

# Poverty alleviation through government-led e-commerce development in rural China: An activity theory perspective

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## Abstract

This paper uses activity theoretic analyses to investigate the role of governments in developing rural e-commerce ecosystems and the effects of such ecosystems on poverty alleviation. On the basis of a case study of Longnan, one of the poorest regions in China, this paper reports and analyses the various actions taken by local governments in nurturing, supporting, and regulating the development of a local rural e-commerce ecosystem and using this ecosystem to transform poverty alleviation. Our study articulates a model of poverty alleviation through e-commerce. By documenting and theorizing the mechanisms underlying rural e-commerce development and poverty alleviation through e-commerce as well as governments' role in developing and sustaining them, this paper contributes to establishing a "theory of the solution" to the grand challenge of poverty alleviation both in China and globally.

## KEYWORDS

activity theory, China, government, poverty alleviation, rural e-commerce ecosystem

## 1 | INTRODUCTION

In September 2000, the leaders of 189 countries adopted the United Nation Millennium Declaration that declared eradicating extreme hunger and poverty as the first of the 8 Millennium Development Goals. Unfortunately, in the decade following the announcement of this goal, populations in poverty had increased in every region of the world except China (Karnani, 2011). From 1978 to 2014, China lifted in total more than 700 million people out of poverty, becoming the first nation to achieve the Millennium Development Goal for poverty eradication.\* However, even with

\*Report on China's Implementation of the Millennium Development Goals (2000-2015). Available from [http://www.cn.undp.org/content/dam/china/docs/Publications/UNDP-CH-SSCMDG2\\_015\\_English.pdf](http://www.cn.undp.org/content/dam/china/docs/Publications/UNDP-CH-SSCMDG2_015_English.pdf), accessed on Dec. 21, 2016.

its remarkable achievement, in 2014, China still had a population of 70.17 million living in poverty. The Chinese central government has set out the goal to completely eradicate poverty by 2020 (Hsu, 2016), a challenge that requires innovative solutions.

In recent years, as an innovative solution, poverty alleviation through e-commerce (PAeC) began to emerge, in which poverty population get involved in e-commerce ecosystems and benefit from online market exchanges (Jha, Pinsonneault, & Dube, 2016; Leong, Pan, Newell, & Cui, 2016). Poverty alleviation through e-commerce represents an information technology (IT)-enabled, market-based poverty alleviation approach, and, once established, it can be effective and self-sustainable (Jha et al., 2016; Leong et al., 2016). However, the fundamental challenge of PAeC is to develop e-commerce ecosystems in a poverty-stricken region in the first place. Moreover, the population in poverty by definition lack financial and other resources and most likely do not have the necessary knowledge and skills required for contemporary market exchanges. How to ensure that poverty population indeed benefits from e-commerce presents another challenge.

Previously, scholars have discussed 2 general approaches for developing business ecosystems: either top-down or bottom-up. A top-down approach is typically implemented by a central organization, such as a government, which plans, designs, and implements an ecosystem from scratch. This approach could be efficient in developing closed ecosystems, but it hardly succeeded in developing open ecosystems with diverse and voluntary participants, such as e-commerce (Moore, 2006; Smith & Elder, 2010). Alternatively, a bottom-up approach is typically community driven and depends on the self-organization of grassroots-level actors and their interactions (Leong et al., 2016) or the organic growth of ecosystems (Jha et al., 2016). This bottom-up, community-driven approach has many advantages as they are adaptive, accommodative, and consequently more sustainable, but it can be difficult to implement in poverty-stricken regions where both the infrastructure and local residents are not prepared. Previous studies also report that e-commerce ecosystems built by this approach sometimes have negative consequences such as intensive and disruptive local competition among ecosystem participants (Leong et al., 2016). In pursuing PAeC, it is not clear whether the 2 approaches can be combined such that a rural e-commerce ecosystem can be nurtured, supported, and regulated by proper government intervention actions while remaining self-organized and community driven. In this paper, we address such a research question as "how governments can lead the development of e-commerce ecosystems in poverty-stricken regions and ensure the poverty population to get involved in, and benefit from, the ecosystems, thus achieving poverty alleviation."

We pursued this research question through a case study of Longnan, a prefectural city in Western China. Longnan had the largest poverty-stricken area, the largest poverty population, and the lowest income level among all the prefectures in Gansu, one of the least developed provinces in China. In 2011, Longnan officially registered a poverty population of 1.3 million, or 53% of its total population. By the end of 2015, however, Longnan had managed to reduce its poverty population to 0.5 million, or 20.4% of its total population (source: M1; see Appendix A). Among its various poverty alleviation attempts, Longnan's use of e-commerce for poverty alleviation was considered a key contributor to its success. Unlike the community-driven, self-organization model of e-commerce development that was predominant in the coastal regions of East China (Cui, Pan, Newell, & Cui, 2017; Leong et al., 2016), in Longnan, the development of its e-commerce ecosystem, and the use of it for poverty alleviation, featured the role of local governments. Longnan's unique experiences have been dubbed as the *Longnan model* by the media and nationally recognized (Meng, 2016). Studying Longnan's experiences thus offers us a valuable opportunity to reveal the role of governments in nurturing e-commerce ecosystems and using them for poverty alleviation.

The design and implementation of our research were guided by activity theory (Allen, Brown, Karanasios, & Norman, 2013; Engeström, 2015; Karanasios, 2014, 2018). Using the activity theoretic framework, we particularly focused on 2 activities: the market-based poverty alleviation activity through which the poverty population tried to raise their income and eradicate poverty and the e-commerce development activity through which Longnan's governments tried to develop a local e-commerce ecosystem. Our findings documented and conceptualized the actions the Longnan governments took in performing the second activity and how the second activity transformed the first one.

From the outcomes of such transformation, we observed that, by involving the poverty population as consumers, producers, micro-entrepreneurs, employees, and investors in its rural e-commerce ecosystem, Longnan managed to transform its original, ineffective poverty alleviation activity system to a new, viable PAeC activity system. The resulting PAeC activity system represents an effective market-based solution for poverty alleviation. By articulating and theorizing these activity systems and their interactions, our paper develops a “theory of the solution” (Majchrzak, Markus, & Wareham, 2016) for the grand societal challenge of poverty alleviation.

We organize the rest of the paper as follows. In Section 2, we first review relevant literature streams and theoretical backgrounds for this study. Our research methods are subsequently presented in Section 3 and our findings in Section 4. We then discuss our findings in Section 5 and conclude the paper in Section 6 with its contributions and limitations.

## 2 | THEORETICAL BACKGROUND

### 2.1 | Poverty alleviation and market-based solutions

Poverty is a multidimensional construct: while it primarily concerns the extremely low income of individuals and households, poverty also means limited access to basic education, sanitation, health care, utility infrastructure, and contemporary finance and public service systems (Bourguignon & Chakravarty, 2003; Dubé, Pingali, & Webb, 2012; Sen, 1976). Poverty alleviation has long been considered one of the grand challenges for modern societies and has drawn significant research attention (George, Howard-Grenville, Joshi, & Tihanyi, 2016; Singer, 2006).

There are generally 3 types of solutions for poverty alleviation (Karnani, 2011). The first type consists of government-led solutions, such as policy-based monetary or nonmonetary public assistance programmes, regional economic development incentive programmes such as deregulation or business tax reduction, and direct public investment in the physical and social infrastructure in poverty regions. The second type consists of non-government organization (NGO)-led solutions, such as NGO's humanitarian assistance programmes, agricultural and economic development aids, and support programmes for education, health, and infrastructure development in poverty regions (Werker & Ahmed, 2008), as well as corporate philanthropy and social responsibility activities of private companies or individual-level charitable volunteer activities (Clyde & Karnani, 2015). Both types of solutions aim to bring in outside resources that are otherwise not available to poverty-stricken regions. Unfortunately, these solutions often work only temporarily and are ineffective for sustainable poverty alleviation (eg, Panagariya, 2013). Even in China where some government-led poverty alleviation programmes have been relatively successful (Meng, 2013), they could still lead to unexpected consequences such as unequal distribution of programme benefits to richer households (Park & Wang, 2010).

Business scholars have particularly focused on the third type of solutions for poverty alleviation, the market-based solutions, which are considered more effective and sustainable (eg, Alvarez & Barney, 2014; Clyde & Karnani, 2015; McKague & Oliver, 2012; VanSandt & Sud, 2012). The common premise of market-based solutions is that poverty persists when the poor have little support from modern market institutions, and thus, a sustainable poverty alleviation programme should effectively involve the poor in market exchanges (Cooney & Shanks, 2010; McKague & Oliver, 2012). Specifically, there are 4 market-based poverty alleviation models in the literature, based on different roles taken by the poverty population as consumers, producers, employees, and microentrepreneurs (McKague & Oliver, 2012).

The first market-based poverty alleviation model is to involve the poor in market exchange as consumers, which is generally referred to as *the bottom of the pyramid* approach (London, 2008; Prahalad, 2005). The logic behind this solution is that the poverty population represents underexplored business opportunities (Mahajan & Warbelow, 2016). If for-profit companies can innovate their business models and manage to provide accessible, low-cost products to the poverty population, there would be a win-win situation in which the companies make profits through serving the poor (McKague & Oliver, 2012).

The second model is to include the poverty population as producers in modern value chains (Slavova & Karanasios, in press). The population in poverty may still have an advantage to produce certain products or services,

such as those that are labour-intensive, dependent on their local environments, or unique because of local history or tradition. If the poverty population have proper channels to deliver such products or services, they can potentially benefit from market exchanges. In order to accommodate the poverty population as producers, though, the markets and the value chains need to be structured in economically viable ways (McKague & Oliver, 2012).

The third model is to include the poverty population as employees, especially by local small-and-medium-sized enterprises. Poverty can be alleviated if a poverty-stricken region can establish a steady or growing job market that continuously provides employment opportunities to the local residents. A healthy local job market also helps retain local talents or even attract talents from outside. To establish such a job market, though, there often need to be institutional and economic incentives and supports to jumpstart the local economy (McKague & Oliver, 2012).

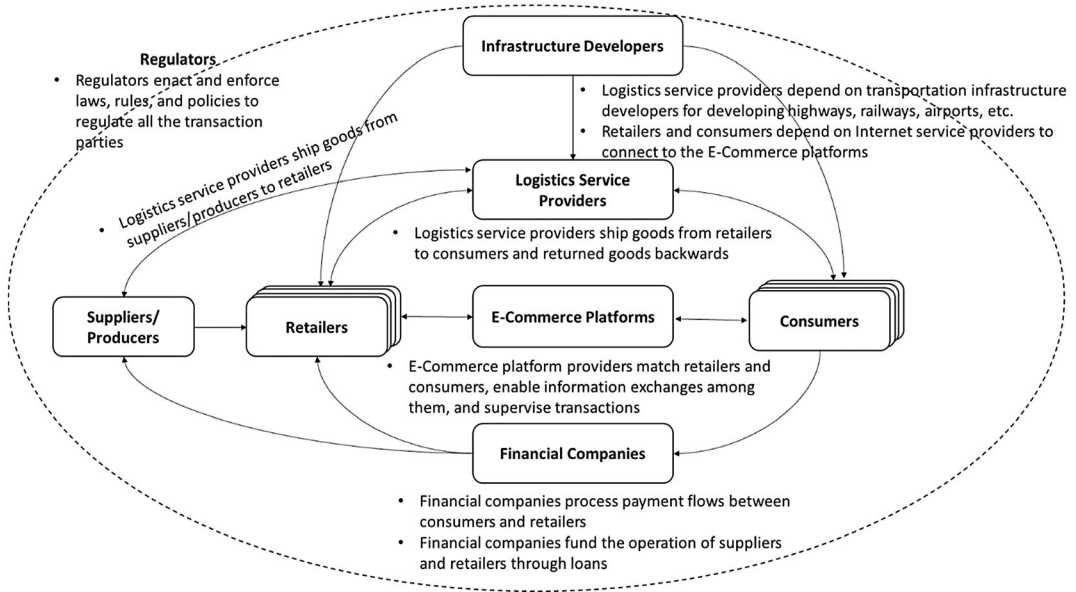
The last model is to help the poverty population become microentrepreneurs (Alvarez & Barney, 2014). Recent practice such as microlending in poverty regions, for example, has been helpful in poverty alleviation because it empowers entrepreneurial activities of the poor (Khavul, 2010). However, preparing the poor for entrepreneurial activities often requires external intervention from governments, NGOs, private organizations, and often the collaboration among them (VanSandt & Sud, 2012).

## 2.2 | Rural e-commerce ecosystems and poverty alleviation

In recent years, with the fast development in information and communication technologies (ICT), practitioners and scholars started to focus on the role of ICT in developing market-based solutions for poverty alleviation (eg, Jha et al., 2016; Kenny, 2002; Spence & Smith, 2010; Urquhart, Liyanage, & Kah, 2008). The poor are excluded from modern market exchanges often because of their lack of access to logistic, financial, and informational resources. Information and communication technologies contribute to addressing many of these issues in cost-efficient ways. At the macrolevel, ICT infrastructure connects the poor and allows them to seek for essential education, health, finance, business, and government information (Cecchini & Scott, 2003; Dewan & Riggins, 2005; Urquhart et al., 2008; Venkatesh, Rai, Sykes, & Aljafari, 2016). Mobile communication networks, for example, have shown incredible effectiveness in improving the social and economic conditions in rural Africa (Aker & Mbiti, 2010). At the microlevel, various ICT-enabled solutions empower low-income individuals and collectives through involving them in online marketplaces (Banker, Mitra, & Sambamurthy, 2011; Leong et al., 2016), increasing market information transparency (Jensen, 2007; Parker, Ramdas, & Savva, 2016), facilitating payment and financing (Hughes & Lonie, 2007; Spence & Smith, 2010), and helping them in joining or self-organizing communities of practice and business ecosystems (Jha et al., 2016; Leong et al., 2016).

Among many ICT-based solutions, developing rural e-commerce ecosystems is recognized by both practice and academia as particularly promising in poverty alleviation (Cui et al., 2017; Jha et al., 2016; Leong et al., 2016). A business ecosystem in general refers to a community of interdependent organizations that cooperate with each other and coevolve their roles and capabilities, to accomplish common business objectives such as innovation or customer services (McIntyre & Srinivasan, 2017; Moore, 1993, 2006). In studying a business ecosystem, scholars usually focus on the actors in the system, the structure of their relationships, and the evolution of these actors and the structure (Tiwana, 2015). E-commerce typically involves a diverse set of interdependent actors, such as retailers and their suppliers, consumers, digital platform providers, logistics service providers, communication and transportation infrastructure developers, financial companies, and regulators, and thus commonly conceptualized as an ecosystem (eg, Huang, Hu, & Lu, 2009; Leong et al., 2016). Figure 1 summarizes the key actors of a typical e-commerce ecosystem and their relationships.

There are several inherent advantages for e-commerce ecosystems to be used for poverty alleviation. First, such an ecosystem is usually self-sustaining (Jha et al., 2016), which reduces the demand on continuous external investment and intervention and ensures the sustainability of poverty alleviation outcomes. Second, such an ecosystem is evolvable (Jha et al., 2016), which adapts to the changes in the population demographics and institutional environments. Thus, it can be a long-term solution with low maintenance costs. Third, such an ecosystem is emancipatory (Kanungo, 2004), which mobilizes the poverty population and unleashes their own potential in alleviating poverty.



**FIGURE 1** The model of an e-commerce ecosystem

However, establishing rural e-commerce ecosystems is a non-trivial task. It requires the orchestration of a vast variety of resources and coordination of many parties with diverse interests (Cui et al., 2017; Leong et al., 2016). Two general approaches have been discussed in the literature (Leong et al., 2016). In a top-down approach, external entities such as governments choose strategic objectives, develop implementation plans, make investments, and closely monitor and supervise the development. In a community-driven approach, different actors collectively drive the development through interactions and self-organize themselves into an ecosystem (Leong et al., 2016). Although governments have both the regulatory power and critical resources that could be used for the formation and growth of an ecosystem, researchers argued that the latter approach still had several advantages, as it allows grassroots movements to control their own paces instead of being forced and it empowers the otherwise marginalized community members such as the extremely poor (Leong et al., 2016). However, self-organizing takes time, and it does not always evolve into a stable or viable state (Ostrom, 2009). It would be ideal for poverty alleviation if the 2 approaches can be combined to get the advantages of both, but no research, to our knowledge, has demonstrated clearly whether or how this can be accomplished. We are thus still in need of an effective theory-driven solution for effective PAeC.

Considering the inherent complexities in both poverty alleviation and e-commerce ecosystems as well as the involvement of governments, we need a theory that can help us develop a holistic view on the mechanisms through which governments and the poverty population work together to transform status quo through e-commerce. Moreover, poverty alleviation is such a grand societal challenge that we are interested in developing a theory of the solution (Majchrzak et al., 2016) that may help to explicate and prescribe a solution mechanism. Both considerations led us to choose activity theory as our primary theoretical lens to study the governments' roles in e-commerce development and poverty alleviation.

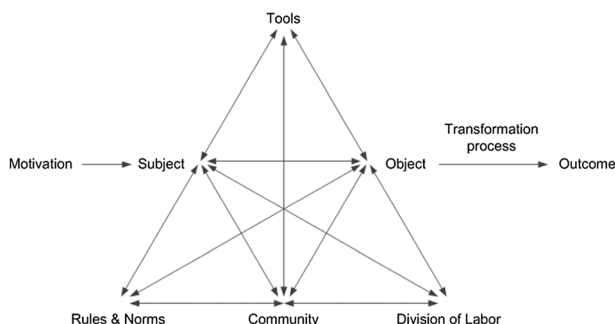
### 2.3 | Activity theory

Activity theory is a theoretical framework that conceptualizes human activities by focusing on the dialectic relationship between the consciousness of human beings and the natural and social reality, which is mediated through the use of "tools." The theory has its intellectual roots in the cultural-historical school of Russian psychology (Ilyenkov, 1977; Leont'ev, 1978; Luria, 1979; Vygotsky, 1980). According to this school of psychology, an activity can be broadly

considered as “a person [or a collective] working at something” (Crawford & Hasan, 2006, p. 50), in which a subject (a person or a collective) *purposefully* conducts an activity to learn about and change the object (something, tangible or intangible). Building on the concept of activity, Engeström (2015) developed the modern version of activity theory that studies an activity as a system, called an *activity system*, which consists of 8 interconnected components. Figure 2 illustrates the main framework of activity theory.

Engeström (2015) broadly defined tools to include physical instruments and symbolic or cognitive ones such as signs, languages, and mental models (Allen et al., 2013; Crawford & Hasan, 2006). Activities are always purposeful, in that a subject performs an activity in response to certain intrinsic or extrinsic motivations. Activities usually involve transformation processes that apply to objects and consequently lead to changes as outcomes. Moreover, activities are always subject to established rules and norms in a community of other related parties. In performing activities, subjects need to interact with their community, and community members each have their own roles and powers through formal or informal division of labour arrangements. Table 1 summarizes the definitions of the 8 components of an activity system.

Activity systems are dynamic, and contradictions are the internal impetus for changes to an activity system (Allen, Karanasios, & Slavova, 2011). Contradictions are misfits within or between different components of an activity or between different activities that oppose the overall motivation of a system or systems (Allen et al., 2013; Kuutti,



**FIGURE 2** Engeström's (2015) activity theory

**TABLE 1** Definitions of components of an activity system

Component	Definition
Subject	“A subject is an agent (a person or collective) that acts upon the object.” (Karanasios, 2018, p. 136)
Object	“The object is the problem, situation or focus of the activity, and anchors the activity” (Karanasios, 2018, p. 136)
Tools	Tools are “culturally established artefacts” that “humans on most occasions interpose between themselves and the object of interest, thereby enabling them to act more effectively” (Karanasios & Allen, 2013, p. 290)
Motivation	Motivation is “the stimulus for the activity” or “the reason(s) for the activity taking place.” (Karanasios, 2014, p. 5)
Rules & Norms	Rules and norms, either explicit or implicit, “define what behaviors are appropriate.” (Karanasios, 2018, p. 137)
Community	Community consists of “individuals or groups other than the subject who have the same general object, but are distinct, and with whom the subject interacts.” (Karanasios, 2014, p. 6)
Division of labour	Division of labour is “the way tasks are divided and roles and hierarchies structured” in performing an activity. (Karanasios, 2014, p. 6)
Outcome	Outcome is the product or consequence of the transformation processes through which the subject acts upon the object. It may or may not be the desired outcome of the subject. (Karanasios & Allen, 2013)

1999). They are inherent in any activity system and constantly trigger system transformation and evolution (Engeström, 2001).

According to activity theory, an activity is realized through a series of actions (Allen et al., 2011; Karanasios, 2014). An action is a conscious step taken by the subject towards its goal (Karanasios, 2014). For example, if building a house is the activity of interest, then installing the roof could be one of the actions that realize the house-building activity (Kaptelinin, 1996). In this sense, understanding actions taken by a subject is critical to understanding the functioning of the activity system.

Different activity systems can be interconnected to form complex organizational and societal situation (Crawford & Hasan, 2006; Karanasios, 2018). For example, one activity system could produce tools for another activity system. When the tool-producing activity system transforms, it can cause high-level contradictions among activity systems and consequently forcing the other activity system to transform too (Engeström, 2015). The connectedness of different activity systems allows humans to sometimes design and implement intervention mechanisms that improve the outcome of one activity system by transforming its connected activity systems (Karanasios, 2018; Karanasios & Allen, 2013).

In this study, we chose to use activity theory as our primary theoretical lens for 2 considerations. First, as a few previous studies pioneered, it has been theoretically fruitful to apply activity theory in studies of information technology and economical and societal development (eg, Hasan, Smith, & Finnegan, 2017; Karanasios, 2014; Karanasios & Allen, 2013; Slavova & Karanasios, in press). In activity theory, the various steps, components, and aspects of the mechanisms through which actors transform the status quo are “analytically inseparable moments of a single unit of analysis, the activity system”(Allen et al., 2013, p. 840), which allows researchers to conduct their analyses at the levels of systems and networks of systems. In addition, activity theory focuses on theorizing the mediation role of “tools,” which is essential to understand the complicated influences of the tools on the ultimate societal outcomes and all the collateral changes and rearrangements during the transformation processes (Karanasios & Allen, 2013). Poverty alleviation, as a complex social challenge, is deeply embedded in cultural-historical contexts. The other focus of our theorization, ie, rural e-commerce ecosystems, is itself another complex social-technical system. To understand how poverty alleviation can be mediated through rural e-commerce ecosystems, we need a theoretical framework that can track the dynamics of interrelated complex systems. This need can only be possibly fulfilled by non-reductionist theories, such as activity theory, that can retain the complex nature of the phenomenon rather than simplify it into linear relationships (Hasan et al., 2017).

Second, activity theory is an incarnation of the theory of the solution (Majchrzak et al., 2016). Unlike regular theories that are focused on explanation and prediction, a theory of the solution focuses on theorizing how and why a sophisticated problem can be resolved in a certain way (Majchrzak et al., 2016). Particularly for ICT studies, a theory of the solution “would address how and why ICT is expected to contribute to solving a particular organizational or societal problem, along with the additional (non-ICT) conditions necessary for the success of the ICT solution” (Majchrzak et al., 2016, p. 271). Activity theory has been featured by its emancipatory power of guiding and empowering subjects in their object-oriented activities (Karanasios, 2014). As Engeström commented, “most of our scientific ventures into social reality perpetuate the status quo; to the extent that we include ecological contexts in our research, we select and treat them as sociological givens rather than as evolving social systems susceptible to significant and novel transformation ... I was convinced that research needs to be actively involved in making the world better” (Engeström, 2015, pp. xiii). Studies of ICT for development in general, and studies of rural e-commerce ecosystems for poverty alleviation in particular, can benefit from activity theory's emancipatory power to empower the relevant subjects in addressing grand societal challenges (Karanasios, 2014).

### 3 | RESEARCH METHODS

Previous scholars particularly noted that the case study method was preferable when applying activity theory perspectives to complex phenomena (Sam, 2012). For this specific research, we also adopted the case study method

based on the following considerations. First, the case study method can better address the *how* and *why* types of research questions and help understand the essence and complexity of the underlying mechanisms (Benbasat, Goldstein, & Mead, 1987; Yin, 2009). Second, the research area of ICT solutions for poverty alleviation is still a nascent area where theories are still being developed, which demands more qualitative studies for theorization (Edmondson & McManus, 2007; Eisenhardt, 1989). Third, as activity theory emphasizes analysing the cultural-historical contexts of the subjects, the case study method has the strength of studying an ongoing phenomenon in its contexts (Yin, 2009). Finally, using the case study method also allows us to better contextualize our findings, which has been argued as particularly important when studying phenomena in developing economies (Davison, Kien, & Ying, 2008; L. Li, Gao, & Mao, 2014; Walsham, Robey, & Sahay, 2007).

### 3.1 | Research setting and case selection

We used theoretical sampling that selects cases “based on their ability to illuminate and extend relationships among constructs or develop deeper understanding of processes” (Eisenhardt, Graebner, & Sonenshein, 2016, p. 1114). Specifically, we conducted theoretical sampling in 2 steps.

First, we chose Longnan, a prefecture in western China, as our case site. Longnan was the most poverty-stricken area in one of the least-developed provinces in China. Yet it more than halved its poverty population from 2011 to 2015. E-commerce was recognized as one of the key contributors to its success, and its usage of e-commerce for poverty alleviation was hailed as the Longnan model by the media and led to numerous national honours and awards. In January 2015, the Chinese central government designated Longnan as its first pilot site in history for PAeC. In October 2015, Longnan received the *Innovation in Poverty Alleviation Award of China 2015*; and in October 2016, Longnan was awarded by the Chinese State Council as *Exemplary Prefecture in Poverty Alleviation through E-commerce*. Therefore, Longnan offered an “unusually revelatory, extreme exemplar” (Eisenhardt & Graebner, 2007, p. 27) for us to study PAeC, thus becoming the “talking pig” that can make our single-case study revealing (Siggelkow, 2007).

After deciding on Longnan as the research site, we contacted the Poverty Alleviation Office of Longnan's prefectural government and explained our research purpose. Officials there then recommended a list of exemplary counties, towns, and villages that excelled in PAeC<sup>†</sup> and a few organizations for us to visit. We assessed the basic information of the recommended sites and confirmed that these sites could be revealing for our research objectives before we made site visits. Similarly, for each site visit, we solicited recommendations from local contact for the interviewees that can provide us with the richest stories of local rural e-commerce development (ReCD) and/or poverty alleviation. Using these sites can potentially reveal more insights on PAeC.

### 3.2 | Data collection

During our site visits, we attended small-group presentations with question-and-answer sessions, conducted face-to-face interviews, and made observations. All the presentations and interviews are in Mandarin Chinese, and interpretation was occasionally needed when an informant spoke only the local dialect.

We conducted site visits in 2 stages. During the first stage, we were mostly interested in an overall understanding of poverty alleviation at Longnan. We had focus-group interviews with prefectural government officials and made field trips to a number of organizations such as an e-commerce industry park, the local College of E-commerce, county e-commerce service stations, and offices of third-party e-commerce platform providers in 2 counties and 1 municipal district within Longnan. We focused on identifying key actions taken by prefectural and county governments as well as other actors in developing rural e-commerce and poverty alleviations and observing the outcomes of the actions.

<sup>†</sup>The administrative hierarchy of Chinese governments consist of, from bottom to the top, village, township, county or district, prefectural, provincial, and central governments. Longnan itself is at the prefectural level, and it consists of 8 counties and 1 municipal district, 195 towns, and 3201 villages.



During the second stage, we focused on the poverty alleviation efforts at the town and village levels. In addition to visiting a county poverty alleviation office and a town e-commerce service station, we travelled to 4 poverty-stricken villages and visited village e-commerce service stations, poverty households, and producing sites such as backyard chicken farms and bee yards in the villages. We interviewed local government officials (including college graduate village officials [CGVOs], see Section 4.2.4), e-commerce participants, and poverty-stricken households there.

Appendix A specifies our field data collection activities, and conceptual objectives we achieved for each site visit. In Appendix A and in the rest of the paper, we use P1 to P9 to indicate the informants who delivered us presentations and held question-and-answer sessions; and I1 to I14 to indicate the informants who had face-to-face interviews with us. All interviews in both stages were semistructured. We largely followed questions from an interview guide we prepared in advance, which is included in Appendix B, but also asked follow-up questions to explore incidental findings during each interview when appropriate. All interviews were recorded and later transcribed. We also recorded and transcribed some informal interactions with our informants. In total, we recorded interviews and informal interactions of about 14 hours, which were transcribed into more than 220 000 words.

To avoid possible sampling bias and overreliance on government recommendations in case site selection, we followed the principle of triangulation (Yin, 2009). First, we complemented interview and field observation data with archival documentations. We collected a substantial number of documentations, including 18 government documents, 22 government reports, and 169 media reports totalling more than 600 pages. While most of the site visits occurred in July 2016, the documentations we collected covered Longnan's poverty alleviation and e-commerce development activities dated back to 2011. These materials helped us better understand the contexts of our research sites, provided formal documentation of actions taken by Longnan governments, and served an important means for us to triangulate the primary data we collected during site visits. Appendix A lists the selected documents that we referenced in the text, numbered as M1 to M22.

Second, we organized our data by creating a case study database, which includes interview records and transcripts, field notes, field photos, governmental documents, news reports, and other evidence (Yin, 2009). Such a database enabled the members of the research team to review the evidence directly and independently and subsequently double-check, validate, and confirm each other's coding and findings, thus increasing the reliability of data analysis.

Finally, during our data analysis, we paid much attention to building chains of evidence that allow us "to follow the derivation of any evidence from initial research questions to ultimate case study conclusions" (Yin, 2009, p. 122). A missing piece of evidence prompted us to collect more data—usually archival data from media report or government documents—to either substantiate or disconfirm our theorizing.

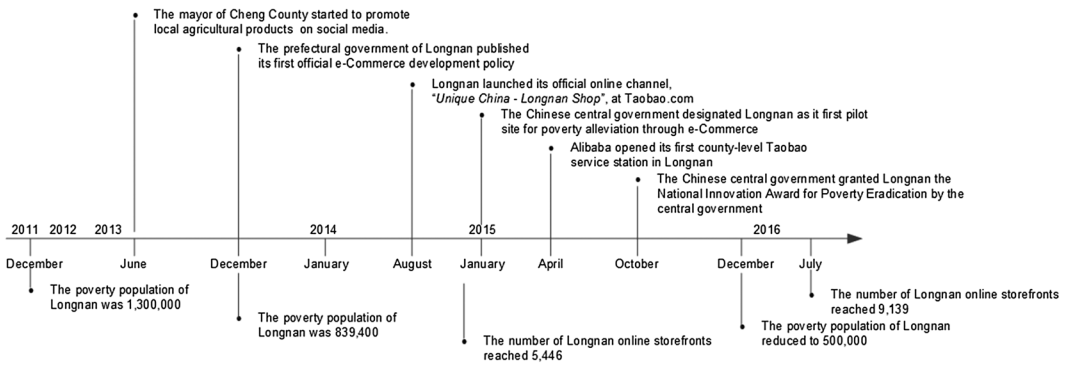
### 3.3 | Data analysis

Under the guidance of activity theory (Allen et al., 2011; Crawford & Hasan, 2006; Karanasios, 2014), we conducted data analyses in the following 4 steps:

#### Step 1. Identify the activity systems in the poverty alleviation efforts

On the basis of the interviews with our key informants and systematic processing of archival documents, we first constructed a timeline, as in Figure 3 below, and established narrative accounts for major poverty alleviation events we identified. Then, by analysing the narratives, initially, we identified 2 distinctive activity systems, with one conducted by Longnan's poverty population to alleviate poverty and the other by its governments to establish rural e-commerce ecosystems. By this step, we chose to focus on the evolution and interaction of these 2 activity systems.

#### Step 2. Identify the components of the activity systems



**FIGURE 3** The timeline of major poverty alleviation through e-commerce.

In this step, we focused on identifying the constituents of each activity system, including both its components, specific actions, and contradictions. To do so, we coded both the interview transcripts and archival data we collected. Our coding strategy is a "partway between the a priori and inductive approaches" (Miles & Huberman, 1994, p. 61), in which we used activity theory to develop a general coding scheme and then develop detailed codes inductively. The research team repeatedly read the interview transcripts and archival documents to capture their meanings. During this process, one member of the research team conducted *in vivo* coding and compiled the initial coding table. The initial coding results were then discussed among all the research team members. Research members who did not make the field observation played the role of "resident devil's advocate" and constantly challenged the initial interpretation of the data (Eisenhardt, 1989). All disagreements were eventually resolved through discussions, and consensus was reached. Finally, we matched the codes to the components and actions of the activity systems we identified to obtain a holistic understanding of the activity systems.

### Step 3. Identify the evolving and interconnected relationships between the activity systems

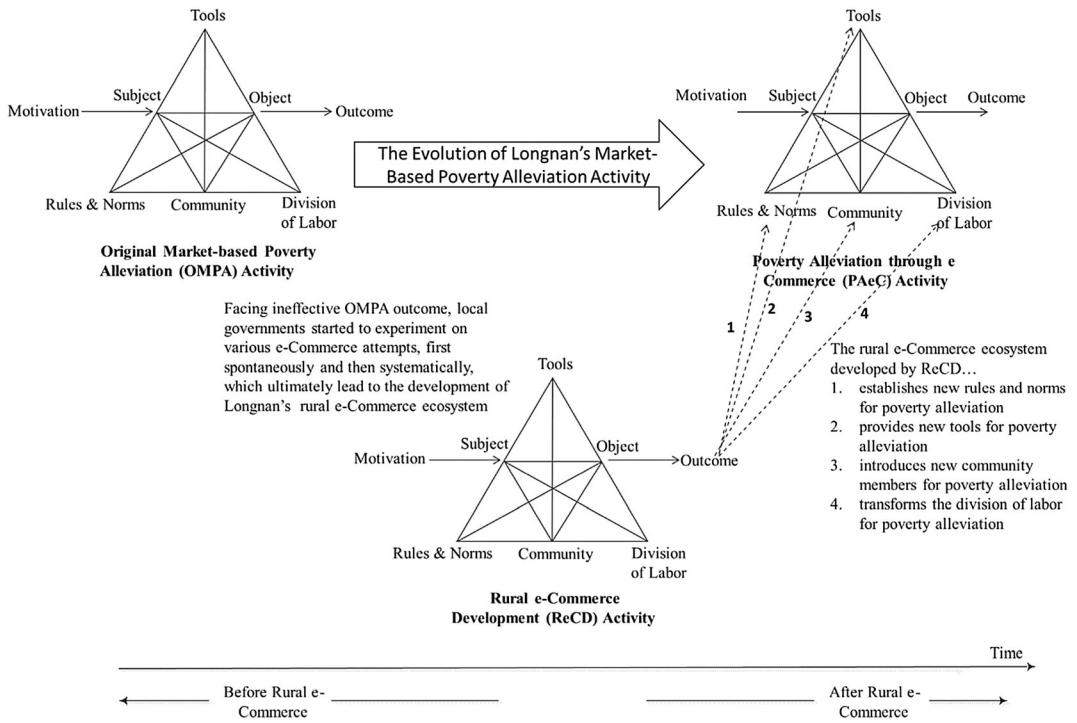
During this step, we focused on analysing the evolution and interconnection of the activity systems we identified. We started our analyses by tracking the changes in the various components of the poverty alleviation activity system and then went back to the coded data to understand the root causes of such changes. In many cases, the changes can be contributed to the constituents in the ReCD activity system, which we took as opportunities to understand and conceptualize the intervention of one activity system on the evolution of the other.

### Step 4. Identify the roles played by the governments

During step 3, we gradually realized the unique and important roles Longnan governments played in different activity systems and their relationships. To better theorize the roles of governments, we started to analyse the data again with a focus on the government actions and their implications to the activity systems and relationships between the activity systems. We developed theoretical explanations of the roles of governments and contrasted our findings with the literature iteratively until we reached theoretical saturation (Eisenhardt, 1989).

## 4 | FINDINGS

We summarize our findings as a conceptual model in Figure 4. Overall, the baseline of our findings is the evolution of Longnan's market-based poverty alleviation activity system, and the evolution is triggered, enabled, and shaped by another activity system about the development of the rural e-commerce ecosystem. With the original market-based



**FIGURE 4** The conceptual model

poverty alleviation (OMPA) activity prior to the introduction of e-commerce, the local poverty population attempted to reduce poverty by using their traditional agricultural tools, and the local governments were enthusiastic advocators behind such attempts, hoping increased agricultural outputs could bring increased income. However, the activity turned out not as effective as expected, which led the governments to rethink their poverty alleviation efforts. Meanwhile, the local governments started to first experiment with, and then systematically engage in, rural e-commerce ecosystem development (ReCD) to improve overall economy. As the local e-commerce ecosystem took shape, the e-commerce ecosystem started to empower the poverty population, provide necessary tools, redefine rules and norms, build a broader community, and rearrange division of labour for the poverty alleviation activity. As a result, the OMPA activity system evolved into the new PAeC activity system. We define the detailed components of these activity systems in Table 2.

In our conceptual model, local governments served as the subject in the ReCD activity in Longnan's case and as one of the community members in the OMPA and PAeC activities. It is because in both OMPA and PAeC, Longnan governments were trying to foster and support market-based solutions. For market-based solutions to work, the poverty population need to be the subject who needed to lift itself out of poverty by participating in market exchanges. Thus, governments intentionally stepped back as one of the community members instead of as the subject who conducted the OMPA or PAeC activity. However, for ReCD, as we observed in our data, Longnan governments actively led the development processes, thus qualifying themselves as the subject of this activity. The shifting of governments' roles and their specific actions in different activities constitutes some of our major findings, as we summarized in Figure 5.

### 4.1 | OMPA activity system in Longnan

Longnan is a prefectural area in the south of Gansu Province in China. In 2011, its population was approximately 2.45 million, and 53% of them, ie, 1.3 million, lived in poverty. Out of the total 3201 villages in Longnan, 2328 were considered poverty stricken (source: M1). The poverty of Longnan was a historical problem, and the Longnan

**TABLE 2** Components of poverty alleviation, rural e-commerce development, and poverty alleviation through e-commerce activity systems

Components	Original Market-Based Poverty Alleviation Activity	Rural E-Commerce Development Activity	Poverty Alleviation Through E-Commerce Activity
Motivation	To raise income and improve living conditions	To increase the reach and efficiency of market exchanges through e-commerce	To raise income and improve living conditions
Subject	Poverty population (as self-sufficient agricultural workers)	Local governments	Poverty population (as consumers, producers, entrepreneurs, employees, and investors)
Object	Poverty alleviation	Rural e-commerce development	Poverty alleviation
Tools	<ul style="list-style-type: none"> <li>• Subsistence and cash crops</li> <li>• Traditional farming tools</li> <li>• Primitive transportation and ICT infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Social media platforms</li> <li>• e-Commerce platforms (e.g., Taobao)</li> <li>• Modern information and communication technology (ICT) and transportation infrastructure</li> <li>• Training programmes</li> </ul>	<ul style="list-style-type: none"> <li>• Cash crops</li> <li>• Rural e-Commerce ecosystem</li> <li>• Modern ICT and transportation infrastructure</li> <li>• Skill sets and mindsets needed for participating in market exchanges</li> <li>• Microloans</li> </ul>
Rules and norms	Government policies to encourage increasing agricultural outputs	<ul style="list-style-type: none"> <li>• Government policies to (1) mandate the support of rural e-commerce development as government duties; (2) mobilize state-owned enterprises to participate; (3) leverage college-graduate village official (CGVOs) as local agencies and pioneers</li> </ul>	<ul style="list-style-type: none"> <li>• All business rules and norms that apply in e-commerce ecosystems, including transaction rules imposed by rural e-commerce platforms (eg, Taobao)</li> <li>• Targeted poverty alleviation programmes</li> <li>• Government rules and policies supporting poverty alleviation through e-commerce</li> </ul>
Community	Mostly just the local governments	<ul style="list-style-type: none"> <li>• CGVOs</li> <li>• E-commerce platform providers</li> <li>• ICT infrastructure providers</li> <li>• Transportation system constructors</li> <li>• Financial institutions</li> <li>• Local poverty population</li> </ul>	<ul style="list-style-type: none"> <li>• Local governments</li> <li>• CGVOs</li> <li>• Members of e-commerce ecosystem (platform providers; sellers and consumers; logistics service providers; information technology vendors; ICT and transportation infrastructure providers; financial institutions)</li> </ul>
Division of labour	Governments work as advocators and facilitators for increasing agricultural production; poverty population receive the support and follow the instruction	Government as the advocators, supporters, and regulators of e-commerce; CGVOs as local e-commerce agents and pioneers; e-commerce platform providers, logistics service providers, information technology vendors, ICT and transportation infrastructure providers, and financial institutions all as participants to form the ecosystem; local poverty population as sellers and buyers	Poverty population are consumers, producers, employees, entrepreneurs, and investors; members of rural e-commerce ecosystems are collaborators, business partners, or transaction parties of poverty population; governments serve as advocators, supporters, and regulators
Outcome	Ineffective poverty alleviation	<ul style="list-style-type: none"> <li>• Established rural e-commerce ecosystem</li> <li>• Improved infrastructure</li> <li>• Industrial adjustment</li> <li>• Positive social changes</li> </ul>	<ul style="list-style-type: none"> <li>• Effective, sustainable, and inclusive poverty alleviation</li> </ul>

### The Actions of Longnan Governments

Original Market-based Poverty Alleviation (OMPA) Activity	<ul style="list-style-type: none"> <li>• Directing and supporting the poverty population to increase agricultural production</li> </ul>
Rural e-Commerce Development (ReCD) Activity	<ul style="list-style-type: none"> <li>• Motivational and educational actions that prepare the poverty population for e-Commerce participation</li> <li>• Community building actions that involve e-Commerce pioneers (e.g., CGVOs), e-Commerce platform providers, and logistics service providers in developing the e-Commerce ecosystem</li> <li>• Rule-making actions that establish and stabilize the institutional environments for the e-Commerce ecosystem</li> <li>• Tool-producing actions that develop the transportation and ICT infrastructure for the e-Commerce ecosystem</li> </ul>
Poverty Alleviation through e-Commerce (PAeC) Activity	<ul style="list-style-type: none"> <li>• Actions that facilitate poverty population to take new roles</li> <li>• Targeted poverty alleviation actions that ensure that the disadvantaged poverty population can participate in, and benefit from, the e-Commerce ecosystem</li> </ul>

**FIGURE 5** The actions of governments in different activity systems

governments attempted to address this problem through various government-led poverty alleviation solutions, such as policy-based public assistance programmes. These solutions worked to a degree, as the poverty population dropped from 1.3 million to around 0.8 million by the end of 2013. However, facing severe resource constraints by themselves, the Longnan governments needed poverty alleviation solutions that are more sustainable and self-organizing, and they turned to consider market-based solutions.

The natural and cultural conditions of Longnan make market-based poverty alleviation solutions seem plausible. Longnan has favourable weather conditions and fertile lands for agricultural development. Eleven of Longnan's agricultural products were officially recognized as "Products of Geographical Indications." Thirty-six additional products, such as walnuts, peppercorns, and olive oil, are well known provincially or even nationally (source: M3). Unfortunately, the villagers of Longnan had great difficulties in converting these products into incomes. The transportation and ICT infrastructure was primitive in most villages, which led to limited and primitive exchanges in local village markets only. Ms Yong, a college graduate who worked as a village official, shared her first impression of the village where she worked in 2012:

*It was like travelling back to the primitive society. [The village was] almost completely isolated from the outside. The roads were unpaved. It took two days to get to the nearest market ...We had no mobile reception, and I could only use my cellphone as a clock. There was only one landline for emergency use in the entire village. (Source: M4, echoed by I9)<sup>‡</sup>*

As the governments in Longnan made their attempts to alleviate the poverty through market-based solutions, they started by encouraging poverty-stricken villagers to increase their agricultural outputs and supporting them with funds, skill training, and agricultural production supplies. Unfortunately, these attempts backfired. While agricultural outputs did increase with government advocacy and support, the products could not be sold after harvest because of the lack of access to markets, which caused severe overstock. Frustrated villagers once even dumped their products at the gate to a local government building to protest the government's misguidance (source: M5).

Analysing Longnan's OMPA activity system, as summarized in the second column of Table 2, we identified 3 major contradictions related to poverty alleviation. Two of them are about the tools used by local villagers to alleviate

<sup>‡</sup>By "echoed," we mean that other informants also mentioned similar examples.

poverty. The first contradiction is between the high quality and the low local market price of crops as a poverty alleviation tool. Longnan's agriculture does feature a few high-quality cash crops such as walnuts, peppercorns, and olive, which could potentially be effective tools for the poverty population to raise income. However, being local products, the cash crops could not get premium price from the local markets, resulting in the contradiction between the high quality and low local market price of the cash crops. The second contradiction is between cash crops and the transportation and ICT infrastructure as different tools of poverty alleviation activity. Longnan did not have highways until 2013, no railway stations until 2016, and still no airports by 2016. There was virtually no logistics networks. Without efficient transportation systems, Longnan's cash crops could not enter the provincial and national markets in which they could fetch higher prices. Moreover, the poor ICT infrastructure denied local villagers timely access to market information. Therefore, the contradiction between the potential high value of the cash crops in the provincial or national markets and the inferior infrastructure that prevented the materialization of such value further frustrated poverty population to engage in market exchanges.

The third contradiction is between the poverty population as the subject and local governments as a member of the community of the activity system. In the OMPA activity system, the only member in the community that helped local villagers to alleviate poverty was the local governments (Table 2). As summarized in Figure 5, the governments, with good intention, advocated and supported the poverty population to increase agricultural outputs. Their policies and programmes that enabled agricultural output increase unfortunately only aggravated the first and second contradictions, which eventually led to conflicts and mistrusts between local villagers and governments. These 3 contradictions together pushed the local governments and poverty population to explore new approaches for poverty alleviation. They eventually turned to seek help from e-commerce.

## 4.2 | Longnan governments' ReCD activity system

In other regions of China, there had already been great success in developing e-commerce in rural areas, which contributed to addressing a variety of societal issues including poverty alleviation (Cui et al., 2017; Leong et al., 2016). These regions, however, are usually located in the east coast of China, where the infrastructure is better and local residents usually have a tradition of engaging in entrepreneurial or at least market exchange activities. The development of rural e-commerce in those regions typically took a community-driven approach, through which grassroots entrepreneurs self-organized to form their e-commerce ecosystems (Leong et al., 2016). In Longnan, however, the cultural-historical context was not receptive to commercial activities, and the local market was not considered appealing to attract many national, for-profit companies that are critical to e-commerce development. Thus, instead of waiting for a rural e-commerce ecosystem to emerge, Longnan's local governments stepped in and took initiatives to jumpstart the development of such an ecosystem. The third column of Table 2 summarizes the components of Longnan's ReCD activity system. In this ReCD activity system, Longnan governments, as the subject, pursued the object of ReCD through using a series of tools, engaging a diverse set of community members, and taking actions summarized in Figure 5. These actions are critical to the positive outcomes of this ReCD activity system.

### 4.2.1 | Longnan governments' initial motivational and educational actions

*The most important change rural e-commerce brought to our villagers was the change to their mindsets. Take the rural Taobao as an example: at the beginning, many people didn't like the idea of shopping from Taobao.<sup>5</sup> For our villagers, they trusted more the tangible goods with marked prices from the local stores. When you buy online, the goods ... just looked too beautiful to be true. (Source:12, echoed by 16)*

As demonstrated in the quote above, local villagers in Longnan were initially very sceptical towards e-commerce. Although third-party e-commerce platforms, such as Taobao, already existed and could potentially serve Longnan's

<sup>5</sup>Launched in May 2003 by Alibaba, Taobao was the most popular online marketplace in China at the time of this study.

villagers, there appeared no spontaneous emergence of grassroots e-commerce leaders and pioneers as observed in other case studies (eg, Leong et al., 2016). Longnan's villagers appeared not to possess the necessary resources, skills, and mindsets to proactively participate in e-commerce, let alone leveraging e-commerce as a major tool for poverty alleviation.

In one of the first experiments with e-commerce (source: M6), the mayor of Cheng County, Mr Li, created a personal account on Weibo, the most popular microblogging platform in China, and posted a message to promote local walnuts produced in his county.

*We just had a great harvest of walnuts this year. Welcome to visit us and taste our delicious walnuts.... We already have friends from as far as Shanghai coming and buying them. Please come and taste.*

This message became viral on the internet. Subsequently, Mr Li posted or reposted over 500 messages about Longnan's walnuts in just 2 months in June and July of 2013. His messages were reposted by others for more than 40 000 times, averaging more than 80 times per message. With the help from these posts, 5000 kg of walnuts was sold online during this period. Weibo-based promotion activities like this ultimately earned Mr Li the title of "Walnut Mayor" from media (source: M6).

Like in the Walnut Mayor's case, many of the initial attempts at e-commerce were spontaneous, initiated by individual local government officials without much coordination among them or involvement of other government resources. These attempts, however, turned very inspirational to other government officials and local villagers who were either unaware of, or suspicious about, the feasibility of leveraging the internet to develop regional economy in such a poverty-stricken region. As the effectiveness of these experimental moves surfaced, Longnan started to pursue ReCD systematically. The prefectural- and county-level governments started with a series of motivational and educational actions, through which they gradually imprinted the idea of rural e-commerce in the minds of their subordinate governmental officials and local villagers.

The governments initiated a series of formal, regularly scheduled e-commerce training events, such as workshops, demonstrations, and field trips, for the subordinate government officials and villagers to shape their attitudes towards e-commerce. The prefectural government also sponsored the first e-commerce vocational school of Gansu Province in a local college. By July 2016, the vocational school had offered e-commerce training to over 4000 people, each attending on average 20 training sessions (source: P1 and M7). These trainings covered the necessary skills of participating in e-commerce, such as managing procurement, customer services, logistics, payments, and the daily operation of online stores. Similar trainings were also offered to interested individuals at county, town, and village levels, usually organized by and held at the local e-commerce service stations (see Sections 4.2.3 and 4.2.4 for more information on local e-commerce service stations). In addition to bringing the local population the much-needed technical and business skills, these trainings greatly changed their mentality towards e-commerce.<sup>†</sup>

#### 4.2.2 | Longnan governments' rule-making actions

Along with the motivational and educational actions, Longnan governments started to become the "visible hand" and initiated formal policies and programmes to set up an inviting environment and accelerate the development of e-commerce. In December 2013 and February 2014, the prefectural government of Longnan announced 2 important policies to promote e-commerce (D1 and D2 in C2 in Appendix C). Different governmental branches, such as the local Bureau of Agriculture and Animal Husbandry, Industry and Information Technology Commission, and the local branches of Banking Regulatory Commission and People's Bank of China, all followed up and issued their own policies to provide incentives and supports for e-commerce development. Between December 2013 and May 2015, in about 18 months, there were 13 such policies and programmes initiated by just the prefectural government.<sup>#</sup> Following the model of the prefectural government, lower-level governments also formed special task forces within

<sup>†</sup>We provide more detailed data of Longnan's motivational and educational actions in Table C1 of Appendix C.

<sup>#</sup>We provide more detailed data of these policies and programmes in Table C2 of Appendix C.

their leadership team to promote and supervise local e-commerce activities. Collectively, these government interventions greatly promoted the engagement of various parties to form the local e-commerce ecosystem.

### 4.2.3 | Longnan governments' tool-producing actions

In developing a local rural e-commerce ecosystem, Longnan governments built and used 3 sets of tools, including transportation and ICT infrastructure, distribution channels, and microloans.\*\*

Longnan started with several major construction projects to upgrade its transportation, ICT, and other infrastructure. From 2010 to 2015, the number of villages with paved roads increased from 798 to 2129, and the total length of paved roads increased from 2300 to 7870 km. At the beginning of 2015, 96% of Longnan's townships became accessible through paved roads (source: M8). Longnan also invested heavily in the local telecommunication infrastructure. In 450 villages that were selected as rural e-commerce pilot sites, Longnan upgraded their mobile network to 4G and the speed of broadband networks to 20 Mbps or above (source: M9). Some counties also built e-commerce incubators and industrial parks to attract outside investors and entrepreneurs to join local e-commerce development. The infrastructure investments provided a solid foundation for ReCD in Longnan.

Another challenge for Longnan's rural e-commerce is lack of outward distribution channels that can help local villagers to market and sell their products online and ship sold products to buyers. Longnan governments addressed this issue by setting up a 3-layered e-commerce service system at village, town, and county levels. At the village level, village officials or other educated youth managed e-commerce service stations to provide villagers with basic services such as purchasing agency, consignment, training and consulting, delivery, and some other seemingly trivial but nonetheless indispensable services such as paying telecommunication bills on behalf of villagers (source: M7, echoed by I1 and I2). At the town level, the poverty alleviation offices of town governments organized e-commerce service stations to offer guidance to village e-commerce service stations and coordinate villager-led e-commerce associations such as the local commissions of e-commerce and villagers' logistical cooperatives. At the county level, the county governments set up e-commerce service centres that collaborate with the service teams of third-party e-commerce platform providers such as Taobao.

Longnan governments also developed microloan programmes that were customized to the needs of local e-commerce entrepreneurs. Through those programmes, most counties set up dedicated funds for e-commerce development. Village-level governments also set up programmes that pooled villagers' extra funds together to provide microloans for villagers to produce for e-commerce. For example, local pork of Lianglou Village was particularly popular online, and a government official there explained how a microloan programme helped the production:

*Our village has its own mutual-support loan programs, with interest rates lower than [those of the loans from] local credit unions and banks. For example, if someone needs to buy two pigs, he can get from us 10,000 Chinese yuan for his cash flow ... and the two pigs will yield about 2,000 Chinese yuan profit for him in a year. (Source: I6, echoed by I2, I7, I9, and I10)*

### 4.2.4 | Longnan governments' community-building actions

A typical e-commerce ecosystem consists of a variety of actors (Leong et al., 2016). To nurture such an ecosystem, it is particularly important for Longnan governments to engage those actors because Longnan did not want to wait for those actors' spontaneous self-organization but instead tried to jumpstart the process. A series of actions were taken by Longnan governments to engage particularly 3 actors: college graduate government officials, e-commerce platform providers, and logistics service providers.††

\*\*We provide more detailed data of Longnan's tool-producing actions in Table C3 of Appendix C.

††We provide more detailed data of Longnan's community-building actions in Table C4 of Appendix C.



### College graduate village officials

In early 2010s, China launched a nationwide programme to recruit and assign at least 1 college graduate as an official for every village (He & Wang, 2016). The broad objective of the programme was to improve the leadership quality at the bottom of China's political hierarchy, but Longnan took the opportunity to boost its local e-commerce development. These CGVOs enjoy several advantages in developing local e-commerce: they are far more educated than local villagers, far more proficient in information technologies, usually experienced in online transactions, and yet also familiar with local resources and having localized social relationships. Thus, Longnan governments chose to cultivate their CGVOs as grassroots-level e-commerce pioneers.

In May 2014, the prefectural government of Longnan announced its formal policy to include developing e-commerce in the performance evaluation metrics for CGVOs (D7 in C2 in Appendix C). It provided a selected group of CGVOs each with 5000 Chinese yuan (approximately US\$750) as the seeding fund (source: M10). The government also organized numerous knowledge-sharing workshops, demonstrations, field trips, and other events to help CGVOs learn the regulatory, operational, and financial details of managing an online storefront. Once they were well prepared, the selected CGVOs started to work as agents for their local villagers, buying and selling on their behalf in online transactions.

Ms Zhang is one of our CGVO interviewees. Graduating from Gansu Agricultural University, she became a CGVO in 2012. One year after her arrival, she started an online storefront at Taobao, and through her storefront, she sells local honey, poultry, eggs, and nuts on behalf of the local villagers. An organic egg, for example, is usually priced at about 0.5 Chinese yuan in local markets, and Ms. Zhang could sell it at 1.8 yuan at her storefront. By October 2015, Ms Zhang's storefront had generated a revenue of 2.26 million Chinese yuan. Inspired by Ms Zhang, others in the same village opened 5 more online storefronts, and 146 people became employed or self-employed to run them (source: I9, M11).

By early 2015, there were 755 online storefronts managed by 695 CGVOs from Longnan (source: M12). Following the lead of these CGVO pioneers, over 10 000 Longnan villagers, mostly 35 years old or younger, had involved themselves directly or indirectly in e-commerce businesses (source: M13).

### E-commerce platform providers

Several online marketplace platform providers have been playing pivotal roles in the e-commerce development in rural China. In Longnan, the local governments guided these platform providers in 2 phases. We studied Alibaba as a typical example to understand the role of these digital platform providers in Longnan's e-commerce development.

In the first phase, Alibaba, through its e-commerce platform, mainly served as a pure-play online transaction platform for Longnan's local villagers to buy and sell online. In August 2014, the prefectural government of Longnan collaborated with Alibaba to launch its official sales channel, named "Unique China—Longnan Shop," on Taobao. It is the first channel at Taobao sponsored by a prefectural government from Western China. The channel's home page features Longnan's native culture, products, tourist attractions, and links to a variety of Taobao storefronts of Longnan's local suppliers, with the overall objective to establish Longnan as a competitive brand name on Taobao. The prefectural government of Longnan paid great attention to developing this channel. The mayor of Longnan recalled the following:

*When we were developing the "Unique China—Longnan Shop," I told the officials in charge of the project: "Whatever they (Alibaba) need, we will provide; whatever documents or certificates they ask, we will make sure they are provided immediately." So the officials from Longnan established a very collaborative relationship with Alibaba. Our sincerity got recognized by Alibaba, and mutual trust was thus built.*  
(source: I1)

In the second phase, the e-commerce platform providers started to enhance their online operations with offline operations and services. In October 2014, Alibaba announced its plan to invest 10 billion Chinese yuan in 3 to 5 years to build 1000 county-level Taobao service stations and 100 000 village-level Taobao service stations across rural China (source: M14). At each of these service stations, Alibaba would hire a manager to help villagers who lack

necessary computer skills or do not have internet access to make online transactions on Taobao. Thanks to the previously built close collaboration, Longnan was among the first to join Alibaba's rural market expansion plan. Two Longnan counties became the first 2 pilot bases for Alibaba's plan in Western China. Immediately in April 2015, the first 2 county-level service stations started operation in these 2 counties, and soon after that, over 40 village-level service stations were opened, covering almost all the townships in these 2 counties (source: M15).

### Logistics service providers

As e-commerce developed, Longnan governments invited several national logistics companies to start their operations in Longnan, and the governments bargained with these companies for favourable price terms for these companies to ship local products out of Longnan. In addition, many small and regional shipping and delivery companies were founded, often encouraged by government funds dedicated to incubate and support local entrepreneurial activities. These small and regional companies typically focus on niche markets that connects central cities to remote towns and villages, which were often ignored by national logistics companies. The founder of one such regional company shared with us the following:

*We solve the "last-kilometer problem" of rural e-commerce, i.e., those established logistics companies do not want to serve the rural markets. We contracted with those big companies to take over their rural shipments and send them to their final destinations in remote villages. (source: P2)*

By July 2016, Longnan had completed establishing its prefecture-wide logistics network, consisting of 227 package delivery and other logistics companies, 786 package shipping stores, and 1200 village-level package pickup/drop-off stations (source: the Mayor's address to Longnan Forum of PAeC 2016).

### 4.2.5 | Prioritizing government actions

The various government actions discussed in Sections 4.2.1 to 4.2.4 were interwoven throughout Longnan's e-commerce development. However, it does not mean that all these actions were pursued in parallel, with equal importance, at all times. Longnan governments gave priorities to different actions at different stages of development. As the mayor of Longnan summarized Longnan's experiences nicely in one of his publications:

*The governments' push (for e-Commerce) involves first nurturing, then supporting, and finally regulating. We have different priorities at different stages of e-Commerce development: in the beginning, the governments nurture the development of e-Commerce just as fostering a newborn baby. We provide comprehensive services patiently to help every aspect of e-Commerce development; then, in the adolescence stage of e-Commerce development, we enhanced our supporting role by making rules and policies that reinforce the growth of e-Commerce ecosystem; Finally, after the development of e-Commerce took shape and stabilized, we stepped back and focused on regulating the e-Commerce markets and ensuring its sustainable growth. (Source: M15)*

The shift of the governments' role over time is echoed by an official from the Poverty Alleviation Office of Cheng County (I2). The timeline of Longnan governments' actions also confirmed the summary. Local governments started their motivational and educational actions in 2013, which focused on orienting first local government officials and then local villagers, towards the practice and mindset of developing e-commerce. Then, Longnan governments started to mobilize different e-commerce participants: the wide involvement of CGVO started in 2014, the close collaboration with e-commerce platforms started in 2015, and the emergence of a logistics network started in 2016. The tool-producing actions, owing to its long construction cycle, continued throughout our study time window, which continuously opened up new opportunities for other e-commerce ecosystem participants. Longnan's rule-making actions started in mid-2013, which reduced the uncertainty of institutional environments for e-commerce development and set the "rules of the game" for other e-commerce participants (C2 of Appendix C).

Many early policies and rules focused on specific e-commerce-related moves such as online marketing of agricultural products (D2) and e-commerce training (D3). Later some policies became more in general, directive, and strategic, eg, on how to further develop e-commerce in the next 5-year development cycle (D14). While these different actions constantly overlapped to a certain extent, Longnan governments' shifting focus on them was evident and considered an important contributing factor for the successful development of Longnan's e-commerce ecosystem, as noted by the mayor above.

#### 4.2.6 | Outcomes of Longnan's ReCD activity system

As the Longnan rural e-commerce ecosystem took shape, the development of policies, tools, and community continued reinforcing each other. The policies facilitated and regulated the development of tools and the behaviours of community members. The new members and new tools provided feedbacks to the governments and urged them to modify and upgrade the policies. The governments did not try to involve themselves in all the tool-producing activities (eg, building the e-commerce platform or running the logistics network) but instead encouraged other community members of the ecosystem to play to their strengths. As the community evolved, the division of labour among the subject and the community members also evolved. By July 2016, the rural e-commerce ecosystem of Longnan became mature and started to affect Longnan significantly in 3 ways.

The first major impact is economic. By July 2016, there were 9139 online storefronts managed by Longnan residents, with a sale volume of 4.17 billion Chinese yuan and 57 000 jobs created. Cheng County, for example, sold approximately 5000 tons of walnuts through e-commerce in 2014 for 160 million Chinese yuan, or approximately 20% of its total walnut sales (source: the Mayor's address to Longnan Forum of PAeC 2016).

The business of Mr Xu, a local peppercorn dealer, exemplifies the economic benefits of e-commerce. Since 2010, Mr Xu had been purchasing peppercorns directly from farmers and then ship them to nearby cities. According to him:

*Since last year, we started e-Commerce, and we almost immediately noticed two benefits: first, our sales volume rises unbelievably from a few million to above 100 million yuan; second, our customer base grows nationally, and now our peppercorns ship to every parts of China. E-Commerce made it possible for us to reach these [geographically distant] customers and for them to reach us. (Source: M16)*

Second, the diffusion of e-commerce gradually triggered agricultural and industrial adjustment in Longnan. After being able to participate in market exchanges, local villagers started to shift their production focus from subsistence food crops to cash crops. They also started to explore more options. Ms Wang, a county government official, commented:

*[After benefiting from selling cage-free eggs,] villagers started to experiment with growing sunflowers and strawberries. We are growing steadily, and we won't stop here. Cage-free hens can be raised everywhere, so we are exploring something unique to us. (Source: I2)*

By July 2015, Longnan had planted approximately 349 000 acres of peppercorn, 610 000 acres of walnuts, and 72 200 acres of olives, making Longnan the largest peppercorn- and olive-producing and second largest walnut-producing prefecture in China. As of 2015, incomes from these cash crops on average accounted for 37.2% of Longnan villagers' annual income (source: M17). The experience of Mr Hu illustrates this transformation. Mr Hu used to grow corns and grains in his small farm of about 0.5 acre, which was not enough to lift his family out of poverty. In 2014, he started to instead grow arborvitae trees, medicinal herbs, and mushrooms. In 2 years, his annual income reached 100 000 Chinese yuan, an income level that far exceeded the poverty threshold (source: M18).

The third change brought by e-commerce is societal. Rural areas of Western China suffer gravely from "population hollowness" as young people flee their rural hometowns to work and live in cities but leave their elderly parents and young children back home. In Longnan, half of its 2.14 million rural population, mostly young men, worked outside their hometowns, which had created a series of societal issues (source: M19). With the development of rural

e-commerce, young people who saw the opportunities were gradually returning to their hometowns. Ms Zhang, a town governmental official, mentioned in our interview:

*We [the town] used to have a lot of young labors working outside of this town. The number is much smaller now. When I first came here [the town], there was literally no business here. Now the young men are coming back to start their own businesses. (Source: 19)*

### 4.3 | The PAeC activity system

The development of rural e-commerce made it possible to use e-commerce for market-based poverty alleviation, and the conscious efforts by Longnan governments ensured it so happened. The ReCD activity system transformed Longnan's OMPA activity into PAeC, as we illustrated in Figure 4. In the resulting PAeC activity system, as presented in the fourth column of Table 2, poverty population as the subject who attempted to pursue poverty alleviation as the object remained unchanged. However, thanks to the development of e-commerce, a new set of rules and norms, incorporating some rules and norms from ReCD, was introduced and put in place to guide poverty alleviation (dashed arrow 1 in Figure 4); the poverty population were armed with more powerful tools such as e-commerce marketplaces, advanced ICT and transportation infrastructure, and microloans first made available by e-commerce development (dashed arrow 2 in Figure 4); the community of the PAeC activity system also grew significantly, in that poverty alleviation was no longer just between the poverty population and the governments but a joint effort of all e-commerce ecosystem participants (dashed arrow 3 in Figure 4); the division of labour among community members also dramatically changed (dashed arrow 4 in Figure 4). Among these changes, the change in division of labour particularly mobilized the poverty population and unleashed their potential in alleviating poverty by themselves. Thus, below, we highlight the changes in the roles the poverty population played in poverty alleviation and the governments' actions in enabling these role changes.

#### 4.3.1 | The new roles of poverty population in the PAeC activity system

Previous studies identified 4 different roles poverty population can play in market-based poverty alleviation solutions: consumers, producers, employees, and microentrepreneurs (McKague & Oliver, 2012). We observed all the 4 roles in Longnan's PAeC activity. Additionally, Longnan made an innovation to involve the poverty population as investors. We discuss these roles below.<sup>‡‡</sup>

##### Poverty population as consumers

As rural e-commerce developed, the poverty population started to get familiar with shopping online. In Longnan, villagers started to purchase most household items, from lighter and laundry detergent to fridge and air conditioners, online. A village government official mentioned in the interview:

*Online shopping is no big deal now. Even our elder population has got used to it.... If people are getting married here, for example, it is almost certain that they will buy all the wedding supplies online. (Source: 16, echoed by 13, 18, and 19)*

In addition to household items, villagers also did procurement for their businesses online, including both production materials such as fertilizers and packaging supplies such as wrapping papers and cardboard boxes. Cost saving from online shopping thus became a contributing factor to poverty alleviation.

##### Poverty population as producers

In Longnan, many poor individuals or households participated in e-commerce by producing merchandises that are ultimately sold online. Some of them ran their production by themselves. To help these producers to hedge market risks,

<sup>‡‡</sup>We provide more evidence on these different new roles of poverty population in Table C5 of Appendix C.

Longnan governments issued policies to encourage online retailing stores to contract with these producers for purchasing their future products at protected prices (source: M1).

Many others joined cooperatives that pooled the production capacity of individuals and households. The cooperatives provided production materials and directions, supervised individual productions, and bought all outputs at promised prices. They also managed marketing and sales, both online and offline. In this way, poor individuals or households only needed to focus on production, and the cooperatives they joined or contracted with would sell their products for them. This arrangement was particularly helpful for people who were incapable of, or unwilling to, run an online business by themselves. The local governments took an active role in promoting production cooperatives. As a county government official explained:

*We now don't encourage all poverty families to open online stores ... because it would be enough if a village or a town has a few good online stores that can buy things in and sell things out. Now we mainly encourage poverty families to focus on productions—growing or producing goods that can be sold through the Internet. Through such arrangements [selling through a cooperative], the villagers do what they could and should be doing [ie, production]. It doesn't make sense for some villagers to [directly] engage in e-Commerce. (Source: I2)*

Once started, the cooperatives could sustain its own growth. For example, as the demands from e-commerce rose for certain products, specialization in production started to emerge among local producers. Some producers or their cooperatives started to specialize in certain products only and gradually built up the scale of their production. The organization of local production also gradually evolved from its initial simple form to modern enterprise structure. One staff member at a town-level e-commerce service station mentioned such an example in our interview:

*The director of our village, Mr. Zhang, organized the poverty families here to found a cooperative to produce wildflower honey. Now the cooperative operates almost like an industrial enterprise. Next, they plan to apply for a QS (quality standard) certification that would [further] legitimize their products. (Source: I3, echoed by I2, I6, I9, and I12)*

### Poverty population as employees

The development of e-commerce greatly increased local employment opportunities. Successful online retailers started to hire full-time or part-time workers. For example, a local e-commerce company hired local housewives, many of them in poverty, to work part-time. The housewives would get raw materials from the company, work on them at home when they were free, and then turn in final products and get paid (source: I2). A booming e-commerce also created many employment opportunities in many related industries such as construction, transportation, logistics, hospitality, and other service sectors. To further encourage businesses to employ individuals in poverty, the governments offered incentives such as lower tax rates (source: M22).

### Poverty population as microentrepreneurs

With the help of e-commerce, many poor individuals or households became microentrepreneurs. Some of them started to operate their own storefronts online, through which they would sell their own products, run consignment stores, or buy local products from neighbours and then sell them online. Some others started service companies that were related to e-commerce, such as local shipping companies or small IT studios for online storefront design and image processing (source: I3). Longnan governments set up some special programmes to fund such entrepreneurial activities. Compared with traditional commercial loans, loans from these programmes specifically target poverty population, having much less stringent requirements on credit history or income and asking for much lower or even free interests. For example, Cheng county set up special funding programmes through which poor individuals can apply for a loan up to 50 000 Chinese yuan to fund their start-ups (source: I9).

### Poverty population as investors

For those extremely poor individuals and households who usually lacked both abilities and resources to participate in production, employment, or entrepreneurship, Longnan governments ensured that they could benefit from e-commerce through a financial innovation. These extremely poor were eligible to apply for government-funded interest-free microloans that were dedicated to poverty alleviation. Then, instead of using the loans for their own production, they could invest the fund into the businesses of their more successful peers, such as the cooperatives or microentrepreneurs discussed above, and share in the benefits of e-commerce in the form of annual dividends. A village government official explained this model as follows:

*For example, if some [people in poverty] applied for and received a three-year, interest-free loan of 50,000 Chinese yuan, he can directly invest it in other online retailers here and receive about 5,000 Chinese yuan dividends every year. If he invests the same amount in raising crops, it would take much longer time to yield the same return. Thus, investment in existing successful businesses provides a safer and faster way for the poor to increase income. (Source: I6, echoed by I2, I12, and I13)*

We note that the poverty population can play more than one role at a time. They can also take different roles at different times. For example, a poverty-stricken farmer can be a producer but at the same time invest her interest-free loan into an e-commerce start-up as an investor. She can play different roles at different times too. In the busy season, she can focus on her producer role and work the fields, and then during the leisure season, she can work for local e-commerce businesses as an employee or even for her own e-commerce business as a microentrepreneur. Moreover, in a poverty-stricken family, different family members can take different roles. For example, it is common for husbands to be producers working the fields or raising livestock and for wives to be part-time employees working for local e-commerce businesses. These new roles enabled by e-commerce complement each other in lifting local villagers out of poverty.

We also note that the expansion of the roles played by poverty alleviation did not occur automatically. Rather, governments' actions greatly facilitated the role expansion. Table 3 summarizes these actions. Some of the actions apparently overlapped with the governments' efforts to develop rural e-commerce in general. However, the conscious efforts by the governments to orient e-commerce specifically for poverty alleviation is evident.

### 4.3.2 | Contradiction resolution in PAeC

Contradictions within activity systems drive their evolutions. As Engeström (2015, p. 73) commented, "new qualitative stages and forms of activity emerge as solutions to the contradictions of the proceeding stage or form." Three contradictions were identified in Longnan's OMPA activity earlier in Section 4.1: the high quality of local products vs the low

**TABLE 3** Governments' actions to facilitate expanded roles of poverty population

Expanded Roles of the Poverty Population	Governments' Actions to Facilitate the Role Changes
Consumers	<ul style="list-style-type: none"> <li>• Motivational and educational actions that familiarize poverty population with e-commerce</li> <li>• Developing local rural e-commerce infrastructure to make e-commerce more accessible</li> <li>• Setting up e-commerce service stations in towns and villages</li> <li>• Collaborating with e-commerce platform providers to set up rural e-commerce service stations</li> </ul>
Producers	<ul style="list-style-type: none"> <li>• Encouraging online retailers to contract with poverty populations at protected price</li> <li>• Promoting the organization of production cooperatives</li> </ul>
Employees	<ul style="list-style-type: none"> <li>• Creating incentives for businesses to increase employment of poverty population</li> </ul>
Microentrepreneurs	<ul style="list-style-type: none"> <li>• Setting up special programmes to fund poverty population's start-ups</li> </ul>
Investors	<ul style="list-style-type: none"> <li>• Encouraging the extremely poor or disadvantaged to invest government-funded microloans into other e-commerce businesses</li> </ul>

local market price; the potential high value of local products in provincial or national markets vs the inferior infrastructure that prevented the materialization of such value; and the conflicts and mistrusts between local villagers as the subject and governments as the only community member. We observed from the data that these contradictions are largely resolved as OMPA evolved into PAeC.

First, with the help from the e-commerce, the poverty population could sell their quality products to online customers at much higher prices. Thus, the e-commerce market space helped resolve the contradiction between the high quality of local products and the low local market price, bringing higher income to the poverty population. As an employee at a town-level e-commerce service station mentioned:

*[Before PAeC,] the villagers have to sell their products in the market by themselves. Take local honey as an example: before e-Commerce, the price at the market was a little more than 10 yuan per 500 grams and they have to pay to get to the market. At the beginning of e-commerce, the price was raised to 20 yuan per 500 grams. Now local honey with decent quality can be sold at 40 or even 50 yuan. That's a big price change. Local eggs were sold at 0.5 or 0.6 yuan each. Now [online] customers have to pay 0.8 or 1 yuan. Even we have to pay 0.8 or 1 yuan. With the market opened, the supply can't keep up with the demand, and the price won't drop any more. (Source: I3)*

Second, the e-commerce development upgraded both transportation and ICT infrastructure in Longnan. It also brought improved logistics and delivery networks. Instead of having to sell locally at lower prices, products from Longnan can now sell in the online market space and reach customers nationwide much more easily than before. Previously a constraint, the transportation and ICT infrastructure became the powerful tool that facilitated poverty population to achieve higher prices for their products, as indicated in a following quotation from a county government official:

*Before, some villagers raised local honeybees. They only raised a few hives, and couldn't sell the honey. The village was far away. They just couldn't sell it. Now e-Commerce helped to bring us nine construction projects, including the roads and the Internet. After the completion of the projects, they started to sell online and realized the honey was well received, and hence now they are growing and expanding their beekeeping. (Source: I2)*

Finally, e-commerce allowed both governments and poverty population to play new roles in the PAeC activity system when the community of PAeC activity system incorporated the diverse community of the ReCD activity system. Consequently, instead of involving themselves directly in the poverty alleviation activity, the governments changed to orchestrate the community members to play to their own strengths to help poverty population in their pursuit for poverty alleviation. Instead of receiving instructions from governments on what to produce and hoping governments' guidance were right, with the development of e-commerce, poverty population could be involved in the market exchange in many other roles than just producers. The e-commerce ecosystem also organized poverty population in different ways and provided them with better access to market information and resources, both helping to reduce their business risks. Thus, in the PAeC activity system, the chances for direct conflict between governments and poverty population were greatly reduced.

Contradictions are inherent to any activity system (Engeström, 2015). While the PAeC activity system gradually resolves the old contradictions in the OMPA activity system, it leads to new contradictions. One of such contradictions that is particularly salient is the contradiction between the subject and the rules and norms of the activity. Despite all the new roles enabled by rural e-commerce, the subject of PAeC activity system, the poverty population, was still relatively disadvantaged because of its resource constraints and lack of education and experiences in participating market exchanges. However, the rules and norms of PAeC feature a higher level of market competition, in which individuals and firms with competitive advantage will dominate the market. Because of this contradiction, the poverty population might not be able to benefit from e-commerce to its full potential. Previous studies showed that Chinese poverty alleviation programmes sometimes benefited the richer households more than the poorer ones (Park & Wang,

2010). Other studies of Chinese rural e-commerce also reported negative consequences such as intense and disruptive competition among local e-commerce entrepreneurs, which caused not only price wars but also frictions in the communal life of local villages (Leong et al., 2016). To address this issue, Longnan governments took further actions to ensure that the poverty population can indeed benefit from PAeC. These actions, detailed in Section 4.3.3 below, were consistent with the general targeted poverty alleviation efforts in China (Y. Li, Su, & Liu, 2016) but particularly featured e-commerce in Longnan.

### 4.3.3 | Governments' targeted PAeC actions

As a part of the nationwide efforts, Longnan's targeted poverty alleviation actions started with identifying and registering specific individuals and households who live in poverty. By the end of 2014, Longnan had built a database of household-specific information for a poverty population of 643 700. Then, Longnan paired these households with selected government employees and sometimes entire villages with selected government agencies that signed up to participate in targeted poverty alleviation activities. Overall, Longnan mobilized 1445 government organizations and 40 000 government employees (the "helpers") that "adopted" 2970 poor villages and 85 000 poor households respectively to help lift them out of poverty (source: the Mayor's address to Longnan Forum of PAeC 2016, echoed by M1). Once paired to their targets, the helpers were expected to bring in resources for infrastructure improvements on the targets' sites if necessary. They were also required to provide the much-needed information and knowledge to guide and support the targets' economic and social development.

For the targeted poverty population, Longnan still strived to help them through market-based solutions rather than subsidies and charitable donations, and e-commerce was its preferred approach as its rural e-commerce ecosystem matured. Caotan Village, for example, was one of the poorest villages in Longnan, with an annual income per capita of only 2450 Chinese yuan (about US\$377) in 2011. As part of the targeted poverty alleviation activities, a "helper" organization was assigned to Caotan Village from the prefectural government of Longnan, which soon helped the village to get 4G cellular phone network. With the support from the helper organization and a newly assigned CGVO, Caotan villagers soon opened their own e-commerce storefront to sell local products (source: M20, echoed by I12, I13, and I14). One of the poor villagers in Caotan showed us a contact card he received from the helper organization:

*On this card, I have the contact information of the online storefront manager and the contact person from my helper organization. I also have, on this card, what my family can sell on the online storefront, such as poultry, walnuts, kiwi fruits, mushrooms, etc. We signed a contract [with the storefront to sell our household products]. (Source: I14)*

With the help of PAeC and the local government's targeted poverty alleviation actions, the percentage of poverty population in Caotan Village dropped from 73% in the beginning of 2011 to 27% in the end of 2014, and the annual income per capita increased by 161% in the same period (source: M20).

### 4.3.4 | Outcomes of the PAeC activity system

Overall, PAeC in Longnan appeared to be effective in driving poverty alleviation. The poverty population of Longnan were reduced from 839 400 in 2013 to 500 000 by the end of 2015, a period overlapping with the evolution of OMPA to PAeC. Of course, the reduction cannot be solely attributed to PAeC. Other forms of poverty alleviation efforts without using e-commerce, such as organized labour exportation, also made great contributions. Nevertheless, our interview and archival data all repeatedly highlighted the important role of e-commerce in accomplishing this poverty alleviation achievement. The fact that Longnan was recognized and awarded nationally for its pioneering work in PAeC, but not for other forms of poverty alleviation activities, also suggested that PAeC was an important contributing factor for Longnan's poverty alleviation achievement.



## 5 | DISCUSSION

Longnan's success in PAeC suggests that e-commerce can be an effective solution for poverty alleviation and governments can play an important role in the process. Specifically speaking, the governments can (1) jumpstart the development of local e-commerce by taking a leading role in nurturing, supporting, and regulating a viable and sustainable rural e-commerce ecosystem and (2) ensure that the poverty population can indeed benefit from the ReCD.

### 5.1 | The role of governments in ReCD

As reviewed in Section 2, there are 2 approaches that have been discussed in the literature on developing rural e-commerce ecosystems, including the top-down approach and the community-driven approach (Leong et al., 2016). The community-driven approach is organic and accommodative and thus often the preferred approach for developing rural e-commerce ecosystems. While the role of governments in community-driven development has not been adequately discussed in the literature, as argued by VanSandt and Sud (2012), it is widely assumed that governments should limit its influence for a community-driven, market-based approach to work (Panagariya, 2013). In our research site, however, Longnan was severely unprepared for a rural e-commerce ecosystem to emerge spontaneously because of Longnan's cultural-historical backgrounds. The local governments, largely motivated to boost local economy, successfully implemented a series of intervention actions to nurture and support the development of a rural e-commerce ecosystem. These actions appeared very effective. Thus, on the basis of our findings, it is advisable for governments to get proactively involved in the development of certain IT-based ecosystems, especially when the self-organization of such an ecosystem is unlikely to occur.

Our findings further suggest that instead of directly planning and controlling the development, the governments should take nurturing, supporting, and regulating roles in ReCD, as summarized in Figure 5, and be judicious about exactly which role to prioritize based on different stages of ReCD. In its nurturing role, governments should focus on motivating and directing various actors of the e-commerce ecosystem to join forces, including promoting e-commerce through a series of motivational and educational initiatives and directly involving key actors, such as e-commerce pioneers and role models (eg, CGVOs), e-commerce platform providers, and logistics service providers. In its supporting role, governments should focus on establishing both the physical infrastructure and policy environment for e-commerce development so that the key actors can play to their own full strength. Finally, as the e-commerce development stabilizes, governments should switch more to a regulating role to ensure the sustainability of the rural e-commerce ecosystem. These nurturing, supporting, and regulating roles and actions taken by the governments are critical for ReCD based on Longnan's experiences. Exploring the roles governments can play, our findings complement existing studies on the different stages of ReCD (eg, Huang et al., 2009; Jha et al., 2016).

### 5.2 | The role of governments in PAeC

Market-based poverty alleviation solutions are widely believed as more effective and sustainable than government- or NGO-led solutions. However, there remain many unclear questions, such as how market-based solutions can be developed and how governments should get involved for market-based solutions (VanSandt & Sud, 2012). Our results offer new insights to these questions.

Our findings painted a promising picture of how rural e-commerce as an ecosystem can potentially contribute to poverty alleviation. Many previous studies of using ICT for poverty alleviation tend to focus on the use of ICT as a tool, such as a communication tool or information-sharing tool (eg, Spence & Smith, 2010; Urquhart et al., 2008). By focusing not on ICT per se but on the level of ecosystem, our study reveals how an e-commerce ecosystem can be an effective, market-based poverty alleviation solution. In particular, a mature e-commerce ecosystem in a poverty region can contribute to poverty alleviation through 2 mechanisms. First, the e-commerce ecosystem itself can

increase the effectiveness of poverty alleviation by involving more parties to contribute to poverty alleviation. When e-commerce is developed in a poverty region, all the participants of the e-commerce ecosystem can contribute to boosting the local economy, and, more importantly, they do so by pursuing their own business agendas rather than because of philanthropic motives or corporate social responsibilities. In this sense, these participants can share the responsibilities of poverty alleviation that would otherwise burden only the poverty population and the governments, as in Longnan's OMPA era. Second, the e-commerce ecosystem can be effective in poverty alleviation also because it offers a rich set of roles for the poverty population to play in the ecosystem. As our results reveal, the poverty population can potentially benefit as consumers, producers, microentrepreneurs, employees, and investors when they participate in the ecosystem. The abundance of choices for the poverty population allows them to choose the most suitable poverty alleviation approach for themselves. Consequently, PAeC turns out to be more effective than other government- or NGO-led poverty alleviation solutions in which the poverty population passively receive help or directions from governments or other organizations.

Our findings also painted a cautious picture on how governments can ensure that rural e-commerce indeed contribute to poverty alleviation, which we consider both theoretically interesting and practically important. In a competitive market, players with more abundant resources and greater capabilities inevitably will have competitive advantages and appropriate most of the values created (Barney, 1991). The poor is disadvantaged in such market-based competition, owing to their lack of initial resource and capability endowment (Alvarez & Barney, 2014). A market enabled by e-commerce is no exception in this regard. Thus, even after an e-commerce ecosystem starts to mature in a poverty region, the poverty population that are often disadvantaged and marginalized may still face challenges in participating in and benefiting from the ecosystem. These individuals are at a great risk of being excluded from or even being exploited by rural e-commerce. Thus, governments must manage to direct e-commerce for poverty alleviation, and Longnan governments' actions illustrated how.

Governments must address the inclusiveness issue. In Longnan, governments aggressively pursued a series of targeted poverty alleviation actions, such as pairing resourceful helpers with households in poverty. Such actions brought poverty population e-commerce resources otherwise not available to them, making it possible for them to be included in the local e-commerce ecosystem. Second, governments must ensure that poverty population can indeed benefit from e-commerce. In Longnan, governments achieved this mostly by taking appropriate actions (Table 3) so that poverty population can possibly play multiple roles in the local e-commerce ecosystem. Such role expansion created more opportunities for the poverty population to benefit from e-commerce. For example, poor villagers who were incapable of directly participating in e-commerce can still share the benefits of e-commerce by being a passive investor, as we described earlier.

Therefore, while ReCD provides poverty alleviation with a solid foundation, it is the governments' conscious effort in using the resulting e-commerce ecosystem for poverty alleviation that made PAeC's success in Longnan possible. While previous literature might have implicitly assumed that successful ReCD will automatically lead to successful PAeC, we caution that governments still need much work to help the poverty population to overcome their inherent disadvantages in market competition before they can benefit from market-based poverty alleviation solutions, including PAeC.

## 6 | CONTRIBUTION, LIMITATION, AND FUTURE RESEARCH DIRECTIONS

Poverty alleviation is a grand challenge to modern society, and it is also a complex problem that cannot be easily addressed through simple linear approaches (George et al., 2016). While practitioners have tried numerous ways to solve the problem, theory-based solutions to poverty alleviation remain rare. Based on activity theory, this paper theorizes how poverty can be alleviated through rural e-commerce and particularly the role of governments in developing e-commerce ecosystems and ensuring PAeC. Our findings highlight the role of the entire e-commerce ecosystem, not any ICT artefact alone, in addressing poverty alleviation issues. The findings also highlight the role of governments in

developing such as an ecosystem when it cannot be readily self-organized at the grassroots level. Taken together, they suggest that, to develop an e-commerce ecosystem, local governments should focus on motivating and educating potential participants, making rules and policies, building transportation and ICT infrastructure, and engaging community members of the ecosystem. Once the ecosystem is in place, it can become self-organizing and start to contribute to poverty alleviation in poverty-stricken regions. However, the governments still need to take conscious efforts, such as targeted poverty alleviation programmes, to ensure the poorest population can still benefit from e-commerce instead of being left behind even further. Through theorizing how Longnan governments used e-commerce for poverty alleviation and detailing how ReCD triggered, enabled, and shaped the evolution of poverty alleviation activity system at Longnan, we hope to contribute to a theory of the solution (Majchrzak et al., 2016) for poverty alleviation.

Our study makes a contribution by bridging 2 literature streams of ReCD (Cui et al., 2017; Leong et al., 2016) and market-based poverty alleviation (Clyde & Karnani, 2015; McKague & Oliver, 2012; VanSandt & Sud, 2012). While previous studies have speculated that rural e-commerce can be used for poverty alleviation (Leong et al., 2016), they often blurred the difference between rural e-commerce for regional economy development and rural e-commerce for poverty alleviation. The implicit assumption often seems that, once rural e-commerce was developed, it could alleviate poverty automatically and effectively. Our study recognized the general contribution of rural e-commerce in developing regional economy, which would arguably benefit local residents including the poverty population. However, rural e-commerce still features market competition that could potentially exclude or even exploit the poverty population further. To align e-commerce development and poverty alleviation, governments need to take proper actions to ensure the inclusiveness of e-commerce ecosystems and their effectiveness for poverty alleviation.

Beyond poverty alleviation, our findings might be generalizable to other industrial and societal challenges that are related to the difficulties in establishing an ecosystem. For example, studies of mobile payments have revealed grand challenges for a viable mobile payment ecosystem to emerge and stabilize, mostly because various potential community members cannot reach mutual agreements on the division of labour in the ecosystem (Ozcan & Santos, 2015). On the basis of a similar analytical framework as in this paper, it can be argued that some parties with coercive forces, perhaps governments or industry associations, need to step in and jumpstart the evolution of such an ecosystem. While there would certainly be unique challenges in developing other ecosystems such as mobile payments, this study nevertheless offers a theory-driven, potentially feasible solution for other scholars and practitioners to consider.

This paper also contributes to the ICT for development studies in general. Information and communication technology for development is widely considered "the next grand challenge for information systems" (Sahay, Sein, & Urquhart, 2017, p. 838). As Avgerou, Hayes, and La Rovere (2016) recently noted, "increasing diffusion of ICT in developing countries does not necessarily lead to expected socio-economic benefits" (p. 329) and, for ICT to become effective in helping developing countries, we need to "accompany ICT with complementary organizational, macro-economic, and societal reforms" (p. 330). There have been great hopes for using ICT to solve many societal problems including poverty (eg, Cecchini & Scott, 2003; Kenny, 2002; Smith & Elder, 2010), but, as Longnan shows, ICT per se is probably not as effective as the ecosystem it enables and empowers. The relationship between ICT investment and poverty alleviation is not direct and linear, nor should policymakers assume so. Governments and other organizations need to carefully consider their intervention plans when applying ICT to address economical and societal development problems.

Lastly, our study also contributes back to activity theory. While activity theory discusses connected activity systems, such that one activity system produces tools for another activity system (eg, Karanasios & Allen, 2013), this paper presents a much more profound case in which one activity system, the ReCD activity system, transforms the evolution of another activity (from OMPA to PAeC) in a more intricate way. By producing an ecosystem, the ReCD activity simultaneously affects the tool, the community, the rules and norms, and the division of labour of poverty alleviation activity. The comprehensive influence of one activity (ie, e-commerce development) directly and significantly transforms the evolution of another activity (ie, OMPA) into a new form (ie, PAeC), which, to our best knowledge, has not been theorized before. Thus, by elaborating activity theory in the context of poverty alleviation, we made theoretical advancement through deepening the understanding of interconnected activities, or activity networks, which

is one of the areas that particularly need further research attention in advancing activity theory (Engeström, 2000). Moreover, by explicating the expanded roles played by poverty population, the subject of the poverty alleviation activities, this study also offered a great illustration of the emancipatory power of activity theory and confirmed a previous speculation that studies of ICT for development can contribute back to activity theory by providing the proper settings that can unleash activity theory's emancipatory power of guiding and empowering subjects in their object-oriented activities (Karanasios, 2014).

Three limitations need to be noted in our study. First, we present a single-case study in the context of Western China, and, following previous scholars' advocates (eg, Davison et al., 2008; L. Li et al., 2014), we contextualize our theory deeply in that context. We call for future studies to test and enrich our theory in other contexts, including in other developing countries and applying it to other societal problems. Second, poverty itself is a multidimensional construct. Our study mainly focuses on poverty manifested as low income levels, but future studies can also build on our findings to study other dimensions of poverty, such as limited access to education, sanitation, health, and civil services. Third, our study only captured Longnan's PAeC efforts until 2016, when they appear to be quite successful. However, a great challenge to poverty alleviation is to keep people who were lifted out of poverty from returning to poverty (Trielli, Prengaman, & DiLorenzo, 2017). Whether PAeC in Longnan can remain successful and sustain itself and what governments can do to ensure it remains so are intriguing topics for future research.

Poverty and other grand societal issues are grand challenges that "require coordinated and sustained effort from multiple and diverse stakeholders toward a clearly articulated problem or goal" (George et al., 2016, p. 1881). Information and communication technology and continuous industrial revolution start to appear promising in addressing them, but there are significant gaps in theory development that can guide the design of those ICT-related solutions. We end this paper by echoing the call for business school scholars to join force with colleagues in other fields in tackling these grand societal challenges (George et al., 2016).

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## REFERENCE

- Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *The Journal of Economic Perspectives*, 24(3), 207–232.
- Allen, D., Karanasios, S., & Slavova, M. (2011). Working with activity theory: Context, technology, and information behavior. *Journal of the American Society for Information Science and Technology*, 62(4), 776–788.
- Allen, D. K., Brown, A., Karanasios, S., & Norman, A. (2013). How should technology-mediated organizational change be explained? A comparison of the contributions of critical realism and activity theory. *MIS Quarterly*, 37(3), 835–854.
- Alvarez, S. A., & Barney, J. B. (2014). Entrepreneurial opportunities and poverty alleviation. *Entrepreneurship Theory and Practice*, 38(1), 159–184.
- Avgerou, C., Hayes, N., & La Rovere, R. L. (2016). Growth in ICT uptake in developing countries: New users, new uses, new challenges. *Journal of Information Technology*, 31(4), 329–333.
- Banker, R., Mitra, S., & Sambamurthy, V. (2011). The effects of digital trading platforms on commodity prices in agricultural supply chains. *MIS Quarterly*, 35(3), 599–611.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, 11(3), 369–386.
- Bourguignon, F., & Chakravarty, S. R. (2003). The measurement of multidimensional poverty. *The Journal of Economic Inequality*, 1(1), 25–49.
- Cecchini, S., & Scott, C. (2003). Can information and communications technology applications contribute to poverty reduction? Lessons from rural India. *Information Technology for Development*, 10(2), 73–84.
- Clyde, P., & Karnani, A. (2015). Improving private sector impact on poverty alleviation. *California Management Review*, 57(2), 20–35.

- Cooney, K., & Shanks, T. W. (2010). New approaches to old problems: Market-based strategies for poverty alleviation. *Social Service Review*, 84(1), 29–55.
- Crawford, K., & Hasan, H. (2006). Demonstrations of the activity theory framework for research in information systems. *Australasian Journal of Information Systems*, 13(2), 49–68.
- Cui, M., Pan, S. L., Newell, S., & Cui, L. (2017). Strategy, resource orchestration and e-commerce enabled social innovation in rural China. *The Journal of Strategic Information Systems*, 26(1), 3–21.
- Davison, R., Kien, S. S., & Ying, D. X. (2008). Introduction to the special issue on information systems in China. *Information Systems Journal*, 18(4), 325–330.
- Dewan, S., & Riggins, F. J. (2005). The digital divide: Current and future research directions. *Journal of the Association for Information Systems*, 6(12), 298–337.
- Dubé, L., Pingali, P., & Webb, P. (2012). Paths of convergence for agriculture, health, and wealth. *Proceedings of the National Academy of Sciences*, 109(31), 12294–12301.
- Edmondson, A. C., & McManus, S. E. (2007). Methodological fit in management field research. *Academy of Management Review*, 32(4), 1155–1179.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25–32.
- Eisenhardt, K. M., Graebner, M. E., & Sonenshein, S. (2016). Grand challenges and inductive methods: Rigor without rigor mortis. *Academy of Management Journal*, 59(4), 1113–1123.
- Engeström, Y. (2000). Activity theory and the social construction of knowledge: A story of four umpires. *Organization*, 7(2), 301–310.
- Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14(1), 133–156.
- Engeström, Y. (2015). *Learning by expanding: An activity-theoretical approach to developmental research*. New York, NY: Cambridge University Press.
- George, G., Howard-Grenville, J., Joshi, A., & Tihanyi, L. (2016). Understanding and tackling societal grand challenges through management research. *Academy of Management Journal*, 59(6), 1880–1895.
- Hasan, H., Smith, S., & Finnegan, P. (2017). An activity theoretic analysis of the mediating role of information systems in tackling climate change adaptation. *Information Systems Journal*, 27(3), 271–308.
- He, G., & Wang, S. (2016). Do college graduates serving as village officials help rural china? *Social Science Research Network working paper*. <https://doi.org/10.2139/ssrn.2880507>
- Hsu, S. (2016). Can China wipe out poverty by 2020? Retrieved from <http://www.forbes.com/sites/sarahsu/2016/08/19/china-wipe-out-poverty/#3f3c11f7461b>
- Huang, L., Hu, G., & Lu, X. (2009). E-business ecosystem and its evolutionary path: The case of the Alibaba group in China. *Pacific Asia Journal of the Association for Information Systems*, 1(4), 25–36.
- Hughes, N., & Lonie, S. (2007). M-PESA: Mobile money for the “unbanked” turning cellphones into 24-hour tellers in Kenya. *Innovations: Technology, Governance, Globalization*, 2(1–2), 63–81.
- Ilyenkov, E. V. (1977). *Dialectical logic: Essays on its history and theory*. Moscow: Progress Publishers.
- Jensen, R. (2007). The digital provide: Information (technology), market performance, and welfare in the south Indian fisheries sector. *The Quarterly Journal of Economics*, 122(3), 879–924.
- Jha, S. K., Pinsonneault, A., & Dube, L. (2016). The evolution of an ICT platform-enabled ecosystem for poverty alleviation: The case of eKutir. *MIS Quarterly*, 40(2), 431–445.
- Kanungo, S. (2004). On the emancipatory role of rural information systems. *Information Technology & People*, 17(4), 407–422.
- Kaptelinin, V. (1996). Activity theory: Implications for human-computer interaction. In B. Nardi (Ed.), *Context and consciousness: Activity theory and human-computer interaction* (pp. 103–116). Cambridge, MA: MIT Press.
- Karanasios, S. (2014). Framing ICT4D research using activity theory: A match between the ICT4D field and theory? *Information Technologies & International Development*, 10(2), 1–18.
- Karanasios, S. (2018). Toward a unified view of technology and activity: The contribution of activity theory to information systems research. *Information Technology & People*, 31(1), 134–155.
- Karanasios, S., & Allen, D. (2013). ICT for development in the context of the closure of Chernobyl nuclear power plant: An activity theory perspective. *Information Systems Journal*, 23(4), 287–306.

- Karnani, A. (2011). *Fighting poverty together: Rethinking strategies for business, governments, and civil society to reduce poverty*. New York, NY: Palgrave Macmillan.
- Kenny, C. (2002). Information and communication technologies for direct poverty alleviation: Costs and benefits. *Development Policy Review*, 20(2), 141–157.
- Khavul, S. (2010). Microfinance: Creating opportunities for the poor? *The Academy of Management Perspectives*, 24(3), 58–72.
- Kuutti, K. (1999). Activity theory, transformation of work, and information systems design. In Y. Engeström, R. Miettinen, & R.-L. Punamäki-Gitai (Eds.), *Perspectives on activity theory*. Cambridge, UK: Cambridge University Press.
- Leong, C., Pan, S. L., Newell, S., & Cui, L. (2016). The emergence of self-organizing e-commerce ecosystems in remote villages of China: A tale of digital empowerment for rural development. *MIS Quarterly*, 40(2), 475–484.
- Leont'ev, A. N. (1978). *Activity, consciousness, and personality*. Englewood Cliffs, NJ: Prentice-Hall.
- Li, L., Gao, P., & Mao, J.-Y. (2014). Research on IT in China: A call for greater contextualization. *Journal of Information Technology*, 29(3), 208–222.
- Li, Y., Su, B., & Liu, Y. (2016). Realizing targeted poverty alleviation in China: People's voices, implementation challenges and policy implications. *China Agricultural Economic Review*, 8(3), 443–454.
- London, T. (2008). The base-of-the-pyramid perspective: A new approach to poverty alleviation. *Academy of Management Proceedings*, 2008(1), 1–6.
- Luria, A. R. (1979). *The making of mind: A personal account of Soviet psychology*. Boston, MA: Harvard University Press.
- Mahajan, V., & Warbelow, K. (2016). *Rise of rural consumers in developing countries: Harvesting 3 billion aspirations*. India: SAGE Publications India.
- Majchrzak, A., Markus, M. L., & Wareham, J. (2016). Designing for digital transformation: Lessons for information systems from the study of ICT and societal challenges. *MIS Quarterly*, 40(2), 267–277.
- McIntyre, D. P., & Srinivasan, A. (2017). Networks, platforms, and strategy: Emerging views and next steps. *Strategic Management Journal*, 38(1), 141–160.
- McKague, K., & Oliver, C. (2012). Enhanced market practices: Poverty alleviation for poor producers in developing countries. *California Management Review*, 55(1), 98–129.
- Meng, J. (2016). E-commerce poverty alleviation in Longnan city. Retrieved from [http://www.chinatoday.com.cn/english/report/2016-10/31/content\\_729610.htm](http://www.chinatoday.com.cn/english/report/2016-10/31/content_729610.htm)
- Meng, L. (2013). Evaluating China's poverty alleviation program: A regression discontinuity approach. *Journal of Public Economics*, 101, 1–11.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.
- Moore, J. F. (1993). Predators and prey: A new ecology of competition. *Harvard Business Review*, 71(3), 75–86.
- Moore, J. F. (2006). Business ecosystems and the view from the firm. *The Antitrust Bulletin*, 51(1), 31–75.
- Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science*, 325(5939), 419–422.
- Ozcan, P., & Santos, F. M. (2015). The market that never was: Turf wars and failed alliances in mobile payments. *Strategic Management Journal*, 36(10), 1486–1512.
- Panagariya, J. B. A. A. (2013). *Why growth matters: How economic growth in India reduced poverty and the lessons for other developing countries*. New York, NY: Public Affairs.
- Park, A., & Wang, S. (2010). Community-based development and poverty alleviation: An evaluation of China's poor village investment program. *Journal of Public Economics*, 94(9–10), 790–799.
- Parker, C., Ramdas, K., & Savva, N. (2016). Is IT enough? Evidence from a natural experiment in India's agriculture markets. *Management Science*, 62(9), 2481–2503.
- Prahalad, C. K. (2005). *The fortune at the bottom of the pyramid*. Upper Saddle River, NJ: Wharton School Publishing.
- Sahay, S., Sein, M. K., & Urquhart, C. (2017). Flipping the context: ICT4D, the next grand challenge for IS research and practice. *Journal of the Association for Information Systems*, 18(12), 837–847.
- Sam, C. (2012). Activity theory and qualitative research in digital domains. *Theory Into Practice*, 51(2), 83–90.
- Sen, A. (1976). Poverty: An ordinal approach to measurement. *Econometrica*, 44(2), 219–231.
- Siggelkow, N. (2007). Persuasion with case studies. *Academy of Management Journal*, 50(1), 20–24.
- Singer, A. E. (2006). Business strategy and poverty alleviation. *Journal of Business Ethics*, 66(2), 225–231.
- Slavova, M., & Karanasios, S. (in press). When institutional logics meet information and communication technologies: Examining hybrid information practices in Ghanaian agriculture. *Journal of the Association for Information Systems*.

- Smith, M., & Elder, L. (2010). Open ICT ecosystems transforming the developing world. *Information Technologies & International Development*, 6(1), 65–71.
- Spence, R., & Smith, M. L. (2010). ICT, development, and poverty reduction: Five emerging stories. *Information Technologies & International Development*, 6(SE), 11–17.
- Tiwana, A. (2015). Evolutionary competition in platform ecosystems. *Information Systems Research*, 26(2), 266–281.
- Trielli, D., Pngaman, P., & DiLorenzo, S. (2017). Millions return to poverty in Brazil, eroding 'boom' decade. Retrieved from <https://apnews.com/89afd8d964984eb69678129e7d4a16cc>
- Urquhart, C., Liyanage, S., & Kah, M. (2008). ICTs and poverty reduction: A social capital and knowledge perspective. *Journal of Information Technology*, 23(3), 203–213.
- VanSandt, C. V., & Sud, M. (2012). Poverty alleviation through partnerships: A road less travelled for business, governments, and entrepreneurs. *Journal of Business Ethics*, 110(3), 321–332.
- Venkatesh, V., Rai, A., Sykes, T. A., & Aljafari, R. (2016). Combating infant mortality in rural India: Evidence from a field study of eHealth kiosk implementations. *MIS Quarterly*, 40(2), 353–380.
- Vygotsky, L. S. (1980). *Mind in society: The development of higher psychological processes*. Boston, MA: Harvard University Press.
- Walsham, G., Robey, D., & Sahay, S. (2007). Foreword: Special issue on information systems in developing countries. *MIS Quarterly*, 31(2), 317–326.
- Werker, E., & Ahmed, F. Z. (2008). What do nongovernmental organizations do? *Journal of Economic Perspectives*, 22(2), 73–92.
- Yin, R. K. (2009). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.

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## APPENDIX A

## SUMMARY OF DATA SOURCES

**TABLE A1** Primary data sources

Location	Site	Conceptual Objectives Achieved	Data Sources
Stage 1			
Cheng County	Longnan Teachers College, College of E-commerce	<ul style="list-style-type: none"> <li>Understand the general progress of Longnan rural e-commerce development</li> <li>Learn the educational actions taken by local governments</li> </ul>	<ul style="list-style-type: none"> <li>Presentations and Q&amp;As by the college dean (P1) and 2 executives from a distribution company and an e-commerce company incubated by the college (P2 and P3)</li> <li>Field observations of the 2 companies</li> </ul>
	Cheng County Service Station of Rural Taobao	<ul style="list-style-type: none"> <li>Understand the participation of e-commerce platform providers (Taobao)</li> <li>Observe the interaction between e-commerce platform providers and local villagers</li> </ul>	<ul style="list-style-type: none"> <li>Presentation and Q&amp;As by the Station manager (P4)</li> <li>Field observations of the organization's operation</li> </ul>
	"Unique China · Longnan Shop" (an e-commerce storefront on Taobao)	<ul style="list-style-type: none"> <li>Understand the operation of Longnan's typical rural e-commerce site</li> <li>Understand the governments' role in engaging e-commerce platform providers as e-commerce community members</li> </ul>	<ul style="list-style-type: none"> <li>Presentation and Q&amp;As by the shop manager (P5)</li> <li>Field observations of the shop's operation</li> </ul>
	Huachang E-commerce Industry Park	<ul style="list-style-type: none"> <li>Learn the rule-making actions of local governments</li> <li>Learn the tool-producing actions of local governments at the prefectural level (in setting up the 3-layered e-commerce service systems)</li> <li>Learn the interaction of various e-commerce community members</li> </ul>	<ul style="list-style-type: none"> <li>Presentation and Q&amp;As by the park manager (P6)</li> <li>Field observations of the construction of the park</li> </ul>
Wudu District	Tianze e-commerce service platform	<ul style="list-style-type: none"> <li>Learn the general progress of local rural e-commerce development at the county level</li> <li>Learn the tool-producing actions of local government at the county level (in setting up the 3-layered e-commerce service systems)</li> <li>Learn the interaction of various e-commerce community members</li> </ul>	<ul style="list-style-type: none"> <li>Presentation and Q&amp;As by the manager (P7)</li> <li>Field observations of the platform's operation</li> </ul>
	Longnan Xiangyu Oliver Oil Development Co	<ul style="list-style-type: none"> <li>Understand the operation of Longnan's typical agricultural company supported by e-commerce</li> <li>Understand the support from local governments</li> </ul>	<ul style="list-style-type: none"> <li>Presentations and Q&amp;As by the executive (P8)</li> <li>Filed observations of the manufacturing process</li> </ul>
Kang County	Huaqiao Village, Changba Town	<ul style="list-style-type: none"> <li>Learn the general progress of local rural e-commerce development at the village level</li> <li>Learn the tool-producing actions of local government at the village level (in setting up the 3-layered e-commerce service systems)</li> </ul>	<ul style="list-style-type: none"> <li>Presentations and Q&amp;As by the manager of the service station (P9)</li> <li>Field observations of the poverty alleviation efforts by poverty-stricken households</li> </ul>
Others	Others	<ul style="list-style-type: none"> <li>Understand the cultural-historical contexts of Longnan</li> <li>Learn the strategic plans and policies of e-commerce development and poverty alleviation</li> </ul>	<ul style="list-style-type: none"> <li>Interview with the mayor of Longnan (I1)</li> <li>Attend Longnan Forum of Poverty Alleviation through E-commerce 2016. Participants include prefectural</li> </ul>

(Continues)



TABLE A1 (Continued)

Location	Site	Conceptual Objectives Achieved	Data Sources
			<p>government leaders including the mayor and vice mayor of Longnan, and officials from the Office for Poverty Alleviation and the Office for E-commerce of the prefectural government</p> <ul style="list-style-type: none"> <li>• Informal interactions with local governmental officials accompanying the researchers during their field trips</li> </ul>
Stage 2			
Cheng County	The Poverty Alleviation Office of Cheng County Government	<ul style="list-style-type: none"> <li>• Learn the general progress of local rural e-commerce development at the county level</li> <li>• Learn the tool-producing actions of local government at the county level</li> </ul>	<ul style="list-style-type: none"> <li>• Interview with a governmental official of the Poverty Alleviation Office of Cheng County (I2)</li> </ul>
	E-commerce Service Station, Hongchuan Town	<ul style="list-style-type: none"> <li>• Learn the general progress of local rural e-commerce development at the town level</li> <li>• Learn the tool-producing actions of the local government at the village level</li> </ul>	<ul style="list-style-type: none"> <li>• Interview with the manager of the service station (I3)</li> <li>• Field observations of the station's operation</li> </ul>
	Manping Village of Hongchuan Town	<ul style="list-style-type: none"> <li>• Learn the general progress of local rural e-commerce development at the village level</li> <li>• Understand the participation of the poverty population in e-commerce</li> </ul>	<ul style="list-style-type: none"> <li>• Interview with village government officials and poverty-stricken households (I4 and I5)</li> <li>• Field observations of the poverty alleviation efforts by poverty-stricken households</li> </ul>
	Lianglou Village of Chenyuan Town	<ul style="list-style-type: none"> <li>• Learn the various actions of local governments in developing e-commerce</li> <li>• Learn the general progress of local rural e-commerce development at the village level</li> <li>• Understand the participation of the poverty population in e-commerce</li> <li>• Learn the various actions of local governments in developing e-commerce</li> </ul>	<ul style="list-style-type: none"> <li>• Interview with village government officials, manager of the village's e-commerce service station and the rural Taobao service station, and poverty-stricken households (I6, I7, and I8)</li> <li>• Field observations of the poverty alleviation efforts by poverty-stricken households</li> </ul>
	Changgou Village of Jifeng Town	<ul style="list-style-type: none"> <li>• Understand the participation of the poverty population in e-commerce</li> <li>• Learn the role of CGVOs in e-commerce</li> </ul>	<ul style="list-style-type: none"> <li>• Interview with a college-graduate village official (CGVO), the manager of the village e-commerce service station, and poverty-stricken households (I9, I10, and I11)</li> <li>• Field observations of the poverty alleviation efforts by poverty-stricken households</li> </ul>
	Caotan Village of Jifeng Town	<ul style="list-style-type: none"> <li>• Understand the participation of the poverty population in e-commerce</li> <li>• Learn the role of CGVOs in e-commerce</li> </ul>	<ul style="list-style-type: none"> <li>• Interview with CGVOs, the manager of the village e-commerce service station, and poverty-stricken households (I12, I13, and I14)</li> <li>• Field observations of the poverty alleviation efforts by poverty-stricken households</li> </ul>

Note: P1-P9 are the informants who delivered presentations and held Q&A sessions; I1-I14 are the informants with whom we had face-to-face interviews.

**TABLE A2** Sources for selected media reports that are referenced in the paper

No.	Source	Date	URL (All Accessed on June 18, 2017)
M1	Gansu Daily	March 31, 2015	<a href="http://epaper.gansudaily.com.cn/gsr/b/html/2015-03/31/content_245844.htm">http://epaper.gansudaily.com.cn/gsr/b/html/2015-03/31/content_245844.htm</a>
M2	Farmers' Daily	June 13, 2017	<a href="http://szb.farmer.com.cn/nmrb/html/2017-06/13/nw.D110000nmrb_20170613_1-03.htm?div=-1">http://szb.farmer.com.cn/nmrb/html/2017-06/13/nw.D110000nmrb_20170613_1-03.htm?div=-1</a>
M3	Economic Daily	August 8, 2015	<a href="http://paper.ce.cn/jjrb/html/2015-08/08/content_252979.htm">http://paper.ce.cn/jjrb/html/2015-08/08/content_252979.htm</a>
M4	Xinhuanet.com,	July 20, 2015	<a href="http://news.xinhuanet.com/local/2015-07/20/c_1115977663.htm">http://news.xinhuanet.com/local/2015-07/20/c_1115977663.htm</a>
M5	People's Daily	October 28, 2015	<a href="http://society.people.com.cn/n/2015/10/28/c1008-27746925.html">http://society.people.com.cn/n/2015/10/28/c1008-27746925.html</a>
M6	Gansu Daily	July 19, 2013	<a href="http://epaper.gansudaily.com.cn/gsr/b/html/2013-07/19/content_282133.htm">http://epaper.gansudaily.com.cn/gsr/b/html/2013-07/19/content_282133.htm</a>
M7	China Network Television (CNTV)	November, 6, 2015	<a href="http://news.cntv.cn/2015/11/06/ARTI1446797760316662.shtml">http://news.cntv.cn/2015/11/06/ARTI1446797760316662.shtml</a>
M8	Gansu Daily	March 30, 2015	<a href="http://epaper.gansudaily.com.cn/gsr/b/html/2015-03/30/content_245731.htm">http://epaper.gansudaily.com.cn/gsr/b/html/2015-03/30/content_245731.htm</a>
M9	People's Posts and Telecommunications News	July 17, 2015	<a href="http://news.163.com/15/0717/09/AUNDENLD00014AED.html">http://news.163.com/15/0717/09/AUNDENLD00014AED.html</a>
M10	Youth.cn	July 31, 2015	<a href="http://cunguan.youth.cn/2015/0731/1586198.shtml">http://cunguan.youth.cn/2015/0731/1586198.shtml</a>
M11	China Youth Daily	October 17, 2015	<a href="http://zqb.cyol.com/html/2015-10/17/nw.D110000zqnb_20151017_3-01.htm">http://zqb.cyol.com/html/2015-10/17/nw.D110000zqnb_20151017_3-01.htm</a>
M12	China Commercial Times	February, 17, 2015	<a href="http://finance.ifeng.com/a/20150217/13508068_0.shtml">http://finance.ifeng.com/a/20150217/13508068_0.shtml</a>
M13	Xinhua Net	June 4, 2015	<a href="http://www.moa.gov.cn/fwllm/qgxxlb/gs/201506/t20150604_4631469.htm">http://www.moa.gov.cn/fwllm/qgxxlb/gs/201506/t20150604_4631469.htm</a>
M14	QQ.com	October 13, 2014	<a href="http://finance.qq.com/a/20141013/044443.htm">http://finance.qq.com/a/20141013/044443.htm</a>
M15	Learning Daily	May 4, 2015	<a href="http://www.cac.gov.cn/2015-05/04/c_1115162031.htm">http://www.cac.gov.cn/2015-05/04/c_1115162031.htm</a>
M16	Farmers' Daily	August 3, 2015	<a href="http://news.xinhuanet.com/politics/2015-08/03/c_128084831.htm">http://news.xinhuanet.com/politics/2015-08/03/c_128084831.htm</a>
M17	Gansu Daily	July 22, 2015	<a href="http://epaper.gansudaily.com.cn/gsr/b/html/2015-07/22/content_264624.htm">http://epaper.gansudaily.com.cn/gsr/b/html/2015-07/22/content_264624.htm</a>
M18	Gansu Daily	August 19, 2015	<a href="http://gansu.gansudaily.com.cn/system/2015/08/20/015669250.shtml">http://gansu.gansudaily.com.cn/system/2015/08/20/015669250.shtml</a>
M19	Farmers' Daily	October 10, 2015	<a href="http://szb.farmer.com.cn/nmrb/html/2015-10/10/nw.D110000nmrb_20151010_1-01.htm">http://szb.farmer.com.cn/nmrb/html/2015-10/10/nw.D110000nmrb_20151010_1-01.htm</a>
M20	Gansu Daily	April 23, 2015	<a href="http://epaper.gansudaily.com.cn/gsr/b/html/2015-04/23/content_249766.htm">http://epaper.gansudaily.com.cn/gsr/b/html/2015-04/23/content_249766.htm</a>
M21	Gansu Daily	July 6, 2015	<a href="http://epaper.gansudaily.com.cn/gsr/b/html/2015-07/06/content_262009.htm">http://epaper.gansudaily.com.cn/gsr/b/html/2015-07/06/content_262009.htm</a>
M22	Longnan Daily	May 4, 2016	<a href="http://ln.gansudaily.com.cn/system/2016/05/04/016043442.shtml">http://ln.gansudaily.com.cn/system/2016/05/04/016043442.shtml</a>

## APPENDIX B

## INTERVIEW GUIDE

To prefectural/county-level government officials in charge of poverty alleviation:

- What are the typical poverty alleviation activities prior to the development of e-commerce?
- What are the major actions taken by local governments to develop e-commerce?
- What are the roles of e-commerce in poverty alleviation?
- What companies and non-government organizations have participated in developing e-commerce? What roles did they play?
- What are the outcomes of using e-commerce in poverty alleviation?

To managers of e-commerce-related companies:

- How did your company participate in e-commerce? Have you ever collaborated with local governments and how?
- Did the operation of your company support the local poverty-stricken population and how? How did your company and local poverty population collaborate?

To village-level government officials and CGVOs:

- What is the current status of the poverty population in your village? What are the major reasons for their poverty?
- What is the current progress of e-commerce development in your village?
- What actions did you take to develop e-commerce and use e-commerce to help the poor? Which group of local villagers benefited the most and how?
- What are the major barriers to develop e-commerce and use it for poverty alleviation?
- What were the outcomes of poverty alleviation in recent years? What are the plans for the next few years?

To villagers originally or currently in poverty:

- After e-commerce, how did you produce and sell your products?
- What helps and supports have you received in participating in e-commerce?
- Did you join any cooperative or association in your village? What are their effects on your production and income?
- What are other major changes to your life and production after e-commerce?

## APPENDIX C

## ADDITIONAL DATA TABLES

**TABLE C1** Motivation and educational actions of rural e-commerce development activity

Subjects	Actions	Goals	Exemplary Quotes or Evidence
Leadership team of the local governments	Advertise Longnan's local agricultural products on social media platforms	<ul style="list-style-type: none"> <li>• To promote local agricultural products</li> <li>• To set role models for subordinate government officials to join the efforts of e-commerce advocating and promotion</li> </ul>	In October 2014, Mr Pan Zhe, the vice mayor of Li County, visited one remote village and noticed a large stock of newly harvested apples. The apples were disfigured by a recent hail and thus not very marketable. The vice mayor made an emotional appeal on his personal Weibo account to help this village. Over 2000 Weibo accounts, mostly related to Longnan, reposted his message, and all 250 tons of apples were sold out in the next 4 days. (Source: M21)
The dedicated branches of local governments	Advocate and train	<ul style="list-style-type: none"> <li>• To motivate the local villagers to try out e-commerce</li> </ul>	<ul style="list-style-type: none"> <li>• "The most important task (for developing e-Commerce) is the training of villagers to change their</li> </ul>

(Continues)

**TABLE C1** (Continued)

Subjects	Actions	Goals	Exemplary Quotes or Evidence
		<ul style="list-style-type: none"> <li>To prepare the local villagers with right mindsets</li> <li>To prepare villagers with necessary skills for their production and transactions</li> </ul>	<p>mindsets. This is the most difficult part." (Source: I9)</p> <ul style="list-style-type: none"> <li>"With regards to training, sometimes we [the town's government] organized some [training sessions]. The county government will organize some too. When there was no formal training session, we will sometimes just go outside [the town] and learn new things and come back to teach our villagers." (Source: I9)</li> </ul>

**TABLE C2** Policies by Longnan's prefectural government for rural e-commerce development activity

No.	Date	Subjects	Policy Title
D1	Dec 21, 2013	The general offices of Longnan Municipal Government and Longnan Municipal Party Committee	"Announcement on Accelerating e-Commerce Development"
D2	Jan 6, 2014	The Bureau of Agriculture and Animal Husbandry of Longnan Municipal Government	"Announcement on Online Marketing of Agricultural Productions"
D3	Jan 14, 2014	The general offices of Longnan Municipal Government and Longnan Municipal Party Committee	"Implementation Plans of the e-Commerce Operation Training Program of Longnan"
D4	Feb 19, 2014	The general offices of Longnan Municipal Government and Longnan Municipal Party Committee	"Recommendations on Accelerating the Progress of e-Commerce Development"
D5	Feb 25, 2014	The Financial Regulation Office of Longnan Municipal Government, The Longnan branch of People's Bank of China, the Longnan branch of China Banking Regulatory Commission	"Instructions on the Support of e-Commerce Developing in the Finance Industries"
D6	Mar 31, 2014	The general office of Longnan Municipal Government	"Recommendations on Accelerating Communication Network Construction for e-Commerce Support"
D7	May 6, 2014	The Organization Department of Longnan Municipal Party Committee	"Announcement on Using College-Graduate Village Officials in e-Commerce and Rural Development"
D8	May 9, 2014	The general offices of Longnan Municipal Government	"Recommendations on the Development of the Logistics Industry"
D9	Jun 4, 2014	The general offices of Longnan Municipal Government and Longnan Municipal Party Committee	"Incentive Plans on Using e-Commerce for Poverty Alleviation in Longnan 2014" "Evaluation Criteria and Procedures in Rewarding e-Commerce for Poverty Alleviation in Longnan 2014"
D10	Jun 16, 2014	The general offices of Longnan Municipal Government	"Announcements on Using Micro-loans in Support of Re-employment and e-Commerce Entrepreneurship"
D11	Mar 29, 2015	The general offices of Longnan Municipal Government and Longnan Municipal Party Committee	"Announcements on Excellence Awards of e-Commerce Development for Individuals and Organizations"
D12	Mar 30, 2015	The general offices of Longnan Municipal Government and Longnan Municipal Party Committee	"Announcement on the Release of Longnan e-Commerce Development Focus of 2015"

(Continues)

**TABLE C2** (Continued)

No.	Date	Subjects	Policy Title
D13	May 12, 2015	The e-commerce leadership office of Longnan Municipal Government, the Industry and Information Technology Commission of Longnan	"Announcement on Accelerating the Progress of Founding the '1688' Online Storefronts" (note: 1688 is a domain name operated by Alibaba as an online wholesales website.)
D14	Aug 30, 2017	Bureau of Commerce of Longnan Municipal Government	"The Plan on Longnan E-Commerce Development During the 13th Five-Year Planning Period"

**TABLE C3** Tool-producing actions of rural e-commerce development activity

Subjects	Actions	Goals	Exemplary Quotes or Evidence
The E-commerce Office and Poverty Alleviation Office of Local Governments	Set up the 3-layered e-commerce service systems	To solve the logistics problems in the outward shipment of agricultural products	<ul style="list-style-type: none"> <li>"There are 26 online stores from our town, and they are all members of our town's e-Commerce service station. We have a hierarchical structure [of the service stations], in which the town's stations serve the villages and the village stations serve households" (Source: I3)</li> </ul>
The E-commerce Office and Poverty Alleviation Office of local governments	Provide seed funds for e-commerce development	To supply villagers with necessary financial resources for their production	<ul style="list-style-type: none"> <li>"There is a cooperative fund in this village.... Any villager who paid 100 yuan membership fee can join. If one member wants to invest in raising hens, for example, and he is lack of starting fund, then he can get a loan from the cooperative fund. If he paid back the loan in one year, then he can continue getting new loans. It is very flexible." (Source: I9)</li> </ul>
The transportation construction department and telecommunication regulatory department of local governments	Develop the transportation and telecommunication infrastructure	To establish the infrastructure for e-commerce development	<ul style="list-style-type: none"> <li>"This road was built in 2014. It leads to a village inside these mountains. Without this road, the villagers there would have to walk three days to get outside if the weather is bad." (Source: I9)</li> <li>"In 2013 when we started to develop e-Commerce, the governments came to this village and set up this cellular towers. In 2014 they got mobile networks, and in 2015 the whole village got broadband networks." (Source: I2)</li> </ul>

**TABLE C4** Community-building actions of rural e-commerce development activity

Subject	Actions	Goals	Exemplary Quotes or Evidence
The Organization Department of Longnan Municipal Government	Assign new duties to college graduate village officials to develop local e-commerce	To guide and facilitate local villagers for e-commerce development	<ul style="list-style-type: none"> <li>"In 2013, our county government let the CGVOs to take charge of rural e-Commerce. In our county, newly admitted CGVOs were sent to the villages and towns to focus on rural e-Commerce. The CGVO came to this poverty-stricken village [Manping Village] in 2014 and started working on</li> </ul>

(Continues)

TABLE C4 (Continued)

Subject	Actions	Goals	Exemplary Quotes or Evidence
			this.... He [the CGVO] majored in design in college, and I think he did a good job focusing on positioning, packaging, designing, and promoting the local products.... He visited villagers every day and knew very well which families have cage-free chickens, which have eggs, which have harvested honeys, and which have picked edible wild herbs etc." (Source: I3)
E-commerce platform provider	Collaborate with local governments in promoting rural e-commerce	To penetrate the rural markets	<ul style="list-style-type: none"> <li>• "At the beginning we had nothing to do with Alibaba. At the end of 2015, our county government signed an agreement with Alibaba to develop rural Taobao, and our town became one of the first to join in the efforts. We opened a rural Taobao service station in Xiliu village, the largest village in our town." (Source: I3)</li> </ul>
Shipment and delivery companies	Expand the delivery areas to cover towns and villages	To serve the niche markets in rural areas	<ul style="list-style-type: none"> <li>• "Now almost all of our villages are covered by express deliveries. Shentong [a national delivery company] directly deliver to our town e-Commerce service center. The other companies deliver to a Yunda [another national delivery company] store in front of the town. ... Many logistics companies now pay a person to further deliver from the town to villages." (Source: I3)</li> </ul>

TABLE C5 The new roles of poverty population under the poverty alleviation through e-commerce activity

Roles	Actions	Exemplary Quotes or Evidence
Consumers	Purchase low-cost household items online	<ul style="list-style-type: none"> <li>• "We are all smokers and we need lighters. A lighter costs 1 yuan here in our village, but if we five or six people place one order one line, on average we would pay just 0.4 yuan for one.... We like Taobao very much. Previously I had to visit the local marketplace in the town several times every month, but now I don't need to. I just make orders online when I am having a walk after dinner." (Source: I8)</li> <li>• "Rural Taobao focuses on buying on behalf of villagers to get better deals on items as small as a bag of salt or rice or diapers and as big as appliances such as refrigerators and washing machines and cars. Last year the car manufactures had a big promotion, Ms. Wang of the Xiniu Village [who worked in the rural Taobao service station] helped a villager save more than 40 thousands yuan by paying 74 thousands for a Chevrolet car with a market price of more than 110 thousands." (Source: I3)</li> </ul>
	Purchase low-cost production materials online	<ul style="list-style-type: none"> <li>• "These are the packaging materials for cage-free eggs. It is fall-proof. We tried many different packages before and these are the best ones in terms of fall-proof ... and we got these materials from Taobao." (Source: I3)</li> </ul>
Microentrepreneurs	Run own businesses	<ul style="list-style-type: none"> <li>• "I grow walnuts, nearly 10 acres of them. Last year I sold more than 750 kilograms of walnuts. More than 200 kilograms were sold in the local market at 10 yuan per kilogram. They sold the other 500 kilograms for me online at 16 yuan per kilogram, 6 yuan higher than local price, and I earned 2000 yuan more. Rural Taobao did bring us tangible benefits." (Source: I8)</li> </ul>

(Continues)

TABLE C5 (Continued)

Roles	Actions	Exemplary Quotes or Evidence
		<ul style="list-style-type: none"> <li>• “In 2013 when we started to help him [a villager in poverty] to raise hens, he had only a handful of them, which produced just enough eggs for his own family. In 2014, he raised 1,000 as part of his learning process, and in 2015 he raised 4,000.” (Source: I2)</li> </ul>
Producers	Join a cooperative for production and sales	<ul style="list-style-type: none"> <li>• “In Erlang Town, there is a cooperative group focusing on producing wood-ears [an edible fungus used in Chinese cuisine] ... the group attracted many other villagers in poverty to work for them. For example, there are housewives who need to take care of their kids and cannot work too far... [to supply wood-ears to this cooperative.] they can just work at their own doors to pick and dry wood-ears while staying with their kids.” (Source: I2)</li> <li>• “Our village has two cooperatives. One focuses on producing wildflower honey and cage-free eggs. The other one, which is located deep in the mountain there, focuses on raising cattle.” (Source: I12)</li> </ul>
Employees	Work for companies	<ul style="list-style-type: none"> <li>• “This honeysuckle tea is one of our best products sold online. It was produced by a local company, which means that the entire production process of picking, packaging, and shipment is based on specialized equipment and people ... the company contributed to poverty alleviation by offering employment opportunities to local villagers in poverty, hiring them as employees for jobs such as weeding or picking in the plantation.” (Source: I3)</li> </ul>
Investors	Receive dividends through capital investment	<ul style="list-style-type: none"> <li>• “We are planning to form a cooperative or an association, with the village government holding majority shares but also allowing our villagers in poverty to become shareholders.... With stronger capital base, we can expand our business of honey production and later return more dividends to these villagers in poverty.... Our e-Commerce is no longer just at an exploration stage but instead at a stage of focusing on quality and efficiency.” (Source: I12)</li> </ul>

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