Corruption and Reform in India

Public Services in the Digital Age

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grand corruption. At the same time, both private models should be more prevalent than public ownership and management, as this offers no new opportunities for collecting bribes.

The choice of ownership and management model, as well as the level of corruption, should be closely linked to the scale of service center implementation in terms of the number of centers implemented under a reform policy. In states with high levels of grand corruption where the state partners with a company, politicians can collect bribes upfront and will have little interest in the number of centers opened. If, however, the state partners with entrepreneurs, politicians will want to maximize the number of centers opened in the state so as to increase the number of entrepreneurs from whom they can extract bribes, leading to a higher number of centers overall.

In states with low levels of grand corruption, the dynamics of petty and grand corruption are likely to interact, with the degree of *petty* corruption having important effects on scale. This is because, even if there are few services in the centers, each additional center provides new chances to reduce rents in service delivery, thereby threatening incumbents who depend on these rents. Where petty corruption is low, the state should promote a large number of centers, particularly under the entrepreneurial model, so as to maximize local economic benefits. However, if the state has high petty corruption, regardless of the ownership model, then they should implement a low number of centers per capita.

CONCLUSION

The current state of Indian politics entails that politicians have substantial incentives to improve the quality of public services received by citizens. Not only is there substantial electoral competition across the Indian states, but the delivery of public services is rife with corruption that can have substantial effects on the livelihood of citizens. Yet, politicians also frequently depend on sources of corruption, often derived from the process of service delivery itself, to finance distribution of more targeted goods to citizens in their campaigns for reelection.

This chapter laid out the detailed argument that guides the empirical analyses of this book. I posited that in evaluating policy outcomes, it is necessary to give primary attention to the interaction of diverse institutions and policy options in order to understand the nature of political incentives. Without doing so, we will have little leverage for understanding and explaining policy outcomes, let alone predicting the expected response of politicians to proposed reforms in the future. In the following chapters, I explore the leverage offered by my argument for explaining the specific policy outcomes of technology-enabled service center reforms in the Indian states and across countries.

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Do Reforms Affect the Quality of Services?

The primary argument of this book rests on the idea that politicians perceive technology-enabled administrative reforms to have the potential to improve the quality of public services, largely, but not solely, through the reduction of corruption in the service delivery process. In the face of frequent failures in public service delivery, as well as the electoral pressures of increased competition and anti-incumbency, this may compel ruling parties to adopt these measures in hopes of winning reelection. However, if, as discussed in the previous chapters, politicians perceive the anticipated reduction in corruption as a threat to their established sources of rents, they may instead forgo this type of reform to retain any potential advantages they expect to have in future elections.

In this chapter, I investigate the potential of technology-enabled service reforms to improve the quality of service delivery in general and offer a test of the assumption that these reforms can reduce the prevalence of corruption in service delivery. Through an evaluation of one-stop computerized service centers in the state of Karnataka, I show that this type of administrative reform is associated with higher-quality service delivery in terms of the number of visits individuals make to a government office or service center, the total time spent to get a service, the overall cost of the service, the number of days required to receive the service, and the number of officials with whom citizens meet. In addition, and most importantly for current purposes, individuals patronizing the one-stop computerized service centers considered here face substantially less frequent and lower demands for bribes than those visiting noncomputerized government offices.

Before considering the Karnataka case in more detail, I first provide a brief description of the administrative reforms attempted in India in the last two decades, the evolution of technology-enabled reforms in general, and emergence of one-stop public service centers as a key element of the reform agenda.

A substantial number of policy and administrative reforms were attempted in India during the 1990s and early 2000s in response to failures of state and national governments to translate economic growth into social and economic well-being for the majority of citizens. Many of these reforms concentrated on making the government more responsive to citizen demands and more transparent in its operations. Reforms and attempted reforms included the passage of a national Right to Information (RTI) policy in 2005 and, in 2008–2009, tabling in the national legislature of a new policy to reform political control over the bureaucracy. Most recently, the national government initiated a program to provide national identification cards that can be linked to databases across departments (Economic Times 2009). However, to date, none of these reforms has provided the desired outcome of clear benefits to citizens. Studies have shown that only a small portion of the population, most often researchers, was utilizing the provisions of the RTI Act in the first years after its introduction, despite efforts by NGOs to educate citizens on this powerful resource (Garg 2009). Reforms of the bureaucracy itself were stymied by the lack of political support for efforts to increase the minimum length of time a top bureaucrat should remain in a given position.

Technology-Enabled Public Service Delivery

During the mid-1990s, development practitioners, both within and outside of India, began to see opportunities for using new digital information and communication technologies (ICTs) to foster more transparent and effective governments. More generally, the idea that the Internet would lead to massive revolutions in the shape of economic and political life became commonplace (Barlow 1996; Negroponte 1995; for discussion, see Boas et al. 2005). New technologies were seen as fundamentally important, and developing states were poised to reap the benefits of digital technology; being "behind" was even perceived to be a benefit. Echoing older ideas in the study of development, one analyst projected that "developing nations will leapfrog the telecommunications infrastructures of the First World and become more wired (and wireless)" (Negroponte 1995; see also Singh 1999).

Similar to earlier eras of technological advancement, information technologies were perceived not as a technological end unto themselves. Instead, they were seen as tools for achieving the broad goals of development in general. Technology has played a consistent role in theories of economic development (see, *inter alia*, Acemoglu and Robinson 2006; Gerschenkron 1962; Hall and Jones 1999; Mokyr 1990), and information and communication technologies in the era of the Internet were expected to be a means for transforming not just economic, but also social and political conditions (Boas and Dunning 2005), often through opportunities to use new technologies within public administrations.

When the Millennium Development Goals were adopted by the United Nations General Assembly in 2000, information and communications technologies were promoted as "tools for development" to achieve these objectives (Brown 2001; United Nations 2003a). The G8 group of countries tasked itself with developing "new, innovative strategies for using ICTs to spur social, economic and civic development" (United Nations 2003a) through bodies such as the Digital Opportunities Task Force. From 1994 to 2005, the United Nations Development Program, the United Nations Conference on Trade and Development, the World Bank, and others produced dozens of reports on using information technologies in developing countries, typically emphasizing opportunities for improving economic growth, education, and health care; reducing poverty; and, most importantly for the current discussion, improving access to government services (Bussell 2005).

The expected benefits of information technologies for public administrations are manifold. As noted by the UN Conference on Trade and Development, "The Internet, with its capacity to allow the sharing of information across organizations and to help people work together, creates new possibilities to reorganize and network government services so that they can become more user-centred, transparent and efficient" (UNCTAD 2003: xxxi). Despite the constraints of poor telecommunications infrastructures, low literacy levels, and insufficient regulatory environments in many developing countries, aid organizations felt confident that "the changes brought about by the Internet regarding the delivery and management of public services will be significant.... Not only can resources be saved, but also the quality of services provided to citizens can be dramatically improved" (ibid.). In an analysis of particular relevance to the current discussion, Bhatnagar (2003) posited that new technologies could be used specifically to reduce corruption in public administrations.

Others offered less sanguine perspectives on the potential for technology use in developing countries and within governments in particular. Heeks (*inter alia*, 2003, 2006a) has repeatedly highlighted the risks associated with technology promotion and the multitude of ways in which these efforts can fail. Case studies of government technology adoption in countries such as Ethiopia show that programs can often fall into disuse when there is not sufficient political support for their support and maintenance (Pathak et al. 2007).

Despite these potential risks, growing interest in the potential for technology-enabled reform led to a wide range of development programs using information technologies. In India, this type of reform emerged initially in the shape of efforts to improve ticketing on the Indian National Railways, which successfully shifted an inherently patronage-based system into a predictable process for gaining access to the most popular form of long-distance

travel in the country (Dataquest 2010; Raj 1999). Similarly, the emergence of a more liberal regulatory framework for mobile phones demonstrated to citizens that access to technology itself was not inherently dependent on individual contacts, as had largely been the case with landline telephones (Singh 1999).

Across developing countries, a large subset of technology-enabled reforms involved the computerization of public services and delivery of services through one-stop public service centers. This model can be identified on the basis of three main components or characteristics. First, centers deliver public services to private individuals through the use of digital information technologies, and in particular computers and the Internet.[1] Second, they provide these services in a dedicated manner. Whereas governments may also have policies regarding service delivery via mobile centers or mobile phones, the computer-enabled service centers considered here all involve service delivery at an immovable center. Third, the centers act as a "one-stop shop" offering services from *multiple* government departments. In other words, a department-based service center, such as that of the Indian Railways, does not fit this definition because *only* Railways tickets are available, not services from other departments. The centers studied here take the ultimate act of service delivery out of the hands of the originating department and place it in the hands of service center operators.

These efforts have produced thousands of new technology-enabled locations for government-citizen interaction, with the one-stop service center model gaining popularity around the world as a tool for delivering public services. In Brazil, 5,000 state-supported centers are estimated to be in operation (Government of Brazil 2010), while more than 11,000 have been opened in India (author's analysis). In addition, public technology centers where citizens can access online government services have been implemented across the developing world with initiatives in Mali, Mozambique, Uganda, Peru, El Salvador, Bangladesh, and Sri Lanka, to name only a few (Etta and Parvyn-Wamahiu 2003; Gamage and Halpin 2007; Shore 2003). Government provision of technology-enabled services in general has grown dramatically in the last decade, with only 8 percent of countries offering fully executable online services in 2001, whereas by 2008, this had grown to 50 percent (West 2001, 2008).

India's One-Stop, Computerized Service Centers

State governments became the locus for experimenting with this type of "one-stop" computerized service center model in India. States are tasked with primary responsibility for public service provision by the Indian constitution.[2] As a result, any changes to the nature of services related to areas such as public health, local government, property taxes, education, social insurance, and many others are likely to be legislated and implemented at the state level.[3]

In the late 1990s, Indian state governments began to implement one-stop, computerized service centers. As described earlier, these centers were intended to improve the quality of service delivery to citizens by making government services more transparent and accessible. Never again, it was proposed, would citizens have to spend their days going from government office to government office to complete all of the transactions necessary to acquire a basic service such as a death certificate for a family member or a welfare benefit (Page 2007; Times of India 2005).

These reforms were made viable by the rapid growth and declining costs of information and communication technologies since the mid-1990s and the anticipated ubiquity of the Internet, which ensured that provision of at least some technology-enabled services was feasible in all parts of the country. State policies to provide one-stop access to government services emerged in 1999, and by 2006, nearly all of India's major states had implemented policies to introduce service centers.[4]

These reforms mark more than the computerization of government processes because they present the potential for a major change in the practice of administration. By instituting computer-based monitoring and queuing systems, automated document transfer, and databases of citizen information, these centers can help limit the degree of discretion that bureaucrats hold over who receives services and when they receive them. In addition, some state governments have removed the act of service delivery from the hands of bureaucrats completely, outsourcing the ownership and management of service centers to the private sector. No longer the face of government to citizens, bureaucrats confront a dramatic shift in their relationship with the public (Kuriyan and Ray 2009).

[1] Service centers may also offer private services, but to be included in my analysis they must provide at least one type of public (government) service.

[2] The constitutional allocation of responsibilities in the Indian federalist system makes subnational state governments, rather than the national government, responsible for the provision of a majority of government services to citizens. According to the Seventh Schedule of the Constitution, states are independently responsible for, among other things, public order and the police, public health, overseeing local government, agriculture, water, land rights, industries (other than those declared important for defense and the national interest), trade and commerce, transportation taxes, property taxes, and professional taxes. The states and the central government have concurrent responsibility (in which both can make laws, but national laws supersede state laws if in conflict) for, among other areas, criminal law and procedure, contracts, forests, economic and social planning, family planning, social insurance and employment, trade unions and labor welfare, education, vital statistics, electricity, and any fees related to such activities.

[3] Although there may be related policies regarding service delivery via mobile centers or mobile phones, the policies studied here all involve service delivery at an immovable center through the use of information and communication technologies.

As described in the previous chapter, computerized service delivery can also directly affect the access of bureaucrats, and thereby politicians, to rents. In an ideal-type computerized service center, the process of service application and delivery is automated to reduce opportunities for the extraction of bribes and increase the overall speed of the system. Citizens go to a service center and receive a number for an automated queuing system that prevents officials in the center from serving citizens other than in the order in which they arrived. When their number is called, citizens go to a single counter to apply for all of the services that they require. The center operator enters their information into an online system, which transfers the data to the office of an official who is authorized to evaluate the application. The actions of the authorized bureaucrat can be tracked, so as to evaluate the amount of time that they hold the application before making a decision on its status. Once a decision is made, the information is automatically transmitted back to the center operator, who can then relay the response and any approved services to the citizen. At any time, citizens can also go to the center to check the status of their application.

The reduction of corruption via service centers is largely expected to result from these changes to current bureaucratic processes that simplify procedures, increase oversight, impose technical constraints on the sources of bribes, and generally reduce the frequency of government-citizen interaction. Bhatnagar argues that in the preexisting system, a "lack of transparency in the functioning of government agencies can make it easy for perpetrators to cover their tracks and unearthing corruption becomes very difficult" (2003: 1). Specifically, as a bureaucrat from Haryana described, "babus[4] used their power over files [citizen applications] to collect bribes. Babus would hold onto a file, or tuck it away in a drawer and say that it had been misplaced. In order to get him to look for it, people would have to pay a bribe. The babu then was able to use the collection and delay of files to derive additional income" (Government of Haryana, Information Technology Department official, February 4, 2008). Any system that changes the official's ability to control access to these files can affect the flow of income.

Those familiar with service center initiatives note, by example, the multiple ways in which corruption opportunities can be minimized. An analyst of the Rural Access to Services Initiative (RASI) in Tamil Nadu stated that "RASI staff would get the signatures of the government official concerned, and certificates would be delivered to the applicants in three days.... The setting up of RASI Centres ... virtually eliminated harassment and corruption in government offices as it avoided the people-staff interface" (Manikandan 2008). Similarly, a bureaucrat in Haryana highlighted the importance of a regulated queuing system for reducing the relevance of "speed-money": "Now they [bureaucrats/clerks] can't really play mischief because each application has a number, so it can't be preponed or postponed. If people want to pay a bribe, we can't stop that, but the official now has no power to actually slow down or speed up the process" (Haryana former Information Technology Department official, February 6, 2008). Similarly in Karnataka, an observer noted that the "software doesn't allow people to move up in the queue, so this changes the incentives to the operator. If they can't move someone from fifth in line to the front, then they can't viably take a bribe from someone to do this" (Government of India, Information Technology Department official, February 25, 2008).

Computerization of service delivery can also potentially threaten the ability of politicians to direct state benefits to particular recipients. When applications for welfare benefits are filtered through the computerized system, it can become more difficult for politicians to influence the selection of particular beneficiaries. A related logic has been seen in the implementation of the National Rural Employment Guarantee Act in some Indian states (Burra 2010).

Service center policies, however, differ tremendously across the Indian states in terms of the timing of policy initiation and the character and extent of implementation, and thus also in terms of their likely effects on rents. In 1999, for instance, the Indian state of Andhra Pradesh launched an aggressive policy that resulted in provision of more than forty services to citizens in urban areas. West Bengal, a state with similar levels of economic development, did not launch a policy until 2003 and neglected to develop a range of government services to offer in the centers; the initiative is now widely perceived to be a failure (West Bengal Information Technology Department official, January 18, 2008). In the low-income, neighboring states of Chhattisgarh and Orissa, the Chhattisgarh state government provides nearly forty services, whereas Orissa offers fewer than ten.

The variation in service-center-based reforms across the Indian states, detailed in subsequent chapters, implies that there is the potential for related variations in the benefits received by citizens. As discussed later, computerized service centers can be linked to significant improvements in the quality of service delivery. Depending on the patterns of reform, citizens across India may move closer together or farther apart in terms of their typical experiences accessing services from the state. As a result, it is imperative to evaluate the nature and causes of variation in reform in the digital era, both from the perspective of understanding reform itself and because the benefits new technologies provide to citizens may be highly varied.

EFFECTS OF REFORM IN KARNATAKA

Given this broader context for technology-based reforms in India, I now consider the degree to which reforms have affected the quality of service

[4] "Babu" in this usage is a term originating during the British colonial period that refers to an Indian clerk. In current usage, the term has a somewhat derogatory flavor but is still used frequently in reference to lower-level bureaucrats.

delivery in a single state, Karnataka. To evaluate the assumption that one-stop service reforms can reduce corruption in service delivery, and in anticipation of Chapter 7's discussion of alternative ownership and management models, I use the Karnataka case to shed light on the effects of differing models of computerization and privatization on the delivery of services to citizens. In particular, I contrast noncomputerized government offices with both computerization of government service delivery in traditional offices and the computerized, one-stop, private-ownership model. I do so using original data from a survey and field experiment conducted at government offices and one-stop service centers in the state.

Whereas the analysis presented here serves to test a core assumption of my argument, that one-stop service center reforms can reduce corruption in service delivery, addressing the effects of policy reforms is significant in its own right and is an important agenda item for both scholars and practitioners. That said, the implementation of service delivery reforms in developing countries often leaves questions about the effects of interventions unanswered. A UN report in 2003 noted that little work had been done to evaluate the economic effects of eGovernment (United Nations 2003b). The attempts at evaluation of reforms using information technology have been critiqued for their lack of policy relevance (Bhatnagar and Singh 2009). In response, analysts have made initial efforts to assess the relationship between technology-based reforms and the quality of service delivery. Bhatnagar, in multiple works, addresses the effects of technology-enabled services, or eGovernment, on the quality of service delivery to citizens, and builds a framework for evaluation, on which I draw later in the discussion (*inter alia*, Bhatnagar 2003; Bhatnagar and Singh 2009). Benjamin (2005) provides a critical view of technology-based reforms, showing how preexisting interests and the local political economy can affect service reform outcomes, in this case with regard to land-related services.[5] Heeks has produced multiple works evaluating the success, or lack thereof, of eGovernment initiatives, placing particular focus on the gaps between the design of technological initiatives and the reality of the environment in which they are placed (*inter alia*, Heeks 2003, 2006a, 2006b). From a methodological standpoint, however, none of these works moves beyond the case study or survey format to gain greater leverage over whether reforms display a causal relationship with observed differences in the quality of service delivery.

The combination of computerization with a one-stop model for service delivery in government reforms makes it additionally difficult to evaluate the individual effects of each strategy on the quality of reforms. Does computerization make government offices more efficient, or is it necessary to take the act of service delivery out of government offices and bureaucratic hands to actually affect outcomes? Research to date has not attempted to parse out the effects of each model in order to inform future policy making.

I evaluate the effects of policy reform and the relative contributions of computerization and the one-stop, private model to these effects by taking advantage of a unique temporal opportunity in the implementation of service centers in Karnataka. As addressed in more detail in upcoming chapters, the Karnataka government introduced a number of public service reforms using information technology. One initiative in particular, the *Nemmadi kendras*,[6] was implemented in largely rural areas of the state to provide services to citizens. The approximately 800 village centers are owned and operated by Comat Technologies and provide public services through an agreement with the state government. Nemmadi centers offer government services to citizens through a technical interface that connects each Nemmadi office to the database and systems of the local taluk office.[7] The private companies in the initiative[8] worked with the state government to computerize all of the taluk offices, starting in 2006. But the computerization of taluk offices was staggered, meaning that for a period of time computerized services were available through Nemmadi centers in some parts of the state and not others. In addition, once the local taluk offices were computerized, they could also provide services to citizens even after Nemmadi centers were functional.[9]

In this initial stage, the computerized local taluk offices continued to provide most of the same services, creating the potential for competition between the two types of centers.[10] Given these characteristics of the initiative – staged implementation across the state and computerization of both taluk and Nemmadi offices – it is possible to evaluate three distinct types of citizen experience in accessing services. First, those citizens in areas with noncomputerized government offices; second, those citizens who live in areas with computerized services who visit government-run taluk offices; and third, those citizens who live in areas with computerized services who patronize the privately run Nemmadi offices.

[5] In related work, Kaushik and Singh (2004) evaluate the effects of privately run computer centers in India on broad-based development outcomes.

[6] "Nemmadi" means "peace of mind" in Kannada, the state language of Karnataka, and "kendra" means center or office. I will refer to the Nemmadi offices here as "centers."

[7] The state of Karnataka is divided into districts, which are then subdivided into taluks, and further into hoblis. These serve as administrative divisions and have traditionally determined where citizens must go to access government services.

[8] Three companies were initially involved in the project. 3i Infotech provided capital as well as networking and technology services (Times of India 2006), Comat Technologies owns and manages the centers, with Comat employees operating the centers in villages, and n-Logue Communications provided additional technological support. Currently Comat Technologies is the main company involved in the initiative.

[9] The state is transitioning to a model where citizens can only go to Nemmadi centers to apply for and receive services, but this had not been fully implemented at the time of the survey and experiment.

[10] Competition is on the basis of noncost factors, as the official cost of accessing public services is the same in either type of office.

TABLE 3.1. *Subject Pool for Observational Survey*

Type of Office/Center	Taluks in Survey	Respondents
Government taluk office in noncomputerized areas	2	155
Government taluk office in computerized areas with public and private option	18	411
Privately operated center in computerized areas with public and private option	18	437

I make these comparisons by evaluating survey data collected from all three types of service locations and field-experimental data from the two types of computerized service locations. In the observational component, surveys of citizens leaving government offices and Nemmadi centers were conducted in both noncomputerized and computerized regions. These surveys provide observational data on the characteristics of service delivery and opinions of citizens across the range of service-access options potentially available in the state. With these data, I am able to draw conclusions about the service delivery experiences of citizens accessing computerized taluks, private one-stop centers, and noncomputerized government offices. While drawing causal conclusions in this observational environment is difficult, owing both to the lack of computerization in some of the research locations and to selection effects that may result from differences in the types of citizens who choose to go to computerized government offices versus the privately run Nemmadi centers, some cautious conclusions can nonetheless be drawn. These limitations of the observational survey also motivate the use of the complementary field experiment. Table 3.1 summarizes the categories of service centers and the subjects in the survey.

In the second component, I use a field experiment to compare directly the service delivery experience across government offices and Nemmadi centers, a strategy explained in more detail later. Each participant in the experiment was trained in advance and assigned to apply for three different services in their home taluk[11] – an income certificate, a caste certificate, and a birth certificate[12] – at randomly assigned types of service locations, a Nemmadi center and/or the taluk office. The assignment of subjects to treatment conditions is shown in Table 3.2. Once subjects completed the process, they were asked to fill out a questionnaire about their experience applying for

[11] Services are available to citizens only in their home region.

[12] In those cases where a subject was not currently eligible for one or both of these services, they were asked to request the service for a local relative or friend. These modifications to the protocol are tracked in the questionnaire and included in portions of the analysis. In addition, some field investigators applied for copies of their birth certificate, but in most cases birth records prior to the implementation of computerization had not been computerized by the state government and were not available in either type of center.

TABLE 3.2. *Subject Pool and Treatment Assignment for Experimental Survey*

Service Type \ Office Type	Taluk Office (Control) Subjects	Nemmadi Center (Treatment) Subjects
Income Certificate	13	14
Caste Certificate	16	11
Birth Certificate	15	12
TOTAL	44	37

each service. The same questionnaire was used in the citizen surveys. This research design provides a direct and controlled comparison across service access locations and types of services.

The policy outcomes evaluated through these surveys include a number of indicators of economic, governance, and service quality characteristics, building on established indicators of eGovernance reforms. I emphasize the effects of reforms on the experience of citizens accessing the state and how reforms affect not only absolute factors such as the time and monetary cost taken to acquire a service, but also subjective factors such as overall satisfaction and citizen perceptions of government efficiency.

Based on the observational survey evidence, I find that privatized, one-stop Nemmadi centers tend to perform better than noncomputerized government offices in areas such as the number of visits to the office, the total time spent at the office, the total cost of the service, the number of days taken to receive the service, and the number of officials with whom citizens met, as well as, most importantly, in terms of reduced and smaller demands for bribes and reduced payments to middlemen. Computerized government offices also often outperform noncomputerized offices, but for most indicators, the effect for one-stop, private Nemmadi centers is considerably larger than that for computerized government offices. The positive outcomes for technology-enabled centers are not absolute, however, and computerized centers in general score lower than traditional noncomputerized offices in the important area of overall citizen satisfaction, whereas citizens using Nemmadi centers tend to expect that they will have a greater need for help accessing services in the future. The findings of the field experiment are largely in line with those of the observational study and in particular show that subjects at Nemmadi centers meet with fewer officials, require less additional assistance, and are more satisfied than their peers at computerized government offices.

POLICY REFORM IN KARNATAKA

As discussed in more detail in Chapter 4, the Nemmadi program in Karnataka emerged after a number of reasonably successful eGovernance initiatives in the state. Based on the success of a digital land record program

(*Bhoomi*), the bureaucrat who led that initiative embarked on an effort to provide a range of government services through computerized centers, with the support of Chief Minister S. M. Krishna. This initiative materialized initially in the form of the Rural Digital Services (RDS) project, which was piloted in 2003. The goal of RDS, which became the Nemmadi initiative, was to provide a one-stop shop for government services at the village level. The implications of this computerized model were explicitly to "provide transparent, speedy, and efficient services to rural citizens," thereby eliminating the need for middlemen and bribes in service delivery (Government of Karnataka 2006).

Based on the perceived success of the RDS pilot in fourteen locations, the state government extended the initiative across the state at the subdistrict level by implementing approximately 800 centers (Karnataka Indian Administrative Service Officer, Bangalore, February 22, 2006; External Consultant to Karnataka Government, Bangalore, February 22, 2006). Implementation of these Nemmadi centers began in 2006 and was nearly complete in the summer of 2009. Centers were fully operational in all but two taluks (subdistricts) at the time of this evaluation.

As noted earlier, Nemmadi centers are owned and operated by a private company, Comat Technologies. The public explanation from the Karnataka government for why they worked with the private sector to implement rural service delivery centers was that an implementation of this scope would require external participation to be successful. The model for the partnership differed from that implemented in other states, such as neighboring Kerala, where individual entrepreneurs contract with the state to operate rural centers. In Karnataka, instead, the government partnered with a single company that was tasked with owning the centers and hiring permanent employees to serve as center managers (see Chapter 7).

To provide services through Nemmadi centers, the state computerized government offices at the taluk and district levels first and then offered the services through a Web link at the Nemmadi centers to the database at the taluk office. Government employees at the taluk office would review the electronic applications and send the notification of approval or rejection back to the Nemmadi center. This also meant that computerized services could be provided directly by government officials at the taluk offices. At the time of this research, citizens could go to either the taluk office or a Nemmadi center for nearly all services that had been implemented in the Nemmadi centers, whichever they preferred. This implies that there was potential for competition between the Nemmadi centers and the taluk offices. Because the Nemmadi centers operate on a for-profit basis, unlike the nonprofit government offices, there may be incentives for Nemmadi centers, but not necessarily government offices, to provide high-quality service delivery.

In 2009, Nemmadi centers were offering a range of services to citizens, as discussed in more detail in Chapter 5. The full list of services is shown in Table 3.3. Based on the findings of the survey and discussions with Nemmadi center operators, the most common services requested by citizens are caste certificates, income certificates, and land records.

TABLE 3.3. *Services Available at Karnataka's Nemmadi Centers*

Karnataka Nemmadi Center Services
Birth and Death Certificates (for new cases)
Caste Certificates
Income Certificates
Ration Cards
Land Records (RTC and mutations)
Pensions (old age, widower, disabled, etc.)

EVALUATING REFORM OUTCOMES

In both the citizen survey and field experiment, I attempt to evaluate how reforms of public service delivery are associated with changes in the experience of citizens when they attempt to access services. Whereas the effects of reform on service "quality" could imply a wide range of characteristics that might be evaluated in a survey context, here I am focusing on the effects of service reforms on the experience of one stakeholder group, those citizens who attempt to acquire basic services from the government. There are other important stakeholders who might also be considered in an evaluation of service reforms, including, most prominently, the government itself and specific actors within the government. The private actors involved in operating the centers might also be considered. In later portions of this book, I focus explicitly on the potential effects of service reforms for politicians and local bureaucrats. Here, I emphasize citizens, the purported beneficiaries of reforms. However, this analysis also helps test the hypothesis that one-stop service centers can reduce corruption in basic service delivery, at least as it exists in the previously established, noncomputerized institutional model.

It is appropriate that reforms be evaluated in the context of their generally proposed goals, which, as noted earlier, are typically "to improve efficiency, effectiveness, and transparency of governments" (Bhatnagar and Singh 2009: 185). From the perspective of citizens, Bhatnagar and Singh identify three categories of "outcome dimensions" that provide a framework for evaluating the effects of reforms. The first category is economic, encompassing both direct and indirect effects of reforms on the costs to citizens of accessing services. The second is governance, which may include measures of corruption, transparency, accountability, and participation. The final category is quality of service, which can include fairness, decency, and convenience. This categorization follows a general trend in evaluations of

technology-based reform to emphasize the value of service reforms to citizens in terms of reduced costs, time savings, and overall satisfaction (Bhatnagar and Singh 2009; European Commission 2006; Lau 2005).

I use citizen responses to survey questions about their experience accessing services to evaluate a set of these outcomes. In line with previous efforts, I take advantage of the fact that "financial savings to users in terms of time and money spent in finding and using public information are the most direct and measurable benefits of e-government applications for clients" (Bhatnagar and Singh 2009: 184). I also evaluate citizens' perceptions of their experience in terms of their need for assistance and their overall satisfaction. In the economic category, I evaluate the number of visits, time spent at the office/center, overall cost, and days to receive the service. With regard to governance, I consider the number of officials met, requests for additional money (bribes), use and cost of middlemen, and perception of government efficiency. Finally, in terms of service quality, I measure overall satisfaction and the need for assistance.

There are multiple ways in which service provision outcomes across reformed and non-reformed offices may differ, which can be measured on the basis of a number of indicators. First, a computerized system should speed up the delivery of services by reducing any delays associated with paper-based files and transferring of files between government offices. Second, inclusion of an electronic queuing system should reduce opportunities for people to pay bribes to move ahead in line, potentially reducing the average time to acquire services. Third, computerized records should increase the likelihood that citizens receive the services to which they are entitled and not those to which they are not. Fourth, computerization may also make it easier for illiterate citizens to apply for services, thereby reducing the demand for middlemen.

One-stop centers that are both computerized and privatized should have the same benefits of computerized government offices, with additional characteristics that may improve the service delivery experience for citizens. First, in this case, the Nemmadi centers are located at the village level, and so should be closer to citizens than bureaucratic offices located in taluk headquarters, thereby reducing travel time. Second, private operators working on a for-profit basis should be inclined to provide better customer service to citizens, both in terms of more efficient service delivery and with regard to fewer demands for bribes. Third, because the operators at the Nemmadi centers do not approve applications directly, it should be more difficult for them to justify taking a bribe from a citizen to help with their application. Fourth, because there are more Nemmadi centers than taluk offices, it may be the case that the time spent at the center in the queue may be less than at the taluk office, but this also assumes that there are more operators overall, across the Nemmadi centers, than in the taluk office, which is not necessarily the case. In most Nemmadi centers, there is only one operator staffing the center.

Based on these characteristics and potential benefits of computerization and one-stop centers, I hypothesize that computerized centers in general, both privatized and government operated, should display improvements over noncomputerized centers on a number of economic indicators, including lower wait times at the office, less need for multiple visits, and fewer days to acquire a service. There may also be improvements in governance factors, such as a reduction in bribe taking at these offices and a reduced need for the services of middlemen.

In one-stop centers, in addition to those factors noted for computerized offices, we should see an additional reduction in the frequency and size of bribes and the use of middlemen. We may also expect that citizens will have to meet with fewer officials overall. Beyond these economic and governance outcomes, we may also expect to see improvements at both types of centers in measures of service quality, such as overall satisfaction with the service delivery process and perceptions of government efficiency.

Research Design and Structure of Surveys

The citizen survey and field experiment were conducted in the summer of 2009. I combine a citizen survey with a field experiment in order to benefit from the strengths of both research methods while attempting to alleviate some weaknesses of each. While experimental research designs have been used in India both to evaluate public services (Bertrand et al. 2007) and to measure the effects of government reforms (Banerjee et al. 2008) this model has not been utilized to date in the evaluation of basic public service reforms. Prior to my surveys, no comprehensive and independent evaluation had been conducted to measure the effects of computerization and one-stop service centers in Karnataka on the quality of service delivery.

The citizen survey allows me to gather information from a randomly selected sample of citizens accessing government services across twenty taluks in six districts of Karnataka. The primary problem with making causal claims based on the results of this survey, however, is that I am not able to manipulate the key treatment under consideration, which is the type of center visited by the citizen. Because there may be factors associated with the choice to go to a taluk office versus a Nemmadi center that may also be associated with perceptions about these centers, in addition to differences in personal characteristics that may exist across different parts of the state I cannot claim any clear causal effect of the centers themselves in producing any differences that I find across the centers under examination. For example, differences in outcomes such as overall satisfaction with the service delivery experience may be due to differences across the types of offices or centers, confounding differences in the types of individuals who choose to go to different offices or centers, or both. I attempt to account for the effect

of some potential confounding characteristics in the multivariate analysis that follows, but the constraints of an observational study still hold.

With the field experiment, however, I am able to randomly assign participants to visit one or another type of office or center, thereby creating treatment and control groups for which I can assume no major differences across the populations in each group, other than the treatment itself. In this way, I should be better able to evaluate the specific effects of having privately operated service centers on the characteristics of public service delivery versus those run by the government. This research design has its own weaknesses, particularly in terms of our ability to generalize from the field experiment to broader populations, which I consider in more detail later. In order to be clear on the methodology for each part of the study, I will discuss the citizen survey and findings first, and then move to a discussion of the field experiment.

Citizen Survey

For the observational portion of the study, surveyors recruited subjects outside of taluk offices and Nemmadi centers when citizens were leaving the office. Subjects were asked to participate in the survey and qualified on the basis of the conditions that they were at least eighteen years old and that they had returned to the office to drop off materials or pick up documents, not to apply for a service. Surveyors approached every fourth person, to establish a random sample of citizens who visited the center during the study period. Respondents were asked demographic questions and questions about the characteristics of their visits to the office and their perceptions about the experience. Subjects were not paid to participate in the survey and were not promised any benefits for their participation.

The taluks included in the survey were chosen based both on the presence, or lack thereof, of computerized service delivery and the requirements of the experimental portion of the project, discussed later in the chapter. At the time of the study – June and July 2009 – two taluks in the state did not yet provide computerized services to citizens. These taluks were included in order to establish a baseline for the characteristics of service delivery prior to any computerization or privatization. Risks of non-representativeness, or threats to internal and external validity from comparisons with these taluks, are also discussed later. All of the taluks are considered rural, under the administrative guidelines of the state, but are in the area of Karnataka surrounding Bangalore, the capital and largest city. I account for any potential differences between more and less rural taluks in the multivariate analysis. In total, surveys were conducted in twenty taluks across six districts.

Findings for the Observational Survey

For the majority of the analyses, I estimate standard OLS models with dummy variables for the type of center, except where the outcome variable

TABLE 3.4. *Summary Statistics for Observational Group*

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Days to receive service	659	9.0	9.8	0	70
Overall cost (INR)	832	74.4	150.8	0	3,000
Visits to office	830	3.9	3.4	1	70
Time spent at office (minutes)	830	327.5	221.9	20	2,160
Number of officials met	822	2.9	1.4	1	12
Did any official ask for extra money?	832	.23	.42	0	1
If yes, how much? (INR)	184	137.9	131.9	5	1,000
Did you pay a middleman for help?	832	.22	.42	0	1
If yes, how much?	183	112.4	132.3	5	1,000
How efficient is government?	831	3.5	1.4	1	7
How satisfied are you with your experience accessing this service?	805	4.0	1.6	1	7
Did you need help getting this service?	832	.52	.50	0	1
Do you expect to need help in the future?	832	.65	.48	0	1

Note: In all analyses, for the yes or no questions, no is coded 0 and yes is coded 1; opinion variables are coded on a scale from 1 to 7, with 1 = the least positive response and 7 = the most positive response, except in the case of corruption, where 7 = entirely corrupt; nonresponses are excluded from the analysis. INR = Indian Rupees.

is a dichotomous measure, in which case I use a probit model. The excluded case for the main model is the noncomputerized taluk offices, but I also report findings for the outcomes of the computerized offices and Nemmadi centers relative to each other. Table 3.4 presents the summary statistics for all of the dependent variables. Overall, 23 percent of respondents were asked to pay a bribe, with an average requested amount of Rs. 140 (~U.S. $3.11), and 26 percent used a middleman to help them get their desired service, paying an average of Rs. 110 (~U.S. $2.44). In addition, nearly 50 percent of the citizens surveyed required assistance from some other source. Respondents made, on average, four visits to the government office or service center, spent five and a half hours at the office, met with three officials, and received their service after nine days. In the analysis, I also include a number of demographic control variables to account for potential differences in perceptions and experiences across demographic groups that could potentially be correlated with the choice to go either to a taluk office or Nemmadi center to apply for a service, including gender, education level, caste category, monthly income, and age.

Across all indicators of economic outcomes, the Nemmadi centers exhibit better performance than the noncomputerized taluk offices. This is the case both in bivariate models (results not shown) and in the multivariate models reported in Table 3.5. As shown in the table, visitors to Nemmadi centers report, on average, making 3.4 fewer visits to the office, spending 58 fewer minutes in total at the office, paying Rs. 55 less in terms of total cost, and getting their service or certificate 23 days faster than those citizens who went to a noncomputerized taluk office. Those citizens going to computerized taluk offices reported better outcomes only on the number of visits to the office, averaging 2.8 fewer visits, than those subjects going to a noncomputerized office. Across all four measures, the outcomes were better for the Nemmadi centers than the computerized taluk offices, and these differences were statistically significant in the case of number of visits and overall cost (results not shown).

On governance indicators, Nemmadi centers also performed well. For these measures the bivariate tests offer similar findings to the multivariate results discussed here and presented in Table 3.6. Nemmadi patrons met with .85 fewer officials on average and were more than 50 percent less likely to be asked to pay a bribe than citizens at noncomputerized offices. If citizens were asked to pay a bribe, it was Rs. 103 (U.S. $2.29) less on average. The difference in the likelihood that citizens would use a middleman at Nemmadi centers was not statistically significant (although it was in the predicted direction), but if they did use a middleman, they paid Rs. 102 (U.S. $2.27) less on average than citizens at the noncomputerized taluk. Computerized taluk offices performed better than noncomputerized offices in terms of the number of officers met, with citizens at computerized taluks meeting .79 fewer officers on average. Citizens at computerized taluk offices also faced lower demands for bribes, at Rs. 69 (U.S. $1.53) less on average,

TABLE 3.5. *Comparing Economic Outcomes of Computerized Taluk Offices and Nemmadi Centers versus Noncomputerized Taluk Offices – Observational*

Variables	Number of Visits	Total Minutes Spent at Office	Total Cost (INR)	Days to Receive Service
Computerized Taluk	−2.78***	−49.88	−30.76	−20.66
	(−6.96)	(−1.83)	(−1.65)	(−1.82)
Nemmadi Center	−3.41***	−57.66*	−55.22**	−23.42*
	(−8.76)	(−2.17)	(−3.05)	(−2.16)
Age (years)	.01	1.44*	.60	.28
	(1.45)	(2.49)	(1.50)	(1.16)
Education (years)	.00	.72	.22	−.84
	(.14)	(43)	(.19)	(−1.14)
Caste Group*				
OBC(A)	.13	−13.20	13.21	2.90
	(.24)	(−.37)	(.54)	(.18)
OBC(B)	.28	.98	24.37	−3.09
	(.54)	(.03)	(.99)	(−.19)
SC	.43	−17.27	14.90	−2.74
	(.70)	(−.41)	(.52)	(−.14)
ST	3.40***	100.91	142.91***	−1.76
	(4.22)	(1.84)	(3.79)	(−.07)
Income (100 INR)	−.01	−1.18***	−.07	−.22
	(−1.71)	(−3.62)	(−.33)	(−1.56)
Urban	.06	111.18***	14.12	1.78
	(.22)	(5.62)	(1.04)	(.18)
Constant	5.98	326.10	65.57	33.67
	(7.88)	(6.32)	(1.85)	(1.50)
N	762	761	764	593
r^2_{adj}	.11	.06	.03	.00

Note: Entries are nonstandardized regression coefficients with t-ratios in parentheses. Forward castes are the excluded category for Caste Group.
* = p<.05, ** = p<.01, *** = p<.001.

and paid middlemen less, by Rs. 68 (U.S. $1.51) on average. Surprisingly, despite these clear differences in multiple service quality measures across the types of centers, neither of the computerized center types was perceived to be more efficient than the traditional office – an outcome I discuss in detail later in the chapter.

Finally, the results for service quality outcomes also show that the improvements in economic and governance outcomes do not necessarily translate into broader perceptions of improved service quality. Citizens at the noncomputerized taluk offices reported higher satisfaction levels than those at either type of computerized center, and they were also less likely to expect that they would need assistance in the future when trying to access a service (in bivariate tests

TABLE 3.6. *Comparing Governance Outcomes of Computerized Taluk Offices and Nemmadi Centers versus Noncomputerized Taluk Offices – Observational*

Independent Variables	Number of Officials Met	Asked for Bribe?	If Asked for Bribe, How Much (INR)	Paid Middleman?	If Paid Middleman, How Much (INR)	Perceived Government Efficiency*
Computerized Taluk	-.79***	-.00	-68.87*	.43*	-67.72*	-.47***
	(-4.77)	(-.02)	(-2.37)	(2.56)	(2.22)	(-2.76)
Nemmadi Center	-.85***	-.54**	-102.98**	-.31	-102.14**	-.34*
	(-5.29)	(-3.31)	(-3.53)	(-1.83)	(-3.29)	(-2.06)
Age (years)	.01***	.00	.59	.00	1.29*	.01***
	(4.15)	(.57)	(.85)	(.49)	(2.04)	(4.03)
Education (years)	.02	-.02	-2.21	-.01	-.56	.02
	(1.49)	(-1.53)	1-1.09)	(-.74)	(-.30)	(1.52)
Caste Group*						
OBC(A)	.13	.04	-12.61	-.08	4.15	-.21
	(.61)	(.19)	(-.26)	(-.33)	(.10)	(-.95)
OBC(B)	-.02	-.03	50.01	-.07	57.97	-.53*
	(-.15)	(-.12)	(1.02)	(-.31)	(1.36)	(-2.34)
SC	.04	.12	-8.04	-.09	23.12	-.49
	(.17)	(.44)	(-.15)	(-.34)	(.46)	(-1.86)
ST	-.01	.28	114.28	-.27	280.93***	-.42
	(-.03)	(.82)	(1.77)	(-.74)	(4.13)	(-1.22)
Income (100 INR)	-.00	-.00	.14	-.01**	.68	-.00
	(-.74)	(-.91)	(.32)	(-2.91)	(1.33)	(-.25)
Urban	.78***	-.11	81.19**	-.31*	59.59*	.36**
	(6.48)	(-.89)	(3.13)	(-2.42)	(2.28)	(2.95)
Constant	2.68	-.37	165.34	-.43	80.11	3.43
	(8.55)	(-1.14)	(2.47)	(-1.34)	(1.40)	(10.64)
N	754	764	177	764	173	763
r^2_{adj}/pseudo r^2	.07	.04	.15	.06	.17	.03

* Entries are nonstandardized regression coefficients with t-ratios in parentheses; for yes/no questions (where No = 0 and Yes = 1), a probit model is used; for other questions, I use OLS. Forward castes are the excluded category for Caste Group. Government efficiency is scaled 1–7, with 1 = not at all efficient and 7 = highly efficient. * = p<.05, ** = p<.01, *** = p<.001

TABLE 3.7. *Comparing Service Quality Outcomes of Computerized Taluk Offices and Nemmadi Centers versus Noncomputerized Taluk Offices – Observational*

Outcome (DV) Independent Variables	How Satisfied Were You?	Did You Need Help?	Do You Expect to Need Help in the Future?
Computerized Taluk	-1.23***	.21	.71***
	(-6.77)	(1.35)	(4.46)
Nemmadi Center	-.95***	.19	.93***
	(-5.35)	(1.23)	(6.01)
Age (years)	.00	.00	.01**
	(1.41)	(1.20)	(3.35)
Education (years)	.02	.02**	-.02
	(1.84)	(2.60)	(-1.61)
Caste Group*			
OBC(A)	.09	-.05	-.19
	(.39)	(-.25)	(-.87)
OBC(B)	-.27	-.14	-.10
	(-1.12)	(-.69)	(-.49)
SC	-.16	-.09	-.16
	(-.57)	(-.39)	(-.63)
ST	-.13	-.02	-.27
	(-.34)	(-.08)	(-.84)
Income (100 INR)	.00	-.01***	.00
	(.11)	(-3.55)	(.33)
Urban	.06	-.25*	-.10
	(.46)	(-2.26)	(-.88)
Constant	4.54	-.15	-.45
	(12.93)	(-.51)	(-1.41)
N	737	764	764
r^2_{adj} /pseudo r^2	.08	.03	.07

Note: Entries for Satisfaction are nonstandardized OLS regression coefficients with t-ratios in parentheses; Satisfaction is scaled 1–7, with 1 = not at all efficient and 7 = highly efficient. Entries for Need Help and Expect to Need Help in Future are Probit coefficients; No = 0 and Yes = 1. Forward castes are the excluded category for Caste Group. * = p<.05, ** = p<.01, *** = p<.001

and in the multivariate tests reported in Table 3.7). Citizens at Nemmadi centers were more satisfied than those at computerized taluks, but they were also the most likely to think that they would need help in the future.

A few findings for the control variables are worth mentioning in brief. Across a number of outcomes, older citizens, Scheduled Tribes, and those in urban areas seem to face more difficult conditions for accessing services. One additional year of age is associated with 1.4 additional minutes of waiting

time at an office, .01 additional officials met during the process, and a .01 increase in a citizen's perception that they will need help accessing services in the future. Scheduled Tribe individuals, in comparison with members of forward castes, on average, make 3.4 additional visits to an office to acquire a service, pay Rs. 143 more in terms of overall cost, and pay Rs. 281 more when they use a middleman. Urban residents,[13] on average, spend 112 more minutes at the office or service center, need to speak with .78 more officials, are asked for bribes of Rs. 81 more on average, and pay middlemen Rs. 60 more, although they did report a lower need for help in accessing services. Citizens with higher incomes, on the other hand, report more positive experiences on at least a few indicators. For every additional Rs. 100 of monthly income, respondents spend 1.2 fewer minutes at an office and report a lower need for help in accessing services, on average.

These findings suggest overall that one-stop Nemmadi centers improve governance outcomes in general, but that they may not improve overall citizen satisfaction with public service delivery. One interpretation for this finding may be that the results are contaminated by selection bias, in that the more satisfied citizens continue going to traditional or computerized government offices in the first place, whereas dissatisfied citizens are more willing to try the new Nemmadi centers. If this is the case, the experimental data may help shed some light on this question.

Experimental Survey

In the experimental portion of the study, I evaluate the characteristics of access to three services: caste certificates, income certificates, and birth certificates. These services were chosen for three main reasons. First, both caste and income certificates are extremely important for gaining access to a range of state-sponsored welfare programs. In the post-Independence period, major affirmative action programs were put in place to improve the conditions of citizens from what were previously called the "untouchable" castes. These programs include reserved seats for "scheduled castes"[14] in universities, as well as in the electoral system (Parikh 1997). To access these programs, citizens must provide evidence of their caste status, which is typically done using an official caste certificate. Other welfare programs require proof of low income, which can be done through provision of an income certificate. Birth certificates in general are required as proof of identity to acquire other types of services. Second, caste and income certificates are services in which citizens often report paying bribes to gain either legal or illegal access to the certificate in question (Private Sector Representative, Bangalore, January 9, 2009). Finally, these are high-demand services – 52 percent of the services requested in the observational study were income certificates and caste certificates – and so changes in the quality of access to these certificates are likely to affect a large portion of the population (ibid.; Transparency International India and Centre for Media Studies 2005).

Unlike in the observational study, in which enumerators recruited subjects in the field, the enumerators for the observational study were the subjects in the experimental study.[15] This research design was chosen to avoid potential risks related to any attempts to modify the behavior of citizens who were already attempting to apply for services. While studies have shown the use of citizens in experimental studies of service delivery to be a viable research model (Bertrand et al. 2007), because the services being evaluated here are quite sensitive in the local environment (as just noted, income and caste certificates are fundamental for receiving certain kinds of welfare benefits), it was deemed inappropriate to modify citizen behavior in this particular context. Instead, surveyors were hired to apply for services and were randomly assigned to treatment groups.[16]

Experimental subjects implemented the experiment in the same eighteen taluks that were used for the citizen survey, excluding the two noncomputerized taluks. The assignment of subjects to treatment and control conditions is shown in Table 3.2. The subjects then completed the same questionnaire as respondents in the observational portion of the study, filling out one questionnaire for each service to which they applied. In the analyses that follow, cases are pooled across the different types of services. Although this may mask differences in the quality of services provided across service types, the goal in this case is to maximize our ability to evaluate differences across the types of centers rather than the types of services.[17]

[13] These are residents living in the "rural" areas of Bangalore Urban district, which, although classified as rural by the state, are more urban than most of the other areas included in the survey.

[14] "Scheduled Caste" or SC refers to those caste groups included in an official list that is attached to legislation as a schedule and denotes those groups eligible for such state programs.

[15] The enumerators were paid for their overall time in the field, which included the time spent both interviewing subjects for the observational study and implementing the field experiment by themselves applying for services. However, the amount they were to be paid was determined in advance, so as to minimize any risk that they might attempt to lengthen the amount of time required to access services in the experimental portion of the study.

[16] The enumerators hired to participate in the field experiment were generally aware that the goal of the study was to evaluate the performance of different government offices and service centers, but they were not informed that the primary goal was to evaluate the performance of the Nemmadi centers and computerized offices versus the noncomputerized offices. They also had access to the survey instrument in advance because they were using the same protocol to survey citizens, but they were not made aware of my hypotheses regarding the expected effects of computerization and privatization on the delivery of government services.

[17] It was difficult for most of the subjects in the experiment to acquire a copy of their birth certificate. Because birth certificates have not been computerized, only new birth certificates are available at the computerized officers. As a result, the majority of the cases considered are income and caste certificate applications. This helps explain a large portion of the discrepancy between the number of cases listed in Table 3.2 and the number appearing in the analyses that follow.

TABLE 3.8. *Summary Statistics for Experimental Group*

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Overall cost (INR)	50	37.5	75.5	0	400
Visits to office	50	2.3	1.6	1	10
Time spent at office (minutes)	50	199.1	161.1	5	600
Number of officials met	48	2.5	1.2	1	5
Did any official ask for extra money?	50	.06	.24	0	1
If yes, how much? (INR)	3	103.3	95.0	10	200
Did you pay a middleman for help?	50	.04	.20	0	1
If yes, how much?	2	105.0	134.4	10	200
How efficient is government?	50	3.1	1.3	1	7
How satisfied are you with your experience accessing this service?	50	3.7	1.8	1	7
Did you need help getting this service?	50	.56	.50	0	1
Do you expect to need help in the future?	50	.72	.45	0	1

Findings for the Field Experiment

For the experimental analyses, I use difference-of-means tests to evaluate the average response of subjects who applied for services at Nemmadi centers versus that of subjects who applied at computerized taluk offices. I use one-tailed tests, under the hypothesis that in all cases the outcomes should be better, such as reduced visits to the office or reduced time to receive service, at Nemmadi centers. Summary statistics for all variables are shown in Table 3.8.

The findings for the experimental comparisons are generally supportive of the observational study, although the small sample size reduces the power of the tests and makes statistically significant results less likely, for a given true effect size, than in the observational study. In addition, the comparison here is between Nemmadi centers and computerized taluks, owing to regulations on where citizens can apply for services. As shown in the observational study, the differences in service quality characteristics across these types of centers are often less dramatic than between either type of computerized center and the noncomputerized government offices. Because of this greater similarity, we might also expect weaker effects. As a result, any statistically significant findings we do observe in the experimental portion should reflect a strong true relationship between the variables.

TABLE 3.9. *Comparing Economic Outcomes of Computerized Taluk Offices and Nemmadi Centers – Experimental*

Variable	Computerized Taluk (A)	Computerized Nemmadi (B)	A-B
Number of Visits	2.35	2.33	.02
	(.27, N=17)	(.31, N=33)	(.05)
Total Minutes Spent at Office	252.2	171.7	80.4
	(44.34, N=17)	(25.07, N=33)	(1.58)

Note: T-tests for difference in means with standard error and sample in parentheses; the third column shows the difference in means with *t*-ratio in parentheses.

TABLE 3.10. *Comparing Governance Outcomes of Computerized Taluk Offices and Nemmadi Centers – Experimental*

Variable	Computerized Taluk (A)	Computerized Nemmadi (B)	A-B
Number of officials met	3.0 (.29, N=17)	2.2 (.19, N=31)	.86** (2.50)
Did any official ask for money?	.06 (.06, N=17)	.06 (.04, N=33)	−.002 (.02)
If yes, how much? (INR)	10.0 (N/A, N=1)	150.0 (70.7, N=2)	N/A*
Did you pay a middleman for help?	.06 (.06, N=17)	.03 (.04, N=33)	.03 (.43)
If yes, how much? (INR)	10 (N/A, N=1)	200 (N/A, N=1)	N/A
How efficient is government?	3.06 (.33, N=17)	3.15 (.22, N=33)	−.09 (−.24)

* Too few observations to calculate a difference of means.
* = p<.05, ** = p<.01, *** = p<.001

On the economic outcomes, there were no statistically significant differences across the two types of centers (Table 3.9). In terms of governance indicators, subjects who applied for services at Nemmadi centers met with

TABLE 3.11. *Comparing Service Quality Outcomes of Computerized Taluk Offices and Nemmadi Centers – Experimental*

Variable	Computerized Taluk (A)	Computerized Nemmadi (B)	A-B
How satisfied are you?	3.0 (.36, N=17)	4.0 (.34, N=33)	−.97 (−1.96)
Did you need help?	.76 (.11, N=17)	.48 (.09, N=33)	.31* (2.25)
Will you need help in the future?	.76 (.11, N=17)	.70 (.08, N=33)	.06 (.51)

fewer officials, on average, and were less likely to require help in getting a service (Table 3.10). These findings are in the same direction as those in the observational study, although the observational findings were not statistically significant. With regard to service quality, subjects visiting the Nemmadi centers reported higher levels of overall satisfaction, similar to the observational survey (Table 3.11).

DISCUSSION

Overall, the findings in this chapter support a core assumption of my theoretical and empirical analysis in this book: The creation of one-stop computerized service delivery centers is associated with a lower need for citizens to pay bribes and a reduction in the cost of bribes and frequency of using middlemen to access public services; thus, the claim that creation of such centers cuts into the rents available to bureaucrats and politicians is highly plausible. The findings of these surveys support the claim that computerized public services and a one-stop, privatized model for service delivery can be associated with improved outcomes for citizens across economic, governance, and service quality outcomes. The one-stop model in particular displays measurable improvements over the traditional noncomputerized government office. The findings of the smaller field experiment generally support those of the observational citizen survey.

However, not all of the findings suggest an improved experience for citizens at the private, one-stop centers. One of the most interesting overall characteristics of the observational survey data is the disconnect between the improvements in economic and governance outcomes associated in particular with the Nemmadi centers and the lower satisfaction rates seen at these centers, on average, relative to noncomputerized government offices. What this implies, perhaps, is that there are other characteristics of service delivery not measured by this survey that have important effects on citizen satisfaction.

Interviews with citizens and Nemmadi center operators suggest that there is one major cause for dissatisfaction with the Nemmadi centers and this is the perceived length of time it now takes to receive a certificate or other service. The state government has imposed minimum and maximum wait times on the delivery of certificates and other services in computerized offices. The official minimum time – seven days – is longer than a citizen might have needed to wait in the old system, especially if they had been willing to pay "speed money" (Private sector representative, Chikmagalur, June 17, 2009). A citizen interviewed at a taluk office argued that the new process is worse than the old process because now it takes too long to get any certificates. He said that it takes at least fifteen days to get a certificate and that before you could just pay the person and get your certificate quicker, but that now this is not possible (Malavalli Taluk, March 10, 2010). Nemmadi operators corroborated this perspective. One operator said that the only reason people are ever unhappy is that they used to be able to get their certificates on the same day and now it takes at least a week; an operator at a different Nemmadi center mentioned the same reason for dissatisfaction (Devanahalli, March 15, 2010; Peenya, March 15, 2010). These qualitative findings are consistent with the survey. When asked what was the most important factor influencing their level of satisfaction (be it high or low satisfaction), the largest group of those who responded, at 36 percent, said it was the amount of time required to get their service.

This consistent finding for why citizens may be dissatisfied with the computerized system – the inability to get their services in less than seven days – has at least one potential implication. The seven-day minimum is a policy constraint, not a technical one. Technically, citizens should be able to get their certificates on the same day, if there is not a long queue in front of them. The minimum and maximum delivery times were imposed by the state to create an additional limit on corruption, so that bureaucrats and operators could not speed up or slow down an application outside these limits. Although it seems that this constraint may be contributing to lower corruption, at least some citizens may place greater weight on getting a service quickly than on not paying a bribe.

Yet, there is another story in the data. The second-most important factor influencing citizen satisfaction, at 17 percent, was the degree of corruption. Initially, we might expect that the presence (or lack thereof) of corruption would be directly related to satisfaction levels, with a low presence of corruption, in general, associated with higher levels of satisfaction, and vice versa. However, the case here is a bit more complicated. If we consider the relationship between level of satisfaction and the factors respondents noted were most important to their level of satisfaction *within* the respondents at each type of service center, a very interesting picture emerges.

First, in the noncomputerized government offices, those people reporting above-average levels of satisfaction almost exclusively reported that their level of satisfaction was related to the level of corruption. If we assume that people in general do not prefer corruption, all else being equal, then this

implies that citizens experienced *less* corruption than they expected, despite the fact that there was *more* corruption, on average, than in the computerized centers. Those people reporting that the time required to get their service was most important almost exclusively noted simply an "average" level of satisfaction (a score of 4 on a scale from 1 to 7).

Second, the case was somewhat different in the computerized government offices. The largest segment of respondents reporting that they were "not at all satisfied" (45 percent) said that the overwhelming factor for their level of satisfaction was corruption. The next most common reason for a low satisfaction level (29 percent) was the time to receive the service, which was virtually absent among respondents at the traditional office. The largest portion of respondents overall, however, noted an average satisfaction level (score of 4) that was associated with time to receive the service.

Finally, and most strikingly, low levels of satisfaction at Nemmadi centers are largely a result of unhappiness with time to service (31 percent of "not at all satisfied" responses) and presence of corruption (29 percent). Whereas a large number of respondents reported average satisfaction levels (score of 3, 4, or 5) related to time to service delivery, 70 percent of those people who felt that corruption was the most important factor reported below-average levels of satisfaction. This is despite the fact that, as shown earlier, citizens at Nemmadi centers faced significantly fewer, and lower, demands for bribes during service delivery, as well as receiving services more quickly, on average, than their peers at noncomputerized government offices.

These findings seem to imply that the *expectations* of citizens visiting traditional government offices, at least in terms of the time necessary to receive a service and the likely level of corruption, may be quite different from those individuals patronizing a computerized government office or, even more so, a private Nemmadi center. Thus, even though in absolute terms, on average, they are receiving services in a less corrupt and speedier fashion, any corruption or slowness in the process becomes a cause of dissatisfaction at the computerized centers.

This also suggests that a citizen preference for speedy service delivery does not mean that citizens prefer bribing in general. It may instead be the case that citizens want to receive their services quickly *and* not have to pay a bribe to do so, which is technically possible in a computerized service delivery system. If the reformed system could eliminate a major source of demand for bribes in the first place – the desire to get services quicker than they are typically available – by making services available promptly in general, then it is likely that overall levels of satisfaction would go up.[18] Thus it seems fair to posit that the lack of convergence in economic and governance outcomes with levels of satisfaction is most likely a result of both the government's imposition of a minimum wait time for services that contrasts with a strong preference of the general population for speedy access, and the general perception that computerization and one-stop centers will dramatically reduce corruption, such that any remaining corruption in the system, however small, leads to lower satisfaction.

[18] This type of reform would not eliminate an alternative source of demand for bribes that comes from citizens who want a service but are not entitled to it, such as above-poverty-line individuals who attempt to get a ration card intended for below-poverty-line citizens.

EXTERNAL VALIDITY

Before concluding this chapter, it is worth commenting on a number of characteristics of the surveys discussed here in terms of their potential relevance to the other states discussed in the book and to countries outside of India.

Within-Study Considerations

To what extent do the findings discussed here offer implications for understanding the effects of public service reforms in a wider context? First, it is relevant to consider questions of external validity within the research design itself. The two surveys, one observational and one experimental, draw on different subject pools and so it is important to consider differences in the characteristics of the subject pools themselves in evaluating the potential external validity of either portion of the overall study. Table 3.12 summarizes the demographic characteristics of the two groups, based on information from the surveys, and provides the results of difference of means tests comparing the two groups.

This demographic comparison highlights some potentially important differences between the observational and experimental subject pools. In many cases, these differences are to be expected, as the subjects for the experiment came from a university in Bangalore and so would be likely to be younger and have higher levels of education and related experiences than the general population. This is the case, with the experimental group being twelve years younger than the observational group, on average, and having attended an additional seven years of school. The experimental group was also much more likely to have encountered computers in their past. However, the gender differences were indistinguishable across the groups, as was the likelihood of voter registration.

In addition to these demographic differences, it is also worth considering that the experimental subjects were not applying for services under the typical scenario because they were being paid to participate, and so there was not the same kind of pressure on them to get the service as there might be on someone who is planning to use their certificate to apply for other benefits (this could affect the amount of effort they put in and their likelihood to pay a middleman to help with the service). However, a large number of the students involved in the study were from scheduled castes and so at least in the case of

TABLE 3.12. *Demographic Comparison of Observational and Experimental Subject Pools*

Group Variable	Observational A	Experimental B	Difference of Means A-B
Gender (1=Man, 2=Woman)	1.2 (.02, N=695)	1.3 (.06, N=50)	−.04 (−.56)
Age (years)	37.4 (.64, N=658)	24.8 (.63, N=50)	12.5*** (14.04)
Education (years)	9.3 (.20, N=694)	16.4 (.31, N=48)	−7.2*** (−19.35)
Have a computer at home? (0=no, 1=yes)	.09 (.01, N=693)	.20 (.06, N=50)	−.11 (1.85)
Have used a computer before? (0=no, 1=yes)	.22 (.02, N=695)	.64 (.07, N=50)	−.42*** (−5.97)
Registered to vote? (0=no, 1=yes)	.97 (.01, N=695)	.94 (.03, N=50)	.03 (.86)

* = p<.05, ** = p<.01, *** = p<.001

their caste certificate would likely see the benefit of having this certificate (or getting it for a friend or relative) to a similar extent as a typical applicant.[19]

These differences are important to the extent that experiences and perceptions related to age, education, and position might affect the experiences of individuals attempting to access a public service. First, service personnel at the centers might treat young, well-educated citizens differently than other citizens. Experimental subjects were asked not to mention their educational qualifications while applying for the services, but this could still have an implicit effect on service delivery. However, the findings of the observational study show that in most cases, education is not strongly correlated with the outcomes considered here. Age, on the other hand, is correlated with some outcomes, and so we might expect that these younger applicants would experience shorter wait times and the need to meet fewer officials than other citizens on average.

Second, subjects' own understanding of government processes and ability to manage the system could differ from average citizens, affecting the quality of their experiences. Note, however, that there are no clear differences in the average need for help across the two groups (Tables 3.4 and 3.8). In general, it is important to recognize that any of the demographic differences

[19] I also attempted to balance this by requiring that they provide evidence of receiving the certificate before they were paid for the study, unless there were exceptional circumstances.

TABLE 3.13. *Regional Demographic Comparison*

Characteristic	India	Karnataka	Bangalore Urban	Bangalore Rural	Kolar/ Chikbalapur	Mandya	Tumkur
Population (Mil)	1,028.6	52.8	6.5	1.8	2.5	1.8	2.6
Urban	27.8	34.0	88.1	21.7	24.7	16.0	19.6
Scheduled Caste	16.2	16.2	13.0	20.1	26.5	14.0	18.3
Scheduled Tribe	8.2	6.6	1.3	3.3	8.1	1.0	7.5
Without School	1.9	1.9	1.3	2.4	1.9	1.9	1.7
Below Primary	14.1	25.2	13.9	23.5	23.8	21.1	23.2
Primary School	14.3	27.8	20.8	29.3	29.3	30.1	29.0
Middle School	8.8	12.5	12.4	16.6	16.2	18.0	16.2
Matriculated	11.8	17.0	36.3	24.2	24.1	24.2	24.7
Graduate +	3.7	7.3	15.4	4.0	4.7	4.8	5.2

noted here, or others excluded from the analysis, may have an important effect on the ways in which citizens in the two portions of the study perceive and respond to government service delivery and the character of reforms, making comparisons across the two portions of the study difficult.

Regional Considerations

Beyond issues of external validity embedded in the research design, there are additional factors to consider before extrapolating these results to broader populations. The findings discussed here may in many ways be representative of only a small portion of Karnataka, and the character of the Nemmadi initiative may also vary in important ways that limit generalizations beyond Karnataka. Factors that could affect external validity include demographic differences across Karnataka and India in general, let alone other countries; the structure of relationships between the government, private sector, and citizens in the implementation of reforms; and the characteristics of the specific services made available in these centers.

In the preceding analysis, I included a control for urban areas to account for potential differences in service delivery in more urban or rural environments. It is also relevant, however, to consider whether these findings are likely to be generalizable to the rest of Karnataka or India at large. Table 3.13 shows demographic and educational characteristics of the districts included in the study, Karnataka overall, and India in general. The data here provide some interesting comparisons. The urban character of Bangalore versus all

of Karnataka and India implies that there might be important differences in the experiences of people at centers in Bangalore Urban district versus the majority of the state and country, which is consistent with the findings of the observational study. It may be that the findings for the more rural areas in the study are more representative of what we might observe in other parts of the state and rural parts of India.

Ownership and Management Models

How might variations in the structure of ownership and management models lead to differences across reforms in different parts of Karnataka, or the world? In this chapter, I took a first step toward answering this question by comparing the effects of computerized government offices versus privatized, one-stop service centers. But as I discuss in Chapter 7, management models vary beyond what is observed in Karnataka. Nemmadi centers are owned by a single company that employs individual managers to operate each center. This contrasts with a model used in many other Indian states, and advocated by the national government, in which individual entrepreneurs own and operate one or more centers. The Karnataka state government and the company managing Nemmadi centers expected their model to help spread costs across more and less profitable parts of the state, thereby allowing for improved service delivery even in poor and rural areas (Karnataka Indian Administrative Service Officer, Bangalore, February 22, 2006); however, external observers note multiple potential problems with this model that could affect the findings presented here (Private Sector Representative, July 14, 2009, Bangalore).

The major proposed problems with the company ownership/employee manager model involve the incentives for, and monitoring of, the individual center operators. First, under this model, center operators are salaried employees who may have little incentive to improve on the basic service provision model or go above and beyond the call of duty to satisfy their clients. Entrepreneurial center owners, on the other hand, are seen to have greater incentives to serve their clients in a manner that increases the likelihood that they will return, rather than go to the taluk office, and that they might request additional, higher-profit services. If these perceptions are correct, we might expect patrons of entrepreneur-run private sector centers to find more benefits in these centers relative to the traditional model than those citizens surveyed here.

Second, there may be a greater need for monitoring employee operators than there is for entrepreneur owners. Employees have a guaranteed salary, which, under strict monitoring, should disincentivize them from demanding bribes or additional payments from citizens, at least in tight labor markets. If there is no strict monitoring, however, employees may have few incentives not to demand extra payments, just like their undermonitored, securely employed bureaucratic counterparts. Especially in difficult economic times, when small companies managing a large number of centers may run into cash flow problems (as has reportedly been the case with a number of operators under the Indian national government scheme) (Private Sector Representative, January 23, 2008, Haryana; Former Comat Employee, July 6, 2009, Bangalore) and find it difficult to pay their employees, the potential for extra income in the form of bribes may provide an irresistible opportunity for these employee operators. Again, this is less likely to be the case where center operators also own the center, as they are then more dependent on the repeat business of individual customers for guaranteeing their economic viability and should find it more profitable to undercut competing government offices in terms of the demand for bribes, thereby making them more appealing to citizens.

Variation in Available Services

Finally, it is worth considering the specific services covered in this analysis and how effects of service reforms might differ for other services. This is relevant both because of varying demand for the range of government services, but also, as discussed in Chapter 5, because the number and type of services offered in centers across India differs dramatically (Bussell 2010). One way in which the type of service might matter is through significant differences in the average cost of a service. The analyses to this point in the chapter exclude consideration of land-related services, the most important of which are land titles (Records of Rights, Tenancy, and Cultivation or RTC) and mutations or alterations to land titles. In general, subjects who had applied for land-related services reported higher costs for accessing these services than was seen for other services, particularly in terms of demands for bribes. For example, while the average overall cost for all non-land services was Rs. 74 with a maximum cost of Rs. 3,000, the mean for RTCs was Rs. 1,886 with a maximum of Rs. 70,000. In many cases, these costs were due to large bribes or payments to middlemen for assistance with land-related services. The mean bribe for all of the services included in the preceding analysis was Rs. 31 with a maximum of Rs. 1,000, whereas the mean bribe requested for an RTC was Rs. 286 with a maximum of Rs. 10,000. This shows that the character of the services themselves may affect the experience of citizens in accessing services and thus states providing a different range of services than those offered in Karnataka may then produce a different quality of outcomes for their patrons.

CONCLUSION

This chapter provided an important and systematic empirical confirmation of the motivating assumptions underlying the major arguments of this book.

New information technologies and the one-stop service center model can be used to improve important elements of public service delivery and in particular to reduce the likelihood that citizens will be asked for a bribe when they are applying for services. While the model considered here does not improve service delivery on all of the indicators included in this analysis, most importantly overall citizen satisfaction with services, this is most likely the result of specific policy choices made with an eye to reducing opportunities for corruption, which could be modified in response to these findings, and differences in citizen expectations across types of centers. Institutional reforms that leverage new technologies to provide public services in an integrated environment with technical constraints on who receives services and under what conditions can produce positive and measurable improvements in the quality of public service delivery, even in poor and rural communities. As a result, these reforms can also provide a viable threat to established patterns of rent seeking in these environments.

4

Policy Initiation in the Indian States

Indian political leaders are faced with overwhelming poverty among large portions of their constituents, often insufficient local institutions for distributing goods to citizens, and a highly competitive electoral system that threatens their position if they are not able to respond to these difficult conditions. The emergence of new information technologies at the turn of the twentieth century presented politicians with a new tool – perceived by an overoptimistic few in the international development community as a "silver bullet" – that had the potential to help them make progress on developmental goals.

Yet, Indian states differed in their likelihood of implementing a policy to reform service delivery to citizens. Of the twenty major states, sixteen introduced policies in a staggered manner during the period under consideration and four states refrained from implementing any policy at all. What explains why some states were considerably more eager to implement reforms while others followed only later? What prevented some states from taking on this type of reform, given the potential benefits and even after so many of their peers had done so?

This chapter argues that Indian politicians faced a trade-off in their decision about whether to implement technology-enabled service reforms and that this trade-off was based both on the level of preexisting petty corruption in the state and the cohesion of the ruling government. Politicians with greater access to bribes paid by citizens in the process of service delivery should have been less likely to implement these reforms because of the expectation that greater transparency and efficiency in service delivery would threaten these rents. Politicians in states ruled by coalition governments should also have been less likely to implement reforms, as they were constrained by the interests of supporting members of their coalition who were unlikely to support reforms.

The decision to adopt a policy and the timing of this decision is thus a key political outcome. I emphasize the timing of reform in this chapter for