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Deployment Strategies for Service Innovation

Qiang Wang , Chris Voss, and Xiande Zhao

Abstract—In large organizations, local use of innovations is not enough; extracting the full use of the innovation requires deployment across the organization. The purpose of this paper is to explore strategies for the deployment of service innovations and factors influencing success. We adopt an inductive theory-building approach with a longitudinal embedded case study of ten successful service innovations. We find two deployment strategies: required adoption, in which subsidiaries are required to adopt innovations, and voluntary adoption, in which adoption is not compulsory—innovations are showcased, but the adoption decision is left to the subsidiaries. We have investigated the factors influencing deployment, including the decentralized nature of service innovation, fit with the internal and external context, extrinsic and intrinsic motivations, and handovers. Based on analyses of case evidence, we put forward research propositions accordingly. This study provides managerial guidance for multidivisional organizations to extract full value from service innovations. Although some results may be particular to the Chinese context, research in other contexts can broaden the generalizability of the findings.

Index Terms—Deployment strategies, innovation diffusion, longitudinal case study, multidivisional organizations, service innovation.

I. INTRODUCTION

SERVICE innovation stimulation has been identified as a major strategic priority for research and practice [1]. However, the development and successful use of a service innovation do not necessarily guarantee its broader deployment and success. As such, Ostrom *et al.* [2] suggested that identifying drivers of sustained service innovation is an important direction for future research. For example, a new technology may be introduced amid great enthusiasm and enjoy widespread initial acquisition, but may nevertheless fail to be thoroughly deployed. This is of particular concern in a multidivisional firm in which innovations and technologies need to be deployed across diverse parts of the organization. Current innovation research in services and products focuses primarily on the process and strategies for developing innovations: “Many new product introductions con-

tinue to be unsuccessful, and while researchers have studied product development processes, relatively few studies directly address new product launch” [3, p. 901]. We study intracompany deployment, i.e., the process of taking innovations and successfully transferring them across all appropriate divisions of the organization, leading to successful internal use or delivery of services to customers.

The first objective of this study is to develop our understanding of the deployment of service innovations, which “has not received sufficient attention in the empirical literature” [4, p. 1067]. Costa *et al.* [5] and Wang *et al.* [6] re-emphasized the need to investigate deployment issues (especially in a service context) to maximize profits. Building on the seminal work by Ghoshal and Bartlett [7], we propose two strategies for the intracompany deployment of service innovations: required adoption, in which subsidiaries are required to adopt innovations, and voluntary adoption, in which adoption is not compulsory—innovations are showcased, but the adoption decision is left to the subsidiaries.

The service context presents challenges for deployment. In services, and particularly digital services, companies are increasingly seeking to create and deploy innovations rapidly. Service innovations can originate at all levels of the organization, ranging from the front line to central development and open innovation approaches [8]. The distributed nature of this process can pose problems for the management of deployments. The ability to leverage the innovative and entrepreneurial potential of multidivisional companies’ assets in different places is a fundamental strategic imperative [9].

The second objective of our study is thus to understand the factors that explain failed deployment or limit the potential broader success of deployment. We do this by conducting a longitudinal study of a set of successful service innovations in a major mobile telecom organization. The ten service innovations are mainly service product innovations, but some also relate to new business models based on process and/or product innovations [2], [6]. We develop five propositions concerning their deployment. The contribution of this paper is to advance our understanding of the process and strategies for deploying service innovations, which can enhance competitive advantage.

II. THEORETICAL BACKGROUND

A. Intracompany Deployment of Service Innovation

Research on deployment in many contexts is a difficult task. Fichman and Kemerer [10] contended that for innovations in IT to have a positive effect on quality and productivity, they must be effectively deployed, but a large proportion of the innova-

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tions studied failed to be fully deployed. Done *et al.* [11] found various degrees of deployment of process innovations, with full deployment in only one of the seven cases studied. Jensen and Szulanski [12], studying the intracompany transfer or deployment of new management practices, found mixed results. One set of practices had a high degree of effective adoption. Another set faced strong resistance, “Some countries openly refused, but most feigned enthusiasm while giving implementation only a token effort” [12, p. 172], leading to low adoption.

In this study, we focus on the internal adoption of innovations across diverse parts in a multidivisional organization. This intracompany deployment process is influenced by both innovation factors and organizational factors. One model for deployment of innovations is diffusion [13]. The speed of adoption is affected by how information about the innovation is communicated, social aspects such as norms, and the interconnectedness of those concerned. Extant models of diffusion are based on users gaining information and then deciding whether to adopt [14]; however, successful deployment sometimes necessitates the user being required to adopt.

Ghoshal and Bartlett [7] studied the influence of organizational attributes on the creation, adoption, and deployment of innovations—new products, processes, or administrative systems—by the subsidiaries of multinational corporations. They saw deployment as having two possible forms: required adoption and diffusion. Required adoption occurs when a parent company requires its subsidiaries to adopt innovations developed by the parent company, a central R&D facility, or other subsidiaries of the company; diffusion occurs when a parent company requires its innovation-developing subsidiaries to diffuse their local innovations to the parent company or to other subsidiaries.

B. Required Versus Voluntary Adoption

We build on Ghoshal and Bartlett’s [7] approaches and propose and examine two alternate strategies for deployment: required adoption and voluntary adoption.

In intracompany deployment, we define required adoption as a strategy in which a parent company requires other parts of the organization to adopt an innovation. We define a voluntary adoption as a deployment strategy in which processes are put in place to allow for diffusion of chosen innovations internally on a voluntary basis. We take a broader view than Ghoshal and Bartlett [7] in that innovators may or may not be required to seek innovation diffusion. The adopter is the primary driver behind the adoption decision, but the innovator plays a role in encouraging adoption. Similarly, in innovation management literature it has been argued that companies have a choice between “push” (technology) or “pull” (market) strategies [15]–[17] to drive the creation of innovation and must choose a strategy suited to each individual innovation [18]. We argue that after the creation phase, in the deployment phase, companies still need to make strategic choices (required versus voluntary adoption) suited to each innovation. This leads to the following research questions.

RQ1: What patterns of deployment strategies are used for service innovations?

RQ2: What factors determine the conditions under which these strategies should be used?

RQ3: What are the other factors (in addition to deployment strategies) that influence the deployment outcomes?

C. Market or Organizational Fit

When many innovations are deployed, both required and voluntary adoptions can take place. Although the strategies for deployment may directly affect the deployment process and outcomes, other project-specific factors and organizational factors may also be influential. The attributes of an innovation, especially its fit with the market and potential users, strongly affect its adoption [13]. An innovation that better fits its potential users will diffuse faster. However, in required adoption, all relevant organizations should in principle adopt the innovation regardless of fit, though we would expect that the company would consider fit before requiring adoption. Even when being required, the subsidiary/division may be reluctant to use or market the innovation if the fit is poor. Companies might resist adoption for at least two reasons. Market or user context can vary substantially for service innovation [19], resulting in failed or slow deployments in contexts with poor fit. There may also be nonmarket fit issues, such as insufficient resources (or capability) or lack of connections to appropriate suppliers in the adopting organization, which are seen as organizational fit issues and would result in failed or slow deployments as well.

D. Locus of Service Innovation

Another important characteristic of innovation in services is the distributed (or divided) nature of the innovation process and its organization; although some innovation takes place in central R&D, much takes place elsewhere. Zomerdijk and Voss [20] observed a wide range of structures and responsibilities for service innovation, and found that “one of the most striking observations was the degree to which the development and improvement of service resided in the functional areas” [20, p. 13]. In services, the final product often is cocreated in the interaction between a customer and a service provider; therefore, the role that front-line employees play is of major importance [21].

We posit that the locus of development of an innovation will affect the approach to deployment. There could be two possible effects. First, innovations developed centrally will be more visible to senior management than those developed locally and are thus more likely to be selected for either required or voluntary deployment. Second, innovations developed centrally are more likely to focus on organizationwide impact and are thus more likely to be required to adopt for all subsidiaries or divisions. Of course, the organization may also directly promote the innovations developed by subsidiaries and deploy the innovations in other subsidiaries. Thus, distance from the center makes it more difficult for innovators to get the attention and the resources that they need for deployment.

In addition, organizational attributes such as autonomy and internal communication are influential factors affecting the deployment of innovations [7]. Engaging front-line employees in the innovation process contributes to the internal marketing of the new service, facilitating implementation and

acceptance [22]. The scope of a subsidiary's innovation is local until the broader organization recognizes the innovation's value, but recognition may be hindered by organizational constraints (e.g., the degree of subsidiary autonomy and the size of the organization) and innovation applicability issues. Because of certain innovation features, deploying the same innovations in other contexts may be difficult [23].

E. Senior Management Attention and Support

Although accessing resources is critical for service innovation [24], we argue that it is just as important for deployment. It can involve organizational change, managerial problems, and allocation of key resources, all of which require high senior management support [25]. Senior management attention is a critical, scarce, and sought-after resource in organizations. In a context in which there are multiple innovations, the attention and support of senior management can potentially affect the success of the deployment [26]. Young and Jordan [27] suggested that "top management support is the most important critical success factor for project success and is not simply one of many factors." It is especially important for service innovation because senior management support for risk-taking efforts is an important aspect of new service development culture [28]. We argue that for service innovations developed by subsidiaries, it is critical to get the attention and support of senior management so that the service innovations can be deployed to other subsidiaries. As financial and management attention resources are limited, not all innovations will receive enough management attention, thus affecting their ability to be deployed. This may lead to subsidiaries competing for headquarters' attention to acquire resources [29].

F. Motivation

An innovation team that is motivated to exploit their innovation locally may not be motivated to devote the time and effort needed for wider deployment. Indeed, it may detract from their continuing work on development or day-to-day management: "A knowledge source may be reluctant to share crucial knowledge for fear of losing ownership, a position of privilege, superiority; it may resent not being adequately rewarded for sharing hard won success; or it may be unwilling to devote time and resources to support the transfer" [30, p. 31].

Motivation can be extrinsic or intrinsic. Extrinsic motivation refers to performing an activity to attain a separable outcome. Intrinsic motivation refers to doing an activity simply for the enjoyment of the activity itself instead of for its instrumental value [31]. Researchers agree that intrinsic motivation is vital for innovation. Birkinshaw *et al.* [32] contended that innovation does not require monetary rewards. Innovation is intrinsically enjoyable, and it is easy to recognize and confer status on those who put their discretionary effort into innovation. In deployment, intrinsic motivation can result from the pride and satisfaction of having developed a successful innovation and from the association with the potential social and economic benefits if the innovation is widely deployed. However, De Jong and Den Hartog [33] argued that intrinsic motivation is not a prerequisite for effective implementation and Ko

et al. [34] found that intrinsic motivation is more important than extrinsic motivation except in implementation. Extrinsic motivation can result from many sources, from payment to promotion. The deployment of innovations differs from their development: development requires greater creativity, and deployment requires operational and internal marketing skills.

G. Handover of Responsibility

R&D and deployment decisions are clearly linked [4]; thus, the arrangements for the interaction or transition between the development and deployment processes are important. The project teams responsible for the development process of new services may not necessarily be the teams in charge of the deployment process. In deploying an innovation, an organization may have a choice as to whether to use the team that developed and introduced the innovation locally for its subsequent deployment or to hand responsibility over to another group to manage company-wide deployment (a handover).

Although a handover can provide more appropriate resources and capability for further deployment, it may hinder deployment due to the need for knowledge transfer; handover knowledge is "sticky" [35]. A change in the project team or membership can result in a flux in coordination [36], and changes in project scope often require effective knowledge-sharing practices [37], [38].

III. METHODOLOGY

Case studies are a preferred research strategy in building or extending theories. They use one or more cases to create theoretical constructs, propositions, and/or midrange theories from case-based evidence [39]. We adopt an embedded multiple case study methodology based on grounded theory and an inductive approach [40]–[42]. We have longitudinally studied the deployment processes of ten service innovations within a large company, supported by secondary data collection and archival data. A real-time longitudinal approach helps to build a more complete view of the process [43]. The unit of analysis is an innovation project, consistent with Carrillo *et al.* [44], who suggest that studies at the project and individual level are needed to better understand aspects of innovation.

The need to study multiple projects in an innovative environment and to compare them in a controlled manner guided case selection [42]. The mobile telecommunications industry is one of the most important and rapidly changing industries in the world. Technologies, government policies, and intensifying competition have led companies in this industry to develop new services or new business models to maintain or increase their market share. We study ten cases in a major mobile telecom operator in China. This operator is a listed company, with around 70% of its shares held by a state-owned holding company and others held by the public. As one of the largest operators in the world, the company has a reputation for success, not only in terms of its market share, and revenue, but also in terms of its innovative new services introduced to the market. It is recognized both inside and outside China for its innovation, and was ranked among the "The 50 most Innovative Companies" in 2010 by *Business Week*. The company provides a full range of mobile telecommunications services in all 31 provinces,

autonomous regions, and directly administered municipalities in Mainland China and in Hong Kong, via its 31 independently operating provincial subsidiaries (each having many city-level subsidiaries). Each regional subsidiary is responsible for its own profit and operations within the geographical region, although the top management of the subsidiaries is appointed by higher level headquarters. The company also has functional departments and research centers at both the national and provincial headquarters levels.

When building theory from case studies, case selection should use replication logic rather than sampling logic [41]. Each case should be selected so that it either 1) generates similar results (literal replication), or 2) produces contrary results for predictable reasons (theoretical replication). We selected a set of innovation projects based on the literal replication logic. Only innovations that are worth transferring should be transferred or deployed [23]. All projects had been successful initially and were expected to be deployed successfully. To control for initial success, all innovations selected had been winners of the best innovation award in the operator's largest provincial company, which accounted for one-third of the operator's revenue and one-fifth of its customer base. This provincial company is also the most innovative subsidiary among all 31 provincial companies, and it has 21 city-level subsidiaries and 16 functional departments and research centers. Each year, all departments and subsidiaries can apply for the "service innovation award" by submitting the relevant documents (application file and presentation slides) of their service innovation project. After oral presentations of all the projects and an evaluation process conducted by a group of 15 to 20 experts in the company, all the projects are scored across several key aspects including innovativeness, financial and nonfinancial performance, generalizability, etc. Based on the ratings from the evaluation panel, 35 service innovations each year are given awards and expected to be further deployed. Then, national awards are selected from provincial awards with similar selection criteria and procedures. The cases chosen are shown in Table I.

We collected objective data on deployment outcomes for each innovation, from the initial launch in April 2009 until late 2013. Additional data on the innovations and the processes during deployment were collected through interviews and archival documentation. Semistructured interviews and secondary archival data were used to explore the innovation context and to clarify uncertainties in the data. Key managers involved in the deployment of the ten projects were interviewed over a three-year period (see Fig. 1). A detailed research protocol (Appendix A) was developed following the guidelines specified by Yin [41] to act as a basis for the interviews. Each key manager we interviewed was knowledgeable about the deployment of an individual project; for some projects we also had the chance to interview the top management and these interviews were conducted separately. The basic descriptive information on the cases and some information about the development team and process were accessed from archival documentation. The interviews were conducted in Chinese. An English-speaking researcher was present at several key meetings at which there was suitable translation. The interviews were recorded and subsequently transcribed, then the documents and interview notes

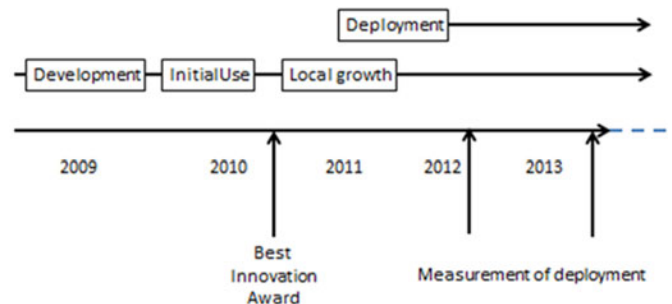


Fig. 1. Longitudinal study timeline—A typical case.

were translated into English. The use of multiple sources of data contributes to reliability. To further ensure reliability and validity, we used multiple interviewers and fed the data and conclusions back to the managers.

To study the deployment outcome, we drew on the measurement of the deployment of best practices used by other researchers. Jensen and Szulanski [12] measured the number of recipient units adopting the initiative studied. Done *et al.* [11] measured the degree to which the practices had been deployed within the organization, from all transferred to none transferred. Building on these scales, we use a four-level model of deployment outcomes: no deployment, city-level deployment, provincial-level deployment, and national deployment.

The analysis was conducted in three parts. We first documented the context for each project, based on the best innovation award documentation. We supplemented this documentation with semistructured interviews with managers and engineers at various levels to gain an understanding of the context of the innovations, including the company's innovation processes and the organizational and competitive environment. Second, we reviewed the objective data to analyze the trajectories and the outcomes of the deployment of the projects and to construct timelines over the period studied. Finally, we analyzed the interview data to build a picture of the process of deployment of each innovation and to identify key events. We followed the methodology of constructing and analyzing arrays suggested by Miles and Huberman [45]. Where we identified themes, we conducted additional interviews to examine the themes in other deployments. The qualitative data are summarized in Appendix B.

IV. RESULTS

The company studied was a multidivisional company organized in three levels: local (typically a city subsidiary within a province), provincial, and national. Each provincial (or city) subsidiary is responsible for its own profit and resource allocation within the province (or city). There are functional departments and development labs at both the provincial and national headquarters which coordinate resource allocation among city- and province-level subsidiaries. For strategically important initiatives and innovations, the company may also set up new centers/bases (equivalent to provincial subsidiaries in terms of organizational hierarchy) to take charge of certain businesses and propel their deployment across the country. There were nine national centers/bases in total, mainly

TABLE I
CASES AND DEVELOPMENT BACKGROUND

Case	Name	Description	Where developed
1	Synergistic classroom	An online platform that provides educational resources and support for teachers, students and their parents, in addition to the traditional face-to-face teaching and learning conducted in school.	Initiated by a small developer in Beijing. Taken on by the province.
2	Mobile Market	An online application store for smartphones which provides services such as testing, charging, and advertising to external developers (individuals and companies) so that they can develop and upload various smartphone applications and contents (music, videos, or books) to the platform. Consumers can buy and download the apps and contents to their devices.	Initiated at the national level. Handed over to the province as it was the biggest province and seen as the most innovative.
3	BlackBerry hosting for SMEs	BlackBerry enterprise email service was faced with a problem that many small and medium sized enterprises (SMEs) do not have standard email servers, thus a city subsidiary developed a solution for SMEs.	City
4	Marketing operations monitoring	An IT system designed by two departments at the headquarters, which is used to monitor the performance indicators of all city-level subsidiaries in the province. Alerts and suggestions from headquarters will be sent through the system.	Province
5	Cloned cards control	A solution developed to control the problem of cloned SIM cards of mobile phone. In the original system a loophole existed through which one type of SIM card could be cloned. The original system could not fix the problem, even though the problem can be detected.	Province
6	Customized signature	A new service that provides added value to the customers in a way that a customer can set personally tailored text information. Then when he makes voice-calls (either incoming or outgoing) with others, the text will appear on the screen of the mobile phones of others.	Provincial product development center. Developed jointly with data business operations.
7	Smart city mobile service	Based on the combination of RFID technology and traditional SIM cards, RFSIM, customers can use their mobile phones as transportation card to take the Metro and buses and make payments using mobile phones.	City
8	Electronic medical service	The basic function of this service is that customers can call the hotline to make appointments for medical services instead of queuing up in hospitals. It also provides other related services such as hospital maps.	Province. Initiated by local president who wanted to enter the healthcare market.
9	Managing customer account balance	New practices have been developed together with an information system to monitor and manage the residual amount in customer accounts and analyze the related customer behaviors, to achieve precision marketing for different market segments.	City. Was seen by provincial management, who encouraged development and deployment.
10	Mobile payment of railway tickets	Based on RFSIM technology, it was developed for users who regularly take the high-speed railway between two major cities in a province, allowing users to use mobile phones to replace railway tickets and use the tool kit pre-installed in SIM cards to pay for the tickets.	City

in (mobile) internet businesses. To provide an overview of the process studied, we describe a case that was a very successful innovation at the local level but that had problems in deployment. This case illustrates the context of the research, the company's deployment approach, and some of the issues found (see Appendix C).

A. Deployment Outcomes

For each case, we observed the deployment status up to the end of 2013. We documented the deployment steps from the initial local deployment to provincial and then national deployment. The deployment outcomes of the innovations varied greatly from no deployment at all to partial and to full deploy-

TABLE II
SUMMARY OF DEPLOYMENT AT THE END OF DATA COLLECTION

Case	Origin	Local deployment	Provincial deployment	National deployment
1. Synergistic classroom	Provincial	Yes	Yes	2 other provinces, further national deployment in progress.
2. Mobile Market	Provincial and national	Yes	Yes	Yes
3. BlackBerry hosting for SMEs	Local	Yes	No	Almost none, only 1 city in another province adopted.
4. Marketing operations monitoring	Provincial	Yes	Yes	Limited: national deployment was planned but delayed.
5. Cloned cards control	Provincial	Yes	Yes	Limited, but other provinces learned and developed their own solutions.
6. Customized signature	Provincial	Yes	Yes	Yes, national deployment near complete.
7. Smart city mobile service	Local	Yes	Limited: 1 other city	Limited: 2 cities in 2 other provinces.
8. Electronic medical service	Provincial	Yes	Yes	Yes (almost all provincial companies)
9. Managing customer account balance	Local	Yes	Yes	Limited, just started national deployment (several cities in other provinces).
10. Mobile payment of railway tickets	Local	No (only tested)	No	No

ment at the provincial or national level. The varying outcomes (indicating failures and successes) provide a rich practical base for us to build up new theory, as sound theories should be able to analyze failures [46]. The deployment outcomes are summarized in Table II.

By the end of 2013, the organization had deployed three innovations across multiple provincial companies. For example, case 8, an electronic medical service, had been deployed across 16 cities in the province by July 2012, with 203 hospitals using the service. By July 2013, nearly all provincial companies were offering the service. This illustrates a provincial company that initially deployed an innovative service to all local divisions and then across multiple companies in the organization. We found similar patterns in cases 2 and 6. The organization fully deployed case 6 at the provincial level, and national deployment was successfully in progress, with full deployment in ten provinces (10 million users) and building a national system (phase 1 would serve 27 million users).

In four cases, there had been provincial deployment and some national deployment. In some, the innovation was clearly in the early stage of national deployment, and full deployment was expected. An example was case 1, the synergistic classroom, which had proved very successful. This innovation provided a service for schools to notify children of their homework assignments through their mobile phones. This was copied to their parents' phones, allowing them to check that their children did their homework on time. Teachers and parents strongly welcomed this innovation. The number of schools in the province using the service rose from 4831 in September 2012 to 11 636 in November 2013, and the number of student users rose from

1.55 million to 6.13 million. Further deployment did not start until there had been substantial use in the originating province. Thus, by November 2013 only two other provincial companies were marketing the service. However, the company expected that the deployment would soon become much broader.

In other cases, although some were deployed nationally, it was not clear whether there would be widespread deployment. For example, in case 5, although some provincial companies were using the innovation, others had chosen not to. Some companies encountering similar problems had already chosen to use local partners and develop a similar service independently. These cases illustrate that limited deployment may be due to the characteristics of the innovation and/or of the context of the potential adopter.

Case 3, BlackBerry hosting for small- and medium-sized enterprises (SMEs), had been developed at the city level. However, after initial deployment to one other city, there was no further deployment. By this time, BlackBerry use was declining, so there were limited prospects for further deployment, and no effort was made to deploy it. Finally, for case 10, mobile payment of railway tickets, initial use at the city level encountered technical problems, and was eventually discontinued without deployment. We illustrate these outcomes in Fig. 2.

B. Strategies for Deployment

We found both required and voluntary adoptions used as deployment strategies. A key element of the voluntary deployment was making the innovation more visible to other parts of the company. There was a policy of "showcasing" successful

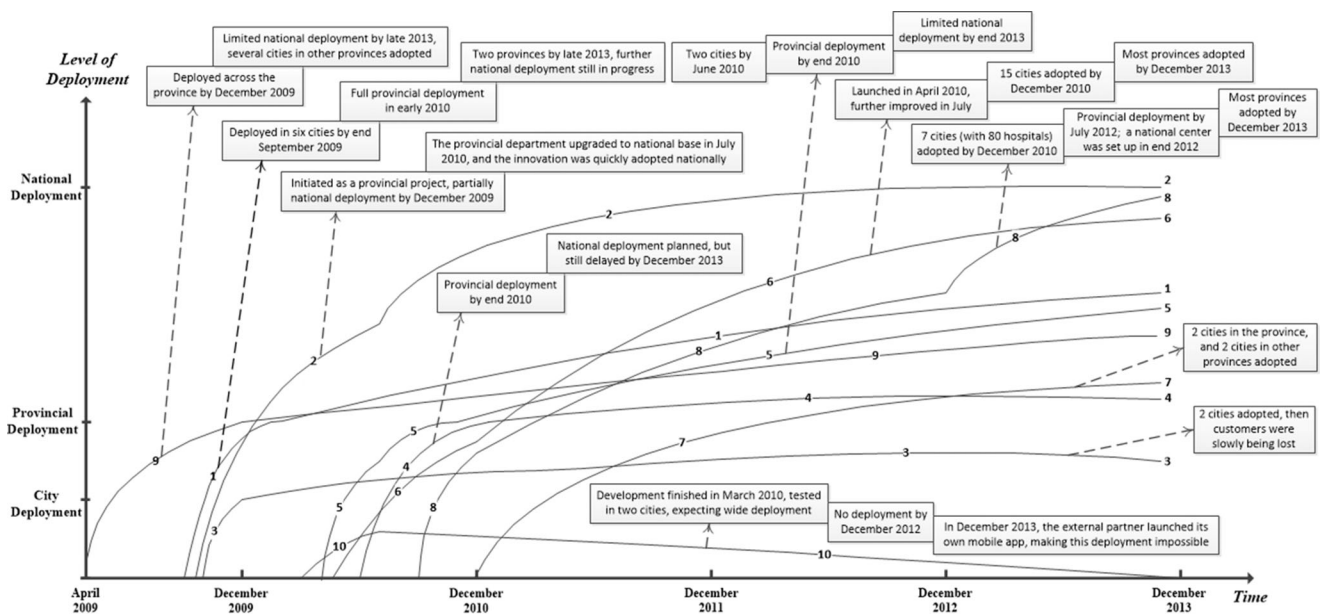


Fig. 2. Deployment trajectories of cases 1–10.

service innovations at the provincial and national levels. At the provincial level, the award process was highly visible and would make the innovation known to the managers at the national headquarters but not necessarily to other provinces. All cases studied were award winners and would therefore have been visible to others in the province and at the national headquarters. At the national level, there was a parallel award system but with far fewer innovations from each of the 31 provinces. All national award winners would have been visible to the national headquarters and all provincial companies. Cases 5 and 7 won national awards and thus gained much more national visibility; case 8 was submitted for a national award and, although not a winner, gained considerable national visibility. The manager of case 5 reported that “the innovation won the national award; then the national headquarters arranged us to have meetings with other provinces and asked us to make presentations to them. The other provincial companies will make their own decision as to whether to adopt this solution or not, and all of our documents are available and open to them. If they want to adopt this solution, they can just copy what we did, or they can learn from us and develop their own solution.” There were also national events that showcased these awards; for example, case 4 was presented at a national event. The underlying logic of this showcasing was to demonstrate the nature and value of the innovation, to build connections with managers elsewhere, and to motivate them to consider taking the innovation on board as part of their portfolio of services or internal processes. However, it was left to local management to decide whether to adopt the innovations.

When senior management saw the innovation as very important they sometimes exerted pressure throughout the company, a required-deployment strategy, requiring that all should adopt this service innovation. An example was case 2, “Mobile Market” which headquarters initiated as a key strategic initiative. The organization implemented the development in one province before rolling it out to all provinces. Although consumers from

other provinces (who had not devoted efforts to coordinate with the originating province) may also buy and download apps from this online platform, they were not motivated by substantial marketing programs, thus the number of consumers was not increasing as fast as in provinces using a required-deployment strategy.

The president made regular visits to the provinces, where innovations were presented to him and his team. They could decide to showcase an innovation nationally or go one step further and decide to use a required-deployment strategy. Some innovations diffused through a required-deployment strategy at the provincial level but a voluntary-deployment strategy at the national level, and vice versa. For example, an innovation that was performing very well, which initially diffused through voluntary adoption, would come to the attention of headquarters and could lead to the decision of changing to required adoption. Headquarters saw case 8, after having been very successfully deployed in the province, as an important innovation nationally. Therefore, the organization set up a center in another province to facilitate national deployment. At the national level, four innovations diffused through a required-deployment strategy, and six through a voluntary-deployment strategy initially. The showcasing and deployment strategies are summarized in Table III.

When we examine the outcomes, all four with national-level required adoptions were fully deployed at the provincial level, and three (cases 1, 2, and 6) had strong national deployment. The other, case 4, had planned national deployment. Of the voluntary adoptions, only two of the six (cases 5 and 9) had full provincial deployment with limited national deployment. Case 8, although diffused through voluntary adoption at the province and national level, was changed to required adoption by the setting up of a national center. It was quickly deployed nationally; the others had far more limited deployment. It shows that the deployment strategies can be switched to required adoption to quicken the market success illustrated by voluntary adoption. In

TABLE III
DEPLOYMENT STRATEGIES

Case	Examples of showcasing	Required or voluntary (province)	Required or voluntary (national)
1	Provincial innovation award and limited showcasing nationally, innovation was reported by some newspapers and main media	Required	Required
2	Highly visible from the start	Required	Required
3	Limited or none	None	Voluntary if at all
4	Displayed at a national conference	Initially voluntary, then required. Central installation, all cities must use it.	Required. All provinces were required to adopt.
5	Won national award	Required	Voluntary
6	Details were shared online with other provinces	Required	Required. Company saw this as a product that all provinces should have and asked all provinces to adopt.
7	Local and national innovation awards	Voluntary. Only one city has adopted and even then has modified.	Voluntary
8	Showcase through applying for national innovation awards (although they did not win)	Voluntary: the government and enterprise customer department asks, not orders, subsidiaries (city level) to adopt.	Voluntary (then became required)
9	Limited	Required	Voluntary if at all
10	Limited	Voluntary	Voluntary

addition, among the three cases (3, 7, and 10) with a consistent voluntary-deployment strategy, showcasing at the national level (case 7) led to wider deployment compared to showcasing at the provincial level or limited showcasing (cases 3 and 10). We therefore put forward the following propositions.

PIa: Required adoption leads to wider deployment than voluntary adoption, and changing from voluntary to required adoption will speed up the deployment process.

PIb: Showcasing as a voluntary-deployment strategy conducted in wider scope will lead to wider deployment.

C. Factors Affecting Deployment

We observed several issues leading to resistance to adoption of the deployed service innovations. These issues included market fit and organizational fit. The smart city mobile service case described in Appendix C provides illustrations. The business models associated with the innovation were less attractive in other provinces, and this lack of market fit led to reluctance to adopt the innovation. In case 3, the use of BlackBerry devices declined significantly after the launch of the service, creating barriers to deployment. There was little motivation for other divisions to market an innovation with a declining market. Both are examples of lack of market fit.

In case 7, others chose to use their own partners or to use different technology solutions. In case 5, many provincial companies chose to use local partners and developed a similar service

independently. We see these as examples of the “not invented here” (NIH) syndrome, which is “a negative attitude to knowledge that originates from a source outside the own institution” [47, p. 368]. This is consistent with Szulanski [30], who saw NIH as a possible reason for the lack of adoption of practices being deployed. In both cases, this was probably amplified by the importance of *guanxi*, strong interpersonal and interorganization ties, in China.

These are examples of context-specific organizational fit. All cases in which we observed fit issues were associated with less effective deployment outcomes, but this negative impact seemed to be weaker when there was a required-deployment strategy. We posit that if the company chooses a required-deployment strategy, either the possibility of lack of fit is low, or a strong required adoption will help organizations fully deploy the innovation despite the poor fit. Case 2 was such an example. The national headquarters proposed it as a key strategic initiative and asked the provincial company to develop and deploy it. The manager of case 2 suggested that “it would have been better if an internet company rather than a telecom develops this platform.” The department developing this innovation was then upgraded to a national base (an independent internet company, at the same level as a provincial company) to take charge of national deployment, and the initial objective for this national base was “not to make profits (as other provincial companies did) but to compete with other platforms provided by internet companies or mobile phone manufacturers.”

TABLE IV
LOCUS OF INNOVATION AND DEPLOYMENT

Deployment	Number of innovations deployed	
	Provincially developed	Locally developed
National	3	
Provincial and part national	2	2
Provincial	1	
Local/city		2

We therefore put forward the following proposition.

P2: Poor market or organizational fit leads to less effective deployment of all service innovations, yet this effect is weaker when a required adoption is used as the deployment strategy.

We also find evidence that poor market or organizational fit issues cannot always be fully eased by a required-deployment strategy. In case 4, although it was successfully deployed across the province, and all other provinces were also required to adopt the innovation (the national deployment was planned centrally), the actual national deployment was delayed, indicating that (organizational) fit issues still hindered the deployment. In addition, we need to acknowledge that market or organizational fit is dynamic and may vary with changes in the market. In case 3, by the time deployment efforts had started, the market attractiveness had substantially diminished. As deployment progresses, the benefits of an innovation at the time of launch may diminish and thus make the innovation unattractive for other parts of the corporation to adopt. In case 10, the technology used was called “RFSIM” technology, and it allowed users to use their mobile phones (with SIM cards) as railway tickets and use the tool kit preinstalled in SIM cards to pay for the tickets. However, the innovation was only tested in two cities and was not deployed at all, and at the same time smartphones based on Android or iOS became more and more popular in China. Then, toward the end of 2013 the external partner China Railway launched its own mobile app for national-wide online ticket ordering, which made this innovation less attractive and far less likely to merit deployment. These cases suggested that slow or delayed deployment risks loss of market or organizational fit.

Further, based on results from the case analyses we summarize the findings concerning the locus of deployment and deployment outcomes. We first compared locally developed and headquarters-developed innovations, and the data indicate that although some locally developed innovations were deployed widely, more of those developed at the headquarters level had been widely deployed (see Table IV). The managers we interviewed provided support and explanations for this. The manager of case 5 pointed out that “at the provincial headquarters level, it is very easy for us to implement better solutions or innovative ideas across the province, such as this case. But for the city-level companies (subsidiaries), it is an issue to diffuse their innovations to other cities within the province.” The manager of case 4 explained that “the city-level companies are limited in their scope, and sometimes what they think is useful and characteristic may not be so useful to other cities.”

We then sought evidence for the role of senior management in innovations developed by subsidiaries. Of the four locally de-

veloped innovations, the strongest senior management support was in cases 7 and 9, in which senior management was directly involved. Both cases achieved better deployment than cases 3 and 10, which had limited support. Even for the innovations with a required-deployment strategy, senior management attention was an important driver for deployment. We had the chance to interview a manager from the company’s external partner for case 1, who helped with the local deployment in different schools across different cities. The manager suggested that “the deployment outcome is determined by their head (city-level general manager), although his or her performance indicators set by the provincial headquarters were not directly related to this innovation; if their head pays much attention to this innovation, they will allocate more resources and devote more efforts to coordinate with us.” Further, although the three national-deployment cases (2, 6, and 8) did not have the formal involvement of provincial senior management, there were other forms of management attention (see Appendix B). Senior management attention was also associated with government support. Case 1 illustrated this correlation, as when media reported on the innovation the company was invited to report to the national Ministry of Education. Afterward, other provincial companies were required to learn from the case province.

Given the organizational structure of this large telecom firm, senior management attention can also be determined by their potential opportunities of promotion. One clear promotion path is from provincial to central management positions, thus the competition between the provincial subsidiaries could be an important influential factor in service innovation deployment, especially when there are significant duplicate innovation efforts across the subsidiaries. This creates an extrinsic motivation for senior managers to deploy their own service innovations, but may also lead to NIH syndrome in adopting service innovations developed by others.

Our interviews indicated that there was a complex relationship between motivation and actual managerial decisions and/or efforts toward deployment. For example, in case 2 (required adoption), the team made a lot of effort to deploy the innovation because they felt that it would make the provincial operation famous for innovation compared to other provinces. Similarly, in the smart city mobile service (case 7, voluntary adoption) described in Appendix C, there was also intrinsic motivation to deploy; managers reported pride and the associated kudos of seeing their innovation deployed as motivating them to actively seek to deploy their innovations. However, the managers also indicated that involvement in deployment would hinder their work and that there were no direct incentives for deployment. This reflected a lack of extrinsic motivation, which potentially contributed to limited deployment. In other cases, many interviewees indicated that extrinsic motivation was important in their involvement with deployment. For example, in case 1 (required adoption), the city-level subsidiaries needed to decide whether to allocate resources to deploy the innovation. They stated that “it would be more easily deployed if the provincial headquarters set performance indicators directly related with this innovation.” Specific targets were seen to act as an incentive for managers to support and work on deployment. In another example, interviewees believed that one of the key factors in engaging them

in deployment was supporting actions that could lead to their supervisor's promotion. This may be particular to the Chinese company context, as the promotion of a supervisor also opens up opportunities for promotion of subordinates. Based on these findings, we put forward the following proposition.

P3: Extrinsic and intrinsic motivation can both contribute to deployment outcomes, but the lack of an extrinsic motivation hinders deployment significantly, and this negative impact is stronger when a voluntary adoption is used as the deployment strategy.

In deploying service innovations, the capabilities needed for deployment may not exist in the innovation team; there may be a handover to teams or organizations with more appropriate capabilities. Handovers varied from transferring responsibility to a new team to, as in case 2, upgrading the provincial department to national status as this gave them greater ability to coordinate with all provincial-level companies so that the deployment could be conducted more smoothly. Five of the cases—1, 2, 4, 6, and 7—involved formal handovers. In the five cases with handovers, there were two full national deployments and one partial national deployment, compared with two partial national deployments among the five cases without handovers. These results do not provide support for previous literature emphasizing the stickiness of handover knowledge and difficulties in coordination or knowledge-sharing. Instead, our data indicated that when the teams handed the innovations over to a new team, the deployment was more successful. We conclude that the disadvantages of handovers were outweighed by their advantages when new skills and/or resources are important. We therefore put forward the following proposition.

P4: Deployment is more effective if responsibility for deployment is handed over to a team with appropriate capabilities.

Managers saw handovers as being useful in two main related contexts. First, they are useful when the development team did not have the resources to manage the deployment. Second, the teams used handovers when deployment was beyond the scope of the development team. For example, a local development and marketing group may not have the skills necessary to deploy an innovation across the company. In this sense, the handover may also indicate the change of deployment strategy. As shown in cases 4 and 8, a handover is needed when the deployment strategy changes from voluntary adoption to required adoption. We also expect that different handover experiences may exist when subsidiary A starts the innovation adoption process before the change of deployment strategy while subsidiary B starts the process after the change. We suggest that for subsidiary A, more coordination work or reprocessing may be needed in handover, as it may already have its own teams and procedures for innovation adoption. Although our cases did not provide such evidence, we believe that this could be a further research opportunity.

V. DISCUSSION

A. Theoretical Contributions

Companies put significant effort into developing innovations both for internal use and for external markets. However, in multidivisional and multinational organizations, local success

in implementing such innovations is not enough. Companies seeking to maximize the return on their innovation efforts must seek to deploy the innovations across the organization. Our study indicates that this task is complex and sometimes difficult. To address this issue, companies need policies and practices that support the deployment of service innovations. We proposed two alternate deployment strategies, required adoption and voluntary adoption, an important extension to those suggested by Ghoshal and Bartlett [7]. Ghoshal and Bartlett [7] studied required adoption (top down) and diffusion (bottom up, but also required), whereas we have taken the broader view that innovators may or may not be required to seek to diffuse the innovation. Our data indicate that a required adoption is more effective than a voluntary adoption in further deploying the service innovations, and that companies may change their strategies between required adoption and voluntary adoption, leading to more complex strategic choices of deployment patterns. Stimulating service innovation is a major research priority seen by leading service scholars [1], [2]. By exploring required- and voluntary-deployment strategies, our research advances theory and practice of service innovation, as the final success of service innovations depends largely on the effective deployment of initial innovation outcomes [6].

Addressing our first research question, the case evidence confirmed that the company clearly used both required- and voluntary-deployment strategies for almost all the innovations studied. However, companies may also change their strategies from one to the other. In addition to individual innovations diffused through either a required adoption or voluntary adoption, we found other patterns. The first was a required adoption at the local level but a voluntary adoption nationally. The equivalent in a multinational firm would be a required adoption in the country of origin but a voluntary adoption internationally. A second pattern was starting with a voluntary adoption, but converting to a required adoption when the importance or success of the innovation became visible to senior management. We therefore propose that required and voluntary adoptions are key strategic choices in the deployment of innovations. The choice is dynamic, and any innovation can be shifted from one strategy to the other during the deployment process. In addition, by default, innovations may not necessarily be chosen for deployment at all.

To address our second research question, we explored with the company their reasons for choices made between required adoptions, which would clearly lead to faster deployment, and voluntary adoptions, which could be slower in a context in which the organization considered deployment important. The prime reason for needing to make such decisions was the volume of service innovations being developed each year, often exceeding 20 000. Given that the managerial resources needed to rapidly deploy an innovation were limited, the company had to make choices. They put forward the following criteria for choosing a required-deployment strategy: first, which innovations would be most beneficial to the company as a whole given the allocation of these resources? This could be the presence of clear and achievable benefits and the likelihood of successful adoption. The interviewees saw some innovations as easy to transfer, whereas others would require substantial local tailoring. This is

consistent with our proposition on the need for market and organizational fit. Second, would the innovation benefit from promotion through making it visible across the company via mechanisms such as innovation competitions and showcasing? Finally, were the benefits strong enough to justify the resources allocated for a required adoption? The stronger the cross-company benefits, the greater the likelihood of choosing a required adoption. Despite these criteria, managers stated that making such decisions in the context of multiple innovations was very difficult.

We conclude that in any organization seeking intracompany deployment of many innovations, the company must make decisions about which innovations to select for investment in deployment. There are two potential limits to the number of innovations that can be actively deployed. The first limit is the resources available. A required-deployment strategy requires considerable resources, and many elements of voluntary-deployment strategy such as internal prizes and showcasing also demand resources. Deployment also requires resources by the adopter, who may not be able to exploit innovations because of a lack of absorptive capacity [30]. The second limit is the number of innovations that any part of the organization can adopt at one time.

An important managerial choice is how to organize for deployment. For example, decisions need to be made about whether and when to handover an innovation from the original team to a new team responsible for deployment. Deployment requires internal knowledge transfer, and much knowledge can often be “sticky” [35]. Thus, handovers to a new team requiring sticky knowledge to be transferred can negatively affect deployment. However, the case evidence points in the other direction. This may indicate that problems associated with sticky knowledge may be outweighed by the advantages of choosing another team with proper resources or deployment skills.

To address the third research question, we summarized the case evidence and put forward three more propositions (P2, P3, and P4) concerning the other factors that influence the deployment outcomes jointly with required- and voluntary-deployment strategies. The case evidence supported that locally developed innovations face greater barriers to deployment than those developed more centrally. Locally developed innovations are usually less visible, and are more likely to encounter difficulties in gaining management attention or having the resources, skills, and motivation needed for deployment. This is consistent with Ambos and Birkinshaw [29], who conclude that when aiming to integrate a portfolio of differentiated subsidiaries, the allocation of headquarters’ attention has become a key strategic issue. Distance from headquarters can lead to a lack of skill and resources for deployment, lower levels of management visibility and support, and lower motivation to deploy. As a result, locally developed innovations may take longer to deploy. Innovations developed locally, often in the front line, could thus be more difficult to deploy than those developed at the headquarters level. This leads us to a dilemma facing the management of service organizations. Because of the customer-facing nature of services, many important innovations will be codeveloped near the front line but will not necessarily be visible to senior management or the wider organization. Thus, it is important for organizations to pay close attention in seeking and recognizing the locally

developed innovations to avoid losing many of the benefits of innovation.

Although intrinsic motivation is clearly very important for the development of innovation, we observed that without extrinsic innovation, the motivation to innovate may not turn into the motivation to deploy, which hinders the deployment more significantly. This may be particularly true for locally developed innovations for which the need to face day-to-day operational pressures may conflict with the deployment targets. This is consistent with Szulanski [30], who argues that there are motivational barriers to knowledge transfer. As such, companies would learn that motivational efforts could be done in tandem with deployment strategies to encourage faster and wider adoption.

With a voluntary, diffusion-based, model of deployment, if an innovation does not provide value to the receiving organization, we would expect some resistance to adoption. Even when there is required adoption, a lack of internal or external fit for the receiving organization may create resistance to deployment. This indicates that even when an organization is pursuing a required-deployment strategy, the organization should pay close attention to fit issues. Questions about fit may lead to the possibility of adapting the innovation to enhance fit or to selectively deploy the innovation only in locations where the fit is good. We also observed that the degree of fit with the market may decrease over time, which often calls for rapid deployment of service innovations.

B. Limitations

Although the sample size was ten projects, which is suitable for case-based research [42], this number means that the results should be treated with caution. Although the case data provided support with details for the propositions, further research with different methods and possibly larger samples will be needed. We selected a single firm and a rapidly changing industry as the context for service innovation deployment. This control allowed us to develop strong insights into the processes involved but also limits generalizability [42]. The outcome variable was mainly about the scale of deployment given the rapidly changing industry and the need for cross-case comparability, yet we expect that in other stable service industries different outcome variables might be appropriate and lead to promising new findings.

We studied deployment in China. Because of the size of the country and the scale of the major companies, China is an appropriate setting to examine deployment and presents great opportunities for operations and innovation management research [48]. Conducting research in a single country, or region, whether China or the West, raises questions of generalizability. However, the context of a large multidivisional and multilocation company in China is comparable to the context of similar sized companies and countries worldwide. Recent years have seen high-tech service innovations prosper in China, enjoying the advantages of fast deployment in a large domestic market. For countries such as India, the United States, Russia, and Brazil, which also have large populations and/or use single official languages, our findings may be more generalizable, yet caution still needs to be taken in contexts of different governance structures and regulations.

In addition, the operations in multiple, very large provinces are in many ways equivalent to multinational companies operating in multiple countries. However, we observed several specific aspects of business in China that affected deployment and which may lead to some bias. One aspect is *guanxi* networks which are essential for doing business in China [48]. Although *guanxi* has been viewed as a positive aspect of supply chain management in China, in the context of deployment, it seemed to have led to the possibility of NIH because companies preferred to work with their own networks instead of networks from other provinces. We also observed some aspects of motivation such as the importance of supporting one's boss's promotion, which might be specific to the Chinese context. However, these aspects were only part of the case evidence behind our propositions, and we feel that even taking into account the Chinese context the relevant propositions were still insightful. For future research, replication in a Western context and in different services would give greater validity to the results.

C. Conclusions and Implications for Practice

Implicit in innovation research is the assumption that a successful innovation will be exploited across the organization. However, our research challenges this notion. Consistent with the research in other areas, we found that the transfer of innovations (i.e., deployment) is difficult. Based on a longitudinal study, these results contribute to our understanding of the strategies and mechanisms of deployment and the factors that may contribute to or hinder it. We proposed and explored voluntary adoption and required adoption as two strategies for deployment, and we provided insights into the effects of different deployment patterns and their contingencies.

Our results are relevant to service organizations that increasingly need to innovate rapidly and successfully. Strategic choices, such as voluntary and required adoption, can help the organizations become more successful. The first implication for practice is that promoting an innovation and requiring others to adopt, a required-deployment strategy will lead to more rapid deployment, but there are resource constraints on how many innovations can be required to adopt at any one time. This calls for a strategy for identifying which innovations should be required to adopt and which not, and for the allocation of scarce managerial resources. This strategy should be dynamic as the potential for some innovations may be revealed only after a period of use (which is often local). The top management of the case company also stated that "our judgment about a particular important innovation based on the current situation may not be accurate enough, thus sometimes we may use a pull strategy (i.e., voluntary adoption) first to test and see if we need to push (i.e., change to required adoption) later on." The second implication is to have in place mechanisms for making other potentially valuable innovations visible to potential internal adopters through a voluntary-deployment strategy. Such mechanisms could include, but are not limited to, those observed in the cases such as best innovation competitions and showcasing. The third implication is that market and organizational fit and extrinsic and intrinsic motivation would affect deployment outcomes jointly with deployment strategies. As such, managerial efforts addressing fit or motivational issues

could be done in tandem with deployment strategies to encourage faster and wider adoption. The final implication is that if the development team does not have the necessary capabilities or resources to manage deployment, they should hand the innovation over to a team that does.

There is scope for further research in most of the areas studied, for example, how effective decisions can be made regarding required- versus voluntary-deployment strategies and allocating resources for deployment. We identified organizing for deployment as an important decision, and there is scope for more in-depth research into how to organize for deployment and what the tradeoffs are between different choices. Future research into the deployment of service innovations should contribute to maximize their potential. Further, research opportunities also exist in extending the current focus on required versus voluntary deployment, and there is potentially a meaningful matrix with required/voluntary deployment on one dimension and top-down/bottom-up on the other dimension.

APPENDIX A

CASE RESEARCH PROTOCOL

Description:

This document serves as a guideline that has specified the types of questions that we would like to ask about the service innovation project.

Background:

- 1) Why did this project start and who proposed it?
- 2) Please describe how your company organized this project, the team members of the project and their respective responsibilities.
- 3) Did this project involve other departments/subsidiaries/external partners in development process? How did they involve?
- 4) Could you please describe the development process of this innovation? What difficulties and how to deal with?
- 5) How successful was this project in terms of prize-winning? What were the factors do you think that could lead to success of the development?

Deployment of Service Innovations:

- 6) Could you please describe the process of deployment and handover (if there was a handover)? Are there any interactions between development team and deployment team before and after the handover? What were the interactions?
- 7) How did the project go after winning the award? What is the current status of this innovation? Has the innovation been deployed nationally or is it going to be deployed nationally? What are the incentives and attractiveness for the deployment of this innovation?
- 8) Who/Which department(s) was responsible for the deployment of the innovation?
 - a) If it was the same department, did the members of project team change?
 - b) If it was another department, did the original team get involved or not?
 - c) How did top management support the deployment of the innovation?

TABLE V
SUMMARY OF QUALITATIVE CASE DATA

Case	Name	Initial deployment	Deployment to province	Deployment nationally	Management Attention	Handover	Showcasing	Motivation and other issues
1	Synergistic classroom	Persuaded education ministry and then school by school.	High and significant increase in the province (Sept. 2012–Nov. 2013: from 4,831 schools to 11,636 schools; 1.55 million parents and students to 5 million parents and 6.13 million students).	Did not begin until substantial use in province. Two other provinces, deployed and broad deployment planned.	Provincial president and two vice presidents listed as team members.	Multiple handovers from and to external partners and to different subsidiaries.	Initially via newspaper reporting. Demonstrated to national Ministry of Education. Other provinces required to learn from the province.	"It would be more easily deployed if the provincial headquarters set performance indicators directly related to this innovation."
2	Mobile Market	Province.	Taken over by national, became the company's southern base – part of national, so that deployment could be done more smoothly nationally as they need to coordinate with all provincial companies.	"As a strategic priority of the national headquarters, although it was locally developed, the deployment of it across all provinces was well supported."	Seen by national headquarters from the start as a national priority.	From provincial department to national base.	Won national innovation award. Presented at national meetings. Featured in annual report as a big move for the company.	Intrinsic motivation in making the provincial operation famous; direct revenue as a potential motivator to adopt. Issue as to who bears the cost of deployment within other provinces.
3	BlackBerry hosting for SMEs	None.	None.	Only one city visited and copied. Still only two cities, and customers are slowly being lost.	Limited support.	None.	None.	Increase in revenue from data business.
4	Marketing operations monitoring	Tried in city and then rapidly deployed in province.	Fully deployed. City-level subsidiaries required to adopt.	Full national deployment still in progress. Slowed by reorganization of responsibilities in the national headquarters.		Formal handover for national deployment, from Enterprise/Government customer department to marketing department.	Displayed at national event.	Easily deployed in the province, as the city-level subsidiaries were just required by the headquarters to implement this system.
5	Cloned cards control	Rapid deployment by modifying central software at the province level.	Complete.	Limited, as other provinces have their own systems thus 1) they do not necessarily have this problem, and 2) they need to user their own local partners.	Provincial vice-president involvement.		Gained high visibility from national award.	Some provinces had chosen to use local partners and develop a similar service independently.
6	Customized signature	Pilot commercialization in province (1 million users). Two major cities and some volunteer subsidiaries. Then handed over to operations for full deployment.	Complete.	Near complete. 10 provinces by July 2012 with 10 million users. 240 million RMB p.a. A national system for this service is being built, and phase 1 will be able to serve 27 million users.	Some senior management involvement in approval.	Formal handover to operations.	Details were shared online with other provinces.	
7	Smart city mobile service	In city	Deployed to one other city in province.	Two additional cities.	Direct involvement of provincial vice president.	Formal handover.	Gained high visibility from national award.	No direct incentives for development team to deploy. Other parts of the organization want to do it on their own way. One provincial subsidiary used a different technological solution. Another province wanted to use its own technology partner. Being unable to build on the original technology partner's expertise making potential adoption more problematic and slower. The initial purpose of this innovation was to provide social benefits thus it was not making money. For individuals, there was no direct financial benefit.
8	Electronic medical service	Local development.	Used by 203 hospitals in 16 cities as of July 2012, 244 hospitals as of Nov. 2013.	Most provincial companies provide this service.	Headquarters support for national deployment.	Seen by headquarters as an important innovation to deploy nationally. They therefore set up a center in another province charged with facilitating national deployment.	Submitted for a national award, and, although not a winner, gained considerable national visibility.	
9	Managing customer account balance	Local development at city level.	Rapidly deployed across the province.	National deployment started.	Direct involvement of provincial vice president.		The vice president organized a provincial conference in the city subsidiary to share the experience to other cities. Then some other provincial companies also came to learn the experience.	
10	Mobile payment of railway tickets	Used locally.	Widespread deployment was planned. After initial use at the city level, encountered technical problems, and use was eventually discontinued without any deployment.	None.		Not applicable.		It was China's first case of mobile payment in railway tickets and was seen as the start of cooperation between the company and China Railway.

- 9) Were there any external partners involved in the deployment of this innovation? What were the roles played by them and how did you collaborate and interact with them?
- 10) What were the difficulties faced by this innovation when it was deployed? How did the company deal with these difficulties generally and for this project specifically?
- 11) Do you think this innovation has been well deployed? Can you provide some current data about the performance of this innovation, e.g., impact on profits/revenues/sales/market share? Are there any other pos-

sibilities that this innovation could be more widely and well deployed?

- 12) Are there any questions that you think I should have asked but I have not?
- 13) Are there any other people that you think I should interview?
- 14) If you would start this project today, how would you manage it differently?

APPENDIX B SUMMARY OF QUALITATIVE CASE DATA

See Table V

APPENDIX C

ILLUSTRATIVE CASE—SMART CITY MOBILE SERVICE (CASE 7)

This innovation was part of the development of a “smart city” in a major provincial city. In collaboration with the city and a technology supplier, a mobile phone payment system for all transportation within the city was developed. Despite costs being higher than anticipated, the service was considered very successful and won local and national innovation awards. Given the clear success, national headquarters actively encouraged deployment, promoted the service to other cities and provinces, and showcased it via a national innovation award. Despite this, the deployment was much slower than expected. By the end of the study, only one city in the province and two cities in other provinces had adopted the service.

The case had several issues affecting deployment. Although there was personal motivation to deploy, there were no direct incentives to support deployment. The team members’ opportunities for promotion did not depend on deployment, and senior management did not provide incentivization to deploy the service. Second, despite headquarters’ active support for deployment, there was no systematic nationwide effort to deploy. In addition, other divisions wanted to adapt the innovation to their own circumstances, adding time and cost. For example, one provincial subsidiary that adopted the innovation used a different technological solution. Another province wanted to use its own technology partner instead of the partner from the original city. These subsidiaries were therefore unable to build on the technology partner’s expertise, making potential adoption more problematic and slower. Finally, the business model that worked in the first city was not always applicable in other cities. The original city was motivated to become a smart city and provided financial and nonfinancial support. The average age in the city was around 30, which also facilitated the adoption of smart services. Other cities may not have had this motivation. Thus, the business model of the innovation might be context specific.

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