Diffusion of E-commerce on Micro-enterprise Cluster Innovation Acceptance Rate: A Case Study in Taiwan

Yao-Chin Lin, Wei-Hung Chen, and Wei-Chun Liu

Abstract—This study focuses on cluster, and explores the use of e-commerce marketing through interviews to explore the acceptance rate of innovation. In addition, it also introduces the "IT therapy" method of action research to explain the effect of innovation diffusion. The research method used interviews to collect views of a cluster leader and six members on the diffusion of e-commerce. This study found that the innovation acceptance rate of the subjects is high, the leader's personality will affect acceptance rate of innovation of the members, another result is appropriate "IT therapy" items chosen by the leader based on the cluster characteristics. It will promote member's acceptance rate of innovation and turnover. This study is to prove when the micro enterprise want to cluster development, the first thing need to find a leader of selfless dedication, and the "IT therapy" theory into actual business management. Then the micro enterprise integrated innovation fusion products imported into the characteristics, and expand the e-commerce sales platform to enhance the essence of each member. Finally, this study proposes theoretical, practical implications and recommendations for future research.

Index Terms—Diffusion, e-commerce, cluster, innovation acceptance rate, IT therapy.

I. INTRODUCTION

The theory of innovation diffusion is a theory that studies emerging technologies, it can be accepted by people and analyze their diffusion effects. This study uses the acceptance rate of innovation to investigate the acceptance of e-commerce by members of the micro-enterprise cluster [1]. In addition, this study also attempts to explore the impact of IT therapy [2] on the introduction of micro-enterprise clusters into the introduction of e-commerce, and the effect of the spread of innovation.

The object of this study is a cluster in Yilan, Taiwan. The interviewee was a cluster leader and 6 members. Each month's they gathering has a common physical marketing activity and to assist members in e-commerce marketing. The purpose of this study is to understand the situation of cluster in the diffusion of e-commerce marketing.

Research questions are as follows:
1. What is the situation of e-commerce diffusion in the cluster?
2. What is the e-commerce innovation acceptance rate in the cluster?
3. What is the impact of the IT therapy on e-commerce diffusion?

II. LITERATURE REVIEW

A. E-commerce Innovation

E-commerce is one of the most commonly used marketing methods for SMEs.

The definition of e-commerce: 1. In terms of communication, e-commerce is the use of telephone, computer network, other media to transmit, processing information, products and services, payment, etc.; 2. Enterprise process perspective, e-commerce is a commercial transaction and the application of workflow automation technology; 3. Service perspective , e-commerce is a tool to reduce service costs among enterprises, consumers and managers, improve product quality and speed up service; 4. From the perspective of the internet, e-commerce provides the ability to buy, service, sell products and information on the internet [3].

Internet marketing is marketing campaign that uses information technology to match the business activities and business methods of the company, thus achieves the marketing goal. Therefore, online marketing is a new structure that is developed by the three aspects of information technology, business model and marketing activities [4].

The e-commerce model takes SMEs as an example to conduct a comparative study between the two countries. The reasons behind these changes are explored through differences in strategies. The preliminary study is to conduct field surveys in Australia and Singapore to collect the recognition of small businesses and apply diversity. Regression analysis to determine the factors that influence the success of e-commerce implementation. The survey results were successful in the overall satisfaction of the 19 influencing factors, and found five factors: observability, communication channels, customer pressure, supplier pressure, and perceived government support, making significant contributions, only in Australia Three factors: firm size, perceived readiness, and observability, and that drivers for digital transformation vary significantly across different industries [5]. The survey results show that organizational and innovation characteristics are necessary, but provide a more comprehensive understanding of the behavior of implementing SMEs. First, other factors need to be considered when testing. And the environment especially the model is in a different country. The adoption of communication methods, government support, external pressure from customers and suppliers is also considered to be very important for Australian SMEs in this decision. The results of this research can help companies understand the relative importance of these factors, SMEs can avoid

expenditure these less important factors, and invest limited resources to achieve e-commerce success [6].

B. Cluster Innovation and Diffusion

The factors influencing the acceptance rate of innovation include the five cognitive attributes of innovation: comparative advantage, compatibility, complexity, testability, observability and four variables: the type of innovation decision, the characteristics of the communication pipeline, the characteristics of the social system, and The extent to which the promotion staff is working hard[1]. Details are as follows.

Comparative advantage refers to the degree to which innovation is superior to existing ideas or technologies that are replaced by it, usually measured by economic benefits, social prestige or other means. 2. Compatibility means that innovation is considered to be compatible with current value systems, past experience, and compatibility with the needs of potential recipients. 3. Complexity refers to the difficulty of understanding and using innovation. Some of the meaning of innovation itself is easy to understand for potential recipients, but some are not. For the acceptance rate of innovation, complexity is a major obstacle to acceptance. 4. Testability refers to the extent to which innovation can be tested on a limited basis. Innovations that can often be phased out are more acceptable than those that cannot be tested. The testability of innovation in the cognition of members of the social system is positively related to the acceptance rate. If innovation can be designed to be highly testable, then the acceptance rate will increase. 5. Observability refers to the extent to which the consequences of an innovation can be observed. When the results of innovation are more observable, the more likely it is to adopt innovation.

In the study of e-commerce diffusion of small and medium-sized enterprises, it is pointed out that e-commerce is the revolutionary product and sales pipeline of technology. The innovation diffusion theory is used to prove the advantages of e-commerce, and it is also proved that e-commerce is a highly universal innovation [7]. The research proposes the developers, communicators, sponsors and customer management personnel of the organization, sums up the four stages that represent the e-commerce, and finally finds that the five factors affecting this are the senior management support, the management understanding of the business interests, and IT. The existence of skills, the availability of consultants, and the priority of e-commerce to confirm the diffusion effect of e-commerce [8].

In action research, IT therapy provides technology-related assistance for micro-enterprise personalization, with a focus on building relationships, training, integrating situational teaching and immediate problem solving, and providing IT solutions to micro-enterprises, which promote micro-enterprise use of Information and Communication Technology(ICT) and e-raising business use ability, IT therapy is also through the industry-university cooperation, allowing students to collaborate with business owners, to understand the business and existing technology at the site of their work, to introduce technology projects and to train

business owners to enhance digital capabilities, and to provide assistance to micro-business owners In order to solve the real-time IT needs, the law is to collect data and understand the current situation through observation and interviews with micro-enterprises, and use the reflective log, in class exercises and through reading to find solutions, to develop technical plans for micro-enterprises, and In the course of the hearing, we discuss issues and propose solutions in the course, provide consultation or related information, and also provide constructive criticism and suggestions for the proposed action plan. Finally, we have improved the digital capabilities and e-commerce application capabilities of micro-enterprises [2].

III. RESEARCH DESIGN

A. Instrument

This study uses a case study method [9]. This study uses interviews to understand the spread of e-commerce among members of Taiwan's micro-enterprise cluster through interview outlines. The interview outline is as follows:

1. How can I assist/get assistance in grassroots innovation, and what are the tools or methods for cluster members to put products on the e-commerce platform?

2. How do you gather in e-commerce relative advantage, compatibility, complexity, testability, and observability?

3. What is the type of innovation decision-making? Individual choice, collective voting, and authoritative. Please give an example?

4. Characteristics of the communication pipeline? Mass media or interpersonal communication?

5. Characteristics of the social system? Traditional norms, degree of interpersonal interaction?

6. What is the level of effort of the extension staff? Please explain separately.

B. Subjects

This study used a cluster leader and 6 cluster members interviewed by a semigroup structure. This study maintains balanced and fair outcomes by ensuring that team members' participation time does not affect their perception of cluster leadership and cluster identification by involving three old members and three new members.

C. Data Analysis

The data of this study were analyzed using innovation acceptance rate as shown in Table I, and analyzed by IT therapy.

The interview will be completed on March 27, 2017 at the cluster's exhibition. These interviews first discovered the use of e-commerce by members of the cluster, and then explored the acceptance rate of e-commerce innovation diffusion. The interview lasted 40 to 50 minutes and was designed to improve the validity and reliability of the construction and data. The audio files of the interview were converted to verbatim records and filled in the Table I novation acceptance rate. Upon completion, triangulation between investigators is checked based on interviews and verbatim records.

TABLE I: INNOVATION ACCEPTANCE RATE

Item	High	Medium	Low
Relative advantage			
Compatibility			
Complexity			
Testability			
Observability			
Promoter efforts			
The characteristics of the communication pipeline -- Social media			
The characteristics of the communication pipeline -- Interpersonal communication			
Characteristics of the social system -- Traditional norm			
Characteristics of the social system - Interpersonal interaction			
Type of innovation decision-making	individual choice	collective voting	authoritative

IV. FINDING

A. Case Description

Leaders actively solve problems in micro-enterprises through interpersonal relationship establishment, situational teaching integration, education and training promotion, and provide IT solutions for micro-enterprises. This approach can promote micro-enterprise's motivation to promote digital capabilities and introduce ICT. Therefore, after gathering the balance characteristics, the cluster leaders introduce applicable technologies (such as LINE@, LINE communication, FB marketing, e-commerce platform, QR Code) and introduce external research institutions (such as Foguang University to assist website development). And the management of IT skills lectures, etc.), to enhance the recognition of members and the actual turnover of booths, and to publish the information on physical booths on the website and social media, through the creation of popularity and attract more people, even by setting up the official website and promoting the digital set. The point strategy is to increase the proportion of repurchase, which makes it easier for members of the group to gather consensus.

This study is based on IT therapy [2]. First, students are allowed to work with business owners. Students must first learn about key technologies and business attributes in their workplace. Afterwards, students used interviews and observations to collect and obtain micro-enterprise data and current conditions, and used classroom exercises, literature reading and reflection logs to find solutions, and finally assisted the gathering leaders to formulate technical plans for micro-enterprises, provide consultation, and introduce customized technology. The project, and assisted the training of business owners to strengthen the digital capabilities, and finally improved the digital capabilities of micro-enterprises.

Therefore, when IT therapy was introduced to cluster, students from Fo Guang University assisted in setting up an e-commerce website and arranging IT training (such as LINE@, etc.). The gathering of members on the expansion of the digital sales channel, the effect of community exposure and positive views, and agrees with the relevant practices of e-commerce innovation diffusion, can indeed bring about the improvement of real performance, achieve sustained growth and play a competitive advantage.

The members of this research cluster are mostly disadvantaged women of middle age. After actual interviews, they have been unfamiliar with mainstream e-commerce innovations due to factors such as family. Introducing IT therapy through the collective influence of the cluster leaders can indeed enhance the members' familiarity and recognition of the innovation acceptance requirements such as characteristics of the communication pipeline-social media and Relative advantage, and enable members to understand e-commerce innovation. The need for micro-enterprises to gradually move towards success.

Although the leaders of this group are stronger, they still insist on providing advice only on innovative decision-making, never forcing orders, and encourage members to gather consensus through a collegial system of collective voting. Studies have shown that the e-commerce diffusion consensus project after the collective voting (such as setting up e-commerce website, mining LINE as internal communication channel, etc.) is positively correlated in terms of innovation acceptance.

B. E-commerce Innovation Diffusion Acceptance Rate

This study compiled a record of interviews between six members of the cluster and a leader. The survey results in Table II are part of the contributions of these interviews. We have omitted secondary issues such as communication channels between members of the group, original marketing methods, and benefit points after joining the cluster. This study finds that members have a high degree of acceptance of ICT innovation after joining the cluster. Among them, the leader's forward-looking concept and selfless commitment are highly affirmed, which proves that the leader's ability and attitude are positive with the success of micro-enterprise clustering. Relevant, and in line with most studies, leadership is considered to be the key to the success of most organizations [10]. In addition, regarding the Characteristics of the social system - Interpersonal interaction, all members also fully agree that joining the cluster can effectively increase interpersonal interaction to open up market niches.

For the main factors such as relative advantage, comparability, observability, etc., most of the members (especially those who have joined the cluster for a long time) also have a positive view.

This study also found that although the leaders of the cluster have a stronger attitude towards the members, they have helped the micro-enterprises to form a cluster because of the correct selection of applicable technologies, and introduced cross-border, cross-industry, and cross-industry alliances to allow small farmers to It became a product, and thus improved the real performance, so members did not raise any objection to this strong attitude.

TABLE II: CLUSTER INNOVATION ACCEPTANCE RATE ANALYSIS

Item	High	Medium	Low
Relative advantage	1.4 members 2.Senior members are more able to feel the advantages of clustering innovation and diffusion.	2 members	1.1 member 2.Leader believe that the relative advantage of cluster is not enough
Compatibility	1.4 members 2.Creative micro-enterprise has higher compatibility	2 members	1.1 member 2.Metal jewelry is affected by the difficulty of processing Compatibility
Complexity	1.3 members 2.The longer a member joins the group, the more he realizes the complexity and difficulty of clustering innovation.	3 members	1.1 member 2.The leader feels that the complexity is not high
Testability	1.4 members 2.Most members believe that clustering innovation and diffusion can withstand testing	2 members	1 member
Observability	1.5 members 2.The positive impact of clustering innovation can be clearly observed	1 member	1 member
Promoter efforts	1.7 members 2.The members of the cluster fully agree with the contribution of the promotion staff and the substantial benefits of the cluster innovation.	-	-
The characteristics of the communication pipeline -- Social media	1.6 members 2.Most members agree with the positive impact of social media technology.	-	1.1 member 2.Reduce the time for members to manage social media due to the difficulty of metal processing
The characteristics of the communication pipeline -- Interpersonal communication	1.4 members 2.Most members of the clusters are easy to communicate	1.3 members 2.The leader believes that due to the stronger potential, the communication is declining. 3.New members believe that it's more necessary to strengthen interpersonal communication	-
Characteristics of the social system -- Traditional norm	3 members	-	4 members
Characteristics of the social system - Interpersonal interaction	1.7 members 2.Joining cluster can effectively increase interpersonal interaction	-	-
Type of innovation decision-making	individual choice	collective voting	authoritative
	-	1.6 members 2.Because of trusting leaders, it is easier to unite collective consensus	1. 1 member 2. Leader is stronger

Note: - Representative interview data did not meet this item.

The purpose of this study also using IT therapy is to explain the relationship between digital competence, marketing opportunities, clustering, counseling, and the relationship between IT therapy and the research and results of this study. To make the effect of innovation diffusion become higher, it is another contribution of this study [2], as shown in Fig. 1, this is to refer to the action research model of Wolcott, Kamal & Qureshi IT therapy to revise the issues to be discussed in this study. The definitions are as follows: 1.Definition of digital competence: Train SME members to use ICT for cooperation and communication. 2.Definition of Internet marketing business opportunity: the performance of e-business through the Internet. 3.Definition of coaching and clustering: to help members create digital opportunities through consultancy and group counselling, and to undertake various activities to help increase digital capabilities or marketing business opportunities. 4.Definition of innovation diffusion effectiveness: in the four-year program data, it is confirmed that members' digital capability and cluster number on innovation diffusion have achieved the preset goal, the number of innovation diffusion and plan setting has grown the cluster efficiency of innovation diffusion and achieved results

Finally, we could improve the number of clusters or clustering innovations to enhance the effectiveness of innovation diffusion.
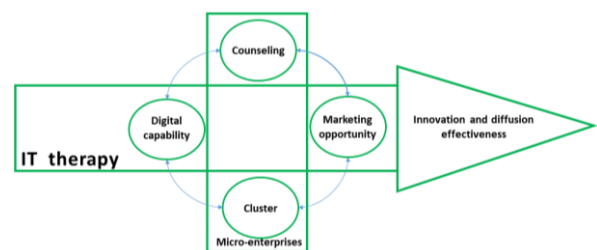

Fig. 1. IT therapy research model.

V. DISCUSSION AND CONCLUSIONS

A. Conclusions

According to the finding, this study found that the innovation acceptance rate of the subjects is high, especially in the aspects of observability, promoter efforts, the

characteristics of the communication pipeline-social media and interpersonal interaction. In addition, the type of innovative decision-making in this case is a type of collective voting, and it is also an issue worthy of further discussion.

IT therapy [2] is mainly through the establishment of relationships, training, integration of situational teaching and immediate problem solving, and the provision of IT solutions for micro-enterprises, the results of which promote micro-enterprises to use ICT and enhance digital capabilities. Therefore, after the leaders of the cluster have weighed the characteristics of their clusters, they will introduce applicable technologies (such as LINE@, LINE communication, FB marketing, e-commerce platform, etc.) and practices (education and training, etc.) to enhance member recognition and booth performance.

B. Theoretical and Practical Implications

This study extends and expands the application of two theories, diffusion of innovations [1] and IT therapy [2]. In the aspect of diffusion of innovations theory [1], this study places special emphasis on the application and influence of innovation acceptance rate. Because it is not a simple task for micro-enterprise clusters to be imported into e-commerce, it is necessary to unite and work together, and leaders are also important key players. In the past research, it was pointed out that leadership is the key to innovation [11].

The theory of IT therapy [2] is to transform the original action research from classroom application into actual business management.

The influence of the above two theories on practice has been proved from the results of this study, and it is also clear that the case of e-commerce diffusion is a successful case. Especially in the context of cluster counseling, the diffusion of e-commerce is a model of success.

C. Recommendations for Future Research

In the future, in terms of research on innovation acceptance rate, it is recommended to use the quantitative survey method to increase the sample and get more results. Another important theory cited in this study, " IT therapy ", is also proposed to increase the number of study samples to enhance better interpretation.

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