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Interacting with the State via Information and Communication Technologies

The Case of Nemmadi Kendras in Karnataka

This article explains how the introduction of information and communication technologies (ICTs) influences citizens' engagement with the state by analysing Nemmadi Kendras (NKs), which are computerised kiosks established in rural areas of Karnataka to provide revenue services and land records to citizens under a public-private partnership. The government argued that the introduction of digital technology as an interface between the State and citizens would contribute towards good governance by enhancing efficiency, transparency and accountability. Drawing on the social shaping of technology perspectives, the findings suggest that a thorough analysis of the impact of information technologies in governance necessitates paying attention to the larger political and social processes within which the technology is introduced and embedded. The article further argues that the introduction of information technologies in a fraught and contested context adds more layers (in terms of bureaucracy and middlemen), which rural citizens have to navigate before they can actually attain services. Concerns related to costs, scale and political dynamics in the design of databases are also discussed here. The article concludes by advocating the 'embedded' approach for studying the role of ICTs in governance.

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Many governments have deployed Information and Communication Technologies (ICTs) in the administration of public organisations through "e-government" and "e-governance" policies to address the problems commonly perceived to plague governance (von Haldenwang, 2002; World Bank, 2001). The terms e-government and e-governance have leitmotif for efficiency, accountability and transparency (von Haldenwang, 2002). Unidirectional links and relationships are often presumed between the role of technology and good governance. A recent focus in this direction is the use of ICTs to improve the interface between government and citizens (Madon, 2006; Gil-Gracia & Martinez-Mayano, 2007; Gatty 2009). It is widely believed in policy circles that replacing human interactions with technological interfaces will automatically improve the ways in which the business of the state is conducted, specifically modes of interactions and relationships between government functionaries and citizens (Ahuja & Singh, 2005; Bhatnagar & Chawla, 2005; Singh & Gururaj, 2009). Policy makers often assume that

technology has an "inherent logic outside the influence of human agency" (William & Edge, 1996: 857) and that its outcomes can be predetermined. This article questions the underlying deterministic assumptions of e-governance agendas. It explores how technological interventions implemented to improve governance (re) shape government-citizen relationships in ways that open up and simultaneously foreclose possibilities of making and fulfilling claims. In this paper, governance is defined as connections and relationships among government bodies operating at different scales and between governments and citizens. These connections and relationships are part of processes and protocols within the wider political system (Stern 2002). E-Governance is defined as the way in which insertion of technology affects the workings of the government and its relationship with other agents in society.

This article further illustrates how a variety of political, bureaucratic and economic logics provide the impetus for introducing ICTs in governance, the domains in which they are introduced and the manner in which they are situated in institutions and contexts (Rossel & Finger, 2007). The choice of technology and its adaptation are influenced by the interests of the public and private organisations involved in conceiving and implementing e-governance programmes as well as factors such as costs of technology and prevailing regulatory environments (ibid). Introduction of ICTs in the administration of State organisations are also driven by the political logic of the State to discipline 'front line workers,' commonly

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referred to as 'street bureaucrats,' (Lipsky, 1980: IX, 3) in many contexts (Bovens & Zouridis, 2002). Given this, introduction of technology in governance is not neutral and has political and social consequences for interactions between various levels of authority in the government and among citizens. In this respect, as Merritt Roe Smith (1985) succinctly argues, technological artefacts are simultaneously social products which embody power relationships, social goals and structures.

The approach adopted in this paper is informed by a range of perspectives broadly grouped under the rubric of "Social Shaping of Technology" (SST) (Bijker & Law, 1992; William & Edge, 1996: 856). According to this perspective,

Technology does not develop according to an inner technical logic but is instead a social product, patterned by the conditions of its creation and use. Every stage in the generation and implementation of new technologies involves a set of choices between different technical options. Alongside narrowly 'technical' considerations, a range of 'social' factors affect which options are selected, thus influencing the content of technologies and their social implications (William & Edge, 1996: 2).

This article demonstrates how society, technology and the realm of the political constituted by both these entities simultaneously act upon each other, thereby shaping the symbolism and uses of technologies, citizen-state relationships and state-society interactions.

Moreover, e-governance theories tend to overlook the differences between citizens in their relationship with the State and the complex ways in which the institutions and agents of the State are embedded in society. Several studies on the anthropology of the State, particularly in the Indian context, have illustrated its embeddedness in society (Corbridge et al. 2005; Fuller & Harris 2002; Gupta 1995). These studies describe how government functionaries, especially those working on the ground, are often faced with competing claims on resources and demands from different citizen groups which they have to negotiate in the course of fulfilling the state's obligations towards citizens and in delivering services. Attending to the complexities of embeddedness reveals that ICT interventions have differential outcomes for different groups in society. This is because citizens' access to and alliances with various functionaries in the bureaucratic and political hierarchies of State institutions differ vastly (Benjamin, 2000; Chatterjee, 2002), thereby impacting their ability to articulate and establish claims in different situations. When ICT interventions are introduced, they affect the capabilities and resources of different groups in society to mobilise state functionaries, as well as state functionaries' own ability to respond to the claims of these different citizen groups. Besides being constrained by the new ICTs, citizens and state functionaries invariably adapt and/or appropriate technologies in ways that suit the realisation of their goals. This article therefore argues that when technology is situated within existing social relations and in a complex ambit marked by differing

interests and alliances between actors inside and outside the state, it becomes important to analyse how and where the technology is embedded, which institutional levers, nodes and processes are sought to be curbed/reformed, and what kinds of interactions between governments and citizens are tried to be straightened. It is also important to map how government functionaries and citizen groups appropriate such technologies. Appropriation, in this case, does not amount to negative consequences; rather, as explained above, appropriation can change the symbolisms, uses and meanings of technology, thereby shaping citizen-state and state-society relationships in complicated ways. This article explores these issues by drawing evidence from research conducted on an e-governance initiative called 'Nemmadi Kendra' (NKs) programme implemented in the state of Karnataka in South India.¹

The rest of the paper is organised into six sections. The next two sections describe the Nemmadhi programme, the research questions and research methodology followed by a description of how the wider political economy context shaped the rationale for introducing Nemmadhi. The subsequent sections explore the following aspects: effects of Nemmadhi, ways in which Nemmadhi has been appropriated by state functionaries and citizens, and the social factors that have contributed to the design of databases used in this programme. The article concludes by emphasising the need to focus on embeddedness of technology to understand its effects in governance along with themes for further research.

RESEARCH FOCUS: THE CASE OF NEMMADI

The Government of Karnataka (GOK) implemented the Nemmadhi programme from 2006 onwards to improve government-citizen interface, mainly to enhance "transparency, accountability and responsiveness of the government to citizen needs" (Singh & Gururaj, 2009: 311). The programme was introduced to continue and extend the rationale of an earlier e-governance programme called 'Bhoomi', which was widely hailed as a success story and best practice in transparent management and delivery of land records (Chawla & Bhatnagar, 2004; World Bank, 2006). The studies on Bhoomi, which were largely authored by policy makers, technologists and bureaucrats who were involved with its implementation (Chawla & Bhatnagar, 2004; Meena et al., 2005), have focussed on the technical aspects of e-governance and administrative concerns with corruption between ground level functionaries and citizens. In their assessments, concepts such as transparency and accountability have been discussed from normative points of view, delinked from the institutional contexts in which land and rural administration are carried out. The few studies that have attempted to move beyond the official discourse explain how e-governance projects such as Bhoomi have impacted land markets in cities (Benjamin et al., 2005) and have had social consequences for particular citizen groups (De, 2005, 2009; Gatty, 2009). These studies also discuss how the roles of street bureaucrats and their relationships with

rural citizens were reconfigured through Bhoomi, which is developed further in this article. This article builds on the sparse research about Nemmadi and explores the role of ICTs in (re)configuring state-citizen relationship post-Bhoomi. It also discusses the interplay of technical, political and social dynamics on decisions relating to technology, which have not been addressed by earlier studies on Bhoomi.

Research questions

NKs deliver digitised land records also known as Record of Tenancy and Crops (RTCs) and 40 Rural Digital Services (RDS) in the rural districts of Karnataka. While RTCs are an important means to stake claims on land (Bhatnagar & Chawla, 2005), RDS documents are a means to strengthen one’s citizenship claims. The Karnataka state government has made it compulsory to produce and update documents such as caste, age, and income certificates² for admission of children in schools and colleges, to claim benefits under government schemes, and even to contest *Panchayat* elections. Further, registering births and deaths and acquiring the necessary certificates has become incumbent to prove the ownership lineage of the land parcel in case of property disputes. These documents must also be produced during surveys that the government is now conducting to update information about land.³ Given the criticality of RTCs and RDS, it is clear that the delivery of these services is highly political and involves resolution of multiple claims.

Prior to the introduction of Nemmadi, street bureaucrats of the Revenue Department, namely Village Accounts (VAs) and Revenue Inspectors (RIs), were the main interface between the hierarchy of officials in the

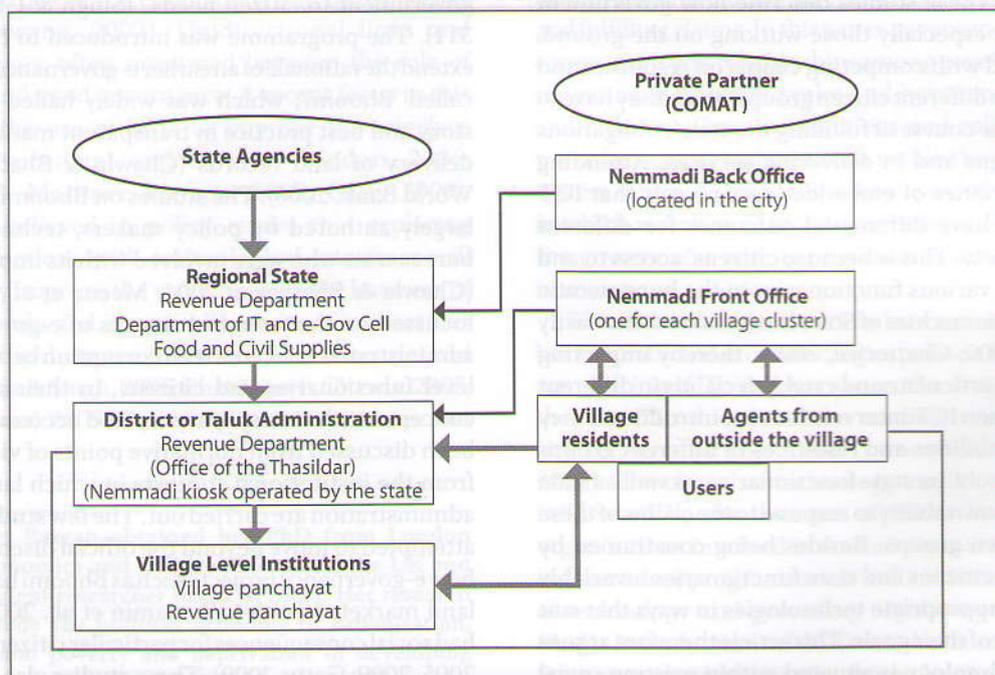
revenue department, rural citizens and political classes. They significantly influenced the process of creating and delivering RTC and RDS documents. Advocates of Bhoomi and Nemmadi programmes attributed the problems regarding RTC and RDS services to the absence of a centralised records management system and street bureaucrats’ “monopolistic” (Rao and Bhat, 2005: 80) control over the delivery of revenue services (Ahuja & Singh, 2005; Bhatnagar & Chawla, 2005; Singh & Gururaj, 2009). To resolve this problem of monopolistic control, NKs were made into a single window for receiving applications for RTC⁴ and RDS documents. Policy makers assume that the shift towards screen bureaucracy together with realignment of decision-making powers within revenue administration will reduce the influence that street bureaucrats have over the process of RTC and RDS services and also restrict their opportunities to interact directly with citizens, thereby curbing petty corruption.

Nemmadi was implemented under a public-private partnership model (PPP) between the GOK and a consortium of private Information Technology (IT) companies headed by Comat Technologies. Figure 1 illustrates the institutional architecture of the NK programme.

As shown in the Figure, there are three broad groups of stakeholders’ viz., users, Comat and the State. NK operations are executed by Comat through front-end kiosks at the village clusters (*hobli*) and back end offices in the sub-districts (*taluks*). Operators in these kiosks are employed by Comat. This article examines the following questions to infer the role of ICTs in reconfiguring the relationship between the State and Citizens:

- What are the effects of Nemmadi on users?

FIGURE 1
Nemmadi organisation



Source: Authors

TABLE 1
Summary of research themes, methods and informants (knowledge, attitude and practices)

Field research questions (topic guide)	Methods	Informants
<p>Background</p> <ul style="list-style-type: none"> • Social and occupational background of respondents • Land ownership • History of the village and recent developments <p>Users' experiences post Nemmadi</p> <ul style="list-style-type: none"> • Knowledge of Nemmadi kiosk • Practices of engagement with the kiosk (process of submitting applications and reasons) • Services procured through Nemmadi kiosks • If yes, what types? If not, why? • Experience with obtaining RTC and RDS services • Process description • Time taken for submitting application; collecting supporting documents; obtaining the RTC and RDS documents • Views on Nemmadi • Frequency of errors in RTC or RDS • Experience with rectifying errors • Relationship with ground level functionaries of Revenue Department • Relationship in the village panchayet <p>Users experiences pre-Nemmadi</p> <ul style="list-style-type: none"> • Practices of obtaining RTC and documents currently issued via RDS • Experience of engaging with the officials of Revenue Administration 	<p>Semi-structured interviews at the following locations:</p> <ul style="list-style-type: none"> • Kiosks • Residence of users • Community spaces (savings and credit groups) • State <p>Non-participant observation at the kiosks, field office of Revenue Administration and village council</p>	<p>Users (68) and brokers (6)</p> <ul style="list-style-type: none"> • Farmers • Agricultural labourers • Non-agricultural labourers • Men, women • Youth and elderly persons • NGOs (social workers) • Brokers
<p>Kiosk operators (COMAT front office)</p> <ul style="list-style-type: none"> • Characteristics of clientele • Level of demand for different services • Issues faced in delivering service (conflicts with Nemmadi clientele) • Links between the back office and front office functions • Pattern of interaction between kiosk operators and field officials of Revenue Administration 	<p>Interviews and non-participant observation at COMAT front office (kiosks)</p>	<p>Private partner (COMAT) (11)</p> <ul style="list-style-type: none"> • Kiosks operators
<p>COMAT back office officials and technologists</p> <ul style="list-style-type: none"> • Reasons for recurrence of errors • Process of decision making relating to selection of technology and design databases • Financial sustainability of Nemmadi • Future plans / use of database • Work organisation between different private partners • Management of databases 	<p>Semi-structured interviews held at:</p> <ul style="list-style-type: none"> • COMAT back office • Other organisations involved in e-governance projects 	<ul style="list-style-type: none"> • Vice chairman of COMAT • General manager (COMAT) • Computer programmers
<p>Agents of the state</p> <ul style="list-style-type: none"> • RTC/RDS service delivery process before and after Nemmadi • View on Nemmadi process • Work flow in paper • Issues faced in everyday administration • Relationship with other functionaries of Revenue Department and kiosk operators • Coordination with kiosk operators • View about the quality of information 	<p>Semi-structured interviews held at:</p> <ul style="list-style-type: none"> • Village-level offices • Sub-districts offices 	<ul style="list-style-type: none"> • Revenue Administration officials (village assistants) • Land Tribunal members (state level) • Village council elected members (present and previous) • Village council officials • Women and Child Welfare Department officials

- How did Nemmadi programme influence citizens' interactions and relationships with street bureaucrats and screen bureaucrats?
- How were decisions on technical aspects such as database design and its maintenance made?

Research methods

The researchers adopted a qualitative research methodology to investigate the research questions. Fieldwork was undertaken in two sub-districts situated on the peripheries of the Bangalore Metropolitan Region, between May and August 2010. The two sub-districts were chosen to reflect differences in social and economic characteristics of the population and demand for land since these aspects influence the volume of RTC and RDS transactions. The villages visited in one district had relatively high land values since they are contiguous with the IT corridor in Bangalore. The second district is situated in a relatively less well-off part of the metropolitan region.

The choice of qualitative research methodology is influenced by the nature of research questions which seek to understand 'process', 'relationships' and 'practices' (Bauer & Gaskell, 2000; Denzin & Lincoln, 2000; Strauss & Corbin, 1998). The methodology draws on the constructivist paradigm, which regards theories and concepts as multiple constructions co-constructed by the researcher and research participants (Corbin & Strauss, 2008: 10). The paradigm is inductive in nature and draws upon local constructions of reality. In order to capture the multiple realities of Nemmadi programme, taking from Bijker (1995), the research followed three sets of stakeholders involved in the programme: users, service providers and decision makers.

Interviews and conversations with users focussed on their knowledge of Nemmadi and their experiences with securing RTC and RDS services before and after. Besides, service providers and intermediaries were interviewed to understand their roles and relationship with users. In addition, decision makers in the State and technologists connected to the e-governance programme were interviewed to understand the factors influencing the choice of technology. About 102 interviews were conducted with all the stakeholders listed in Table 1.

Information relating to the themes listed in the above table could not be easily elicited through a survey methodology. It required repeated interactions and intensive engagement with different stakeholders. Also, the decision-making processes connected with the choice of technology and design of the programme would have been difficult to understand through a survey approach. Such information is held by a closed group of individuals and bureaucrats connected with the implementation of the programme. Therefore, a combination of data collection methods was used including semi-structured interviews, conversations and participant observations. The researchers also referred to government orders, reports and other published material on Bhoomi and Nemmadi.

Interviews were conducted in English and the local language Kannada at different places including the back and front-end offices of Nemmadi, villages where users resided, offices of sub district administration and village level administration. Where possible, interviews were recorded, transcribed verbatim and translated. Translation of Kannada interviews was undertaken by authors along with the research assistant who is a native of Karnataka and is well versed in the local language. The researchers also observed the interactions between people and operators at the kiosk and in the field offices of the revenue department. Triangulation techniques were used to ensure the validity and reliability of the data.

The techniques of 'frame analysis' (Ritchie & Lewis, 2003) and 'laddering of data' (Miles & Huberman, 1994) were used to analyse qualitative data. Each interview was analysed for the themes that emerged which then provided the basis for the second round of data collection. Upon completion of data collection, the researchers revisited all the interviews to review crosscutting concepts and to build relationships between these concepts to generate a theory.

THE POLITICAL ECONOMY CONTEXT OF NEMMADI

NKs deliver services, which are closely linked with the complex domains of land and rural administration. The complexity of land administration stems from imperfect information regarding land claims, diversity of land types and tenure forms, and the underpinning institutional and legal regimes. RDS includes the provision of identification documents and administration of pension schemes. Rural administration is highly political because governance bodies, elected representatives and bureaucrats compete with each other to develop their own constituencies among people and to enforce loyalty. In the context of land and rural administration, three institutions are significant namely the Revenue Department, Village *Panchayat*⁵ and Rural Administration, and the Department of Surveys and Land Records. NKs have been implemented by and for the Revenue Department. Discussions in this paper are limited to the role of Revenue Department which is implementing the Nemmadi programme.

Historically, the Revenue Department has been a powerful agency. During the pre- and colonial times, it was responsible for collecting land taxes which constituted the main source of income for governments at that time. In the post-independence period, the Government of India (GoI) shifted its focus from land reforms to computerisation of land records when the Ministry of Rural Development of GoI announced the Computerisation of Land Records (CoLR) Scheme in 1980s to "streamline the maintenance and updating of land records" (Ahuja & Singh, 2006: 69).

ICTs were introduced in revenue administration at a time when there was a growing emphasis on land as source of economic development in India. There was a high demand for land from both state and non-state actors, particularly for corporate led development. The financial logic of IT corridors and mega infrastructure

projects is linked to realising real estate gains. These projects require large parcels of land, which the state often has to acquire either under public-private partnership arrangements or on demands made by big corporations or by the State's own developmental agencies. In this light, creating a unified database on land information and situating it in a centralised manner in the State was both timely and necessary. Even in villages, subdivisions and assimilations of land parcels were actively taking place in the 1990s as owners of land parcels and real estate brokers (who were often *Panchayat* members and local leaders) were capitalising on the boom around land. Advocates of computerisation also argued that maintaining land information was also critical for the state government and the revenue administration to ensure that people were registering their transactions and that there were no leakages in the income that ought to have accrued to the State through stamp duties and registration fees. It is in this complex sphere of heightened political and economic activity around land that some senior civil servants' calls for introducing ICT in land administration gained support. Their calls were supported by IT entrepreneurs (Meena et al., 2005).

While RTCs were digitised under Bhoomi, Nemmadi extended the e-government agenda through computerisation of RDS documents as a way to bring VAs and their seniors—the RIs—in line with due process in service delivery, thereby curbing the scope for exercise of discretion.⁶ RTCs are delivered immediately since they

require the operator at the front-end kiosk to simply query the database with the survey number⁷ and print the RTC on government stationery. The process involved in availing RDS services is shown in Figure 2.

The findings on Nemmadi's impact in terms of reconfiguring state-citizen relationship are discussed in the next section.

FINDINGS

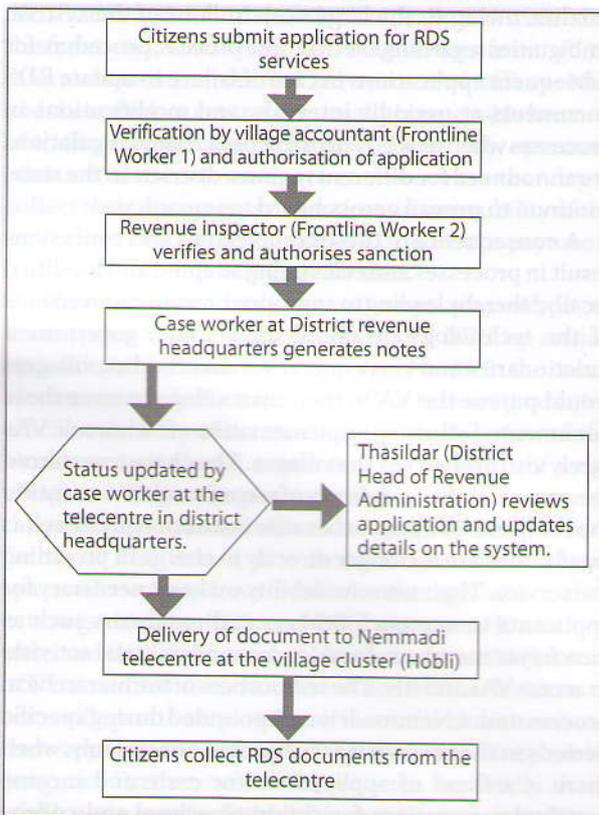
Effects of Nemmadi

It is difficult to categorise Nemmadi's effects in a linear frame of ills and benefits because users' experiences with NKs (and therefore their perceptions of ICTs) vary depending upon their social positioning, including the resources they have and can garner for applying documents at NKs and the social, political and economic networks they can mobilise for expediting the delivery of documents/services. For instance, daily wage labourers are positioned much lower down the socio-economic hierarchy. Not only do they have less time and money to visit government offices for obtaining official documents, they also have less access to resources and networks, which can provide them with information on how to procure government records and claim state welfare. It may be presumed that the introduction of Nemmadi would have made it easier for daily wage labourers to get income and caste certificates as well as avail pension schemes. However, interviews with government education officers, *panchayat* members and local leaders revealed that landless/daily wage labourers did not necessarily benefit from the introduction of Nemmadi and they were not aware that such a programme existed. Secondly, the process for obtaining documents, other than RTCs, through Nemmadi continued to be ridden with bureaucracy, which in turn required users to spend either more time or money or both to get the documents in the first place. These costs add to the overall expense involved in applying and obtaining RDS documents under Nemmadi. Moreover, the emphasis on providing proofs of domicile and identity with each application further marginalises users such as landless and migrant labourers whose citizenship status tends to be highly contentious.

On the other hand, economically affluent users and *panchayat* members who were also involved in the real estate economy mentioned that they found the Nemmadi system to be more convenient. They explained that after first time application, their records had been entered into the RDS database, which minimised the need for identity verification on subsequent applications for the same documents. These users recounted their experiences with Nemmadi as 'correct' and 'modern', suggesting that the introduction of ICTs was beneficial for them. It is important to note that these users do not represent the experiences of majority.

Users' perceptions also differ depending on which services they are seeking and which state institution they are interacting with via Nemmadi. For instance, *panchayat* members indicated that while Nemmadi has made it easier for users to procure RTCs i.e., RTCs are

FIGURE 2
RDS workflow process on paper



Source: Authors

delivered within a day's time; it is highly cumbersome and expensive to correct mistakes and record mutations in the digital RTCs. This is because following the introduction of Bhoomi and then Nemmadi, the authority for authorising corrections and mutations in digital RTCs has been removed from ground level functionaries and handed over to senior bureaucrats, whose offices are centrally located in Bangalore city. This change has increased the social and political distance between users and state agents, necessitating increased employment of brokers and payment of higher amounts of bribe for obtaining sanctions for changes in the digital RTCs. A farmer summarised other farmers' experiences with corrections and mutations through Nemmadi in these words:

The digital system is an unjust system ... for small farmers who do not have the money or influence to make changes in their RTCs and ... (they) lose lands because of errors in their names or extent of their lands.

Overall, although 40 services are provided through Nemmadi (Singh and Gururaj, 2009), most users visited NKs to obtain caste and income certificates, RTCs and to submit applications for pension schemes. Official reports on Nemmadi and Bhoomi cite the volume of RTC transactions as an indicator of the success of the programme. However, RTC services are as much sought by land brokers and real estate dealers as much as by small and marginal farmers. These real estate brokers and dealers viewed the opening up of land records data by making it available on the Internet and the digital delivery of RTCs as a positive move and associated the Nemmadi programme with transparency. Their sentiments are reflected in the following statements:

The advantage is that you can see the records on the Internet if you know the survey numbers. You can also see details such as the name of the owner of the land parcel, location of the plot, etc. It is a very open system. So from anywhere in India, if you know the survey numbers, you can see this information. There is no objection as to who can see this information. (Interview with *panchayat* members, 15 July 2010)

... Nemmadi is good. We can sit here and see the details of the land anywhere in Bangalore" (Interview with broker, 7 July 2010).

In contrast, below is the view expressed by a community member belonging to a socially disadvantaged caste group, which problematises transparency ushered by opening land data:

K gate has become developers paradise ... this whole thing of anybody going and getting a RTC is really problematic... even if a owner does not want to sell, (developers) can mobilise ... information, ... muscle power and money (to get the land). (Interview with Dalit Sangarsh Samithi, president, 29 June 2010)

From the above accounts, it is clear that the volume

of RTC transactions or its timely delivery does not necessarily reflect Nemmadi's success in terms of improving citizens' relationship with street bureaucrats and thereby with the state. Rather, the type of users seeking RTCs raises questions about who benefits from the reconfiguration of citizens' relationship with the State and realignment of decision-making powers and authority within the State. Similarly the effects of making land data open are not equal for every group in society. Moreover, not all users have the resources to avail of every service under Nemmadi. For example, to secure digitised maps, an applicant has to get 15 kinds of documentary proofs, which are maintained by different institutions at different places. Consequently, due to high costs involved, large farmers and developers predominantly used this facility.

Citizens' relationship with street and screen bureaucracies' post Nemmadi: The role of brokers

Another critical issue is the emerging relationship between users and street and screen bureaucrats. The rationale of Nemmadi programme is that the flow of information through computerised networks makes it easier for superiors to monitor the work of field bureaucrats (Meijer & Bovens, 2005). Computerisation, however, occupies a very minor role in the overall process of creating, verifying and delivering RTC and RDS services. The crucial functions of verification and authorisation of applications must still be done by VAs and RIs. The role of computerisation is simply to provide the status of the application and facilitate digital delivery of documents. During interviews, kiosk operators explained that they often encouraged applicants to personally follow-up with VAs and RIs to quicken the process. Further, owing to the large-scale rollout of the system, ambiguities regarding the first time process, procedure for subsequent applications in case of failure to update RDS documents at periodic intervals, and modifications in processes when new government policies and regulations are announced for different regions/districts in the state, continue to prevail across board.

A consequence of these complexities and confusions result in processes and rules being adapted and modified locally,⁸ thereby leading to appropriations and subversions of the technology by middlemen, users, government functionaries and kiosk operators alike. Earlier, villagers would pursue the VA in their own village to issue these documents. Following implementation of Nemmadi, VAs rarely visit and survey the villages. They have transferred the accountability in delivery of records and documents to the computerised system because institutionally as well as legally, they are no longer directly in charge of providing the service. Their non-availability makes it necessary for applicants to approach brokers and mediators such as *panchayat* members, local leaders and political activists to access VAs and RIs. The tediousness of the hierarchical process under Nemmadi is compounded during specific periods in the year, such as between April and July, when there is a flood of applications for caste and income certificates necessary for children's school and college admissions. During such times, the need for brokers to

follow-up and expedite the verification and signature process becomes even more crucial given the urgency of the situation. Middlemen are also important in such periods because they can either directly or through their networks approach revenue department officials to request for exceptions, favours and use of discretion in certain cases. In one instance, it was found during participation observation that a user wanted the RI to review his income certificate application in a way that would make it easier for his son to apply for a reserved category seat in medical colleges. Since as per the regulations and working of the NK system such requests are not legitimate, brokers assisted him in preparing a separate covering letter that explained his situation to the RI and they agreed to follow-up on his application. In this way, citizens have to access/approach officials through mediators and middlemen for bypassing the regulatory barriers introduced by technology interface.

Besides other intermediaries, front-end kiosk operators have emerged as another set of brokers. These operators are employed by Comat, but users perceive them to be government employees performing public service functions. Operators are either already part of the local political system by virtue of being members of political groups or by being related to landlords and local leaders. Or, they may get integrated into the dynamics over time as a result of their relationships with VAs and RIs, which they must cultivate and maintain as part of their executive responsibilities. They can therefore request these officials to quicken procedures for users who pay for hastening/bypassing the process. Sometimes, operators also perpetuate the belief that they have direct access to the network architecture and servers from which certificates and records are electronically transmitted to the front-end. It was found that the servers from where information is transmitted between *taluk* offices, NKs and the state data centres are usually inaccessible because of traffic and poor infrastructure.⁹ Therefore, operators often asked users to wait or to come back another day to collect their documents. Over time, inaccessibility of the server was cited as an excuse to extract extra payments from users for delivering certificates.

Through Nemmadi, an attempt was made to decentralise the delivery of RTCs and RDS by setting up kiosks in the headquarters of every *hobli* in the *taluk*. However, such decentralisation did not always guarantee efficient delivery of service because the location of the kiosks was not always convenient for residents of some villages. Villagers explained that in some instances, the *taluk* headquarter offices are geographically closer for them and that it is a more familiar institutional space where they have networks through which they can negotiate the RDS and RTC processes. It was also observed that the increased physical and social distance of Nemmadi front-end kiosks influenced the decisions of some villagers to employ the services of brokers to submit their applications and subsequently to follow-up on its progress. Further, women applicants, especially those who have to care for little children at home, rarely visited these kiosks because of the time involved in travelling

to the kiosks, difficulty of access owing to poor public transportation facilities and lack of knowledge regarding application and follow-up procedures. For other small and medium farmers, travel to the kiosk involved both time and cost.

Thus, the introduction of NKs has not removed the inequalities that prevail in the socio-economic structure of society. Instead, new layers of bureaucracy and regulation have been added in citizens' relationships and interactions with the revenue department officials. Interviews with users, *panchayat* members and brokers revealed that the process involved in applying for RDS documents and services is more bureaucratic now than it was prior to Nemmadi. The rationale for computerising workflows discounts the specificities and politics of the contexts in which documents are requested as well as the inequalities that prevail among different citizen groups in accessing services and the state.

Technical decisions and their consequences do not stem from an inherent logic of technology, but are influenced by differing interests of and relationships between actors embedded in the state and society. To illustrate the argument about the social shaping of technology, the next section explains how factors such as scale and costs of technologies, and social relations influenced technical decisions concerning databases supporting the Nemmadi programme.

Decisions on database: Questions of cost, scale and social relations

A recurring theme in the interviews with farmers, brokers and *panchayat* members pertained to the issue of rectifying mistakes in digitised titles. To understand the reasons for these errors, factors influencing design of Nemmadi and Bhoomi databases were investigated. Discussions with technologists and managers involved with e-governance programmes brought to fore the influence of bureaucratic and economic logics on database design and maintenance.

RTCs issued through Nemmadi kiosks rely on a database system created under the Bhoomi programme. Bhoomi database was designed to standardise land information across Karnataka state. Digitisation effectively means copying all the information on manual records and inputting it into the system. In reality, however, data entry from manual records into the digital system proved to be a cumbersome and contentious process. Technologists faced a challenge in developing a standardised format for digitising titles due to the diversity of land tenure regimes in Karnataka. The State of Karnataka was created by combining four different regions, each of which had its own administrative and political systems. The systems of recording and managing land information were therefore diverse, including the measurement systems used to record the extent of land parcels in each of these regions. The Bhoomi software, however, uniformly recorded land extent in *gunthas*.¹⁰ The columns and tables designed for the Bhoomi database tried to enforce a standard format for recording and managing land information, whereas there were considerable inter-

regional variations in the type of information contained in the manual records (Ahuja & Singh, 2005). Data entry operators therefore had to calculate and convert different measurement denominations into the metric system.¹¹ Consequently, errors have crept into the digital records. Secondly, errors in spellings of names of owners have been attributed to the poor record keeping practices and illegible handwriting of VAs. While this may have been the case, it also remains that data in land records were stored in multiple languages such as Kannada, Urdu, Tamil, Hindi, etc. Converting spellings from all these languages into a common language naturally results in errors because names spelt in one way in one language can be spelt in multiple ways in another language.¹² Construction of databases is therefore fundamentally linked to the choices that technologists and decision-makers in governments make regarding standardisation and customisation.

Nemmadi and Bhoomi databases were designed and constructed by software companies with sweeping directives from government officials and policy-makers. Technologists who work closely with e-governance programmes or the application of ICTs in governance assess government officials' understanding and capabilities of information technology to be poor in India.¹³ One of the technologists interviewed during this research opined that the state tends to rely on a select group of software companies and individuals to design, develop and maintain ICTs, which, in turn, gives these companies and individuals the power to influence both the design and the costs of technology. As a result, the quality of their work goes unchecked. This technologist explained,

... e-governance systems in general ... are all developed by software companies ... they are developed by external experts whose time is short and they cannot sit and address every issue that comes up with data management. There is a process by which the (database) design is developed ... is flawed to begin with ... (software developers) make a lot of choices simply in the interests of time.

According to another technologist associated with e-governance programmes, these technology lobbies are influential in bringing the agenda of e-governance to the table, the domains in which they must be introduced as well as in defining the terms of e-governance contracts.¹⁴ Further, technologists who develop databases in government and private companies are insulated from the ground situation. Field visits for assessing the local specificities are not mandated in consultants' contracts, which also make the design process fundamentally flawed. This was the case in Bhoomi where the digital database was developed without attending to the complexities that were prevailing in relation with management of land records, including recording mutations and corrections. This technologist opined that companies tend to continue with badly developed software systems and databases because it is cumbersome and expensive to develop a new system from scratch.

The process of data entry itself is cumbersome and expensive. To weed out errors as far as possible, entries have to be done at least twice and crosschecked independently by two different operators.¹⁵ The costs of data entry consistently concerned revenue department officials during the implementation of Bhoomi as a result of which services of VAs were eventually secured to enter data into the digital system. Moreover, technology gets outdated rather quickly but governments cannot afford to keep up because software and licenses are expensive to build and purchase. Besides, software companies prefer to abstract information so that the system they design can be generically applied to more than just land records, as reflected by the following narrative,

... software companies, generally, like to abstract things away. You make systems that generically you could apply as much to land records as to other things. For instance, Bhoomi—there is a lot of talk about repurposing Bhoomi for demographic data as well.

Interviews with technologists revealed that deciding between abstraction and customisation is not an easy choice.¹⁶ Heavy customisation is expensive in terms of development and maintenance. Software companies rarely highlight this dilemma when tendering/pitching for e-governance projects. Governments, on the other hand, plan and roll out e-governance programmes on a large scale, which also adds to the difficulty in customising the software. Thus economic and bureaucratic logics of the government perpetuate continuation of a badly designed system or an outdated one.

While issues of costs, scale and design are important, technologists' recommendations of robust data entry processes and tailoring technology to local contexts overlook the fact that land information is often incomplete. This incompleteness stems not simply from intent but also from which accounts and histories of land ownership gain precedence over other competing narratives. The contested nature of claims on land renders land information imperfect by nature (Haila, 2002; World Bank, 2007). Therefore, in practical terms, it is difficult to design a database co-relating one owner to a single land parcel, which runs counter to the logic of programmes such as Bhoomi and Nemmadi instituted to clear ambiguities in claims believed to stem from human errors, behaviour and design issues.

CONCLUSION

This article examined the role of technology in reconfiguring government-citizen interface following the implementation of Nemmadi and the factors which influenced the design of databases used under Nemmadi. It also described how the wider political and institutional dynamics provided the impetus for introducing Nemmadi. Further, the article illustrated the consequences of ICT interventions, particularly, for citizens with relatively weaker economic and social power and their responses in terms of adapting to, and

appropriating, the new technology. The article thus shows how ICTs introduced to improve government-citizen interactions get entrenched amidst prevailing complexities in society, and even introduce new layers of mediators and regulations which citizens have to navigate before they can access government institutions.

Findings reported in this paper reinforce the observations of earlier studies (Benjamin et al., 2005; De, 2005, 2009; Gatty, 2009) on Nemmadi's predecessor, Bhoomi, about the effects of reconfiguring citizens' relationship with street bureaucrats and those in the higher rungs of bureaucracy. The problems identified with Bhoomi programme by these researchers persist in Nemmadi. This research has added to these studies through a comprehensive exploration of the relationship between street bureaucrats, kiosk operators and rural citizens. While earlier studies have alluded to the potential adverse effects of reconfiguring relationships between rural citizens and street bureaucrats, they have not expanded on the specific ways in which e-governance programmes have sought to reconfigure state-citizen relations. Another contribution of this research is about the findings on social factors which influence technical decisions such as choice and design of technologies. Earlier studies by policy makers as well as academic researchers have not focussed on this aspect of e-governance.

The findings in this article illustrate the need to study technologies by embedding them in the institutional, political, societal and regulatory contexts in which they are introduced and situated. Such an approach moves away from normative assumptions about the impact of technology and allows for more nuanced understandings of how technology reconfigures institutions, processes and interactions between government functionaries and citizens. This understanding is crucial for re-conceptualising technology, governance and politics as intricately linked to material bases and practices. The embedded approach also challenges notions of technological determinism where technology is viewed as the final solution to problems of ambiguities, illegibility and inefficiency. Instead, the authors want to advocate an approach that focuses on how human actors are embedded in political and social systems and how technology transforms their stakes, interests and behaviour and in turn gets appropriated in highly complex ways. All these factors have an impact on the organisation of the state system and how the state will manifest before its citizens.

This study is limited in its analyses of the reflexive influences of social and technical factors on decisions relating to the forms and content of technology in e-governance programmes. It analyses one aspect of technology, viz., database design. Further research is needed on the reasons for selecting a particular technology and the choice of vendors. It is also useful to study the implementation of technology and e-governance in different domains and institutions in India. Finally, this research elaborates only on the role

of revenue administration under Nemmadi. It will be useful to study the effects of technology adoption among other organisations that are connected with rural and land administration.

NOTES

1. Fieldwork for this research was conducted under the aegis of the generous grant awarded by SIRCA/NTU to Servelots, Bangalore. We would also like to acknowledge the support of B. Manjunath who assisted with the field research and analyses of data.
2. RDS documents have acquired mandatory status under the laws of revenue administration and state government even though it is widely acknowledged that the information contained in most of these documents is not accurate despite having been verified by revenue department officials. For instance, incomes of applicants recorded in an income certificates, is known to be underestimated because people prefer to declare lower incomes in order to avail of government benefits and subsidies. Further, the process of verifying incomes is not foolproof. (Interview with officials of Agricultural Bank and Panchayat members, July 2010)
3. Interview conducted with a member of a village council on 2 July 2010.
4. RTCs are available from NKs and also from the registrar's office in the *taluk* headquarters. Additionally, private kiosks authorised by the government also deliver RTCs.
5. *Panchayats* are the basic unit of village administration. It is a form of rural local government.
6. Interview with a technologist who was involved with implementing e-governance projects in India. Interview conducted on 22 May 2010.
7. Survey numbers are unique numbers allotted to each parcel of land owned/occupied singly or jointly under one title. Source: <http://punjabrevenue.nic.in/lr6.htm>. Last accessed on 20 October 2010.
8. It was also found that Comat has modified the process of delivering RDS certificates to first-time applicants in some districts. Applications are verified by checking against the database which the company developed when redistributing ration cards in Karnataka state. This process helps the company and its operators to expedite the delivery of RDS by bypassing the mandatory verification and authorisation by VAs and RIs on first time applications. It was also mentioned to the authors that DCs and *Tahsildars* have the powers to modify processes/regulations and adapt these to local circumstances in the districts.
9. Interview with a technologist who was involved with implementing e-governance projects in India. Interview conducted on 22 May 2010.
10. Forty gunthas equal one acre.

11. Source: Circulars issued by Revenue Secretary dated 10 July 2003 available at stg2.kar.nic.in. Last accessed on 27 July 2010.
12. The authors are grateful to Gautam John, Project Manager at Akshara Foundation, Bangalore, for sharing this insight with them based on his experiences with maintaining digital databases. Interview conducted on 9 July 2010.
13. Interview with Alok Singh conducted on 9 July 2010.
14. Interview conducted on 22 May 2010.
15. Interview with Gautam John conducted on 9 July 2010.
16. Interview with Alok Singh conducted on 9 July 2010.

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of the unique features of this book is the comprehension exercises given at the end of every chapter which would be very useful for students of communications and information technologies.

What the authors convey very clearly is the complexity of the contemporary situation. The ascendancy of global technologies in a developing world and the efforts of countries like India trying to deal with new technologies in the face of International pressures at the same time trying to work with the old technologies that are not entirely obsolete and useless. It would have, however been richer if there had been some more critical analysis

and some comparison with other countries facing similar situations. The authors successfully bring together a number of pieces that provide an overview of ICT for development. Its contribution to the body of literature in the field is valuable. This book should be particularly useful to students of communications and ICT.

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