

The Inclusiveness of Internet-based Agri-business Innovation System: A Case Study on Alibaba

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Abstract—Compared to the economic effect, the social effect brought by innovation remains ignored by scholars. Inclusive innovation, which emphasizes the diversity of the stakeholders related to innovations, especially BOPs (the bottom of the pyramid) has been acknowledged as a possible solution to series of social problems such as imbalanced development and poverty. However, how innovation system achieve inclusiveness is still not clearly explained in existing research. From 2013, “Taobao villages”, where many farmers from rural area are enabled to get free from poverty by doing agri-business online, become prevailing under the development of ICT infrastructure and the Alibaba group’s rural e-business strategy. Such internet-based businesses catalyzed by Alibaba’s innovation on e-business platform, lower the entry barrier for transaction, more easily connects farmers to huge market and provide them opportunity to participate in value creation activity. As a result, such group benefit from such way of sharing the value with other participators. We develop our research on case studies of several “Taobao villages” in China. We attempt to draw implications from the performance of the innovation system which include multiple innovators for the mechanism that reduce social exclusions and enabled farmers participate in value creation activity.

I. INTRODUCTION

Scholars have developed increasing interest on how individuals with low capability and low income participate in value creation. Such individuals are usually trapped in poverty and social exclusion because they are ostracized from traditional economy. Prahalad and Hammond [21] pointed out that more than 4 billion people are at the bottom of the world economic pyramid(BOP) and their need both as customer and producer are still largely unmet. Many researches show evidence that enterprise can gain profound profit by targeting BOP market or working with BOP and at the same time they also improve the living condition for BOP [23][30]. When it comes to BOP producer, researchers have one general idea that enhancing the equal participation of BOP producer in economy can have substantial poverty alleviation implications [13]. And the existing literature point out that BOP face both productivity constraints and transactional constraints in value creation and value capture [15]. Therefore, how innovation can help to reduce such constraints become one of popular topics. Such innovation is defined as inclusive innovation, which emphasizes both fair participating opportunity and equal value distribution for BOP [6]. However, the most inclusive innovation researches still focus on single innovator, which means that the inclusiveness of an inclusive innovation is always depends on the single innovator’s performance. We believe that the

inclusive innovation system involves more diverse innovators can lead to more inclusiveness because the multiple participators could reduce more constraints than a linear approach.

A growing number of literature mentioned that ICT (information and communications technology) can help BOP to reduce the separation from market and enabled them to achieve inclusive growth [29]. Also in China, we noticed the phenomenon of “Taobao villages”, which refers to those villages who have more than ten million online annual sales and a hundred active online shops, was developed in the context of rapid development of Internet-based agri-business. The sales of agricultural products in the “Taobao”, a website of the Alibaba Group, one of the largest e-commerce platform companies with the headquarter in Hangzhou, China, amounted to RMB 48 billion (US\$ 7 billion) in 2014, doubling the figure of 2012, and the number of online agricultural shops exceeded 762,000 in 2015. The number of “Taobao villages” is 20 in 2013, and the number increased to 212 in 2014. However, in 2015, there are 780 “Taobao villages” in the whole country according to the report of Alibaba. Internet-based agri-business offers the poor in China chances of growing their business, connecting them with a vast and growing market of middle class in the country, so that they can increase their income as their business thrives online. Without the innovations in the Internet-based agri-business area which include technological, organizational, business model innovations, these people would be to some extent socially excluded and denied the opportunity to reaping the fruits of economic growth. In this sense, Internet-based agri-business innovation in China is a typical type of inclusive innovation. Moreover, multiple innovators are involved in the Internet-based agri-business innovation system and their collaboration and complementary lead to not only the win-win situation but also a greater degree of inclusiveness. In this perspective, we believe that our study enriches the researches on BOP and widen the research boundary of inclusive innovation.

Our study reviewed and summarized the existing research and tried to solve the following problems by case study of Internet-based agri-business innovation system in China: 1. The causes of the constraints and exclusions of BOP producer. 2. The mechanism that innovation system reducing the constraints. We attempt to draw implications from the Internet-based agri-business innovation system to shed light on the future research on the inclusive innovation in the context of e-business.

II. THEORETICAL BACKGROUND

A. BOP

BOP is referring to the poor who live in the bottom of the economic pyramid. When the BOP theory first proposed, the focus was on the large purchasing power and rapid growth of the BOP market. BOP market is a hotbed for commercial and technical experiments, to serve this market, companies have to be innovative [22]. Most of the existent literature on BOP and inclusive innovation regard the BOP group as consumers [13][15][23][30]. These researches focus on the strategies when serving the BOP market, such as understand BOP market [4], adopt advanced technology [16] and localization [14].

Different from the business lenses, there is growing interests on reducing poverty by applying the business logic on BOP market. To reduce the poverty, despite of offering affordable products and services to the poor, company should also offer employment and business opportunities to the BOP [26]. However, scholars argued that inclusive innovation regarding the BOP as consumers, producers and entrepreneurs are of equally great value [6][8][23][24][25][32]. BOP producers used to be excluded from the economic growth because they have low level of income and capacity. There is increasing calls for alternative ways of tackling poverty problems in developing countries and emerging economies, rather than the aid and charity approaches, emphasize the equal opportunity in economy [9].

To further understand how to include BOP producers in economy, some scholars researched on the cause of the exclusion. BOP cannot get adequate raw material resources, financial resources and production resources so they cannot participate in productivity, and they also face to low degree of market access, market power and market security when capturing value from their production [15]. Also, BOP are more likely to be affected by the changes in the macroeconomic environment because of their low risk tolerance [27]. These constraints limit the performance of BOP producers. Besides, the constraints summarized in practice, some other scholars divide the cause of exclusion into subjective and objective causes. The objective causes are related to geographical, social, political factors [19][20] and institutional voids while the subjective causes are related to the low capacity of BOP [32].

B. Inclusive innovation

In 2007, the ADB (Asian Development Bank) indicated that inclusive growth is aimed at ensuring the economic opportunity available to all, especially the poor. The fairness inclusive growth mentioned should be reflected on the fair opportunity accessing, competition and value distribution [1]. And inclusive innovation, also called innovation for inclusive growth in some literature, highlights the social benefits as well as economic benefits. Like other innovation, inclusive innovation is catalyzed by market pull and technology push [25]. In this paper, the internet-based agri-business innovation

is mainly catalyzed by the development in ICT and the improvement of ICT infrastructure in China.

The main difference between inclusive innovation and the other innovation is that inclusive innovation emphasized the fairness among variety of stakeholders especially the poor. It aspires to create opportunities that enhance social and economic wellbeing for disenfranchised members of society [6]. Inclusive innovation can be technical innovation or the business model innovation, and many case study about inclusive innovation have pointed out the complexity of it: it may be a mixture of different kind of innovations, and has very complicated stakeholders included [17]. Innovation of new model of business is required to make the BOP market more inclusive, such as the innovation at the level of market intermediation and at the level of farmer group mobilization [31]. Existing empirical literature focus on four aspects of inclusivity: precursors, processes, adoption and impacts [5].

Inclusive innovation reduces the social exclusion by lowering the barrier and promoting the capacity of BOP [32]. It benefits the BOP by connect them to a more extended network so that capabilities can be transferred.

C. ICT (Information Communication Technology) and EC (Electronic Commerce)

A growing number of literature mentioned that ICT reduce the geographical, time, financial and information barriers to reduce the separation between BOP and market, thus, enabled them to achieve inclusive growth [29]. And the electronic commerce, which is often regard as a business model innovation, can connect BOP to a large market. The EC platform can be regard as an intermediary, that being trusted, helping aggregating, matching and facilitating [2][11][18]

In our case study, we focused on the BOP producers and BOP entrepreneurs. With more positive participation in production and transaction, the innovation system with BOP producers seems to be more active and sustainable. As for the inclusive innovation, we follow the definition from George [6] that emphasize the process of inclusive rather than the outcomes. Because the outcomes of an inclusive innovation include both the financial and social performance and the latter one is hard to defined and evaluated. The agri-business in this paper refers to its broad sense definition which the business related to agriculture or farmers which can be consistent with the data we used to analysis.

III. METHODOLOGY

This paper is an exploratory study to figure out why and how, thus case study is the best research method to such kind of research questions [35]. And the main research question we tried to answer is how the inclusive innovation system work to achieve inclusive growth. Our goal is to figure out the internal mechanism of this innovation system.

We choice the internet-based agri-business in China because the most of farmers in China lived in rural and less developed area, and most of the farmers are poor and less

TABLE 1. BASIC FEATURE OF SAMPLES

Name of village	Year start e-business	Main production	Annual online sales (million RMB)	population
Beishan	2008	Sports equipment	120	2286
Wantou	2006	Willow handcraft	117	1617
Donggaozhuang	2006	Cashmere products	150	1314
Qingyanliu	2008	Smallware	350	1723
Dongfeng	2006	Wooden furniture	150	2026

All data collected in 2014

educated. As a result, they are usually excluded from traditional economy. With the help of the Internet-based agri-business innovation system, many farmers are enabled to start their own agricultural business online and get profound profit. From such perspective the Internet-based agri-business innovation in China is a typical type of inclusive innovation.

To improve the reliability and validity of the case study, we collect data from different ways and analysis both first-hand data and second-hand data. The first-hand data is collected in the interviews conducted in five “Taobao villages”, show in the table1. All the five “Taobao villages” are identified as “Taobao village” in 2013, when the concept of “Taobao villages” and the list of first batch of “Taobao villages” were first introduced to the society. And these five villages keep developing well in the next three years until now, we believe that they are more representative and developed compared to other villages. Moreover, they have different geographical and economical features, which can provide diversity in samples.

Most of those BOP producers come from “Taobao villages”, which refers to those villages who have more than ten million online annual sales and a hundred active online shops. We conducted the interview in July of 2014. We collected the data from semi structured interview with BOP producers, people working in government and other related stakeholders such as intermediary and E-commerce service provider. As a result, we received more than 40 hours recording which has been transcribed to more than two hundred thousand words raw material.

The second-hand we collect include the documents provided by government and BOP producers themselves, and the information collected from online shop. We also collect some data from public reports, published books and Alibaba’s official website. We analyze data from different sources to assure information authenticity in maximum extent.

IV. CASE ANALYSIS

A. The constraints limit the inclusiveness

According to the existing literature, the exclusions that

BOP faced are result from objective and subjective constrains. To understand how the Internet-based Agri-business innovation system achieve inclusiveness, we should first analysis the constraints that limit the business opportunities in different stage of business activity. we divided the business activity into three part, the participation, the process and the value distribution. In each stage, BOP face with different kind of constrains that limit the opportunities.

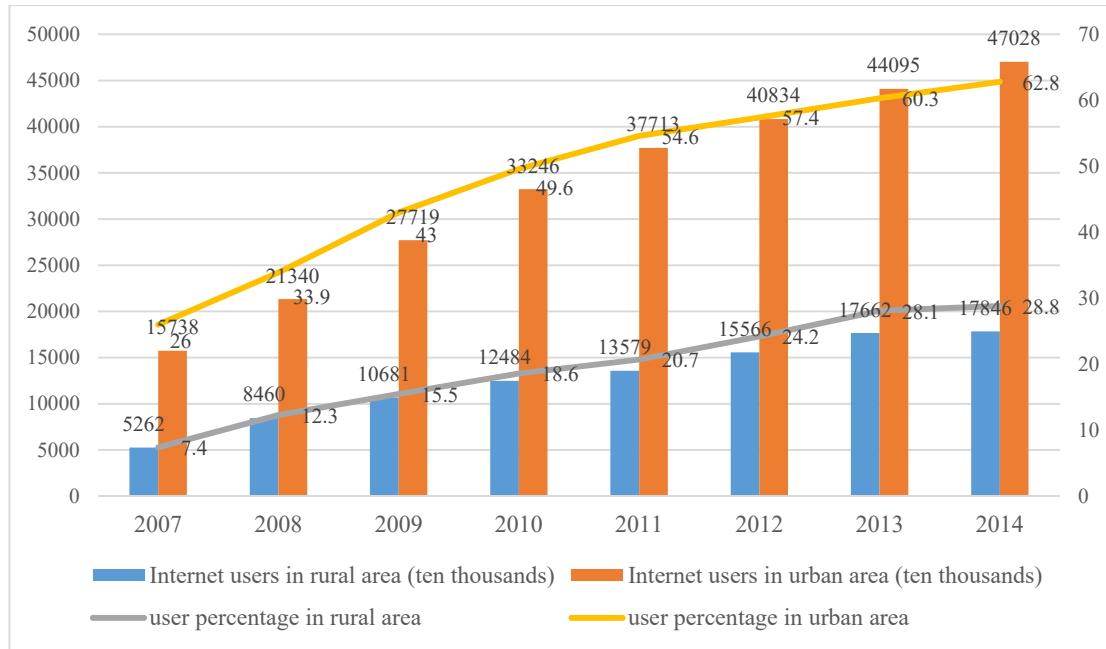
In the participation stage, there are two kinds of objective constraints, the geographic exclusion and the high entry barrier of the market. Most the BOP live in the rural area where the farmers hard to contact with the target supplier and market. The geographic exclusion result in the exclusion in information, raw material and the market. Also, the high entry barrier of the market also stopped them to participate in the traditional economy because they are lack of capital that can not afford the large investment in the early age. In the process, the BOP entrepreneurs have to compete with other participators in the market, who might have advanced technology and better practice in the management. Also, their scale of production may be so small that they have to face with higher cost which make the BOP entrepreneurs less competitive in the market. In the value distribution part, the information asymmetry results from exclusion of information can cause the unfair value distribution in the value chain, and the low bargain power of BOPs lead to the low profit they get at last.

B. Background: ICT infrastructure in China

China has the world’s largest group of Internet users and the number still growing every year. According to the data from CNNIC (China Internet network information center), the percentage of Internet users in urban area reached 62.8% in 2014 while the figure in rural area is 28.8%, and the number of rural Internet users are over 178 million. The huge number and growth in China, especially the rural area result from the development of ICT infrastructure. The policy is the major driving force that promote the availability of Internet service. In 2001, the Chinese government published the

TABLE 2. CONSTRAINTS LIMIT THE INCLUSIVENESS IN DIFFERENT DIMENSIONS

	Participation	Process	Value distribution
Objective Constraints	High entry barrier Geographic exclusion	--	Incomplete market
Subjective constraints	Low capacity Lack of capital	Low capacity Lack of capital	Low bargain power



Data source: CNNIC

Figure 1. Internet users in China

“Rural Telecommunication Universal Service – Implementation Plan for Every Village Connection Engineering”, and this policy targeted to urge the telecommunication operators to provide telephony and Internet service to every village. By the end of 2005, 95% of the villages finished the ICT infrastructure. In 2008, the government carried out the “Home appliance to the rural area plan” and according to this plan, the government would subsidize 13% of the price of home appliance for the people living in the rural area. And the PC sets and mobile phones are all included in the plan. By the end of 2012, more than 18 million PC sets sold to the rural. Due to these policy, the ICT infrastructure in rural area was improved a lot and more people there can afford a PC or mobile phone to access the Internet.

As the growth of the Internet users in the rural area and the improvement in the post service, e-business market expands rapidly in the rural area because the low price and convenient service it provides. In the past 5 years, the money rural consumers spent online increased by more than 50% per year. About 40% of the rural Internet users used to buy products online and such kind of experience enabled part of the BOP customers get familiar with the e-business system and start their own business online. Although the ICT infrastructure seems to be the antecedent of inclusive growth, we believe that it is not the sufficient condition to inclusive outcome.

C. Multiple innovators

We analysis the internet-based agri-business innovation system using the methodology in business model generation that a complete business model must have the value creation,

value transaction and value capture activities. In this case, the BOP entrepreneurs create value by manufacture while the E-business platform worked in the value transaction link. And the third-party services help the BOP entrepreneurs to add more value in their products and make the product more competitive in the market.

E-business platform

The platform can be considered as an intermediary which connect the customers and the producers. In this case, the website called “Taobao” developed and operated by Alibaba company plays the role as a platform. The website was established in 2003, and now it has more than half billion users and more than a billion products.

“Taobao” website reconstruct the value transaction from the producers to the buyers and create its own value by lower the transaction cost. It provides a third-party payment solution called Alipay to coordinate the cash flow from the buyers to the producers to solve the trust problems. It aggregated both the producers and the customers on the website, which means people can spend less effort on the market search and management. The aggregation of customers is of great importance to BOP entrepreneurs because it provides the BOP entrepreneurs a market large enough to expand their business. For example, in Wantou village, the willow handcraft is one of the skills handed down from age to age. However, in the past, people were not aware of the business value of their handcrafts because the demand of such products were far away in the cities. Moreover, even the farmers learnt about the latent demand at that time, they still could not do the business because the demand were too scattered which led to huge cost in marketing and

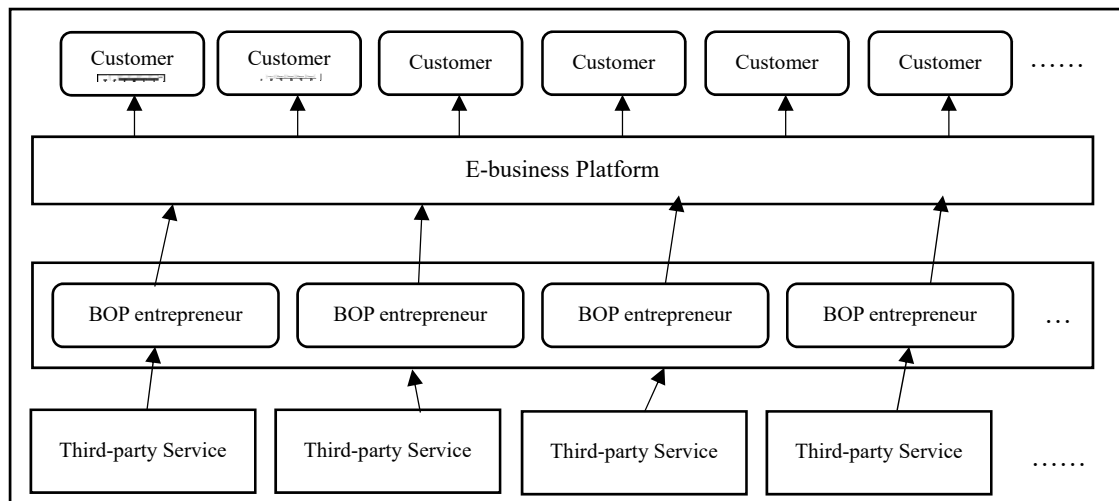


Figure 2. The model of Internet-based agribusiness innovation system

transaction. With the aggregation of customers on “Taobao” website, the BOP entrepreneurs reach the target market more easily with very low cost and their unique handcrafts soon became popular on the Internet and help them gain unexpected profit. Then the e-businessmen start to organize the old people in village to produce the products together and soon the handcraft industry totally improved the living condition of the BOP in Wantou. By the end of 2014, the whole village has more than 700 online shops and over a hundred million annual sales, additionally, more than 40,000 people got employed because of the willow handcraft industry. Moreover, the e-business platform can match the demand and supply online which also reduce the transaction cost. For example, in the past, if the farmers sold agriculture products to the city, they had to go through lots of middle men, and as a result they could only get few profits from their products. But with the e-business platform, farmers can sell the products directly to the customers which ensure them a much reasonable profit. In such way, the “Taobao” website reduces the information asymmetry in the market and helps the BOPs build stronger bargaining power in the value distribution stage.

To sum up, the “Taobao” website plays the role as an intermediary in the innovation system, and it helps to reduce the transaction cost by providing trust, aggregating the customers and matching the demand and supply directly. The website creates a new value chain to influence the value transaction. In such perspective, it can be considered as an innovator on business model level.

BOP entrepreneurs

The BOP entrepreneurs are the value creators in this innovation system who used to be excluded in traditional economy. The E-business platform provides them more opportunities by reducing transaction cost in the value transaction stage, and farmers have more opportunity in the participation stage and the value distribution stage. However,

the business on the platform also means the BOP entrepreneurs have to compete with other producers in the same market, who might be large firms with less capital and capacity constraints. The BOP entrepreneurs in this innovation system use aggregation strategy to build up their capacity in short terms in order to compete with other producers.

Almost every “Taobao” village we interviewed has an active industry association which helped to form cooperation system among BOP entrepreneurs. In Qingyanliu village, the BOP entrepreneurs build up their business relied on a local smallware market, people first choose some products in the local market then sell it online, however, in the initial period, the entrepreneurs faced a problem that they cannot get products in low price because of the small scale of their business. Until one of the entrepreneurs, set up an alliance among the entrepreneurs, that the BOP entrepreneurs aggregate their orders together, and tried to get a much lower prices from the smallware market. They also shared the crafted copy, art design and photography of products. As a result, they were able to greatly increased the product diversity and decreased the product price at the beginning of their business.

The industry association can also conduct a consistent strategy to deal with other stakeholders. In Suichang, a “Taobao” village selling agriculture products, the BOP entrepreneurs gather their need in post and warehousing service to enhance their bargaining power with third-party services providers and get lower price. The village also showed their unity on the Internet and trying to build up the brand for the region. Another “Taobao” village, Beishancun, have a strict price management conducted by their industry association to avoid the cutthroat competition.

Another feature which helped BOPs is an effective local knowledge search network. The BOP entrepreneurs share their knowledge smoothly in the network which enabled the BOP to build up their own capability in short term. In Shaji, Sun Han, started his business online selling the assembled

wooden furniture. Other villagers imitated his business and selling the assembled wooden furniture online as well. Then the pioneers shared their business experience with other people. Only after two years, the furniture became the local industry which has a very complete supply chain.

The coordination among entrepreneurs and the industry association are much more effective in the “Taobao” village. The single entrepreneurs try to benefit from economies of scale by forming consistent strategy and cooperation. The aggregation seems to be important because it can reduce the cost for the BOP and make up for their lack of resource and knowledge.

Third-party Service

The third-party service in this innovation system refers to those supporting service provided by people with specific professional knowledge or technology such as photography, art design, warehousing and logistics. And also, the financial service for BOPs are included in this category. The third-party service targeted to help the BOP entrepreneurs to adding more value to their products. For example, almost all the e-businessmen we interviewed in the rural area have no idea of photoshop or other photo edit software, and some of them even did not know how to edit an online page. However, their online shops seem just as good designed as those ones owned by large firms. All of the BOP entrepreneurs choose to cooperate with an art design studio, which helped them maintain their online shops. Unlike those large firms, the BOP entrepreneurs could not afford hiring professional employees and they can not finish the professional work themselves because they are lack of skills. But with a third-party service provider, they can get professional service that make their shops and products more competitive in the market.

The financial service for BOPs is another important innovation in the innovation system. The BOP entrepreneurs used to be excluded in the credit system conducted by large firms because they could not provide the collateral to the banks. As a result, the traditional bank system could not evaluate the debt paying ability of the BOP. The innovative financial services use the data from an online shop and logistics company to evaluate their clients’ ability of paying debt. The Alicredit, a financial service company owned by Alibaba, had

already lent 30 billion RMB to 130 thousand clients by the end of 2013. Compared to the traditional banks, Alicredit has an extremely low non-performing loans ratio, and the average cost Alicredit spent on every loan is less than 1% of those average cost in the banks.

To sum up, the third-party service helped the BOP entrepreneurs by providing supporting service and adding more value to their products. And the financial service helps the BOP to overcome the financial barrier and supports them expanding their business. The third-party service providers created new value by providing the complementary assets to the BOP, in this perspective, they are also innovators in the whole system.

V. DISCUSSION

The internet-based agri-business innovation system has multiple innovation subjects: the platform, the BOP entrepreneurs and the third-party service providers. The three kinds of innovators form various value chain in the innovation system. In the practice, we also find that the function of one innovation subject we defined might be implemented by another subject. For example, in Suichang, a third-party service company conduct the industry association and Alibaba also provides some supporting service as well. But the basic mechanism we defined are always existed. The three innovators consist the whole innovation system and form a win-win situation. But at the same time, they reduce the constraints which limit the BOPs from participate, competing and gaining profit from the economy. The innovation system can be defined succeed in both financial and social aspects. The platform innovates on the level of business model and builds the trust system, aggregate customers and combines the producers to the customers; The BOP entrepreneurs innovate in the organizational level that use aggregation strategy to lower the cost and increase the knowledge transfer; The third-party service providers innovates their business model that capture value from offering complementary assets to the BOP entrepreneurs and provide innovative financial service according to new data set. And we combined the mechanism to the constraints we defined before, show in the table 3.

TABLE 3. CONSTRAINTS, MECHANISMS AND THE INNOVATION SUBJECTS

	Constraints	Mechanisms	The innovation subjects
Objective	High entry barrier	Aggregation customers	The platform
	Geographic exclusion	Matching supply and demand	The platform
	Incomplete market	Reduce the information asymmetry	The platform
Subjective	Low capacity	Local knowledge search Network The complementary assets	The BOP entrepreneurs The third-party service
	Lack of capital	Aggregation strategy The financial service innovation	The BOP entrepreneurs The third-party service
	Low bargaining power	Aggregation strategy	The BOP entrepreneurs

From table 3 we can summarize that the objective constraints mostly reduced by the platform while the subjective constraints are reduced by the BOP entrepreneurs and the third-party service providers. This evidence confirms our assumption that the ICT and the e-business are not the sufficient condition to inclusive outcome because these kind of innovation can only solve the objective constraints but ignored the low capacity and low capital features of BOP group.

The aggregation strategy and the complementary assets seems to be two important logics to achieve the inclusiveness by reducing the subjective constraints of BOP.

A. The aggregation strategy

One of the characteristics of the BOP business is its small scale. BOP producers are limited by their capital and resource that they can only start with small scaled business. However, the small scaled business result to the high margin cost in the production and low bargaining power in the transaction. As a result, the BOP business seems to be less competitive and less efficient. If the BOP product cannot survive in the market, the BOP producers could not get enough money to expand their business scales. To BOP producers, the scale problem is a vicious circle.

Aggregation strategy means to benefit from the economies of scale by aggregation. The BOP entrepreneurs can share their resources and gather their demands to reduce the transaction cost and enhance the bargain power. Also the aggregation can help the transfer of the knowledge, for BOP with low capacity, the aggregation strategy is a method to accumulate the capital and knowledge initially. However, the aggregation strategy relies on the structure of the business network. In the case we analyzed in this paper, the business network in "Taobao" village is highly coincident with its social network, which made the aggregation strategy easy to realize. In other context, the strategy should be matched to the business network.

B. The complementary assets

Another characteristics of the BOP business is that the business is always simple because the BOP producers cannot finish all the process by themselves. Although the value created at first is limited by the capability of BOP producers, the value could be added by the complementary assets. The BOP producers could increase the value of its products by seeking for the service which is complementary. In the case of the internet-based agri-business innovation system, the BOP producers use the third-party service has their complementary assets, and just focused on the production. With the concentration on the production, the BOP producers can build up their core competence and accumulate their capacity sustainably.

VI. CONCLUSION

The paper figures out both the objective and subjective

constraints faced by BOP and the mechanism that inclusive innovation system works by case study. Our research uses the framework in existing literature to analysis the constraints that leads to the exclusion of BOP. Then, we discuss the innovation subjects in the innovation system and their mechanism to achieve inclusiveness respectively.

The paper contributes to the understanding to the micro level of inclusive innovation system. The existing literature on BOP less discussed the multiple innovation subjects and our research discussed how different subjects worked in the same system and bring both financial and social effect. This paper points out that the ICT and the e-business are not the sufficient condition to inclusive outcome because they can only solve the objective constraints but ignored subjective constraints of BOP producers. And to reduce the constraints of BOP, the aggregation strategy and the complementary assets could be two effective methods.

Our research can shed light on the innovation for the inclusive growth and may guide the policy making and business practice. For the internet-based business, including more stakeholders can realize more economic and social value. And for the policy maker, reducing the subjective constraints of BOP is the key point to reduce poverty. The further research can develop a cross industry case comparison study and large sample statistical empirical study to ensure the reliability and validity of the study.

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