication [46]. This process is not merely a cognitive alignment but also an affective one, where individuals experience heightened enthusiasm and fulfillment from actions that validate their self-concept. Consequently, user entrepreneurs, whose businesses emerge from personal innovation efforts, often exhibit stronger entrepreneurial persistence than non-user entrepreneurs, who may lack this deep-rooted identity connection [46].

Furthermore, role identity theory explains variations in entrepreneurial passion and resilience. When entrepreneurs perceive their venture as an extension of their self-identity, they are more likely to invest time, effort, and emotional energy into sustaining and expanding their business [47]. This intrinsic motivation fosters a sense of purpose, making user entrepreneurs more adaptable to challenges and more likely to persist in their endeavors. However, when an individual's entrepreneurial identity is weakly established, they may struggle to maintain enthusiasm or fail to transition from an innovator to a sustainable business owner [46]. Thus, role identity theory underscores the importance of self-perception in shaping entrepreneurial behavior. User entrepreneurs, by integrating their identity as lead users and innovators into their business activities, not only enhance their likelihood of success but also contribute to a broader entrepreneurial culture that prioritizes problem-solving and user-driven innovation.

### **3.3. Social identity theory**

Social identity theory offers a valuable framework for understanding how user entrepreneurs develop a sense of belonging within their communities and leverage this collective identity to drive their entrepreneurial efforts. Unlike individual identity, which is shaped by personal roles and self-concept, social identity emerges from group membership and shared experiences, influencing behavior and decision-making [48-49]. User entrepreneurs, who originate as members of a specific user community, often identify strongly with their peers, fostering a collaborative environment that supports innovation and entrepreneurial intentions [46-47].

A key factor in this process is the similarity of needs between user entrepreneurs and their communities. In social psychology, shared needs refer to the alignment between entrepreneurs and potential investors in terms of product expectations and demand [34,9]. Since user entrepreneurs typically develop solutions based on firsthand frustrations with existing products, they can engage their communities in co-creation by inviting members to test prototypes, provide feedback, and refine product designs. This participatory development process not only enhances the innovation's relevance but also strengthens the cognitive and emotional investment of potential investors, making them more likely to support commercialization efforts [8]. Community embeddedness plays a crucial role in sustaining user entrepreneurship. Prior research highlights that user entrepreneurs operate within a social structure characterized by shared beliefs, norms, and product preferences, which reinforces trust and cooperation among community members [30,13]. This shared social identity increases the likelihood that user entrepreneurs and funders will perceive each other as part of the same in-group, fostering a preference for supporting ventures that align with the community's collective interests [30]. Through this in-group preference effect, user entrepreneurs cultivate a base of early adopters and financial backers who are not just customers but also advocates of their innovations. In contrast, non-user entrepreneurs, who may lack such embeddedness, often struggle to create narratives that resonate deeply with their target audience, making it harder to secure early-stage investment [7].

Moreover, user entrepreneurs derive a strategic advantage from their ability to integrate community-driven insights into their business models. By actively engaging with their user base, they not only enhance product-market fit but also create a strong foundation of consumer trust and loyalty. This dynamic further differentiates them from non-user entrepreneurs, who typically rely on market research rather than direct community interaction to shape their offerings [4,29]. The shared identity between user entrepreneurs and their communities translates into tangible business benefits, including increased word-of-mouth promotion, stronger customer retention, and higher crowdfunding success rates [31]. Thus, social identity theory explains why user entrepreneurs are uniquely positioned to leverage community support for both innovation and business growth. Their deep-rooted connections with like-minded individuals facilitate resource-sharing,

collective problem-solving, and early-stage market validation, reinforcing their entrepreneurial success.

In conclusion, we believe that the entrepreneurial journey driven by user innovation represents a dynamic evolution from a personal user identity to a fully-fledged entrepreneurial identity [34-35]. This evolution unfolds through three interrelated mechanisms. First, lead user theory explains how early innovators develop tailored solutions to address their own unmet needs. When these solutions receive external validation, they create new entrepreneurial opportunities and reinforce the individual's self-perception as an entrepreneur, thereby enhancing both confidence and commitment. Second, role identity theory indicates that as users begin to see themselves as entrepreneurs, their self-concept shifts. This transformation not only motivates them to pursue business ventures with greater passion but also strengthens their resolve to bring their innovations to market. Finally, social identity theory highlights the importance of community engagement. By actively participating in communities of like-minded individuals, user innovators cultivate a shared social identity that offers mutual support, valuable feedback, and access to early adopters and investors. This collective reinforcement further solidifies their transition into entrepreneurship. Together, these mechanisms create a self-reinforcing cycle where individual innovation, evolving self-identity, and community support combine to significantly enhance the likelihood of entrepreneurial success.

#### **4. The cutting-edge themes and holistic research framework of the entrepreneurial process driven by user innovation**

##### **4.1. Cutting-edge research themes**

###### **4.1.1 Antecedents of entrepreneurship driven by user innovation**

The antecedent variables driving entrepreneurship through user innovation have been explored along three dimensions in current research: individual factors, entrepreneurial subjects, and environmental elements.

Firstly, individual characteristics are mainly focused on three aspects: leading user characteristics, identity identification, and user social network. First, the characteristics of leading users encompass two criteria: trend-leading and high expected returns. Trend-leading refers to the ability of leading users to identify important market trends ahead of others, while high expected returns indicate their anticipation of significant returns from innovative solutions that meet their needs [15-16]. The role of individuals as leading users is a crucial factor in determining their entrepreneurial intentions, as they possess the ability to perceive market demand earlier and are more aware of the potential value creation from meeting these needs. Furthermore, their innovative activities endow them with enough entrepreneurial self-efficacy to develop entrepreneurial intentions [12,50]. Second, with respect to identity identification, user entrepreneurs tend to view themselves as leading users, innovators, and community members. These user identities and roles guide their entrepreneurial behavior and contribute to innovation performance [29,35]. Finally, user social networks consist of two types of relationships: strong ties and weak ties. Strong ties encompass close friends, family, and direct business contacts, which provide opportunities from the surrounding environment at close range. On the other hand, weak ties involve more distant acquaintances, such as distant relatives and indirect business contacts, which provide users with diversified opportunities and ways to obtain unique information and new business channels [51-52].

Secondly, the entrepreneurial subject in the independent variable is primarily manifested in three dimensions: user multiple identities, demand cognition, and entrepreneurial motivation. Unique to user entrepreneurs, these dimensions demonstrate how they differ from typical entrepreneurs [53,29]. Users are not only consumers of existing products but can also participate in product value creation through interaction with the company. By collaborating with a large group of consumers, users can transform from passive

"consumers" to active "innovators" and even become "entrepreneurs." Before generating entrepreneurial ideas, user entrepreneurs have asymmetrical information, such as unique cognition and potential solutions related to product demand. Furthermore, they can access demand information about potential markets from user communities and have a higher level of awareness of consumer demand [30]. The entrepreneurial motivation of user entrepreneurs includes not only intrinsic motivation such as dissatisfaction with products, joy/enjoyment, passion for accepting challenges, and beliefs in success but also external motivations such as social network relationships and economic benefits. User entrepreneurship is driven by intrinsic motivation, and the initial motivation is mainly to satisfy personal needs, accept challenges, or share stimulating experiences with others, rather than solely for pursuing economic profits, which differs from traditional entrepreneurship driven by economic benefits [35].

Thirdly, the environmental factors examined in this study primarily pertain to policy support and entrepreneurship education/training. Essential to innovative and entrepreneurial development, policy support and entrepreneurship education have been documented in previous research [6,54-55]. To promote innovative and entrepreneurial development, entrepreneurship education and industry policies are commonly introduced and supported through higher education institutions, flagship programs, and incubation centers in many countries [6,55]. The enhancement of motivation and creation of an environment conducive to early market entry are among the benefits of these environmental factors, leading to increased speed of effective innovation diffusion. In light of the potential for entrepreneurship to stimulate economic growth, governments are increasingly promoting an innovative and entrepreneurial culture through national movements that integrate entrepreneurship into the education system, encourage start-ups to take on business risks, and support a range of public entrepreneurial incentives [56].

#### **4.1.2. Entrepreneurial process variables**

Research on the variables of the entrepreneurial process driven by user innovation is mainly explored from three aspects: entrepreneurial intention, entrepreneurial opportunity identification, and entrepreneurial activity.

Firstly, regarding user entrepreneurial intention, existing literature primarily focuses on three perspectives. First, user entrepreneurial intention is examined based on the innovativeness of the product. Studies show that innovations and prototypes are typically developed by users to solve problems they encounter or to improve the products they use. Through this process, they recognize the potential for commercialization and related entrepreneurial opportunities, gain experience, and share their ideas [34,12]. It has been found that crowdfunding supporters, like traditional investors, are more likely to fund highly innovative products rather than low innovative products [7-8]. Second, user entrepreneurial intention is examined based on perceived affect. User entrepreneurs have higher levels of perceived affect as their intrinsic motivation and self-identity enable them to "tell" their entrepreneurial story in a convincing and passionate manner. Third, user entrepreneurial intention is examined based on community interaction. Interaction between user communities, social backgrounds, and members provides three valuable benefits for user entrepreneurship [5,57]: (1) collecting iterative feedback, support, advice, and guidance for potential solution improvements; (2) creating potential markets or new niche markets; (3) providing firsthand information and investment about entrepreneurship and business opportunities.

Furthermore, with regards to the identification of user entrepreneurial opportunities, three key aspects have been explored in relevant research. Firstly, the impact of user prior experience and knowledge on the identification of entrepreneurial opportunities has been examined. User innovation ability is derived from their professional knowledge and familiarity with the business as a user. In order to further develop user technology and busi-



ness innovation, the most critical factor is the user's network ability, which assists in identifying entrepreneurial opportunities and provides supplementary assets for successful development and commercialization [35,57]. Secondly, research has explored the impact of network embeddedness on user entrepreneurial opportunity identification. Studies have shown that the embedding of networks, such as makerspaces [58-59], crowdfunding platforms [32,8], social networks [35,60], and customer networks [61,29], has a positive effect on entrepreneurial opportunity identification. This is mainly achieved through information, feedback, knowledge, and capital, which aid users in overcoming resource specificity and promoting the identification of innovative business opportunities. Lastly, research has explored the impact of digital technology on user entrepreneurial opportunity identification. The widespread use of digital technology greatly empowers users to develop their own innovation and identify entrepreneurial opportunities, thereby creating their own enterprises [62-63]. In recent years, the "digital technology perspective" has increasingly focused on the digitization of entrepreneurial activities. Digital artifacts, platforms, and infrastructure have spawned more entrepreneurial opportunities for user innovators [31,63].

Finally, regarding user entrepreneurial activities, the two main aspects are opportunity development and resource development [20,53]. User entrepreneurial opportunity development activities involve multi-stakeholder interactions within the user community. Potential entrepreneurial opportunities are recognized through community participation and further evaluated for their value and utilization [35,60]. With respect to entrepreneurial resource development, user entrepreneurs obtain, identify, and integrate entrepreneurial resources through multi-stakeholder interactions within the user community [60,3].

#### **4.1.3. Entrepreneurial outcome variables**

Based on previous studies, the results of user entrepreneurship can be categorized into three types: successful entrepreneurship, acquisition by established enterprises, and failed entrepreneurship. Successful user entrepreneurship is often attributed to the user community as an important complementary asset, which can help them achieve sustained innovation and develop their entrepreneurial process [4,60]. Additionally, even if user entrepreneurship fails, the highly innovative products with great market potential can still be acquired by established enterprises [53,60]. However, a small number of user entrepreneurs may fail due to limited abilities and resources.

Regarding entrepreneurial success, this research focuses on the entrepreneurial performance of users. Existing research has classified user entrepreneurial performance into survival, growth, innovation, financing, and other types of performance. Studies have shown that user entrepreneurs achieve better performance through crowdfunding compared to non-user entrepreneurs [8,29]. Furthermore, consumers with strong environmental values believe that the business performance of green user entrepreneurs is superior to that of non-green user entrepreneurs [64,29].

#### **4.2. A holistic research framework**

Drawing on a systematic review of classic literature published between 1986 and 2023, the study categorizes the latest themes and variable research hotspots of the entrepreneurial process driven by user innovation. By applying an "antecedents-process-outcomes" logic mechanism, we construct a holistic research framework (depicted in Figure 1) to offer fresh insights into recent developments in this field. The holistic research framework developed in this study reveals the overall mechanism of the entrepreneurial process driven by user innovation, identifies existing research limitations, and provides guidance for future studies.

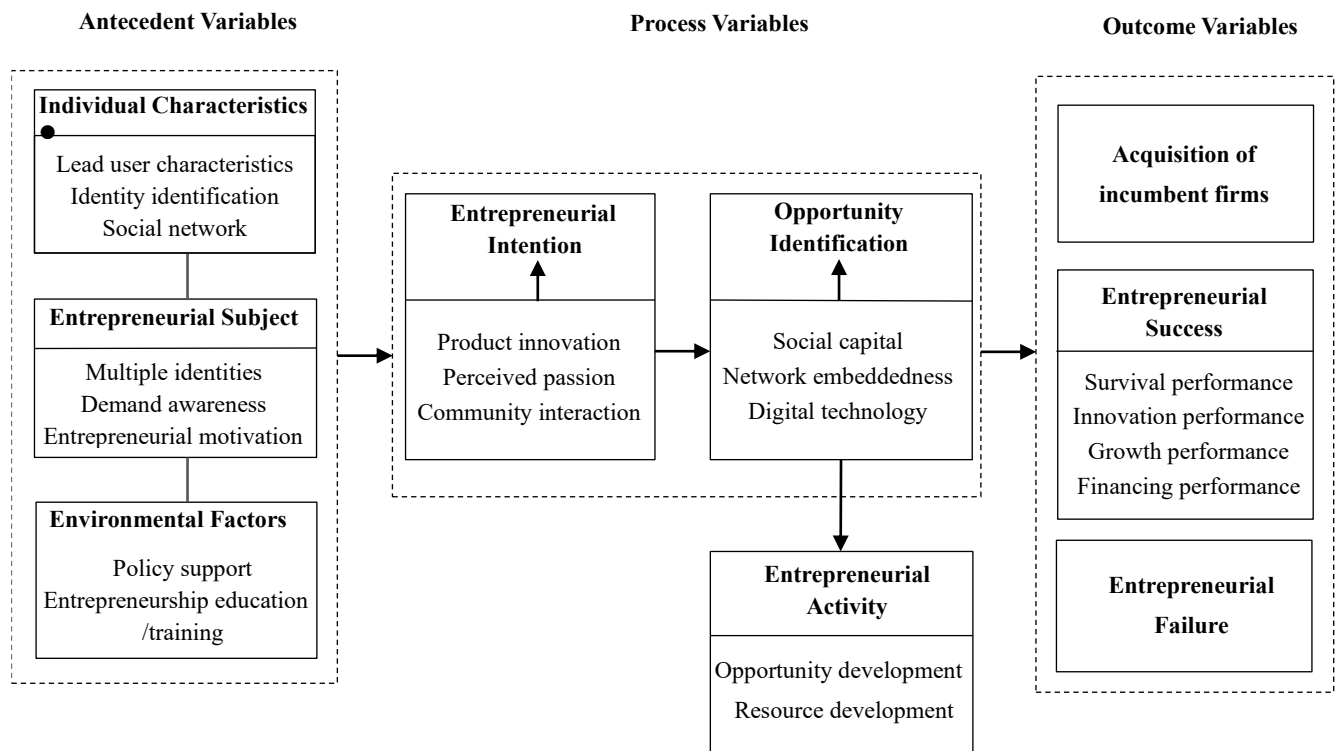


Figure 1. A holistic research framework for the entrepreneurial process driven by user innovation

## 5. Conclusion and future research

### 5.1. Main conclusions

Drawing on the classic literature on user innovation and entrepreneurship both domestically and internationally, this study presents a systematic analysis of the key concepts, classifications, theoretical interpretations, and research frontiers of the entrepreneurial process driven by user innovation. Subsequently, a holistic research framework was developed based on the logical mechanism of the "antecedents-process-outcomes" variables. In summary, the following conclusions were reached:

#### 5.1.1 The entrepreneurial process driven by user innovation has its unique characteristics

The entrepreneurial process driven by user innovation exhibits fundamental differences from the traditional entrepreneurial model. It is characterized by its emergent nature, collective participation of user communities, and the user identity of the entrepreneur. Traditional entrepreneurship involves seeking and exploiting new projects and opportunities driven by entrepreneurial aspirations, whereas user innovation-driven entrepreneurship entails the gradual realization of entrepreneurial aspirations through the commercialization of existing user innovation projects. This process starts from modifying and developing existing products and progresses to discovering, evaluating, and developing their commercial value. In contrast to the traditional entrepreneurial model, the product or service ideas of user entrepreneurs mostly originate from the multi-subject interaction within user communities, representing the collective wisdom of the community. From an identity perspective, user entrepreneurs assume multiple roles as users/consumers and innovators/producers, bringing challenges to the balance of value creation and acquisition, emotional attachment, and profit-seeking in user entrepreneurship. The evolution of user innovation-driven entrepreneurial models continues to remain largely unexplored by existing research, particularly with the ongoing flourishing of digital technology.

### **5.1.2. The diversified theories reveal the dynamic and progressive characteristics of the user entrepreneur identity evolution process**

The process of entrepreneurship propelled by user innovation is characterized by the dynamic evolution of leading users towards assuming the identity of user entrepreneurs. This process is associated with three identities - leading users, innovators, and community members. User entrepreneurs are motivated by unfulfilled needs and generate innovative ideas by conceptualizing their knowledge of these needs. As a result, they gradually progress from being ordinary users to acquiring the status of leading users. Subsequently, having gained recognition for their innovative role by community members, they become more self-assured of their innovative potential. By participating in knowledge co-creation activities that involve the conceptualization of knowledge, they develop innovative ideas into innovative products, and further evolve from leading user to user innovator status. Finally, driven by the expectation of returns, they are stimulated to commercialize their innovation projects, convert the products into commodities, and introduce them into the market, thereby achieving the evolution from user innovator to user entrepreneur status. From a theoretical perspective, while there is an increasing interest among scholars in user innovation-driven entrepreneurship and research, the current research perspectives are not comprehensive enough. Thus, to reveal the process of user entrepreneurship in depth, more diverse theoretical perspectives need to be employed.

### **5.1.3. The user community provides an important collective dimension for the entrepreneurial process driven by user innovation**

Firstly, the identification and evaluation of user entrepreneurial opportunities are promoted by multi-agent interaction within user communities. Secondly, channels for information collection and resource integration are provided by multi-agent interaction within user communities for users-turned-entrepreneurs. Finally, early market guarantees for user entrepreneurship are provided by user communities. In summary, user entrepreneurship activities driven by user innovation are mainly realized through multi-agent interaction within user communities, particularly since complete resource and opportunity development requires participation in community interaction. User communities play an extremely important role in the stages of innovation driven by unmet needs, formation of entrepreneurial intentions, and implementation of entrepreneurial behavior by providing user entrepreneurs with different forms of support and potential benefits. However, the underlying mechanisms of how different types of practice communities provide different forms of entrepreneurial support to user innovators in different stages of the entrepreneurship process remain to be further studied.

### **5.1.4. The entrepreneurial process driven by user innovation follows a variable logical mechanism of "antecedents, process, and outcomes"**

From the perspective of antecedent variables of user innovation-driven entrepreneurship, important roles are played by individual user characteristics, entrepreneurial subjects, and environmental factors in stimulating user entrepreneurial intentions and identifying entrepreneurial opportunities. In the process variable perspective, the user innovation-driven entrepreneurial process mainly focuses on user entrepreneurial intentions, user entrepreneurial opportunity identification, and research on user entrepreneurial activity. From the results variable perspective, entrepreneurial performance is the focus of user entrepreneurial research, and as user entrepreneurship is rooted in user innovation, its performance evaluation is more concerned with survival and innovation performance dimensions. However, research on user innovation-driven entrepreneurship has almost exclusively focused on developed economic environments, and therefore it is necessary to investigate the applicability of existing innovation and entrepreneurship theories in developing economies to advance our understanding of the development of this field.

## 5.2. Future research

Future studies in entrepreneurship driven by user innovation could explore the following aspects based on the current state of research.

### 5.2.1. Focusing on the changes in new entrepreneurial models driven by user innovation during the stage of the digital economy

The rapid development of artificial intelligence, big data, and 5G technology is propelling society and the economy towards a new era of the "digital economy". This transition is expected to generate profound changes in innovation and entrepreneurship models, competitive environments, and industrial development forms, consequently fostering greater diversity in user-driven entrepreneurial activities. Hence, it is essential to explore and research the following questions: Can the "digital economy" cultivate novel entrepreneurial models driven by user innovation, and if so, how? What is the impact of emerging digital technologies such as big data and AI on user-driven entrepreneurial activities? How can practice communities leverage and apply "digital" technologies to establish new user-led enterprises? These are just some of the inquiries that warrant further investigation.

### 5.2.2. Expanding the theoretical perspectives for studying the entrepreneurial process under user innovation

This study aims to expand the boundaries of existing theories on the entrepreneurial process under user innovation, such as social identity theory, on the one hand. Unique characteristics possessed by user entrepreneurs, including user knowledge and experience, may create specific impressions and expectations among community members. Hence, it is worth investigating the impacts of congruent or incongruent role identities between user entrepreneurs and community members on the performance and behavior of user entrepreneurship. On the other hand, new theoretical insights should be introduced, such as mirror neurons, which previous research has identified as a physiological mechanism coupling perception with action. Thus, mirror neurons could aid in understanding others' behavior, learning new skills through imitation, and enhancing personal empathy. To uncover the underlying cognitive, behavioral, and capability mechanisms that interact during user innovation-driven entrepreneurship from a mirror neuron perspective, some scholars have started exploring potential methods that combine neuroscience, psychology, and management research [65-66]. This interdisciplinary approach has the potential to yield interesting research findings.

### 5.2.3. To enrich the research content on the impact mechanisms of the community of practices (CoP) on the entrepreneurial process

The research confirms and explains why user communities are particularly conducive to entrepreneurship under user innovation. Unique characteristics possessed by user entrepreneurs, such as user knowledge and experience, may create specific impressions and expectations among community members, which greatly enhance opportunities for entering new markets and organizations' innovative capabilities, promoting the development and commercialization of radical and incremental innovations. To provide a framework for future research on communities of practice and consumer behavior, this study poses the following research questions: What role does the innovation and entrepreneurship ecosystem play in facilitating the transition from user innovation to entrepreneurship? How do user-created enterprises increase the value of and acquire new knowledge from their peer communities over time? How do user innovators understand consumer behavior and apply these insights to their entrepreneurial and marketing actions? In what ways do different types of communities (enthusiasts/users, developers/innovators, and entrepreneurs) provide diverse forms of support to user entrepreneurs at different stages of the entrepreneurial process?

### 5.2.4. Deepening the exploration of entrepreneurship issues under the context of user-driven innovation in developing countries

Currently, user entrepreneurship research is primarily focused on developed countries, leaving research on user entrepreneurship in developing countries in its nascent stages. Therefore, in addition to the aforementioned direction, researchers in the field of user entrepreneurship must further refine the user entrepreneurship research system, delve deeper into user entrepreneurship issues in developing countries, and foster an understanding of the field's development. This entails, among other things, the following: first, refining the concept of user entrepreneurship. In the context of "Internet+entrepreneurship," user entrepreneurship assumes distinctive meanings and forms. In the future, incorporating specific cases from developing countries is necessary to refine the concept. Furthermore, a dimensional system should be established, and a user entrepreneurship scale developed. Second, motivations for user entrepreneurship require exploration, including internal and external motivations and decision-making processes. Additionally, the factor system that influences the user entrepreneurship process should be enhanced. Third, differences in user entrepreneurship across regions should be studied. Do variations in entrepreneurship policies, culture, and economy among different countries lead to differences in user entrepreneurship activities? If so, what are they? Fourth, a holistic research model should be developed to thoroughly explore the internal causal relationship between antecedents, processes, and outcomes of user entrepreneurship prompted by user innovation, as well as test the moderating effect of influencing factors.

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