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The Chinese model of universal service policy: A two-decade retrospect based on an integrated framework[†]

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ABSTRACT. Over the past two decades China has achieved eye-catching development in the provision of telephone and Internet services in its vast rural areas. With the literature's lopsided focus on Western nations, a cohesive paradigm in mapping the Chinese style of universal service policy remains elusive, a situation that has often obfuscated deeper understanding of the Chinese case. This present paper proposes and applies an integrated offer-agent-target (OAT) framework in a retrospective and empirical examination of China's universal service practices and characterization of what has appeared to be the Chinese model. In so doing, China's universal service development is demarcated into discernible stages which are then matched with corresponding institutional landscapes. Three stages are identified and corresponding institutional landscapes explicated. Finally, implications are discussed and policy suggestions are made for the Chinese policy-maker.

Keywords: Telecommunications universal service; Broadband Internet; Universal access; Policy analysis; Chinese model

1. Introduction

The provision of telecommunications universal service is mandated primarily by sociopolitical objectives that target equality and development. In reality, certain demographic segments, occasionally people living in rural areas, are deprived of basic information and communication technology (ICT) infrastructures such as telephone and Internet access, due to various socioeconomic and technological barriers (Moghaddam & Khatoon-Abadi, 2013; Srinuan, Srinuan, & Bohlin, 2012; Milne, 1998; Xia, 2016a, 2016b). As a usual practice, the government would step in to facilitate the provision and use of predefined services by formulating and implementing the universal service policy to ensure accessibility, affordability, and usability of those services to target recipients (Gómez-Barroso & Pérez-Martínez, 2005; Mueller 1999; Yu, 2011). Universal service has

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become a policy issue and scholarly debate since the 1980s, when Western countries began to liberalize utilities. Since then, the quest for an effective universal service model has been a resonant topical issue among policymakers and academia alike.

Over the past two decades China has achieved eye-catching development in the provision of telephone and, more recently, broadband Internet services in its vast rural areas. China's universal service policy effectively started in 2004 through the re-branding and promulgation of the Village Access Project (VAP), which was originally implemented by the former line-ministry monopoly, namely, the Ministry of Posts and Telecommunications (MPT), and, presently, by the Ministry of Industry and Information Technology (MIIT). In only a decade or so, China now has succeeded in extending basic telecommunications services—telephony and the Internet—to cover its vast rural areas. By the end of 2013, 100% of administrative villages (*xing zheng cun*) and 95.6% of natural villages (*zi ran cun*) with 20 households or more had been connected to telephone services¹; 91% of administrative villages had had broadband Internet connectivity, compared with that in the beginning of 2004, when only 89% of administrative villages had telephone services and 72% had broadband access.² This figure was even lower two decades ago, when the telecom industry was beginning to be reformed—with less than half of the villages being connected with a telephone network in 1994.

China is a developing economy with a vast population, diverse land topology, and unique institutional environment, which may predetermine a unique policy model. Nonetheless, with the literature's lopsided focus on Western nations, a cohesive paradigm in mapping China's universal service policies and practices remains elusive, a situation that has often obfuscated deeper understanding of the Chinese case. The core attributes of the Chinese model in implementing universal service policy, and whether the Chinese model can be explicated in a cohesive and consistent way that is conducive to cumulative tradition remain open questions. For one, existing works on China have not provided a consistent set of units of analysis, which is often ad hoc and confused with level of analysis. For another, researchers have tended to emphasize China's institutional uniqueness lopsidedly while, in large part, ignoring the possibility of some intrinsic consistency and probably compatibility.

¹ An administrative village, which is directly under township government and often consists of more than one residential cluster (or natural village), is the smallest unit of administrative jurisdiction in China. According to China Mobile, with the completion of the construction of a mobile base station in a Tibetan village on March 11, 2011, the last administrative village that had yet to be connected, 100% of administrative villages had been connected to basic telephone services. (*Data source*: News release by China Mobile)

² From 2004 to 2013, China invested RMB 87 billion into the VAP construction. As a result, China succeeded in extending telephone services to include an additional 204,000 administrative villages and naturally formed villages while initiating broadband connectivity for some additional 111,000 township governments and administrative villages. Meanwhile, in a bid to promote comprehensive information services (CIS), 338,000 rural information service stations or points were reportedly constructed nationwide. Moreover, some 5,300 rural schools had been offered broadband connectivity during the same time period. (*Data source*: MIIT)

The present study embarks on a retrospective examination of China's universal service practice by proposing and applying an integrated framework in characterizing what has appeared to be the Chinese model. Based on the proposed framework, the investigator first demarcates the transition of China's universal service development into discernible stages. Each developmental stage may correspond to a certain institutional landscape, which is then pattern-matched against these stages.

The paper is structured as follows. [Section 2](#) introduces the theoretical framework. [Section 3](#) establishes a context upon which China's universal service policy has been formulated and implemented. [Section 4](#) explicates developmental stages, which are then matched, in [Section 5](#), with corresponding institutional landscapes. [Section 6](#) discusses the Chinese model and concludes the paper.

2. Methodology

This study uses qualitative case method in examining China's national rural informatization regime. Case strategy is particularly helpful in revealing chronologically the various actors and events in a contemporary context. The study uses a proposed framework as the units of analysis, the proposal of which is based on deductive reasoning, during which the investigator begins by immersing himself in the literature and data. Data collection, which is effectively a decade long continued effort, has leveraged both secondary and primary sources, the latter relies mainly on dedicated research trips took place once or twice a year. Interview transcripts and other materials are coded and analyzed timely during collection, a process that is administered through a data library and embodies a spiral nature in the hope of reaching theoretical saturation. Triangulations are manipulated based on varying sources.

3. Analytical framework—an OAT typology

3.1. Conceptualization of policy dimensions

Universal service policy, either as public policy debate or research subject, has been around for three decades. Now it is probably necessary to establish a relatively coherent and consistent set of units of analysis for explicating the status of national universal service policies and programs. To this end, one tenable way is by breaking down the policy dimensions of universal service.

When it comes to the provisioning of universal service, there are two broad constructs that answer two dimensions of questions, namely:

- WHAT services are to be offered or achieved? —“*WHAT*”
- HOW to offer or achieve WHAT are to be offered and achieved? —“*HOW*”

The *WHAT* dimension defines socioeconomic objectives and corresponding technological

means to achieve them, while the *HOW* dimension lays out economic means and organizational means through which the technological means are offered and, hopefully, socioeconomic objectives attained. Typically, the policy-making process starts off with the definition of socioeconomic ends and the identification of barriers, which pronounce the types of ICT services to be made available to whom and where as well as the intended impacts. Clearly, service definitions should be based on connectivity—namely, the delivery of intended information services to intended recipients—rather than on specific technologies (e.g., wireline or wireless). Thus, alternative technology solutions should be assessed and selected based on cost-effectiveness and efficiency in achieving predefined socioeconomic objectives. Economic means, in which various policy incentives are prescribed, determine the flow of resources (e.g., financial, physical, human, and information) toward the construction and operation of ICT facilities. Finally, decisions have to be made as to who (i.e., agents, private or public) should be involved with the mandate of administering universal service activities.

Table 1

Policy dimensions: An OAT formula

A. Developmental Dimension—“WHAT”

I. OFFER (O)

- | | |
|---------------------------------------|--------------------------------------|
| ■ <i>Universal Access</i> | ■ <i>ICT infrastructure supply</i> |
| | ■ <i>Interface equipment supply</i> |
| ■ <i>Universal Applications</i> | ■ <i>Information supply</i> |
| | ■ <i>Information services supply</i> |
| ■ <i>Services that facilitate use</i> | ■ <i>Accessibility</i> |
| | ■ <i>Training</i> |
| ■ <i>Venue</i> | ■ <i>Targets’ premises</i> |
| | ■ <i>Mobile/ubiquitous</i> |
| | ■ <i>Third-party premises</i> |
| ■ <i>Integration</i> | |

B. Institutional Dimension—“HOW”

II. AGENT (A)

- | | |
|------------------------------|---------------------------------------|
| ■ <i>Ideological Enabler</i> | ■ <i>Divisions of the government</i> |
| | ■ <i>Ministries and commissions</i> |
| | ■ <i>Provincial/state governments</i> |
| | ■ <i>Local governments</i> |

■ Regulative Enabler	■ <i>Community/grassroots governments</i>
	■ <i>Project administrator</i>
	■ <i>Project funder</i>
■ ICT Enabler	■ <i>ICT system integrator</i>
	■ <i>ICT system operator</i>
	■ <i>Information supplier</i>
	■ <i>Service provider</i>
III. TARGET (T)	
■ End User	■ <i>Individuals</i>
	■ <i>Groups</i>
	■ <i>Organizations</i>
	■ <i>Geographical areas</i>

Table 1 lists those detailed constructs that capture the most fundamental attributes of a universal service regime, pointing to developmental (*WHAT*) and institutional (*HOW*) dimensions. The overall framework is characterized by an *offer–agent–target* (OAT) formula, in which, *offer* represents the developmental aspect (*WHAT*) and *agent* and *target* typify the institutional landscape (*HOW*). The developmental (*WHAT*) dimension is mainly represented by five constructs that characterize the universal service *offer*:

- *Universal access*: Predefined “telecommunications” services in serving policy objectives.
- *Universal applications*: Predefined category of “information services” in serving policy objectives.
- *Services that facilitate use*: Accompanying services that equip or assist target users.
- *Venue*: Physical places where universal services are rendered.
- *Integration*: The level to which “access” and “applications” are integrated, which reflects the depth of the universal service offer.

The institutional dimension should demonstrate role-actor and power relations in the universal service ecosystem, which involves four participatory roles:

- *Ideological enabler*: The supplier and advocate of institutions and the scrutinizer of regulatory enforcement.
- *Regulative enabler*: The planner and administrator of the interplay of actors and the integrator of the flows of resources, information, and policies.
- *ICT enabler*: The facilitator of ICT facilities and the provider of information services.
- *Target recipient*: The end user of the predefined ICT services, upon whom, certain impacts are expected to happen.

The first three roles represent the *agents* and the last role represents the *target*. The

roles/actors in **Table 1** represent a relatively consistent set of units of analysis toward the institutional aspect of the universal service policy discourse. Roles (e.g., ICT enabler) are played by agents (e.g., ICT system integrator) and targets (e.g., end users), which fall into specific actors. The role–actor combination can be unevenly matched—in practice, several roles can be performed by one actor or, conversely, several actors simultaneously perform one role. Policy constructs are supposedly identifiable with nexuses (i.e., roles and actors) and flows (i.e., power-relations and funding flow) in the universal service ecosystem, whereas possible bottlenecks or flaws of the universal service regime can also be traceable and retraceable to those nexuses and flows.

3.2. *Operational issue*

Measurements are those indicators that measure the policy dimensions and constructs (in **Table 1**). Selected set of measurements should ideally capture the quintessence of a universal service regime. Since measurements are supposedly more objective-oriented which responds to research context, hence it becomes more tentative or indicative than imperative in this paper when dealing with the measurements issue. Specifically, when it comes to the measurement of the universal service *offer* (development dimension), three scales are tentatively proposed, namely:

- *Recency*: The distance between universal service offer and the most recent commercially available forms of ICT technologies and services.
- *Integrity*: The degree to which “access” and “applications” are integrated.
- *Granularity*: The spatial deployment mode of the universal service offer to target recipients.

In contrast, the institutional dimension is often characterized by the status of the division of labor and participation which captures the core attributes of the dimension. Accordingly, scales against which variability is being assessed are oversimplified into two broad horizons, namely: the *diversification* of the economic incentives versus the *stratification* of organizational hierarchy.

3.3. *Applications in country cases*

The policy dimensions suggested in the OAT formula are conducive to a concise mapping of national universal service policies and programs without having to going into great details. It is helpful for researchers or practitioners to get a panoramic (or partial) snapshot of national (or local) policies and programs—be it in theoretical policy debates or in practical policy discourses. In so doing, it is useful to base the assessment of development status and the description of institutions in question on the proposed constructs. The characterization can also be visualized, for instance, in the form of a spreadsheet that displays the most fundamental characteristics of a universal service regime.

The following sections put these policy dimensions—i.e., *offer*, *agent*, and *target*—into perspective by applying the OAT formula in the case study of China. The country case shows that all three policy dimensions are present in a national universal service policy.

4. China's rural informatization movement: context and overview

Before characterizing the Chinese model, the generic context based on which China's universal service policy has been formulated and implemented should be examined in the first place. China's universal service policy is mainly embodied in its rural informatization program (Xia, 2016a, 2016b), which is meant to be a national initiative intended to "informatize" rural communities and their members by:

- Improving rural access to ICT infrastructures, including telephone, television, and the Internet;
- Providing applications of so-called comprehensive information services (CIS), including those information services that are related to production, commerce, and daily life in rural China.

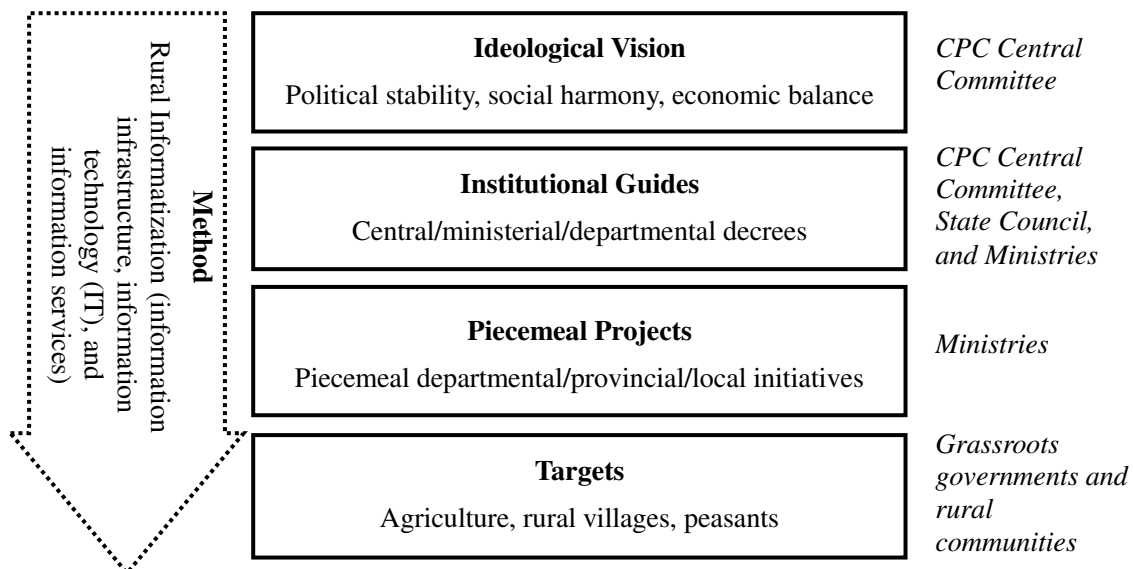


Fig. 1. China's rural informatization movement: a flowchart

As indicated in the flowchart in Fig. 1, China's rural informatization movement is initiated in a top-down fashion, which starts from the ideological vision at the top and is then followed by the issuance of various institutional guides that would consequently spawn various piecemeal projects. These projects enlist multiple departments such as the Ministry of Industry of Information Technology (MIIT) (originally known as the Ministry of Posts and Telecommunications (MPT) and the Ministry of Information Industry (MII)), the Ministry of Agriculture (MOA), and the Ministry of Commerce (MOC), among others. It has been customary, in the beginning of each year, for the Communist Party of China (CPC) Central Committee and the State Council to issue an annual Document-Number-One (DNO) jointly, effectively a central government decree that sets a political tone for the annual priorities on the government agenda. For instance, the 2004 annual DNO brought up the so-called Three Agrarian Issues (TAIs)—i.e., the

developmental issues regarding the farming industry, rural villages, and peasants—which directly led to the reactivation of the Village Access Project (VAP) (Xia & Lu, 2008). The 2006 annual DNO minted the conception of Socialist New Village (SNV), which hatched the concept of the Village Informatization Program (VIP) and Comprehensive Information Services (CIS) (Xia, 2010). Thereafter, the conception set, including the TAIs and SNV, has become the driving ideological vision that basically defines the objectives of China’s universal service initiatives. Table 2 showcases some milestone events, including relevant central documents and decrees and concomitant ministerial follow-ups.

Table 2

Institutional guides: milestone documents and decrees

Year: Milestone	DNOs and other party-state decrees	Ministerial follow-ups	
		Ministry: Decree	Main points
2004: The DNO broached the TAIs. Telephone VAP hence reactivated.	DNO: Various Policy Suggestions about the Promotion of the Farmers’ Income Growth	MIIT: Implementation Method of the Village Access Project	Stipulated the regulatory mode and distribution of the VAP tasks to serve the TAIs end.
2006: The DNO first brought up the SNV concept. Ministries first brought up the VIP and CIS concepts and proposed the CIS platforms project (i.e., the ISS). Telecom carriers started their Agrarian-Connected platforms	DNO: Various Suggestions about the Promotion of the Construction of the Socialist New Villages	MIIT: Suggestions about the Promotion of the Construction Work of the Socialist New Villages	The telecom sector formulated the VIP and CIS concepts to serve the SNV end.
		MIIT: Suggestions on Promoting the Experimentation on Rural Informatization Comprehensive Information Services	The CIS Platform Construction Project (i.e., ISS) is put forward, although without a designated regulatory authority.
		MOA: Suggestions about Furthering Rural Informatization Construction	The agriculture ministry’s response on the TAI-oriented information services.
2006: The first ever state informatization strategy	State Council: 2006–2020 State Informatization Strategy	MOA: The General Framework for the National Agricultural and Rural Informatization Construction (2007–2015)	Framing the roles and initiatives of informatization in the development of modern agriculture and the construction of the SNV.
2007: The first mention of the role of informatization in the so-called Modern Agriculture	DNO: Various Suggestions about the Active Development of Modern Agriculture and the Steadfast Promotion of the Construction of the Socialist New Villages		
2013: Broadband Internet entered universal services	State Council: “Broadband China” Strategy and its Implementation Plan	(Embodied in the MIIT ’s annual work plans as well as long-term plans such as the 13th FYP)	MIIT responded by writing up specific broadband goals in its work plans.
2014: MOA designated the regulatory role in the ISS, which was renamed the Benefiting-Farmers Info Shop under a new Vice Premier (Wang Yang)	DNO: Various Suggestions about Fully Deepening the Rural Reform and Expediting the Promotion of Agriculture Modernization	MOA: Notice on the Experiment Work of Information to Villages and Households	Renewed efforts in improving the ISS, which was readapted and renamed the Benefiting-Farmers Info Shop
		MOA: Work Plan on the Experiment Work of Information to Villages and Households	(Yi Nong Xin Xi She).

Although no official definition of the term “informatization” has been available, it has been rather loosely used by China’s government in reference to those initiatives or activities involved in bringing (integrating) modern ICT into the production, commercial, and organizational processes in various levels to facilitate the same. Accordingly, “rural informatization” can be understood as the initiatives and activities that are directly related to the TAIs. The first part of the TAIs (i.e., the farming industry) is primarily concerned with production and commerce, for which the informatization issue can be profoundly different in nature from that of the remaining parts of the TAIs (i.e., rural villages and peasants). This type of distinction is set out as follows:

- A broadly defined “rural informatization” is concerned with the facilitation and provision of ICT infrastructure, information technology, and information services to all three parts of the TAIs (i.e., the farming industry, rural villages, and peasants).
- A narrowly defined rural informatization is primarily concerned with the facilitation and provision of ICT infrastructure, information technology, and information services to the second and third parts of the TAIs (i.e., rural villages and peasants).

Before starting to characterize the Chinese model, we must first distinguish between the services that reflect the typical universal service attributes and those that do not. It should be noted that some of the services under the broadly defined rural informatization projects may fit better into other public policy categories—such as industry policy, technology policy, and regional and development policy—than the typical universal service category. The informatization of the farming industry in the China, for instance, seems more suitable treated as an industry policy than a universal service policy. Clearly, confusion in the scopes and categories can render theoretical and practical complications. For this reason, this study only considers those projects that belong to a narrowly defined rural informatization that amounts to typical universal services. The mindset is also reflected in the selection of the project cases.

[Table 3](#) provides a snapshot of China’s universal service programs. The piecemeal projects listed in [Table 3](#) represent national efforts in a narrowly defined rural informatization. These projects, the bundling of which represents the general scope of universal services in China, are characterized by using the building constructs underpinning the OAT formula.

Table 3

Mapping China's universal service programs

	Developmental Dimension					Institutional Dimension					
	Access (connectivity)		Applications		Integration	Venue	Services that facilitate use	Ideological enabler	Regulatory enabler	ICT enabler	Target recipient
	ICT infrastructure	Interface equipment*	Information	Information services							
<i>Village connectivity (telephone)</i>	Telephone connectivity	Two telephone sets	(NA)	(NA)	No	Community centers	(NA)	CPC central committee and State Council	MIIT, without explicit funding	State telecom carriers	Villages
<i>Village connectivity (TV)</i>	TV connectivity	Government subsidizing TV sets	TV programs	Basic TV channels	(NA)	Households	(NA)	CPC central committee and State Council	TV regulatory authority, with public funding	State cable operator	Villagers
<i>Information Service Stations (ISS)</i>	Internet connectivity	PCs with Internet connection; information receptacles	Limited	Very limited	Yes	Points/stations	Barely	CPC central committee and State Council	Unclearly-defined role between MIIT and MOA and instable funding	Various participants, including state telecom carriers	Villages
<i>Agrarian-Connected</i>	(NA)	(NA)	Information that are directly related to villages and peasants	Primarily information retrieving	No	Sometimes merged with ISS under an agreement with local governments	(NA)	Central government and MIIT	MIIT, zero budgeting	State telecom carriers	Villagers
<i>Broadband China plan</i>	Broadband connectivity	(NA)	(NA)	(NA)	No	(NA)	Likely in the future	Central government	Central government and MIIT, inexplicit funding	State telecom carriers	Villages

*From 2009 to 2013, rural members were supposed to receive a government-subsidy toward their procurement of home appliances such as TV sets, mobile handsets, personal computers, washing machines, and refrigerators—under a so-called Home Appliances Go to Villages plan from the central government, in the aftermath of the 2008 global financial crisis.

5. Developmental stages

Based on *recency*, *integrity*, and *granularity*, three main stages can be discerned regarding the universal service development and policies in China. These developmental stages are (as generalized in Table 4): (i) community access to the plain old telephone services (POTS), (ii) community access to CIS, and (iii) community access to CIS with recent technologies.

Table 4

The Chinese model: developmental stages

Developmental stages Criteria	Stage I (before 2005): Community access to POTS	Stage II (2006–2012): Community access to CIS	Stage III (since 2013): Community access to CIS with recent technologies
<i>Recency</i>	- Telephone access only (fixed-line, 2G mobile, or VSAT—second-new technologies)	- Telephone access (fixed-line, 2G mobile, or VSA—second-new technologies) - Some broadband access (mostly fiber—recent technologies)	- Telephone access (fixed-line, 2G/3G/4G, or VSAT—reflecting recent technologies) - Broadband access (fiber or 4G mobile—recent technologies)
<i>Integrity</i>	- Telephone access (without apps)	- Telephone and Internet access - Apps (web portals, info service centers, etc.)	- Telephone and Internet access - Apps (web portals, info service centers, etc.)
<i>Granularity</i>	- Initially administrative village and then natural village access	- Natural village access to telephone - Township access to broadband Internet	- Natural village access to telephone - Administrative village access to 4G mobile Internet and/or fiber broadband Internet

5.1. Stage I: Community access to POTS (before 2005)

This is the early stage of China's universal service efforts as of year 2005. The stage is characterized by the promulgation and re-branding of the VAP projects in the line-ministry system—first the MPT before 1998 and then the MII from 1998 to 2005—in a bid to extend voice-grade telephone services to rural villages. Before 1998, China's telecom industry was either a government monopoly (before 1994) or close to a government monopoly (1994–1998),³ during which period the construction of rural

³ China Unicom was officially incorporated in 1994, with both fixed-line and mobile licenses. However, as a new entrant, China Unicom was not mandated to provide universal telephone services before 2004. China

telephone networks was implemented by the MPT's Directorate-General of Telecommunications (DGT) through its VAP planning. From 1998 to 2003, following the initial separation of business operations from the government, telecom SOEs became a profit center. The VAP had since fallen into abeyance by the former China Telecom, a national wireline monopolist at that time.

Before 1998, particularly from 1995 to 1997, China's rural communication system witnessed a period of rapid growth, which was supported by a cross-subsidy mechanism adopted by the former wireline monopolist (the former China Telecom). The introduction of competition and the abolition of the initial access charge as a direct result of telecom reform in 1998 led to the end of the cross-subsidy mechanism; consequently, the former China Telecom pared down investment in rural areas. As a result, the annual growth for village telephone penetration plummeted from 10% before 1999 to 2% afterward.⁴

The TAIs and the SNV had regained priorities on the central government's schedule since 2004, as mentioned previously (Table 2). The VAP regime was reinvented by the MII in direct response to the 2004 annual DNO, which brought up the TAIs. This period retained emphasis on community-level access to the POTS. The goal was to achieve a telephone penetration of, cumulatively, 95% of administrative villages from 2004 to 2005, the last two years of the 10th FYP. The construction work was distributed among six basic telecom carriers at that time, calculated based on the level of revenue and network coverage.⁵ The MII, a de facto line-ministry in the telecom sector, acted as the regulative enabler, which effectively adopted a non-subsidy policy. In short, this stage represents the most basic form of the VAP.

5.2. Stage II: Community access to CIS (2006–2012)

The second stage witnessed a groundbreaking transition in the history of universal service policy in China, from the one-sided access level mandate to the emphasis of both access and applications (i.e., CIS).⁶ Meanwhile, the integration of broadband Internet services into the service scope had also been in a rudimentary stage, which took on, mainly,

Unicom had not had a meaningful PSTN until the 2008 industry restructuring, in which the former China Netcom, a fixed-line telephone operator in north China, was merged into China Unicom. For a more detailed description of the industry reform, see, e.g., Xia (2017).

⁴ Former China Telecom was frustrated by tremendous business losses incurred by providing telephone services to rural areas, for example, the total amount of loss in five relatively developed provinces including Guangdong, Shanghai, Jiangsu, Zhejiang and Shandong mounted to USD 2244 million in 2001, from USD1793 million in previous year (Source: China Communications Yearbook 2004).

⁵ The six basic telecom carriers were: China Mobile, China Unicom, China Telecom, China Netcom, China Railcom, and China Satcom.

⁶ See, e.g., *Suggestions on the Earnest Promotion of the "Village Access Project" and the Development of Rural Services* (MII decree, Beijing, 2008); *Basic Specifications for the Construction and Service of the Rural Comprehensive Information Service Stations* (MIIT decree, Beijing, 2009); *Suggestions on the Implementation of Telephone "Village Access Project" and Advancing "Information to Villages" Activities* (MIIT decree, Beijing, 2009).

townships at that time. This period also witnessed the newly minted conception of rural informatization, which was detailed in the *2006–2020 National Informatization Development Strategy*, a national guideline jointly released by the CPC Central Committee and the State Council in 2006 (Table 2). The promotion of broadband and CIS in rural areas has since been meant to describe China’s renewed universal service efforts. As vowed in relevant government documents and decrees, the government was beginning to channel “broadband to townships, telephone to villages, and information services to households.”⁷ Nonetheless, practitioners were still unsure about and, more often, having to experiment on specific modes that should be and can be employed in facilitating CIS, which was hitherto more of a disembodied concept than elaborated policy instruments. Meanwhile, rural informatization initiatives had tended to be segmented across departments.⁸ Although the degree to which the social ends (e.g., the TAIs and SNV) had been fulfilled was still subject to assessment, this stage did witness an expansion of the VAP concept to be more inclusive and comprehensive (i.e., integrating both access and applications). In this sense, the stage can be labeled as VIP, effectively an expanded version of the VAP.

5.3. Stage III: Community access to CIS with recent technologies (since 2013)

Broadband Internet penetration (with expanded bandwidth) had become an official addendum to the VAP and VIP concepts since 2013. The universal service components embedded in the 2013 *Broadband China* plan can be regarded as a broadband VIP, or B-VIP, which represents the even more advanced stage of China’s universal service efforts, evolving from the basic VAP and then VIP. The concomitant catchword, which implies the level of services provided, had also been upgraded to “broadband to villages, information services to households,” which emphasizes more granular broadband penetration. As part of its content, the ambitious 2013 *Broadband China* plan further specifies the objectives, technological path, and implementation roadmaps in making good this commitment.⁹ According to the plan, China will capitalize on 4G mobile technologies—the most recent technologies at the time—in the promotion of mobile Internet in its vast rural areas. MIIT had also announced that China would be in a bid to take on tele-density (rather than community access) and, by 2020, would have extended the telephone network to cover individual households in the country. Hence, Stage III is meant to be an upgrade in both *recency* and *granularity* from Stage II.

⁷ See, e.g., *Directive Suggestions on the Naturally-formed Village VAP and Telecom Carriers' Promotion of Rural Informatization Test Work in 2006* (MII decree, Beijing, 2006); *Suggestions on the Promotion of the Construction of Socialist New Villages* (MII decree, Beijing, 2006); *Framework on the Construction of Agriculture and Village Informatization (2007–2015)* (MOA decree, Beijing, 2007); *Notice on the Promotion of National Rural Informatization Model Work* (MOA decree, Beijing, 2007); *Suggestions on Expediting the Promotion of Rural Informatization Model Work* (MOA decree, Beijing, 2008).

⁸ See, e.g., *Agriculture and Rural Informatization Action Plan (2010–2012)* (Joint-decree of the MIIT, MOA, Ministry of Science and Technology, MOC, and Ministry of Culture, Beijing, 2010).

⁹ See, e.g., *Broadband China: Strategy and Implementation Plan* (State Council decree, Beijing, 2013).

Table 4 synthesizes the main developmental stages of universal service policy in China, which are qualitatively measured against the scales of *recency*, *integrity*, and *granularity*. Table 4 shows a general developmental trend, namely, over the past decade, China has been in a procession of bids to bring more and more recent and integrative ICT services to more and more granular rural targets. In certain areas—such as the telephone VAP—China has caught up with, if not outperformed, its Western counterparts in terms of its commitment to bringing ICT services to its rural fellow countrymen.

Table 5

The Chinese model: institutional landscape

Developmental stages		Stage I: <i>Centralized line-ministry</i>	Stage II: <i>Diversified centralization</i>	Stage III: <i>Diversified centralization</i>
Agents-Targets				
Ideological Enabler	<i>Telephone</i>	Centralized.	Centralized.	Centralized.
	<i>Broadband</i>	(NA)	Stratified (central, provincial, and local).	Stratified (central, provincial, and local).
	<i>Apps</i>	(NA)	Stratified (central, provincial, and local).	Stratified (central, provincial, and local).
Regulative Enabler	<i>Telephone</i>	Line-ministry; non-subsidy.	Line-ministry; non-subsidy.	Line-ministry; non-subsidy.
	<i>Broadband</i>	(NA)	Provincial governments; fiscal subvention.	Provincial governments; fiscal subvention.
	<i>Apps</i>	(NA)	Segmented multiple ministries and provincial governments; fiscal subvention (for some apps).	Segmented multiple ministries and provincial governments; fiscal subvention (for some apps).
ICT Enabler	<i>Telephone</i>	Incumbent telecom SOEs.	Incumbent telecom SOEs.	Incumbent telecom SOEs.
	<i>Broadband</i>	(NA)	Incumbent telecom SOEs.	Incumbent telecom SOEs.
	<i>Apps</i>	(NA)	Segmented multiple actors.	Segmented multiple actors.
Target Recipient	<i>Telephone</i>	Administrative villages.	Natural villages.	Households and individuals.
	<i>Broadband</i>	(NA)	Townships.	Natural villages.
	<i>Apps</i>	(NA)	Townships, villages, and households.	Households and individuals

6. Matching stages with institutional landscapes

Over the past two decades, China's universal service policy has also witnessed a transition in institutional arrangement, corresponding to the developmental stages (in Table 4). Table 5 epitomizes this institutional metamorphosis, based on the “agent–target” paradigm. In Table 5, the shifting institutional landscape is framed and streamlined according to the

defined roles of *ideological enabler*, *regulative enabler*, *ICT enabler*, and *target recipient*.

For the purpose of capturing the core attributes of the institutional landscape, as indicated previously, scales against which variability is being assessed are oversimplified into the *diversification* of the economic incentives versus the *stratification* of organizational hierarchy. In the degree of diversification and stratification, it is found that the Chinese model has somehow morphed from a centralized line-ministry regime (Stage I) to a diversified centralization institutional arrangement (Stages II and III). For instance, in the early stage (Stage I) of the VAP, the provision of universal services (POTS) was institutionalized under a highly centralized line-ministry system (MPT or MII) with, effectively, a non-subsidy policy. Along with the upgrading of social ends (TAIs, SNV, etc.) in the later stages (Stage II and Stage III), the institutional landscape began to take up more diversified economic and organizational means for more advanced services and more recent technologies (broadband, apps, etc.) but remained highly centralized for basic telephone services. Nonetheless, the core attributes underpinning the institutional landscape have remained basically unchanged over the transitional course from Stage II to Stage III.

7. Discussions and conclusions

This present paper proposes and applies an *offer-agent-target* (OAT) framework in a retrospective and empirical examination of China's universal service practices and characterization of what has appeared to be the Chinese model. The Chinese case study shows that the OAT framework offers a coherent and consistent set of units of analysis and a robust basis in the explication of national universal service policy. The Chinese case also shows that the OAT framework can be potentially applicable to diverse contexts, which is conducive to either focused or comparative case studies (cross-jurisdiction or cross-project; longitudinal or horizontal). Moreover, matching institutional landscapes with developmental traits avails as much to the characterization of policy model as to pinpointing potential mismatches and possible dimensions for improvement, although policy diagnosis is beyond the focus of this paper.

The OAT framework is parsimonious, which is of practical use to policymakers and implementers in casting an informative glance, *ex ante* or *ex post*, on the various critical elements and nexuses entailed in an ongoing or proactive planning of a universal service policy. In this sense, the framework also complements related models—such as the stakeholder analysis, actor-network theory, and institutional environment analysis—in the analysis of role-actor and power relations that are involved in different stages of universal service implementation.

While the Chinese case bespeaks the previously mentioned attributes, it also sheds meaningful light on the status of the Chinese model of universal service policy. The case findings convincingly reveal some fundamental characteristics of the Chinese model:

- *Saltatory development*. Within only a decade, China's universal service objectives

have somehow leapfrogged from community access to POTS (Stage I) to community access to CIS (Stage II) with recent technologies (Stage III), a process that tends to be flatter and take longer in its Western counterparts.

- *Institutional laggard*. Despite the fast development, the general paradigm of regulatory policies and governance has remained unchanged; it has been characterized by a mixture of political mobilization, government domination, and piecemeal departmental projects.
- *Institutional inconsistency*. The regulatory authorities underpinning the applications-level projects (e.g., the ISS), which were initiated from Stage II and onward, are usually spread across multiple departments, often with unclearly defined and inconsistent roles.

By taking a closer look at the match between objectives (i.e., *WHAT*) and institutions (i.e., *HOW*) (as shown in Table 4 and Table 5), it is found that Stage I has probably shown the best fit, with an explicit line-ministry organizational hierarchy matching an explicit universal service objective (i.e., telephone and television access). By contrast, the institutional landscapes associated with Stage II and Stage III have become much more intricate and murky in terms of the equivocal articulation of the economic and organizational means, which could expose cooperation and coordination conundrums during implementation—an attribute that apparently militates against the government’s bid to provide the applications-level comprehensive information services.

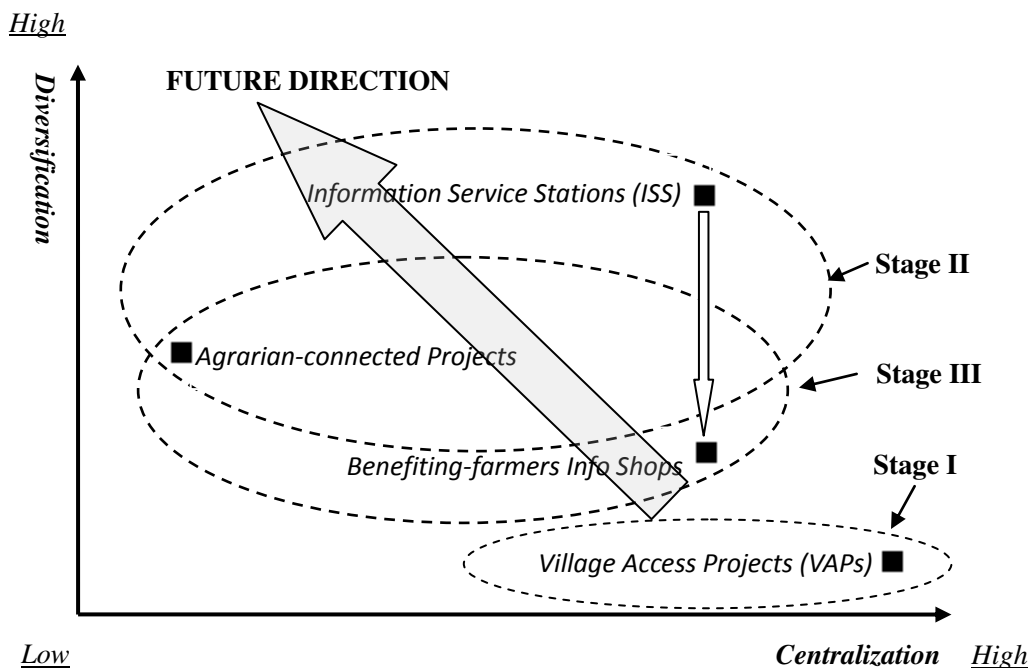


Fig. 2. Institutional façade of the piecemeal projects

The institutional issues could escalate during transition from Stage II to Stage III, between which universal service objectives, if not their actual development, were becoming much

more recent, integrative, and granular than ever before. This would have logically triggered renewed thoughts on more refined regulatory model(s). Nonetheless, the institutional landscape in Stage III has remained largely unchanged if compared with that of Stage II, as shown in the case study. This naturally asks the question of whether the most recently advocated advanced objectives (i.e., CIS with 4G broadband) will be achievable under institutional rigidity. In effect, previous research has also pointed to similar economic and organizational challenges encountered during the provision of CIS (Xia, 2016a, 2016b). Arguably, a highly integrative objective entails institutional innovations—bear in mind that the conventional state-dominated model in the ICT sector may hamper applications development. In spite of this, it should also be noted that Stage III has registered a slight institutional alteration, in which the government has begun to narrow down participations in the Benefiting-Farmers Info Shops project, which was effectively re-branded and reinvented from the ISS. Fig. 2 schematizes the institutional façade of the piecemeal projects against two dimensions (i.e., the diversification of participation and the centralization of regulation) in each stage.

The Chinese case also implies that it would behoove the policymaker and implementer to take a proactive stance toward the established trend in universal service policy, because regulatory actions (*HOW*) as a passive response to the shifting calls of the objectives (*WHAT*) can be inimical to a forward-looking construction plan and institutional design. At the implementation level, a non-proactive approach can also lead to discontinuities and inconsistencies in the technological and infrastructural planning and construction as much as in the usability and sustainability of the projects that have been accomplished. In this regard, as shown in the case study, the OAT framework represents a snapshot approach toward a retrospective and prospective examination of the general landscape of universal service policy and programs while abstracting unnecessary details.

If looked at through the lens of the agent–target paradigm, the institutional ecosystem of the Chinese model is missing grassroots participation, including the target recipients themselves (i.e., villages and villagers) who are absent from the institutional landscape in each developmental stage. This might be just fine in the initial stage, when universal service efforts were limited only to pure access projects (e.g., VAPs), which are implementable by supply-side efforts, but the situation would become quite different for the implementation of more advanced, integrative objectives (e.g., CIS), which hinges more on deeper interplays of supply-push and demand-pull. In this sense, future policy evolution should probably move toward more diversification (of participation) and less centralization (of organizational stratification) (as indicated in Fig. 2).

Generally speaking, the Chinese model has seemingly placed overwhelming weight on the agents—often unclearly defined in roles and ineffectively coordinated in actions, particularly when it comes to the CIS—which are located on the supply side of the ecosystem, while leaving the active participation of the targets on the demand side largely ignored. This sort of institutional mismatch could have aggravated the tendency of confusing ends (e.g., use and impacts) for means (e.g., construction), which should have posed serious policy concerns to the policymaker.

The Chinese case shows—unlike what the literature tends to imply—that a coherent and consistent framework could be aligned in a way that transcends nation-state idiosyncrasies with regard to universal service policy. This paper updates Milne's (1998) stage model and also represents the first attempt of its type to tap into the Chinese model officially. Future research may take on more comparative studies at different levels (e.g., national, local, or project) under either homogenous or heterogeneous technical, socioeconomic, and political backdrop.

References

- Gómez-Barroso, J. L. & Pérez-Martínez, J. (2005). Public intervention in the access to advanced telecommunication services: Assessing its theoretical economic basis. *Government Information Quarterly*, 22(3), 489–504.
- Mueller, M. (1999). Universal service policies as wealth redistribution. *Government Information Quarterly*, 16(4), 353–358.
- Milne, C. (1998). Stages of universal service policy. *Telecommunications Policy*, 22(9), 775–780.
- Moghaddam, B. K. & Khatoon-Abadi, A. (2013). Factors affecting ICT adoption among rural users: A case study of ICT Center in Iran. *Telecommunications Policy*, 37(11), 1083–1094.
- Srinuan, C., Srinuan, P., & Bohlin, E. (2012). An analysis of mobile Internet access in Thailand: Implications for bridging the digital divide. *Telematics and Informatics*, 29(3), 254–262.
- Xia, J. (2017). China's telecommunications evolution, institutions, and policy issues on the eve of 5G: A two-decade retrospect and prospect. *Telecommunications Policy*, 41(10), 931–947.
- Xia, J. (2016a). Universal service policy in China (I): Institutional elements and ecosystem. *Telecommunications Policy*, 40(2–3), 242–252.
- Xia, J. (2016b). Universal service policy in China (II): Case study and institutional variables. *Telecommunications Policy*, 40(2–3), 253–264.
- Xia, J. (2010). Linking ICTs to rural development: China's rural information policy. *Government Information Quarterly*, 27(2), 187–195.
- Xia, J. & Lu, T.-J. (2008). Bridging the digital divide for rural communities: The case of China. *Telecommunications Policy*, 32(9–10), 686–696.
- Yu, L. Z. (2011). The divided views of the information and digital divides: A call for integrative theories of information inequality. *Journal of Information Science*, 37(6), 660–679.