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Abstract

Seeing the scarcity of successful e-government programs in developing countries while a high failure rate reported on the opposite, this study investigates the success of "Digital Wuyi" program in China. This study exhibits its ten-year roadmap in which the e-government has been continuously upgraded at a municipal level, spanning from e-government infrastructure and platform development, community informatization with rural priority, e commerce development for pillar industry, to Internet of Things development. Further, this study identifies the key success factors and reflects the corresponding practices that lead Wuyishan City to achieve the success in e-government development. We find that sustainable and dynamic strategic planning, mayor's leadership with entrepreneurships spirits and action learning, public-private partnership and modular promotion contribute much to the success of this municipal e-government project in China. Implications of this study can be derived for the municipal government development in China and other developing countries.

Keywords: Transformation, E-government, Success factors, Case study.

1   Introduction

Information and Communication Technology (ICT) has become an increasingly important factor in the development of social, economic, political sectors of nations. ICT has been introduced in the government sectors in the past two decades in an attempting to achieve greater operational efficiency and effectiveness (O'Neil, 2009). In developing countries like China, the adoption of ICT in the government sectors is not just for improving its efficiency of administration operation. More importantly, the technology helps the government transform its function from administration-oriented into service-oriented. The relationship between government and business, government and civilians is changing from bureaucracy into a more democratic system. Therefore, the development of ICT-enabled e-government in China presents fundamental impacts on the role and function of government than that in the developed countries.

After a critical literature review, we find several limitations in the existing research in the e-government area. First, there are a branch of studies describing the successful implementation and the resultant benefits in developed countries, e.g., US, Canada, Australia, Singapore, etc. (Chan, Lau, and Pan, 2008; Chen, Chen, Huang, and Ching, 2006; Leidner, Pan, and Pan, 2009; Siau andLong, 2005; Tan andPan, 2003; Tan, Pan, and Lim, 2005). In contrast, a high failure rate of e-government in developing countries has been reported (Heeks, 2003). Whether the successful experience in developed countries is also applied for developing country such as China is questioned. Second, seeing the factual high failure rate, some researchers have begun to investigate the key failure factors of e-government implementation in developing countries, e.g., India (Kumar andBest, 2006). However, such research is not sufficient to satisfy the needs of the government administrators who demand to know more about how to achieve the e-government success. Therefore, the investigation of the best practices of e-government in developing countries present more salient values to both practitioners and researchers. Third, a branch of research is related to the Chinese e-government development. However, prior research focused on the motivation for Chinese e-government development and its impact on business, trade, national economics, information policy, technology, network construction, and office automation (Lovelock andUre, 2002; Ma, Chung, and Thorson, 2005; Xiong, 2006). Recently., Xia's (2010) study reveals rural informatization policies and practices in China in a one-shot mode. Thus, we still have little knowledge about the roadmap of a successful e-government case in China and how such a success, although a few, can be achieved.

In this study, we aim to investigate a successful e-government case in Wuyishan City, China, named as "Digital Wuyi", by describing its ten years evolution, identifying the key success factors for the e-government development, and presenting how e-government helps to local government functions and improves the city image. What makes the case of Wuyishan particularly impressive is its great success in launching e-government in rural areas where Internet access is limited and farmer's awareness of wielding Internet to make them better off is absent. The e-government program provided extensive services and know-how as well as other useful information to farmers, and at the same time made online shopping possible in rural area. It also trained rural women, who later took the position of CIOs at the village level of this program. These are no easy tasks, so how "Digital Wuyi" achieves these is all worth scrutiny.

2   Literature review

Since the emergence of modern ICT, the public sector has been utilizing ICT to support its operations (Bozeman andBretschneider, 1986). In particular, it has been highlighted that ICT possessed the catalytic property to transform the capability of governments in serving their citizens (Bekkers, 2003). ICT has been widely regarded as an indispensable tool for governments to increase customer focus, enhance efficiency, improve effectiveness, reduce bureaucracy (Chan, Pan, and Tan, 2003), increase

transparency in administration, reduce corruption and increase political participation (Bonham andSeifert, 2003). Its potential to make governments more competitive and to enable them to face the challenges of the information and communication age has also been noted (Ndou, 2004; OECD, 2003). Therefore, it is unsurprising that governments in both developed and developing countries have invested billions of dollars in various e-government initiatives (Chan et al., 2008).

A recent study using the United Nations data empirically proves that e-government development and implementation differ in the following three areas: income level, development status, and region (Siau andLong, 2005). The United States, Australia, Singapore, and Canada were the frontiers in the march of initiating e-government and benefited from such initiatives. Compared with the developed countries, the developing countries have been so far behind and they are trying to catch up the progress in developing decent e-government infrastructures from multiple perspectives. Chen et al.(2006) have noticed that the differences between developed and developing countries, including history and culture, technical staff, infrastructure, citizens and government officers, result in the differential e-government performance for different governments.

In particular, e-government implementation in Singapore is a successful case, which has aroused many attentions from academia and practitioners (Chan et al., 2008; Chen et al., 2006; Leidner et al., 2009; Tan andPan, 2003; Tan et al., 2005). E-government helps Singapore government to manage crisis response, manage stakeholder interests, and manage e-transformation in the public sectors. There are various success factors for Singapore Government to successfully implement different e-government projects. For example, existing assets such as information technology infrastructure, leadership, and collaborative networks and existing capabilities such as the ability to build and apply IT, the ability to recognize signals and the ability to see the big picture are critical during crisis response for Singapore government (Leidner et al., 2009).

However, for developing countries, there are relatively few studies to explain the successful e-government implementation in developing countries. Instead, Heeks (2002) has noted several more cases of total or partial failure of ICT initiatives in developing countries. According to Heeks (2003), who has done substantial research in the subject area, most implementations of e-government in developing countries failed, with 35% being regarded as total failures and 50% as partial failures. Moreover, Kumar and Best (2006) identified that the key failure factors for an e-government project in India included the inadequacy of trained personnel, the absence of sustained public leadership, commitment and institutionalization, the lack of consistent evaluation and monitoring, and the insufficient involvement of all stakeholders. Ndou (2004) further argued that challenges for a successful implementation of e-government in developing countries include strategy, leadership role, partnership and collaboration, ICT infrastructure, and change manage management. By studying a social security smart card project in Shanghai, China, Chen et al. (2009) demonstrated that modularity and societal learning play an important role in implementing localized e-government efforts throughout the tiers of the municipal governments. Although it is important, it is still not adequate for the explanation of e-government success which is related to many factors. Therefore, how to ensure the success of e-government implementation in developing countries such as China is warranted.

Through the critical literature review, we identify two limitations in the existing e-government literature. First, research on key success factors of e-government in developing countries is rare, although the e-government implementation in developing countries has been reported with a high failure rate. Secondly, prior e-government research focuses on either a project level or a country level, resulting in a scarcity of research on e-government implementation at a municipal or county level. Therefore, we aim to investigate the e-government development at municipal level in China and attempt to address the following research questions:

RQ1: How is the municipal-level e-government is implemented and continuously developed in developing countries such as China?

RQ2: What are the success factors that contribute to the sustainability of the e-government in a municipal city in China?

3   Research method

Our exploratory study aims to understand the implementation process of successful municipal e-government in developing countries and China in particular. We attempt to identify the key success factors for e-government projects in China. To fulfil the research purposes, we selected Wuyishan City, Fujian Province, China, to conduct the case study, because this city has experienced a transformation by continuously implementing e-government projects in the past 10 years.

Research access was negotiated and granted in January, 2010. The mayor provided us the entry and the widespread access. We had a field study in Wuyishan City in February, 2010. We conducted 10 rounds in-depth formal interviews with the mayor, Steering Group leader and members, which last 26 hours. We organized 2 workshops with the rural people in Xingcun Village and Huangcun Village. We participated in the acceptance meeting of an emergency information platform. We also had various informal conversations with the mayor and other staffs In addition to the first-hand data collection and observations, we also collected a large amount of archival data, including organizational documents, internal memos, online information, as well as the public authorized information about "Digital Wuyi" (e.g., books). We kept on contacting with the key staffs in Digital Wuyi and obtained the updated documents and information about their project progress via e-mail, instant messenger and micro-blogging.

In general, all interviews in the field study lasted around 1.5 to 2 hours. They were digitally recorded and transcribed for data analysis. Interview questions were prepared in advance, designed to be open-ended in nature and tailored to the roles of the informants. All interviews were conducted by multiple researchers. Data triangulation was achieved through iterative data validation and consolidation from the multiple researchers (Yin, 2003). We adopted a data grounded interpretive stance to analyze the data (Strauss andCorbin, 1998). The data from different sources were first triangulated to provide a comprehensive and consistent picture of what has actually transpired in the e-government implementation process undertaken by the Wuyishan Government. Based on the open coding technique (Strauss andCorbin, 1998), themes were inductively generated to reach the conceptualization of key success factors of e-government implementation in Wuyishan City.

4   Case description

4.1   Case background

There are over 3,000 municipal cities in China, and Wuyishan, with a population of 25,000 and 70% of them engaging in farm work, was a nameless city a decade ago. Though possessing a UNESCO World Heritage Site, Wuyishan still failed to attract attentions, which was largely due to its remoteness and the lack of opportunities to expose itself through traditional media such as newspaper and television. However, Wuyishan built the city image and allowed the image spread in China by implementing a series of e-government projects – the "Digital Wuyi" program.

4.2   The roadmap of e-government in Wuyishan City

The government of Wuyishan launched the program of "Digital Wuyi" with a number of continuous e-government projects. This program aims to use information technologies to transform the government management, enhance the city image, thus improve the competitiveness of the city. The program was launched in 2001 and still keeps on going up to now. Wuyishan government embarked on a wide range of e-government initiatives, including the building of e-government infrastructure and the development of e-government platform, rural informatization platform, local industry (i.e. tourism,

tea industry) informatization platform, community informatization, and the platform of "internet of things", and so on. The road map of the e-government development is shown in Figure 1.
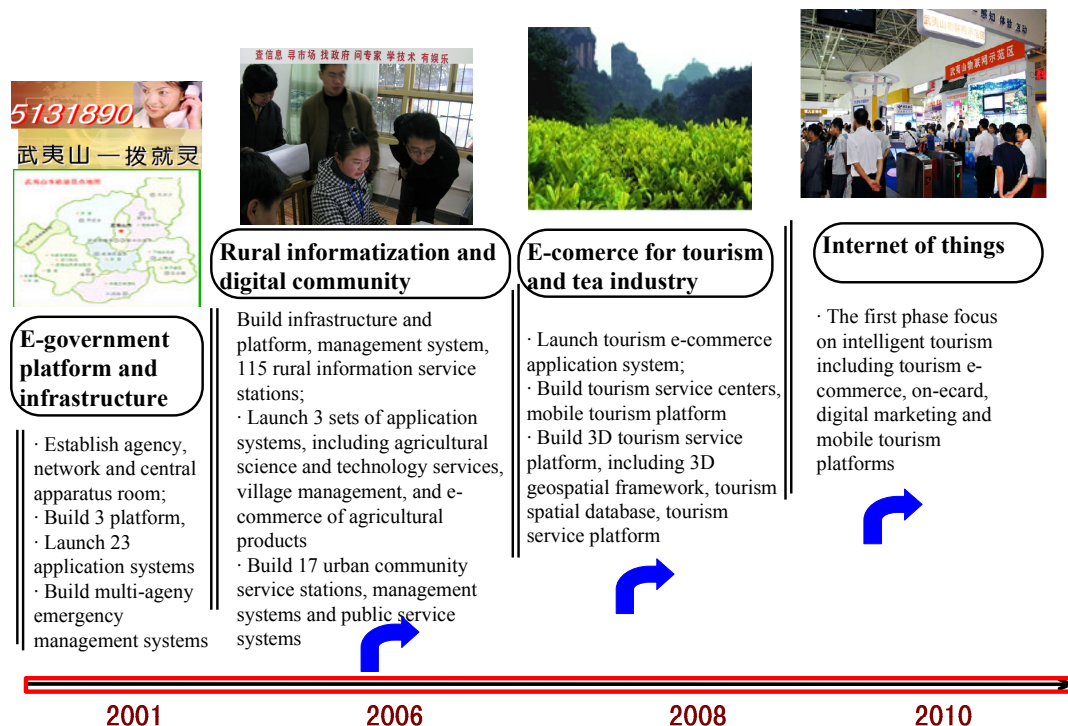

Rural informatization and digital community

E-comerce for tourism and tea industry

Internet of things

E-government platform and infrastructure

· Establish agency, network and central apparatus room;
· Build 3 platform,
· Launch 23 application systems
· Build multi-ageny emergency management systems

Build infrastructure and platform, management system, 115 rural information service stations;
· Launch 3 sets of application systems, including agricultural science and technology services, village management, and e-commerce of agricultural products
· Build 17 urban community service stations, management systems and public service systems

· Launch tourism e-commerce application system;
· Build tourism service centers, mobile tourism platform
· Build 3D tourism service platform, including 3D geospatial framework, tourism spatial database, tourism service platform

· The first phase focus on intelligent tourism including tourism e-commerce, on-ecard, digital marketing and mobile tourism platforms

2001   2006   2008   2010

Figure 1. Roadmap of "Digital Wuyi" project development

4.2.1 Phase 1: E-government infrastructure and platform development (2001-2005)

From 2001 to 2005, Wuyishan government carried out various fundamental projects to promote e-government in the city, such as establishing informatization government management agency to lead the whole project, building technology and network infrastructure and e-government platforms and application systems.

Wuyishan government initiated the e-government project by establishing the "Digital Wuyi" Steering Committee in October, 2001. The mayor, Hu Shuren, headed the committee while other vice mayors served as vice group leaders. Meanwhile, leaders of key government agencies formed members of the committee. The "Digital Wuyi" Steering Office was empowered to implement the task required by the Steering Committee. From then on, the Steering Office began to take charge of formulating informatization strategic plans, organizing and implementing e-government projects, and maintaining e-government outcomes. Then the Steering Office built the central apparatus room, constructed the intranet as the hub of government administrative office and the extranet as the exchange center between governments and other public platforms.

Based on the infrastructure, the Steering Office built three platforms to implement G2G, and G2C services. The website portal of Wuyishan was built and has become the window to the outside world (http://www.wuyishan.gov.cn/). The portal consists of 35 modules, 165 sections and has several channels of Wuyishan characteristics, such as government channel, tourism channel, tea channel, and rural channel. The second platform was the government administrative office platform consisting of intranet office platform, extranet office platform, and mobile office platform. It is a horizontal platform providing sharing service for all the government agencies across the city. The third platform was the government information release platform vertically integrated with the government platforms including websites of Nanping City (a prefecture-level city that Wuyishan belongs to), and other

councils across Fujian province. Moreover, twenty-three IS applications were online in the first five years, including the government office automation system, project management system, call center system, declaration and approval system, conference video system, etc.

4.2.2   Phase 2: Information services in rural areas (2006-2010)

Wuyishan government turned its strategic foci to rural informatization from 2006 after making great achievements in e-government infrastructure and platform building in the first five years. And it was in 2010 that the government decided to launch community informatization after the completion of rural informatization in 2009.

In May, 2006, Wuyishan government signed a cooperation contract with Beijing Huidian Science and Technology Company, Intel (China), and Microsoft (China) to launch the "Digital Wuyi" Rural informatization project. The project lasted almost 4 years and achieved a full physical coverage of 115 villages. It is aiming at improving the quality of the rural narrowing down the gap between rural and urban, and reducing the "digital divide" in this area. The fundamental infrastructure platform of rural informatization was built up, including the network and central apparatus room. The platform was shared by all the villages across the area. Several application systems were online to bring information and convenience for the rural, including agricultural science and technology services, rural village management, and e-commerce of agricultural products. Meanwhile, rural information service centers were built up in every village to facilitate information seeking and acquisition for villagers. And village CIOs were selected and trained to support the operation of the information center. A set of management systems was formulated and adopted to sustain the development of rural informatization, such as information station management systems, coordination mechanism between village CIOs and the Steering Office staff, and online expert management systems.

In 2010, the government began to pay attention to the community informatization in urban areas. There are 17 communities in total, 12 of which are in downtown areas and the rest are in town and township. The Steering Group spent one year building the infrastructure, management service systems and adopting OA, business management system, and public service applications. Meanwhile, community comprehensive service stations are built in each community. Now the project is still in progress and will be checked and put into use in 2011.

4.2.3   Phase 3: Promotion of local industries via e-government platform(2008-2009)

The tourism and tea industries are critical to the economic growth of Wuyishan City. Wuyishan government launched various and more and more sophisticated informatization projects, in order to improve the service level for tourists, standardize the publicity and promotion channel for products, and provide credible tourism products with quality.

The tourism channel and tea channel first went online in 2002 and took up a prominent position on the website portal. The tourism channel serves as the platform which integrates destination marketing, tourism management, and travel reservation system by information technology. The tea channel provides a platform for tea information release management, tea industry management and tea online shopping. Then Wuyishan government built up the tourist service centers around scenic area, and established tourism electronic commerce around 2007.

In 2009, a comprehensive tourism service platform was built up using geography information systems (GIS). This platform provided a three-dimensional picture for tourists to present the natural scenery and historical sites. Tourists could easily obtain rich information from the platform. Meanwhile, mobile-based wireless platforms were developed, which incorporated various applications related to the food, life, housing, travelling and shopping in Wuyishan.

4.2.4 Phase 4: Internet of things platform development (2010-present)

In 2010, Wuyishan began to launch a "Internet of Things" platform in the city. The Internet of Things refers to uniquely identifiable objects and their virtual representations in an Internet-like structure. 48 million RMB was invested in the construction of the Internet of Things. The project touched multiple aspects of a city, including intelligent tourism, intelligent transportation, intelligent campus, smart security, smart environment, and smart urban management. Now the intelligent tourism has been completed. The smart tourism platform integrated various sub-platforms such as tourism e-commerce, One-card, digital marketing and mobile tourism, as well as integrated various information of the city life. This project help to improve the tourism environment and enhance the image of the city.

5   Key success factors for developing "Digital Wuyi"

5.1   E-government strategy planning

One major challenge for an e-government project is the establishment of an appropriate context-tailored strategy. Many e-government projects failed due to the poor strategic planning (Ndou, 2004). One success factor of "Digital Wuyi" program is its decent strategic planning. The government had a holistic vision of implementing the program, continuously adjusted the strategic visions, dynamically aligned the available IT resources with the end users' needs, and concerned about the program sustainability.

A holistic vision. In 2001, Wuyishan, a county-level city, was not permitted to publish newspapers, thus Internet became the only channel to propagandize Wuyishan. The policy and regulation environment urged Wuyishan to implement an informatization strategy and to initiate "Digital Wuyi" officially in October, 2001. The e-government strategy is oriented to enhance the urban competitive power and integrate all levels. Many public institutions limit their activities to a simple transfer of their information and services online without taking into consideration the reengineering process needed to grasp the full benefits (Ndou, 2004). On the contrary, Wuyishan government takes e-government as the most important tool to transform itself and reengineer government, agriculture and tourism, and to achieve strategic competitive advantage for the city through e-government. The informatization platform integrated e-government infrastructure, e-commerce, e-agriculture and e-tourism and brought benefits to all stakeholders, ranging from government administrators to organizations, business, citizens and farmers.

Dynamic strategic alignment. E-government is an alignment between government service goals and the IT resource available (Dawes andNelson, 1995). The government has to achieve a dynamic alignment to overcome the barriers and make progress. Part of the strategy is to engage in a rigorous assessment of the current situation, the reality on the ground and the inventory of projects, articulate costs, impacts and benefits of programme as well as continuously monitor and evaluate the project upgrading.

Initially e-government strategy in Wuyishan is based on the knowledge and cognition of the mayor. The top management team (TMT) successfully turned his vision into municipal e-government strategy. However, Wuyishan's IT resources is very limited, lack of funds and technology. In order to align its IT resources with its e-government service goal, the government did not wait for the higher authority to allocate funds, but drew support from private companies, such as Huidian Company, IBM Corporation and Intel Corporation. During the past ten years, Wuyishan utilizes the Public Private Partnership pattern unceasingly, integrating IT resources outside of the government to improve the services. Meanwhile, Wuyishan government dynamically formulates the e-government focus and objectives, match IT resources with e-government strategic target, and implement e-government strategy. Now Wuyishan e-government is developing from G2G to G2C and G2B, the client service is

expanding from government to the county and tourism and tea industry. Wuyishan has grown to become a e-government pacemaker in China.

E-government with sustainability. E-government in Wuyishan was implemented in the following way: the Steering Committee formulated a stage-based e-government strategy, in each stage the implementation had specific foci, and the strategic foci would be updated when the prior strategy was achieved (see Figure 2). More specific, Wuyishan government planned to build e-government infrastructures at the initial stage. Next, they attempted to develop platforms for the critical industries. With basic infrastructures and platforms held, the government was able to continuously leverage IT to reduce the distance between the rural and urban areas. Therefore, the "Digital Wuyi" program achieved sustainability.
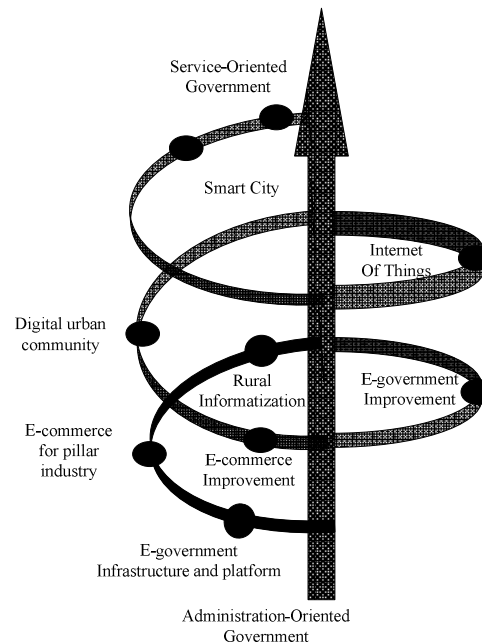

Figure 2. Sustainable and dynamic strategic planning

5.2   Mayor's leadership

The second success factor of the "Digital Wuyi" program is related to the Mayor' leadership. The public sector presents unique challenges for leadership. Changing and hazy visions confuse expectations for reformers and leaders (Gramberger, 2001). Leadership is one of the main driving forces of every new and innovative project or initiative (Ndou, 2004). E-government in Wuyishan is a ten-year "Chief leader project". The mayor of Wuyishan City, Hu Shuren, played a critical role in initiating e-government projects. He showed his entrepreneurship and used action learning during the project implementation.

Mayor's entrepreneurship. The New Public Management movement focuses on how the performance of state agencies could be improved and suggests that public government leaders do their jobs like entrepreneurs in private sectors (Moe andStanton, 1989). And leadership is recommended to be shifted from command and control to facilitation and coordination. Miller (1983) defines entrepreneurship as a multidimensional concept consisting of innovation, risk taking and proactiveness. This classification is widely adopted in entrepreneurship research and we will use it to analyze the mayor's leadership.

Innovation. The innovation dimension manifests the entrepreneur wish to be separated from existing technology and practice. Wuyishan E-government spends few and performs efficiently, while most of

Chinese E-governments spend frequently several hundred million and effect is bad, actually they have not landed on feet. Hu Shuren said that "*Implementing E-government is my initiative conscious activity; it is not an administrative command nor a inspection target*".

Risk adventure. Innovative activities need risk-taking attitude. If the entrepreneur does not have certain risk-taking spirit, the government will not accept the innovation behaviour. The public sector is often perceived to be synonymous with "bureaucratization", and it is associated with routine behaviour, risk aversion, and lack of initiatives. However, for the mayor of Wuyishan, he took the risk and insisted on promoting e-government in this county-level city, willing to bring benefits to citizens here. He indicated that "*In the very beginning，we keep e-government going covertly, because too many people could not understand why we invested so much money in implementing e-government, which seemed useless at that time*".

Proactiveness. Wuyishan does not have advantages in media publicity and geographical position. We observe that e-government provides Wuyishan a great power in improving the city image, which integrates G2G, G2C and G2B. The mayor unceasingly seizes on various opportunities, continually collaborates IT resources from partners, and pushes the city to the national advanced standard finally.

Action learning. Action learning is one of the most effective and powerful tools in developing the necessary competencies and experiences to carry out these roles (Marquardt, 2000). Action learning is an educational process whereby the participant studies their own actions and experience in order to improve performance.

The mayor has been in charge of the informatization work in Wuyishan for ten years. Shuren Hu's understanding of information technology has greatly changed in the past ten years. Initially he was very interested in information technology and took it as a new tool to improve government service. Gradually his understanding becomes more and more profound through active learning, pondering continually and forward feedback in working practice. Through action learning, Shuren Hu realized that information technology is a key to promote administrative reform, to develop the municipal economy and to solve the rural issue in China. And then he turned his interest on IT into government vision and made it evolve into E-government platform that integrate G2G, G2C and G2B. As the e-government proceeds, many stakeholders obtained benefits from this great project and this in turn urged his understanding of IT to upgrade from common sense to a unique insight, a strategic judgment and the practice wisdom, Finally, he believe in that IT will make people better off.

5.3   Public Private Partnership

Public Private Partnership (PPP) means an agreement between government and businesses or non-government organizations (NGOs) for the provision of services by sharing of risks and rewards of the venture. Developing countries would benefit from e-government practices, however, the county-level governments usually lack of financial funds and skills. Public Private Partnership (PPP) has emerged as a viable model, which enables adequate funds and skills of the private sector to flow into the public sector.

PPP in "Digital Wuyi". In China, traditionally local governments were more likely to wait for the upper level governments to allocate resources to support the local developments. However, Wuyishan government adopted the PPP model in integrating resources in the private sectors and NGOs with the resources in the public sectors. The PPP model helped Wuyishan government implement e-government project successfully, obtain adequate financial resources and required skills, especially soft skills. Wuyishan government coordinated the external IT resources to serve for the government, business and citizens. In fact, the awareness of PPP model and the adoption of such model are still rare in China at present. The practice in "Digital Wuyi" signals the success of PPP model in China and a possible solution for other villages and counties.

In 2002, Wuyishan government initiated "Digital Wuyi" project, with RMB three million and technology resources provided by HP Corporation, Beijing Huidian Company and Fujian ShiDa

company. In 2007, together with the China Poverty relief Development Association, China Zhi Gong Party and Intel (China), Wuyishan government implemented the Chinese Villages project – "Wuyi informatization Poverty Relief Stations". In 2010, China Telecom provided 35% of the total investment to the Wuyishan government for developing the platform of the Internet of Things.

5.4 Modular promotion

Modularity is a means of managing complexity, especially in a dynamic environment with limited resources. By limiting the extent of change and incrementally expanding the scale, modular implementation enables the municipal government to cope with the overwhelming complexity intrinsic in large-scale changes in a stepped manner (Chen et al., 2009).The modular approach allows the separation of roles and the parallel progression of the project.

Large scope county-level training. A training program called "hundred village ten thousand people" was implemented in rural areas in Wuyishan, which is aiming at training 10,000 rural people and training them to master the basic computer technology, search information and contact with people outside through Internet. Furthermore, an increasing number of rural people could acquire the agriculture scientific knowledge and the market information through Internet, thus their productive skills and living levels are improved. The rural informatization manager asked the teachers to pay attention to the farmer interests, and to teach them the skills of utilizing modern technologies such as instant messengers, online shopping, and selling products through Internet.

Information service station. During 2007 to 2010, Wuyishan was the pioneer in completing the rural informatization construction that covered all of the 115 villages and the corresponding 115 information service stations. In those stations, village people could have access to agricultural information and technology service, village affairs administration, and the e-commerce for agricultural products. The information service station was established for providing village people with advanced information resources and thus reducing the "digital divide". This practice set up a solid foundation for the modernization of agriculture in Wuyishan. The usage of the equipment and service in all information service stations were free for village people. Liu Deshui stated that "*At present, we cannot require the village people to buy the equipment and cannot charge their usage. If we charged, farmers would not access it. This is the common situation in rural places in China.*"

Village CIOs. Wuyishan government hired a information manager in each village, who was responsible for the daily administration and maintenance of this village's information service station. We call those information managers "Village CIOs". Through the "three notebook one account" management system, the village CIOs maintained their village-level websites, LED information renewal registration, equipment registration, and took charge of training for villagers. Hu Xianbing indicated that "*In Wuyishan 115 villages, more than 80 are female information village officials, most of them are about 30 years old. Through working as information village officials, these ordinary rural women instruct villagers to search the technical information, improve individual quality, increase their income, become information "matchmaker" and the celebrity. They greatly improve their social position.*"

Feasible institutionalization management. The "Digital Wuyi" project set up a feasible institution to manage county-level e-government. The steering office and peer related village committees were co-responsible for the administration of all rural CIOs, including selection, training, inspection, rewards, punishment and so on. At the beginning, multiple village committees recommended at least 2 village residents to compete for the village CIO position. Then, the selection committee carried on inspection and chose two candidates. The candidates were professionally trained for two weeks and were requested to participate in the unified test that determined the final selection of the candidates for rural CIO positions. After that, the steering office motivated the rural CIOs and provided them with more opportunities of taking more responsibilities in the village.

6 Discussion and Conclusion

Seeing the scarcity of successful e-government programs in developing countries while a high failure rate reported on the opposite, this study investigates the success of "Digital Wuyi" program in China. This study exhibits its ten-year roadmap in which the e-government has been continuously upgraded. Further, this study identifies the key success factors and reflects the corresponding practices that led Wuyishan City to achieve the success in e-government development.

Wuyishan has benefited much from the "Digital Wuyi" program. First, the government has been transformed from administration-orientated to service-orientated. The government provided diversified public services to satisfy the needs of different stakeholders, including citizens, farmers, tourists, and business. Second, the core value of e-government in Wuyishan is to bridge the gap between urban and rural areas and the rural people can share the same information resources as the urban people and use IT to change their social status and living standards. Third, the pillar industry has been largely upgraded through informatization and the tourism environment has been greatly improved. Ultimately, the competitiveness of the whole city has been improved through the "Digital Wuyi" project.

From the case of "Digital Wuyi", the success of e-government is largely drawn upon the mayor's recognition and leadership. The mayor has a clear and profound understanding of the role of IT in transforming the society and spent ten years leading the "Digital Wuyi" project. This provides a great impetus and incentive for the TMT and other low-level officials to execute the project. The public-private partnership in the "Digital Wuyi" is also a creative practice. The government tactfully seeks appropriate opportunities and collaborates other private companies and NGOs to acquire financial and IT resources to implement the project, resulting in win-win situations. The success can also be attributed to a sustainable and dynamic strategy planning process. E-government is not a one-hammer project. The Steering Committee of "Digital Wuyi" continually adjusted its e-government strategy foci according to its government service goals and appropriate opportunities to cooperate with other private companies. Moreover, the government adopts a modularity approach to reduce the complexity during the implementation of such a long-term program. For example, the rural imformatization project was promoted step by step. The promotion model was implemented in several typical villages, including information service station, rural CIOs, and feasible institutionalization management. After optimization and adjustment, the success model was extended to the rest villages. Certainly, the success of "Digital Wuyi" should acknowledge the large-scale training across the city.

This study contributes to the e-government literature from the following three aspects. First, this study attempts to disclose the evolution of e-government in Wuyishan. The city Wuyi treats the program "Digital Wuyi" as its core development strategy. Starting from e-government, Wuyishan spent ten years to convert this platform into an integration of e-commerce, e-tourism, e-agriculture and e-community. The integrated platform is able to benefit all its stakeholders, ranging from not only government administration, but also organizations, business, citizens and farmers. In the midst of transition, Wuyishan government shifted its focus from administration-oriented to service-oriented. The different stages experienced during this evolution are demonstrated in this paper. Second, this study reveals the key success factors of implementing e-government at municipal and county level. Compared to those countries that take a lead in implementing e-government, Chinese government has a large space for improvement. Wuyishan, nevertheless, is exceptional. The story behind its great success presents salient values to both administrative and academic sides. Third, the study reveals the value that e-government brings such as the improved city image and management efficiency. "Digital Wuyi" program upgraded the city profile. The relationship between the government and the business and citizens improved when e-government was carried out. At the meantime, the government's ability to cope with crises got boosted. The disclosure of how are these achievements reached adds value to our understanding of the e-government implantation and impact in developing countries in general and China in particular.

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