

Article

Why Were Innovators Motivated to Be Entrepreneurs? An Empirical Study of Taiwanese Start-Ups

Chia-Liang Hung 

Department of Information Management, College of Management, National Chi Nan University, Puli 54516, Taiwan; clhung@ncnu.edu.tw

Abstract: *Background:* According to the lead user theory, lead users at the front of a market, benefiting significantly from new products, usually have more innovation intension than general users. However, little research depicts the entrepreneurship motivations that drive innovators to become businesspeople. Hence, this study investigates Taiwanese entrepreneurs to fill this gap in the research. *Method:* This study examines motivations for becoming an entrepreneur from small- and medium-sized enterprises in Taiwan. A multiple regression analysis is used to examine the relationship between lead user inclination and entrepreneurial motivations as well as to test the moderating effect of community involvement. *Results:* The research results summarise entrepreneurial motivations into five categories: product knowledge advantage, industry expertise, inducements to innovation, career expectations, and benchmarking and indicate the positive moderating effect of community involvement on the association between innovators and entrepreneurs. *Conclusions:* Additional research is suggested to catalyse motivations to aspire lead users to pursue business success as well as to enhance entrepreneurship education policy. This study contributes to understanding the inclination of lead users towards becoming entrepreneurs and, especially, to emphasise the role of community involvement, which increases the likelihood of innovators to be entrepreneurs.

Keywords: entrepreneurship; lead user; motivation; user community; user entrepreneur



Citation: Hung, Chia-Liang. 2022. Why Were Innovators Motivated to Be Entrepreneurs? An Empirical Study of Taiwanese Start-Ups. *Administrative Sciences* 12: 97. <https://doi.org/10.3390/admsci12030097>

Received: 1 June 2022
Accepted: 1 August 2022
Published: 6 August 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Entrepreneurship means to aspire to create a new corporation or an innovative business (Amit and Zott 2001). Drucker (1985) argues that changes generated by social transformation are sources of creativity that allow people to provide new values to customers. Such people become innovators, obtain high returns, and can even change society. Thus, entrepreneurship is crucial to lead to increased economic efficiency, bring innovation to the market, create new jobs, and raise employment levels (Shane and Venkataraman 2000). Entrepreneurship has become a vital economic and social topic as well as the focus of innovation research (Fayolle et al. 2007).

Von Hippel (1986) finds that some people are more insightful in searching for valuable innovation than others are; these people are lead users who typically anticipate significant benefits if they can obtain innovative solutions fitting their personal requirements. This characteristic means that such users are more likely to innovate, and they represent a key source of innovation for manufacturers. Evidence indicates that venture capitalists prefer targets of 5-year-old start-ups established by experienced users to those built by technology-oriented manufacturers (Shah and Tripsas 2016). Moreover, Shah and Tripsas (2007) note that experienced users are inclined to be entrepreneurs with a high success rate even if this is through accidental or unexpected means. User entrepreneurs usually possess knowledge of perceived usefulness, innovativeness, and efficient configuration of complementary assets for creating new products, such that they calculate a lower break-even threshold for entering the market more successfully than manufacturers (Von Hippel 1986). Baldwin et al. (2006); Baldwin and Von Hippel (2011), Franke and Shah (2003),

and [Hienerth \(2006\)](#) find that user community, where collaborative innovation sparks and diffuses, plays a critical role in commercialising users' innovation. Community involvement facilitates the transformation of users into entrepreneurs. In addition, according to the findings of [Cope and Watts \(2000\)](#), mentor support as a higher-level learning increases the power of entrepreneurial learning outcomes. Thus, the involvement of community is vital in entrepreneurial development, which is usually facilitated by entrepreneurship education and industry policy through introducing and promoting at many institutions of tertiary education, capstone projects, and incubation centres in numerous countries ([Jones and English 2004](#)).

The purpose of this paper is to examine the effects of motivations that drive Asian people, that is, Taiwanese, to become entrepreneurs. The author adopted the factor analysis approach to extract the motivation dimensions for an innovator to become an entrepreneur. Thereby, the regression analysis follows to verify the influence of user community on elevating the innovator's motivations to become an entrepreneur. This study not only links the arguments of [Von Hippel \(1986\)](#)—which state that lead users are sources of innovation that manufacturers should be eager to search for and cooperate with—but also adopts user entrepreneurs by [Shah and Tripsas \(2007\)](#) with the moderation effect of social communities. Finally, the results could help policy makers reconsider how to enhance motivations and circumstances to inspire users to enter markets earlier, thereby increasing the diffusion speed of effective innovations.

2. Literature Review

2.1. Characteristics of User Innovators

The concept of lead users is especially prevalent in the literature on user innovation. Two characteristics are central to defining lead users: they have increased needs and they are positioned to benefit when their needs are solved ([Von Hippel 1986](#)). Furthermore, [Urban and Von Hippel \(1988\)](#) identify three proxy characteristics of lead users related to 'the high expected benefit from solving a need'. The first is users who have 'developed' or 'modified' their own products; the second is users who are 'dissatisfied' with existing products; and the third is users with a high 'adoption speed' for new technologies. Studies have further explored these indicators of innovative users. As several authors suggest ([Faullant et al. 2012](#); [Schuhmacher and Kuester 2012](#); [Lüthje 2004](#)), usage experience is indeed associated with user innovators positively. As shown in the survey by [Prause and Thurner \(2014\)](#), user involvement in the economy of open innovation is positively related to product and process innovation. Moreover, the literature in the last two decades has seen growing evidence of successful user-driven innovation from industrial products (such as the PC-CAD software in the semiconductor industry studied by [Urban and Von Hippel \(1988\)](#)), consumer products (such as the sport-related products studied by [Lüthje \(2004\)](#)), and new service development (such as the financial services studied by [Alam \(2006\)](#)). Recently, user innovation also occurred in the sustainable development and green economies. [Borowski \(2021\)](#) asserted that the bamboo microenterprises, composed of one employee on average, conducted all the innovative activities of entrepreneur, CEO, R&D developer, worker, and user simultaneously. [Dai and Hwang \(2021\)](#) articulated there were emerging youth-led brand microenterprises established on the bamboo material and design industry in Taiwan.

2.2. Characteristics of User Entrepreneurship

[Shah and Tripsas \(2007\)](#) state that user entrepreneurs are usually unsatisfied with the products that they use, thereby trying to innovate and propose solutions for the market. They may be lead users, especially, some of whom further share their innovative solutions with the community after benefiting from personal innovation. Ex post feedback, as a process of collectively creative generation, circulates in the community through sharing ideas of lead users with community members, follow-up discussions, and continuous improvement, thereby revealing the market potential to motivate commercialisation because of perceiving

the numerous interested users with common, concrete, and unsatisfactory demands (Franke and Shah 2003). Moreover, along with the common interest group surrounding lead users, an effective calculation among market opportunity, costs, confidence, and empathic understanding gradually pushes innovation into the mass market (Kuckertz et al. 2017). This is why lead users usually recognise the feasibility of market entry more accurately than others. Haefliger et al. (2010) note that common interest groups often comprise people from diversified backgrounds that merge to become entrepreneurial teams. The resulting diversified combination of entrepreneurship skills effectively supports necessary complementary assets that streamline the configuration of a product. This also facilitates the efficient diffusion of innovation (Füller et al. 2013).

Beyond the continual innovation sparked by interactions with diverse interest groups in the user community, Shah (2005) and Shah and Tripsas (2007) assert that innovative users are possibly motivated to become entrepreneurs. It is because they usually have asymmetric information that allows them to gain a market advantage in contrast to manufacturers. User entrepreneurs often have intensive user experiences of certain products, thereby recognising the product-related and technological domain knowledge that is necessary to improve products. Consequently, they are likely to become product innovators in order to satisfy their perceived needs. Shah and Tripsas (2016) argue that user entrepreneurs usually possess expertise in interpreting available information because most of them have experienced industries that were similar or relevant to their innovation. Therefore, the perceived costs for configuring supply chains, production, and marketing might be lower than for other new entrants. Moreover, user entrepreneurs usually perceive lower opportunity costs than incumbents who often possess sunk costs because of previous investments; therefore, they can maintain a high strategic mobility to pursue changes in case of new emerging market requirements.

2.3. Motivations of Entrepreneurship

Consumers have various motivations that are linked to important contingencies in the context of open innovation, such as user characteristics and different levels of ‘emotional property’ (Bogers et al. 2017). Amit and Muller (1995) differentiate entrepreneurship into pull and push orientations. ‘Push’ entrepreneurs push themselves to start a venture because of dissatisfaction with their current position without reasons related to their entrepreneurial characteristics. ‘Pull’ entrepreneurs are those who are lured by a new venture idea and initiate venture activity because of the attractiveness of the idea as well as its personal implications. ‘Pull’ entrepreneurs are usually more successful than ‘push’ ones. Dawson and Henley (2012) state that independence is the most commonly cited motivation even though men are mostly inclined to be pull oriented, whereas women usually combine both push and pull orientations. In fact, specific circumstances usually lead to push or pull user innovators—especially lead users—becoming entrepreneurs, as mentioned above, long experience or heavy usage of a product, personal dissatisfaction with the market, and high demand for innovation, the perceived usefulness caused by users’ product-related, and technological domain knowledge increase their willingness to innovate, which eventually pulls them to be entrepreneurs. Moreover, some motivations come from a background of related industrial networking knowledge, which is inherited from the same or relevant industry to help recognise business opportunities (Kuckertz et al. 2017).

In addition to economic motivations, some psychological and emotional factors should be considered. Dubini (1989) proposes seven pull- and push-oriented entrepreneurial motivations: freedom, monetary returns, escape, philanthropy, status, achievement, and role models. Becoming the head of your own company gains the freedom to choose partners, resources, and locations, as well as flexibility in when and how you work. A high desire for freedom is therefore likely to attract people to become entrepreneurs. Escape refers to the aspiration to change career paths, moving from the status quo to a desired state, especially, and decreasing control by powerful superiors (Littunen 2000). Expected monetary returns often attract people to entrepreneurship. Philanthropy pushes people

to assume the responsibility of being entrepreneurs in order to provide for their family, community, and society. Status ambitions often push people to try and enhance their social position and reputation, and entrepreneurship is one avenue through which they may do so. Achievement drives people to reach the pinnacle of their career, thereby achieving personal realisation and esteem, and clearly increasing personal relations to show mastery of destiny (Littunen 2000). The final motivation, role models, refers to people who want to pursue what role models in the family, community, and society have achieved. Their idols often pull them towards becoming entrepreneurs.

Other motivations result conditionally from interactive and accumulated relationships in the community that user innovators are involved in before entering the market. Such innovators are gradually pulled by the experience of sharing innovation and improvement, perceived market potential, availability of diversified and complementary assets, and building an entrepreneurial team within the user community (Kuckertz et al. 2017).

2.4. Community Involvement

User innovations from a community of users are increasingly important models of innovation (Baldwin and Von Hippel 2011). Franke and Shah (2003) note a common interest association in which users are involved and some of them are dissatisfied with current equipment. As Baldwin and Von Hippel (2011) argue, a community of user innovators supports the free exchange of information in real time, which means that designers could learn of other designs in time. As per the definition of user community by Füller et al. (2013) on the case of Apache software development, a user community is a user group centred around the common interest of product. Von Hippel (2005) argued that users democratised the innovation activities and organised cooperation in the development, testing, and diffusion of user-initiated innovations, which are indeed created as costless by-products of community member interactions. In other words, users within a community rarely compete with each other, with a willingness to freely reveal follow-up performance-enhancing innovations (Franke and Shah 2003). When users are involved in a community of user innovators, they often share modularised designs and create toolkits to facilitate innovation (Baldwin et al. 2006; Faraj et al. 2011). Therefore, the costs of design and communication decrease because of trial-and-error learning. Many open-source software projects have these characteristics (Baldwin and Von Hippel 2011). Moreover, each innovation opportunity occurring in the community also reveals low production and transaction costs. Production costs, which are the costs of carrying out design instructions to produce a specified goods or service, are comparatively low because of a useable form of design with a clear and specific dissatisfaction analysis. Transaction costs, which are the cost of establishing property rights and engaging in compensated exchanges of property, are relatively low because of the nonrivalry of co-creative designs and controllable opportunistic behaviour (Baldwin and Von Hippel 2011). Communities increasingly represent a critical external source of knowledge, practical experience, and innovation. Considerable attention has been devoted to understanding how to interact with these organisational forms most effectively in order to foster innovation and entrepreneurship (Füller et al. 2013). Therefore, the involvement of the user community is critical for user innovators to sharpen and reshape the usefulness of their innovations and encourage the commercialisation process to continue until market launch (Shah 2005).

2.5. Research Hypotheses

The literature indicates a positive association between user innovators and user entrepreneurs. Motivations to become a user entrepreneur are increasing because of the relative advantages endowed by users, especially lead users who possess useful innovations (Shah 2005; Shah and Tripsas 2007; Shah and Tripsas 2016). Furthermore, the community facilitating user innovators supports the pathway from users to entrepreneurs (Baldwin et al. 2006; Baldwin and Von Hippel 2011; Franke and Shah 2003). Figure 1 presents the research framework. There are three constructs within the dot-line square, indicating the innovators with the lead

user orientation are likely to produce the motivations to be entrepreneurs. Based on the aforementioned literature review, the following hypotheses are proposed:

H1. *The higher magnitude of lead user orientation of innovators, the higher their motivation to become entrepreneurs.*

H2. *High community involvement positively affects innovators' motivation in becoming an entrepreneur.*

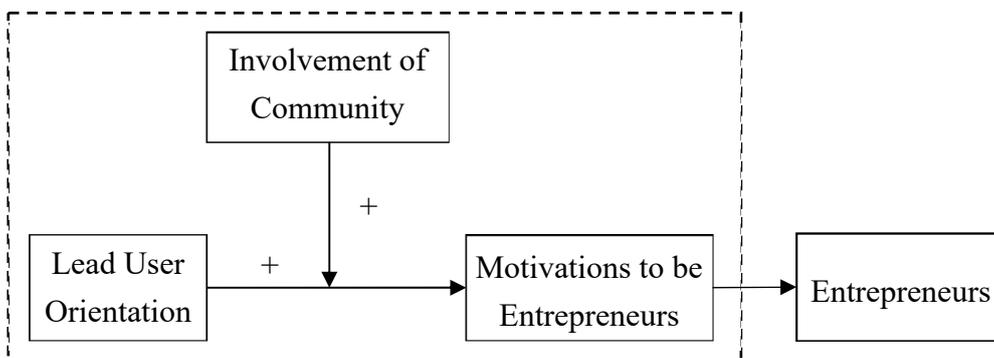


Figure 1. Research framework.

3. Research Method

This study targeted start-ups from International Entrepreneur Initiatives of the Small and Medium Enterprise Administration of the Taiwan Ministry of Economic Affairs and members of the Taiwanese government-based Youth Career Development Association and the watchlist of AppWorks, a leading accelerator of Internet start-ups. Totally, we obtained 228 founders of start-ups as a sampling pool. Because all of them are the exact entrepreneurs, this study only focuses on the constructs within the dot-line square in Figure 1.

This study elaborated on the associated question items to measure the concerned constructs. There were seven question items proposed by Franke and Shah (2003) for measuring the lead user orientation. The other 20 items were adopted to measure innovators' motivations to be entrepreneurs, including 13 user entrepreneurial driving forces by Shah and Tripsas (2016) and 7 entrepreneurship motivations articulated by Dubini (1989). The last item was given to respondents to evaluate the intensiveness of innovator involvement in the community. Table 1 describes the constructs and question items. Even though all the question items were shown as affirmative sentences, the respondents were asked to answer the questions with the 5-point Likert scale to specify their level to a statement.

Table 1. The constructs and related question items of lead user orientation and entrepreneurial motivation.

Constructs	Properties	Question Items	Literature Sources
Lead user orientation	Being ahead of the trend	I usually find out about new products and solutions earlier than others.	Franke and Shah (2003)
		I have benefited significantly by the early adoption and use of new products.	
		I have tested prototype versions of new products for manufacturers.	
		I am regarded as being on the cutting edge in my field.	
	High benefit from innovation	I improved and developed new techniques for the product that I used.	Franke and Shah (2003)
		I have new needs which are not satisfied by the existing product and am looking forward to solutions.	
		I am not satisfied with the existing equipment until the new version improved by myself or others.	

Table 1. Cont.

Constructs	Properties	Question Items	Literature Sources
Entrepreneurial motivations	Use experience	I ever experienced using the relevant products that made me understand the exact functioning and obtaining the insights of requirements.	Shah and Tripsas (2007); Schuurman et al. (2011)
		I ever experienced using the relevant products that stimulated me to innovate and become an entrepreneur consequentially.	
	Product-related knowledge	I ever experienced the relevant products to what I used, so as to explore the state-of-the-art solutions and then justify the unsatisfactory demands.	Shah and Tripsas (2007); Schuurman et al. (2011)
	Domain knowledge	I have the related technological expertise to solve the problems when using the products.	Shah and Tripsas (2007); Schuurman et al. (2011)
	Innovation aspiration	I am usually eager to solve the problems by myself when using the products.	Shah and Tripsas (2007); Schuurman et al. (2011)
	New demands	I usually have additional demands, which are not supported by the available market products presently.	Shah and Tripsas (2007); Schuurman et al. (2011)
		I ever met some people having similar demands to me when searching for the available products.	
	Dissatisfaction	I can clearly specify the points that cause users' dissatisfaction.	Shah and Tripsas (2007); Schuurman et al. (2011)
		I can clearly suggest the possible solutions to release the dissatisfaction of existing products.	
	Industry experience	I ever engaged in or worked for the product that I used before being an entrepreneur.	Shah and Tripsas (2016)
	Relevant industrial experience	I ever experienced the upstream or downstream industrial knowledge of product that I used, such that I can understand thoroughly the related skills from manufacturing to marketing before being an entrepreneur.	Shah and Tripsas (2016)
	Experienced interaction of community	I liked to share what I innovated with others in the community where I was usually involved and experience the communication of improvement about my innovative stuffs.	Franke and Shah (2003); Shah and Tripsas (2007); Haefliger et al. (2010)
	Perceived market potential	I usually obtained the insights of market potential and possibility of commercialisation through sharing what I innovated with other in the community.	Franke and Shah (2003); Shah and Tripsas (2007); Haefliger et al. (2010); Kuckertz et al. (2017)
Entrepreneurial team	I can obtain support from the community, where I have ever shared my innovative stuffs with others, and organise an effective entrepreneurial team beyond myself.	Franke and Shah (2003); Shah and Tripsas (2007); Haefliger et al. (2010); Shah and Tripsas (2016)	
Complementary Assets	I can obtain the necessary assets from my personal networks of community, such as manufacturing, channeling, and other related intellectual properties, which usually increase the odds of commercialisation.	Franke and Shah (2003); Haefliger et al. (2010); Shah and Tripsas (2016)	
Opportunity costs	I never thinks that I will have a high burden on opportunity costs when deciding to be an entrepreneur.	Shah and Tripsas (2016)	

Table 1. Cont.

Constructs	Properties	Question Items	Literature Sources
	Freedom	Being an entrepreneur brings me high flexibility on organising tasks, arranging working time, and selecting coworkers and location.	Dubini (1989)
	Monetary returns	Being an entrepreneur gives me an expectation of higher returns than employment by others.	Dubini (1989)
	Escape	Being an entrepreneur lets me remove the fear of unemployment and control my own destiny.	Dubini (1989)
	Philanthropy	Being an entrepreneur can increase welfare for family, community, and society.	Dubini (1989)
	Status	Being an entrepreneur can enhance my social position, leadership, and reputation.	Dubini (1989)
	Achievement	Being an entrepreneur can challenge myself to pursue the summit of career and earn personal esteem.	Dubini (1989)
	Role models	Being an entrepreneur usually results from benchmarking the models of seniors or masters in the family or community.	Dubini (1989)

The next research processes are to extract key factors of lead user orientation and entrepreneurial motivations, respectively, by the exploratory factor analysis. Then, the multiple regression was applied to evaluate the association between the degree of lead user orientation and entrepreneurial motivations accounting for the moderation effect of the intensiveness of community involvement.

Before conducting the survey, a pre-test and pilot test were performed to validate the instrument. This study pretested the questionnaire by asking three practitioners who were entrepreneurs in the software, e-commerce, and cultural creativity industries to assess its logical consistency, ease of understanding, sequence of items, and contextual relevance. Based on the comments, the author made minor modifications to the wording. Then, overall, 25 students studying for master's degrees in information systems participated in the pilot study. The results of the pilot test were evaluated using Cronbach's α and factor analysis to assess the initial reliability of the scales. The standard lower bound for Cronbach's α was 0.7 (Hair et al. 2006). Item-to-total correlation was used to improve Cronbach's α level, with a minimum value of 0.5. All items in the pilot test indicated instrument reliability. Some modifications to refine the instrument were made based on the respondents' suggestions. The final measures obtained from the pilot test were used as indicator variables for the study.

Through an online questionnaire invited by the emails or phones from 1 April 2016 to 10 June 2016, 75 valid respondents out of a pool of 228 entrepreneurs answered all of the questions after several follow-up requests and removing invalid or incomplete responses. The response rate was approximately 33%.

4. Research Results

4.1. Descriptive Statistics

The investigated companies are summarised in Table 2. The results reveal that most entrepreneurs were well-educated and possessed experience in industrial training. Moreover, the majority were married but paid below the average wage in Taiwan (USD 1650 per month), and they started their businesses with a low level of capital.

Table 2. Descriptive Profile of respondent entrepreneurs.

Variables	Distribution
Education	Below college (41.4%); above college (58.6%)
Age at entrepreneurship	Below 25 years old (12%); between 25 to 40 years old (73.4%); above 40 years old (15.6%)
Matrimony	Single (30.7%); married (69.3%);
Gender	Male (60%); female (40%)
Salary before entrepreneurship	Below USD 1650/month (50.7%); above USD 1650/month (49.3%)
Industrial age before entrepreneurship	Below 7 years (46.7%); above 7 years (53.3%)
Venturing capitals	Below USD 33,000 (53.4%); above USD 33,000 (46.6%)

4.2. Factor Analysis for Motivations of User Entrepreneurship

Exploratory factor analysis was conducted using SPSS version 22.0 to extract the main common factors from 20 entrepreneurial motivations. First, using the Kaiser–Meyer–Olkin (KMO) goodness-of-fit criteria, if the KMO value is closer to 1 then it means that our data is suited to factor analysis. Values of KMO above 0.5 are generally accepted as indicating the adequacy of the sample for factor analysis while values below 0.5 mean that the sample is inadequate (Hair et al. 2006). The surveyed data revealed a KMO value near to 1 (0.743), indicating that the factor analysis approach was modestly plausible for this dataset. Next, the common factor extraction process was followed. By repeating the principal component model of factor analysis and varimax orthogonal rotations, eliminating the factors by the criteria of commonalities lower than 0.5 gradually increased the total variance explained by five extracted components up to 70% until the sixth analysis (Hair et al. 2006). As Table 3 shows, each extracted component had an eigenvalue greater than 1, indicating that all components could adequately represent the original data. Moreover, the factor loadings associated with all question items grouped in the same component were greater than 0.5, indicating enough construct validity that question items converged effectively on the extracted component (Hair et al. 2006). Table 3 shows the reduced, concise five motivations which are underlying components (causes) capturing much information of the 16 entrepreneurial properties reflected by the founders of Taiwan startups.

The five common components were named by the representative items in each group. The first component was called ‘product knowledge advantage’ because the grouping items were mostly related to product functionality, configuration, and market, which Shah and Tripsas (2007) and Schuurman et al. (2011) emphasised. The second component was called ‘industry expertise’ because of its high relatedness to entrepreneurs’ past industry experience, which Shah and Tripsas (2016) mentioned. The third component was called ‘inducements to innovation’, consisting of unsatisfactory needs, high desire for improvement, and benefits from new innovations, which Von Hippel (1986) argued as the driving force of being lead users. The fourth component was ‘career expectations’, which was concerned with the enhancement of family welfare and social position, which were asserted by Dubini (1989). The final component was ‘benchmarking’, which was externally driven by escaping the status quo, following role models, and controlling personal destiny, which Dubini (1989) pointed out.

According to the extracted five components of Table 3, the factor scores of each component, indicating the magnitude of each motivation, were derived from the corresponding original entrepreneurial properties. Table 4 shows the Cronbach’s α reliability analysis for the factor score of each component. Most of Cronbach’s α values were greater than 0.7, indicating satisfactory reliability (Hair et al. 2006).

Table 3. Factor analysis for motivations of user entrepreneurs after Varimax rotation.

Entrepreneurial Properties	Component					Commonality
	1	2	3	4	5	
1. Product-related knowledge	0.853	0.032	0.168	−0.016	0.034	0.758
2. Use experience–stimulation to innovation	0.797	0.166	0.298	−0.042	−0.069	0.759
3. Use experience–obtaining insights of requirement	0.776	0.115	0.318	−0.132	−0.008	0.735
4. Perceived market potential	0.701	0.098	0.249	0.201	0.017	0.604
5. Experienced interactions of community	0.668	0.285	−0.021	0.268	−0.01	0.600
6. Complementary assets	0.508	0.443	0.063	−0.119	0.22	0.520
7. Relevant industrial experience	0.256	0.868	0.093	−0.077	0.061	0.837
8. Achievement	−0.052	0.742	0.03	0.236	0.032	0.611
9. Industry experience	0.4	0.731	0.096	0.047	−0.05	0.708
10. New demands–market unavailability	0.272	−0.005	0.791	0.097	−0.042	0.711
11. Innovation aspiration	0.254	−0.011	0.783	−0.093	0.106	0.698
12. Dissatisfaction–the solution suggestion	0.152	0.26	0.744	0.142	0.157	0.689
13. Philanthropy	0.054	0.138	0.078	0.869	−0.016	0.783
14. Status	0.038	−0.01	0.02	0.863	0.243	0.805
15. Role models	0.09	−0.052	0.046	0.004	0.870	0.770
16. Escape	−0.094	0.153	0.121	0.229	0.818	0.768
Eigenvalue	5.148	2.112	1.700	1.316	1.081	
Explained variation (%)	32.175	13.198	10.624	8.224	6.754	
Total variation explained (%)	32.175	45.373	55.997	64.221	70.974	

Table 4. Reliability analysis of key user entrepreneurial motivations.

Entrepreneurial Motivations	Cronbach's Alpha	Associated Property Items
Product knowledge advantage	0.855	1–6
Industry expertise	0.759	7–9
Inducement to innovation	0.752	10–12
Career expectation	0.766	13–14
Benchmarking motivation	0.670	15–16

4.3. Factor Analysis of Lead User Orientation

According to the measurement constructs of lead user characteristics suggested by Franke and Shah (2003), the empirical test of Taiwanese entrepreneurs shown in Table 5 reveals measurement validity with high factor loadings as well as measurement variability with an acceptable Cronbach's α .

Table 5. Validity and Reliability analysis for measuring characteristics of leader user.

Question Items of Lead User Orientation	Common Components	
	Being Ahead of the Trend	High Benefit from Innovation
Develop new techniques.	0.815	0.358
Being on the cutting edge in my field.	0.785	0.274
Test prototype versions.	0.764	−0.116
Benefit significantly from early adoption.	0.750	0.178
Find out new solutions earlier than others.	0.714	0.333
Look forward to new solutions.	0.109	0.875
Unsatisfied until the new version improved.	0.218	0.798
Cronbach's alpha	0.836	0.684

4.4. From Lead Users to User Entrepreneurs

After factor analysis, this study adopted the factor scores of the total characteristics of a lead user and five extracted user entrepreneurial motivations for correlation analyses, including the indicator of community involvement. Therefore, the relationship between key

constructs in the research framework shown as Figure 1 can be examined. Table 6 shows that most of the associations among lead user orientation, community involvement, and motivations of being entrepreneurs were significant. Next, a product of lead user orientation and community involvement was created to evaluate the moderating effect. Therefore, a multiple regression analysis between lead user orientation, community involvement, and their product was conducted toward five user entrepreneurial motivations. The purpose of regression analysis is to examine whether the intendedness of user innovators with higher lead user characteristics are likely to be motivated to become user entrepreneurs, especially when involving the moderator of user communities. Table 7 shows the results. All regression coefficients along the lead user characteristics were significantly positive, indicating that the high level of lead user orientation promotes the high level of user entrepreneur motivations. However, the effect of user community involvement is not always significant to all the motivations to be entrepreneurs. Nevertheless, the involvement of community not only stimulates the entrepreneurial motivations of learning product knowledge (with a significant coefficient, 1.016) and industry expertise (with a significant coefficient, 0.925) but also facilitates lead users to elevate these two motivations (with significant coefficients 0.326 and 0.607, respectively) to become user entrepreneurs.

Table 6. Mean, standard deviation, and bivariate Pearson correlations for all variables.

Variables	Mean	S.D.	1	2	3	4	5	6	7
1. Lead User orientation	3.090	0.543	1						
2. Involvement of Community	3.640	1.512	0.394 **	1					
3. Product knowledge advantage	3.162	0.390	0.488 **	0.732 **	1				
4. Industry expertise	3.358	0.538	0.257 *	0.486 **	0.516 **	1			
5. Inducement to innovation	3.117	0.641	0.552 **	0.327 **	0.565 **	0.306 **	1		
6. Career expectation	3.020	1.007	0.419 **	0.220	0.101	0.138	0.092	1	
7. Benchmarking motivation	2.687	0.820	0.307 **	0.286 *	0.282 *	0.072	0.311 **	0.320 **	1

* p -value < 0.05; ** p -value < 0.01.

Table 7. Regression analysis from lead users to motivations of user entrepreneurs.

	Product Knowledge Advantage	Industry Expertise	Inducement to Innovation	Career Expectation	Benchmarking Motivation
Intercept	0.127	0.098	0.292	0.050	−0.028
Characteristics of Lead user	0.488 **	0.312 *	0.572 **	0.419 **	0.307 **
Involvement of Community	1.106 *	0.925 *	0.271	0.224	0.233
Lead user × Community	0.326 **	0.607 *	0.073	0.128	−0.071
<i>Adj. R</i> ²	0.573	0.416	0.292	0.270	0.175

* p -value < 0.05; ** p -value < 0.01.

5. Discussion

According to the statistical results, the start-up respondents with inclinations towards lead user characteristics significantly produced five entrepreneurial motivations to become entrepreneurs, or so-called ‘user entrepreneurs’. The lead user orientation is significantly related to the entrepreneurial motivations of product knowledge, industry expertise, career expectation, and benchmarking. The results reveal that the lead user orientation is a push factor (i.e., escaping from dissatisfactory aspects such as motivation for inducements to innovate and benchmarking) as well as a pull factor (i.e., stimulating users towards achievement and opportunities mixed with their relative product knowledge advantage, related industry expertise, and career expectations) to motivate a person becoming an entrepreneur. H1 was indeed supported, resulting in expanding the manufacturer’s standpoint of von Hippel’s lead user theory from merely searching for sources of innovation to the user point of becoming user entrepreneurs. H1 confirms again the user entrepreneur theory by [Shah and Tripsas \(2007\)](#).

However, only partial significance was found for the involvement of community and its moderating effect on the relationship between lead user orientation and entrepreneurial motivations. H2 was only partially supported. The community effect revealed that community involvement increased entrepreneurial motivations in terms of the pull factors of enhancing product knowledge advantage and learning-related industry expertise. In addition, community involvement positively motivated users to become user entrepreneurs by its significant moderating effects. Thus, beyond the emphasis of lead user theory, people with the lead user orientation and involved in communities may allow to exchange related industry and product knowledge. Moreover, the results reveal that the involvement of interest-centred communities may be less supportive of innovation, career expectations, and benchmarking, even though they are also important motivations for a person to be an entrepreneur. However, H2 still supplements effective motivations of entrepreneurship to the emphasis of community only on collaborative innovations by [Baldwin and Von Hippel \(2011\)](#) and [Franke and Shah \(2003\)](#).

6. Conclusions

This research links lead users to user entrepreneurs through exploring their motivations. After integrating the driving forces behind users to be entrepreneurs ([Franke and Shah 2003](#); [Shah 2005](#); [Shah and Tripsas 2007](#); [Haefliger et al. 2010](#); [Schuurman et al. 2011](#); [Füller et al. 2013](#); [Shah and Tripsas 2016](#)) with the general entrepreneurship motivations contributed by [Dubini \(1989\)](#) and interactions within the user community ([Franke and Shah 2003](#)), a moderating effect on entrepreneurial motivations was examined. Statistical significance indicated positive regression effects from lead user orientation to entrepreneurial motivations as well as a moderating effect of intensiveness of community involvement. The results indicate that people inclining toward the lead user orientation are motivated to have a lower estimate of entrepreneurial costs than other roles (e.g., manufacturers) and to expect larger benefits from entering markets, resulting from product knowledge advantage and industry expertise, especially when they are highly involved in the user community.

6.1. Academic Implications

The results add to the literature regarding the power of lead users. The alternative value of lead users can be shifted from merely licensing innovation to manufacturers, as [Von Hippel \(1986\)](#) argued, to being entrepreneurs themselves. This paper demonstrates an empirical study to show that people with lead user orientation are inclined to produce multiple motivations to be entrepreneurs. Nowadays, in a world where outside facilitators such as interest-centred communities, industrial society, or Internet forums prevail, people with lead user orientation can share and obtain feedback for their ideas in real time and more easily than previously possible, resulting in aggregating complementary assets to challenge the original market. Especially, the research results delineate the role of community involvement in the generation of entrepreneurial motivations related to economic incentives because of more insights about product and industry. Furthermore, this research augments the other three non-economic motivations to incubate user entrepreneurship. Because this research collected the entrepreneurs' motivations after they have owned their own companies, future research could compare the likelihood of different motivations of the wannabe entrepreneurs to build their start-ups. In addition, concerning the importance of community, future research should focus on organisational designs of communities that efficiently attracts people and lead users who are willing to be involved.

6.2. Managerial Implications

From an empirical perspective, the role of community facilitating entrepreneurial motivations gives insights to strategic employment. Firms should encourage employees to join outward industrial societies and interest groups, or to advocate inward interest groups, where innovation can be further shared, discussed, and challenged. From the outward side, the linkage to communities provides firms opportunities to acquire new

ideas, collaborate on open innovation, and even to invest in start-ups. For the inward side, internal communities can play as a leverage of 'intrepreneurship' because they provide the right path of the pre-commercialisation of useful innovations, resulting from dissatisfied equipment users, and hint at market potential to launch new diversified businesses.

Another valuable implication of this research is focused on entrepreneurship education. Most entrepreneurship education curricula teach marketing, finance, and strategic partnership skills for market segmentation, exploration, and collaboration through corporate imagination, investigating customer demands (Jones and English 2004), or searching through relevant industry employer statements (Pittaway and Cope 2007). Entrepreneurship programmes developed by universities can help raise awareness of enterprise opportunities for students and shape perceptions; however, little evidence had previously been found to guide students actually to be new entrepreneurs (Pittaway and Cope 2007). According to the results, the properties of being lead users and community involvement in real entrepreneurial life can be applied to further the development of entrepreneurship education. The focus of entrepreneurship education should be on transforming students into being lead users, thereby increasing the likelihood of them seeking to become self-employed. In addition, community involvement hints at developing user communities, such as special but open interest groups, wherein ideas can emerge, be demonstrated, and be challenged to anticipate outside demands, with visiting experienced industrial mentors. As discussed by Gilbert (2012), designing an industry-centred laboratory may be more suitable for students to practice community engagement on campus or in their local community because they can receive possible feedback without rivalry. Such communities are full of debates and experiments before a dominant design and feasible business plan emerge (Baldwin and Von Hippel 2011). This is in stark contrast to most tournament games or entrepreneurial forums initiated by entrepreneurship education programmes or governmental economic departments that invite student groups to compete using their own business plans and innovative ideas (Hytti and O'Gorman 2004). The nature of competition impedes the possibility of continually reshaping innovation. Nevertheless, more research is required to examine the costs, benefits, mechanisms, and effects of loosely coupled student incubation communities and their ability to encourage students to focus on innovations and catalyse their entrepreneurial motivations.

Funding: This work was funded by the Ministry of Science and Technology of Taiwan (MOST-105-2410_H-260-14; 106-2410-H-260-040).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

References

- Alam, Ian. 2006. Removing the fuzziness from the fuzzy front-end of service innovations through customer interactions. *Industrial Marketing Management* 35: 468–80. [CrossRef]
- Amit, Raphael, and Christoph Zott. 2001. Value creation in e-business. *Strategic Management Journal* 22: 493–520. [CrossRef]
- Amit, Raphael, and Eitan Muller. 1995. 'Push' and 'Pull' entrepreneurship. *Journal of Small Business & Entrepreneurship* 12: 64–80.
- Baldwin, Carliss, and Eric Von Hippel. 2011. Modelling a paradigm shift: From producer innovation to user and open collaborative innovation. *Organization Science* 22: 1399–417. [CrossRef]
- Baldwin, Carliss, Christoph Hienerth, and Eric Von Hippel. 2006. How user innovations become commercial products: A theoretical investigation and case study. *Research Policy* 35: 1291–313. [CrossRef]
- Bogers, Marcel, Ann-Kristin Zobel, Allan Afuah, Esteve Almirall, Sabine Brunswicker, Linus Dahlander, Lars Frederiksen, Annabelle Gawer, Marc Gruber, Kathrin M. Moeslein, and et al. 2017. The open innovation research landscape: Established perspectives and emerging themes across different levels of analysis. *Industry and Innovation* 24: 8–40. [CrossRef]
- Borowski, Piotr F. 2021. Innovation strategy on the example of companies using bamboo. *Journal of Innovation and Entrepreneurship* 10: 3. [CrossRef]

- Cope, Jason, and Gerald Watts. 2000. Learning by doing—An exploration of experience, critical incidents and reflection in entrepreneurial learning. *International Journal of Entrepreneurial Behavior & Research* 6: 104–24. [CrossRef]
- Dai, Ying, and Shyh-Huei Hwang. 2021. Social Innovation Design and Sustainability of Youth-Led Bamboo Craft Brand in Zhushan Township, Taiwan. *Sustainability* 13: 9911. [CrossRef]
- Dawson, Christopher, and Andrew Henley. 2012. 'Push' versus 'Pull' entrepreneurship: An ambiguous distinction? *International Journal of Entrepreneurial Behavior & Research* 18: 697–719.
- Drucker, Peter F. 1985. *Innovation and Entrepreneurship: Practice and Principles*. New York: Harper Business.
- Dubini, Paola. 1989. The influence of motivations and environment on business start-ups: Some hints for public policies. *Journal of Business Venturing* 4: 11–26. [CrossRef]
- Faraj, Samer, Sirkka L. Jarvenpaa, and Ann Majchrzak. 2011. Knowledge collaboration in online communities. *Organization Science* 22: 1224–39. [CrossRef]
- Faullant, Rita, Erich J. Schwarz, Ines Krajer, and Robert J. Breitenecker. 2012. Towards a comprehensive understanding of lead users: The search for individual creativity. *Creativity and Innovation Management* 21: 76–92. [CrossRef]
- Fayolle, Alain, Benoît Gailly, and Narjisse Lassas-Clerc. 2007. Towards a new methodology to assess entrepreneurship teaching programmes. In *Handbook of Research in Entrepreneurship Education*. Edited by Alain Fayolle. Cheltenham: Edward Elgar Publishing, vol. 1, pp. 187–97.
- Franke, Nikolaus, and Sonali Shah. 2003. How communities support innovative activities: An exploration of assistance and sharing among end-users. *Research Policy* 32: 157–78. [CrossRef]
- Füller, Johann, Roland Schroll, and Eric von Hippel. 2013. User generated brands and their contribution to the diffusion of user innovations. *Research Policy* 42: 1197–209. [CrossRef]
- Gilbert, David H. 2012. From chalk and talk to walking the walk: Facilitating dynamic learning contexts for entrepreneurship students in fast-tracking innovations. *Education+ Training* 54: 152–66. [CrossRef]
- Haefliger, Stefan, Peter Jäger, and Georg Von Krogh. 2010. Under the radar: Industry entry by user entrepreneurs. *Research Policy* 39: 1198–213. [CrossRef]
- Hair, Joseph F., William C. Black, Barry J. Babin, Rolph E. Anderson, and Ronald L. Tatham. 2006. *Multivariate Data Analysis*. Englewood Cliffs: Prentice Hall.
- Hienerth, Christoph. 2006. The commercialization of user innovations: The development of the rodeo kayak industry. *R&D Management* 36: 273–94.
- Hytti, Ulla, and Colm O'Gorman. 2004. What is 'Enterprise Education'?" An analysis of the objectives and methods of enterprise education programmes in four European countries. *Education+ Training* 46: 11–23. [CrossRef]
- Jones, Colin, and Jack English. 2004. A contemporary approach to entrepreneurship education. *Education+ Training* 46: 416–23. [CrossRef]
- Kuckertz, Andreas, Tobias Kollmann, Patrick Krell, and Christoph Stöckmann. 2017. Understanding, differentiating, and measuring opportunity recognition and opportunity exploitation. *International Journal of Entrepreneurial Behavior & Research* 23: 78–97. [CrossRef]
- Littunen, Hannu. 2000. Entrepreneurship and the characteristics of the entrepreneurial personality. *International Journal of Entrepreneurial Behavior & Research* 6: 295–310. [CrossRef]
- Lüthje, Christian. 2004. Characteristics of innovating users in a consumer goods field: An empirical study of sport-related product consumers. *Technovation* 24: 683–95. [CrossRef]
- Pittaway, Luke, and Jason Cope. 2007. Entrepreneurship education: A systematic review of the evidence. *International Small Business Journal* 25: 479–510. [CrossRef]
- Prause, Gunnar, and Thomas Thurner. 2014. User communities—Drivers for open innovation. *форсайт/Foresight STI Governance* 8: 24–33. [CrossRef]
- Schuhmacher, Monika C., and Sabine Kuester. 2012. Identification of lead user characteristics driving the quality of service innovation ideas. *Creativity and Innovation Management* 21: 427–42. [CrossRef]
- Schuurman, Dimitri, Dominik Mahr, and Lieven De Marez. 2011. User characteristics for customer involvement in innovation processes: Deconstructing the lead user concept. Paper presented at the 22nd ISPIM Conference, Hamburg, Germany, June 12–15; Available online: hdl.handle.net/1854/LU-1887184 (accessed on 25 June 2016).
- Shah, Sonali K. 2005. Open beyond software. In *Open Sources 2.0: The Continuing Evolution*. Edited by Chris DiBona, Mark Stone and Danese Cooper. Sebastopol: O'Reilly Media, pp. 339–60.
- Shah, Sonali K., and Mary Tripsas. 2007. The accidental entrepreneur: The emergent and collective process of user entrepreneurship. *Strategic Entrepreneurship Journal* 1: 123–40. [CrossRef]
- Shah, Sonali K., and Mary Tripsas. 2016. When do user innovators start firms? A theory of user entrepreneurship. In *Revolutionizing Innovation: Users, Communities, and Open Innovation*. Edited by Dietmar Harhoff and Karim R. Lakhani. Cambridge: MIT Press, pp. 285–307.
- Shane, Scott, and Sankaran Venkataraman. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review* 25: 217–26. [CrossRef]

Urban, Glen L., and Eric Von Hippel. 1988. Lead user analyses for the development of new industrial products. *Management Science* 34: 569–82. [[CrossRef](#)]

Von Hippel, Eric. 1986. Lead users: A source of novel product concepts. *Management Science* 32: 791–805. [[CrossRef](#)]

Von Hippel, Eric. 2005. *Democratizing Innovation*. Cambridge: MIT Press.