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Implementation of an Information and Communication Technology in a Developing Country: A Multimethod Longitudinal Study in a Bank in India

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Developing countries, such as India and China, are the fastest growing economies in the world. The successful implementation of information and communication technologies (ICTs) in these countries is likely to hinge on a set of institutional factors that are shaped by the environmental tension between two competing forces, emergent catalysts, such as new economic policies and reform programs, and traditional challenges, such as infrastructure and traditional value systems. To unearth the temporal dynamics underlying the success and failure of ICT implementations in organizations in developing countries, we conducted a two-year multimethod study of an ICT implementation at a large bank in India. Based on data collected from over 1,000 employees and over 1,000 customers, we found, relative to preimplementation levels for up to two years postimplementation, that we characterized as the shakedown phase (1) operational efficiency did not improve, (2) job satisfaction declined, and (3) customer satisfaction declined. In-depth interviews of approximately 40 members of top management, 160 line employees, and 200 customers indicated that these outcomes could be attributed to the strong influence of a set of institutional factors, such as ICT-induced change, labor economics, Western isomorphism, parallel-manual system, and technology adaptation. The interplay between these institutional factors and the environmental tension posed a formidable challenge for the bank during our study that led to the poor and unintended outcomes.

Keywords: developing countries; ICT implementation; operational efficiency; job satisfaction; customer satisfaction; institutional factors; environmental tension; traditional challenges; emergent catalysts
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1. Introduction

Information and communication technologies (ICTs) are critical for organizations to gain operational efficiency and strategic benefits (Rai and Tang 2010, Rai et al. 2006, McAfee and Brynjolfsson 2008). There has been much research on ICT implementations, especially enterprise-wide systems and associated outcomes in organizations in developed countries (e.g., Bala and Venkatesh 2013; Dewan and Kraemer 2000; Fichman 2000; Kohli and Grover 2008; Morris and Venkatesh 2010; Sykes et al. 2009, 2014) and some research on understanding of ICT implementations in organizations in developing countries (Dewan and Riggins 2005, Puri 2007, Rai et al. 2009, Silva and Hirschheim 2007, Venkatesh et al. 2010, Walsham and Sahay 2006, Walsham et al. 2007). Despite some progress in our understanding of ICT implementations in developing countries, such as China and India, more is needed as these countries change and grow. These countries represent a majority of the world's population and have become the forefront of economic growth and development in the past two decades. The question of what factors drive successful ICT implementations in organizations in developing countries is thus critical for both theory and practice.

The investigation of ICT implementations in developing countries is of scientific significance because it enriches our current understanding of the unique antecedents, consequences, and processes stemming from the socioeconomic, cultural, and regulatory conditions in these countries (Lachman et al. 1994, Rosenzweig 1994, Walsham et al. 2007). In particular, this research will shed light on unique challenges and catalysts that organizations in developing countries may face as they embrace ICTs that are primarily developed by and for organizations in developed countries. These unique challenges and catalysts are likely to be salient during an ICT implementation because of the unique socioeconomic and cultural conditions in these countries and the institutional environment that organizations in these countries face (Silva and Hirschheim 2007, Venkatesh et al. 2010). Furthermore, there is a potential misfit between Western-based theory and the organizational contexts in developing countries (Kiggundu et al. 1983). For example, Venkatesh et al. (2010) found that the job characteristics model (JCM), a widely used model that links employee job characteristics and job outcomes, was not able to explain postimplementation employee job outcomes in the context of an ICT implementation in an organization in India.

Much prior research on ICT implementations in developing countries has focused on broad societal issues related to the links between ICTs and development (e.g., Silva and Figueroa 2002), the role of ICTs in cross-cultural working (e.g., Walsham 2002), the influence of local practices on implementations (e.g., Bada 2002, Brown and Thompson 2011, and issues related to addressing digital divides (e.g., Dewan et al. 2005, Venkatesh and Sykes 2013).[1] Although these works have provided insights on ICT implementations and use in developing countries, there has been limited research that focuses on the impacts of ICTs on organizational outcomes in these countries and factors that explain the link between ICT and these outcomes. In particular, there is a need to understand the relationship between ICT implementations and key outcomes from the perspectives of different organizational stakeholders as they experience and embrace the implementation over time. Such an understanding can potentially complement prior research and theories on ICT implementation by bringing forth key contextual factors and contingencies that are likely to be salient in organizations in developing countries (Johns 2006, Pettigrew 1985).

Against this backdrop, we conducted a multimethod longitudinal study of a major ICT implementation[2] in a large bank in India to accomplish three objectives: (a) to understand the impacts of the implementation on three key performance indicators for the bank, i.e., *operational efficiency*, *employee job satisfaction*, and *customer satisfaction*; (b) to unearth the *temporal dynamics* of the key drivers of these outcomes from multiple stakeholders' perspectives; and (c) to inductively develop a model of ICT implementation and outcomes. The key drivers were conceptualized as institutional factors—an assemblage of prevailing institutional conditions, norms, values, belief systems, and practices that shaped three key stakeholders' (i.e., top management, line employees, and customers) experiences with and reactions to the new ICT over time. We found that the interplay between institutional factors and the environmental tension—that we conceptualize as a friction between traditional challenges and emergent catalysts in developing countries (see Section 2.3 for more details)—influenced the implementation over time and also explained the declining trajectory of the outcomes. We contribute by offering meta-inferences, i.e., integrative theoretical insights from multimethod studies (Venkatesh et al. 2013), regarding challenges related to ICT implementations in developing countries. We also contribute by unearthing important contextual factors and contingencies that are likely to augment prior research and theories on organizational innovation in general and ICT implementations in particular. Finally, we extend the literature on impacts of ICTs on organizational outcomes by offering explanations regarding why and how ICTs may not lead to intended outcomes in developing countries.

2. Background

2.1. ICT Implementation: The Shakedown Phase and Prior Research

An ICT implementation is typically a sequential process, with distinct phases that start with planning and end with the infusion of the new ICT in the organization. It typically has four phases: *chartering*, *project*, *shakedown*, and *onward and upward* (Markus and Tanis 2000).[3] We focus on the shakedown phase because organizations typically encounter most implementation challenges during this phase (Morris and Venkatesh 2010, Sykes 2015, Sykes and Venkatesh 2016, Sykes et al. 2014). The shakedown phase is the period of time from the point the ICT is functional

[1] See Avgerou (2008) and Walsham et al. (2007) for reviews of ICT implementation research in developing countries.

[2] The implementation involved deployment of hardware, network infrastructure, and enterprise-level software to support the core business processes and transactions of the bank.

[3] The chartering phase typically involves decisions leading up to the funding of an ICT and activities, such as developing a business case for an ICT, creating a project team, selecting consultants, selecting a software package, and approving a budget and schedule. The project phase comprises activities related to the deployment of an ICT, such as hardware and network infrastructure, business process changes, software configuration, integration, testing, data conversion, training, and rollout. The onward and upward phase continues from normal operation until the ICT is replaced with an upgrade or a different ICT.

and accessible by employees (going live or rollout) to the point when normal operation or routine use has been achieved (Markus and Tanis 2000). In addition to mandating the use of the new software and business processes, this phase involves activities, such as cleaning up data and parameters (e.g., business rules), providing additional training to new users, particularly on business processes, and working with vendors and consultants to resolve bugs in the software.

Prior research on ICT implementations focusing on the shakedown phase has provided a rich understanding of ICT implementations in developed countries (e.g., Morris and Venkatesh 2010, Sykes 2015, Sykes et al. 2014). Our understanding is limited in developing countries (Puri 2007, Silva and Hirschheim 2007). Table A1 in Online Appendix A (available as supplemental material at http://dx.doi.org/10.1287/isre.2016.0638) provides a summary of the factors (catalysts or enablers and constraints or inhibitors) that influence ICT implementations in developing countries. Typical catalysts or enablers of ICT implementations in developing countries include favorable economic and local policies (e.g., Brown and Thompson 2011, Gibbs et al. 2003, Okoli et al. 2010); human capital development (e.g., Chinn and Fairlie 2006, Ngwenyama and Morawczynski 2009); social capital (e.g., Urquhart et al. 2008); and alignment and local adaptations of technology, developers, and users (e.g., Bada 2002, Walsham and Sahay 1999). These factors represent emerging catalysts that are likely to engender successful ICT implementations in developing countries. By contrast, the factors that are considered constraints or inhibitors represent a set of traditional challenges that are likely to obstruct successful implementations, such as poor infrastructure (e.g., Ewusi-Mensah 2012), cultural and learning barriers (e.g., Barrett and Walsham 1995, Gutierrez and Gamboa 2010), and lack of organizational readiness and capabilities (e.g., Silva and Hirschheim 2007).

2.2. ICT Implementation Outcomes

We focus on three outcomes of ICT implementations: *operational efficiency*, *job satisfaction*, and *customer satisfaction* (Banker et al. 1990, Cotteleer and Bendoly 2006, Ranganathan and Brown 2006, Ray et al 2005). Banker et al. (1990) noted that operational efficiency represents the conversion of ICT investments into business value. ICT implementation has been shown to significantly improve operational efficiency—e.g., reduction in the time needed to provide services to customers or execute an end-to-end business process—of organizations in developed countries (Krishnan and Ramaswamy 1999, Lee and Menon 2000, Venkatesh and Bala 2012). With respect to the second outcome of interest, i.e., job satisfaction, prior research has suggested that ICT implementations can positively influence employees' job satisfaction by improving the quality and nature of their work by potentially transforming mundane work processes into robust, efficient, and interesting activities (Bala and Venkatesh 2013, Morris and Venkatesh 2010, Venkatesh et al. 2010). Finally, prior research has found that ICTs can influence customer satisfaction by enhancing the quality and reliability of the service offering and delivery (Mithas et al. 2005). In addition, with the aid of an ICT, employees are likely to have more time to interact with customers rather than just focusing on processing transactions, thus improving service offering and delivery (Venkatesh et al. 2010).

2.3. Environmental Tension in Organizations in Developing Countries

Organizations operate within a sociocultural boundary and, therefore, the success of an ICT implementation in an organization in a developing country largely hinges on the applicable sociocultural elements (Walsham et al. 2007). We suggest that the societal and organizational environments in most developing countries present a *tension* between *traditional challenges* that could hinder the process of ICT implementation and *emergent catalysts* that could facilitate the implementation and realization of valued outcomes. The traditional challenges include physical, socioeconomic, and cultural barriers, whereas the emergent catalysts include a significant shift in economic policy and the availability of various new ICTs. Online Appendix B provides a brief background of these traditional challenges and emergent catalysts in the context of our focal country—i.e., India. We suggest that the effects of specific traditional challenges and emerging catalysts will vary across the different types of ICT implementations and contexts. We propose four archetypes of environmental tensions that organizations in developing countries may face when they implement ICTs (Figure 1). We leverage these archetypes as we present our study and explain our findings related to an ICT implementation in India. In particular, we suggest that organizations in India are likely to be in a confronting state during an ICT implementation because despite the presence of many emergent catalysts (i.e., enablers), these organizations may face traditional challenges (i.e., constraints or inhibitors) in various phases of ICT implementations. Consequently, they are likely to experience substantial environmental tension as they implement ICTs and embed them into their core routines and processes.

3. Method

We employed a multimethod design and collected both quantitative and qualitative data. Such an approach is deemed suitable for developing novel theoretical perspectives and finding answers to both exploratory and confirmatory research questions

Figure 1 Environmental Tension Archetypes for ICT Implementations in Developing Countries

		Emergent catalysts: High	Emergent catalysts: Low
Traditional challenges	High	Confronting state Although an ICT implementation will perhaps move forward and organizations may gain benefits in the long run, organizations may face substantial challenges as they attempt to figure out the ideal process for a successful ICT implementation. For instance, many organizations in developing countries feel the need to implement ICTs to keep up with global demand and competition. Nonetheless, these organizations may find it difficult to implement these systems because these systems may not be compatible with local values and work processes.	Cold state Organizations may not be willing to implement ICTs if there are serious traditional challenges and poor/few emergent catalysts. Even if they move forward with large-scale ICT implementations, it is highly likely that the new ICTs will not be perceived favorably by key organizational stakeholders. For instance, in many developing countries, office automation is not desirable because there are no incentives (i.e., low emergent catalysts) and high degrees of traditional challenges (i.e., job insecurity).
	Low	Conducive state Organizations will be able to leverage the emergent catalysts and implement ICTs rapidly and benefit. For instance, the widespread diffusion of mobile technologies can be attributed to the conducive state in many developing countries because there are a few traditional challenges related to the diffusion of such ICTs in developing countries.	Cautious state Although there are few traditional challenges, organizations may still not be willing to move forward with ICT implementations because there is no environmental, social, and institutional impetus to implement ICTs. For instance, healthcare ICT implementation initiatives in developing countries may face situations in which there might be low traditional challenges, yet there are limited emergent catalysts (i.e., institutional incentives to implement such ICTs).

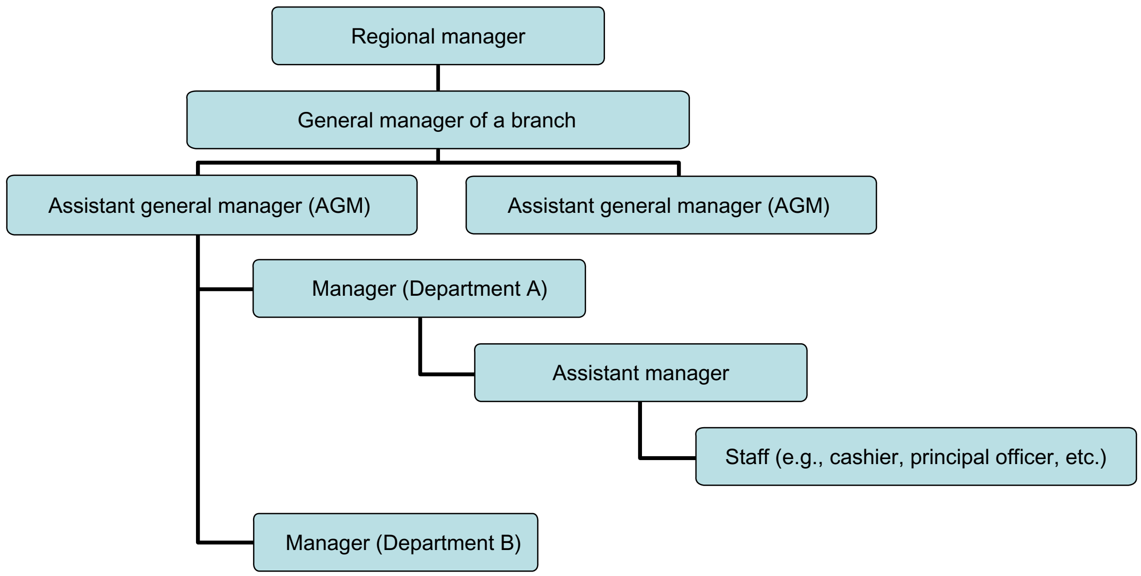
(Venkatesh et al. 2013). Given that our primary objectives are to understand whether an ICT implementation had a positive impact on an organization in a developing country (i.e., a confirmatory question) and how the implementation unfolded over time (i.e., an exploratory question), a multimethod approach was particularly suitable. We closely followed the guidelines from Venkatesh et al. (2013) for conducting mixed methods research and offer meta-inferences—i.e., substantive theory—based on the findings from both quantitative and qualitative analyses. Our quantitative data and analysis provided insights on the impacts of the ICT implementation on the key outcomes. The qualitative data and analysis helped us better understand the implementation and reasons for the outcomes observed in the quantitative analysis.

3.1. Site Selection and Setting

The research setting was a large bank in India (henceforth, BANK) implementing an enterprise-level ICT to support and automate core banking transactions and processes. This is a reasonably representative situation of an ICT implementation as the banking industry is typically one of the first to innovate via deployment and use of ICTs. We collected data both from implementing and nonimplementing branches of BANK. BANK chose 100 locations for the implementation of the first phase of the ICT to automate all banking transactions. Half of these branches and 19 nonimplementing branches were randomly chosen for the purpose of our study. These were full-service branches offering a range of banking services—e.g., personal banking, corporate banking, foreign exchange banking, and government services. Banking services in India are considerably more complex than what is typically found in developed countries because of the tight governmental regulations on certain matters, such as foreign exchange. Branches of banks in India also employ significantly larger numbers of employees compared to U.S. banks—in some cases, over 100 employees work in a branch, including a number of employees whose sole task is to move paper around the office. It is typically difficult for employees in India and even customers to have access to the operational head of a branch. Given that competitive advantage and operational efficiency are not a key consideration for many banks in India, these banks continue to operate with many practical constraints that they face on a regular basis.[4] Figure 2 depicts the *relevant* organizational hierarchy of BANK. The complete hierarchy is more complex but is not included here as those above the general manager (branch) and the regional manager were not available for interviews and, therefore, were not part of the study.

[4] A discussion of the Indian banking sector can be found in Setia et al. (2013).

Figure 2 (Color online) Partial Organizational Chart of BANK



3.2. The ICT Implementation: Paper-Based System to Computer-Based System

Prior to the new ICT implementation, all transactions at BANK including accounting and auditing activities were recorded in physical ledgers, i.e., the system was completely manual and paper based. The ICT was implemented by a CMM (Capability Maturity Model) level-5 certified information technology (IT) consulting firm in India. The consulting firm followed a standard formal implementation strategy and methodology following the guidelines of CMM level-5. After a design and development process that lasted about a year, BANK conducted beta tests of the ICT in two different branches located near the corporate headquarters. Subsequent to bug fixes and changes that took about six months, BANK provided training for its employees in the 100 different branches chosen for the first phase of the ICT implementation. The consulting company conducted an intensive three to five days of training that was organized by job type. For a period of one month after the ICT went live, there was one support person on-site per 50 employees in a branch. The support personnel helped with ICT glitches, provided brief tutorials when called on, and reported any problems to the consulting company.

Managers at the branch and corporate levels were supportive of the ICT implementation. They provided electrical power generators to each branch to ensure that power failures, a common occurrence in India even in major urban centers, would not seriously interrupt transaction processing using the new ICT. For instance, Bengaluru (formerly known as Bangalore), which is India's IT capital, has struggled for years with scheduled power outages for several hours a day. BANK's management also provided change management support (e.g., meetings with employees and customers) to help transition to the new ICT. During our initial conversation with BANK's management, we found that senior managers were aware of the typical ICT implementation challenges, such as employee resistance, initial performance loss, transaction errors, and infrastructure issues (e.g., power failures). Employees were actively involved in the implementation (e.g., requirements determination, testing). Following the training, employees began using the ICT for all banking transactions. It was decided that the manual, paper-based system would run in parallel for a year to allow for data verification and provide a backup solution. However, in reality, both the manual and ICT systems were run in parallel for the entire two years of our data collection because of various glitches in the ICT, situations of lack of employee familiarity with the ICT features, lack of employee ability to immediately resolve/handle unique customer requests using the ICT, and other infrastructure problems.

3.3. Participants

The participants were identified in each of the three stakeholder groups being studied—i.e., top management, line employees, and customers. Top management included individuals at the rank of manager or higher because they managed a specific unit in a branch or had the primary responsibility to oversee a fairly large number of employees. However, top management was involved only in the qualitative study because the focus of the quantitative study was on outcome data gathered from employees and customers. Line employees were those who interacted with customers and were involved in the day-to-day activities of BANK. These employees participated in both the quantitative and qualitative studies. Assistant managers were also categorized as line employees because they performed various routine tasks (e.g., approving a check for payment) throughout the day. The title of assistant manager appeared to be used more as a way of recognizing organizational tenure with BANK and promoting employees rather than as a way of giving significant managerial responsibilities. Finally, for the purpose of sampling, only actual customers (and not their helpers) visiting BANK were studied. This was an important participant selection decision because of the availability of fairly cheap labor in India, organizations and even individuals (or families) use helpers to run errands, including visits to a bank. However, helpers are unlikely to have any decision-making authority related to switching banks and their time is not likely to be valued highly by those for whom they work. Thus, only those customers who were visiting BANK for their personal or business transactions *and* possessed significant control over where the account holder banked were studied to minimize potential response biases.

We invited about 4,400 employees across 50 branch locations where the new ICT was implemented to participate in a survey and received 2,995 usable responses in the preimplementation phase for a response rate of around 67%. Of those, 1,375 provided responses in the two waves of postimplementation data collection, resulting in a response rate of 46% relative to the preimplementation data collection. From the 19 nonimplementing branches, 368 out of 648 employees provided usable survey responses at all points in time (response rate 57%). Therefore, our sample size was 1,743. The demographic data of the 1,743 participants and the 1,900 employees who did not participate in both waves showed no significant differences. In studying customers, however, a between-subjects comparison had to be used because it was impractical to expect to find the exact same customers nearly a year apart, let alone to do so on multiple occasions. From the 50 implementing branches, 892, 1,208, and 975 customers were studied in each of the three phases: preimplementation, one year postimplementation, and two years postimplementation. From the 19 nonimplementing branches, 290, 237, and 304 customers were studied at similar points in time. In the postimplementation phase, in-depth interviews of a randomly chosen subset of top management (40), line employees (160), and customers (40) were conducted.

3.4. Measurement of the Impacts of the ICT Implementation

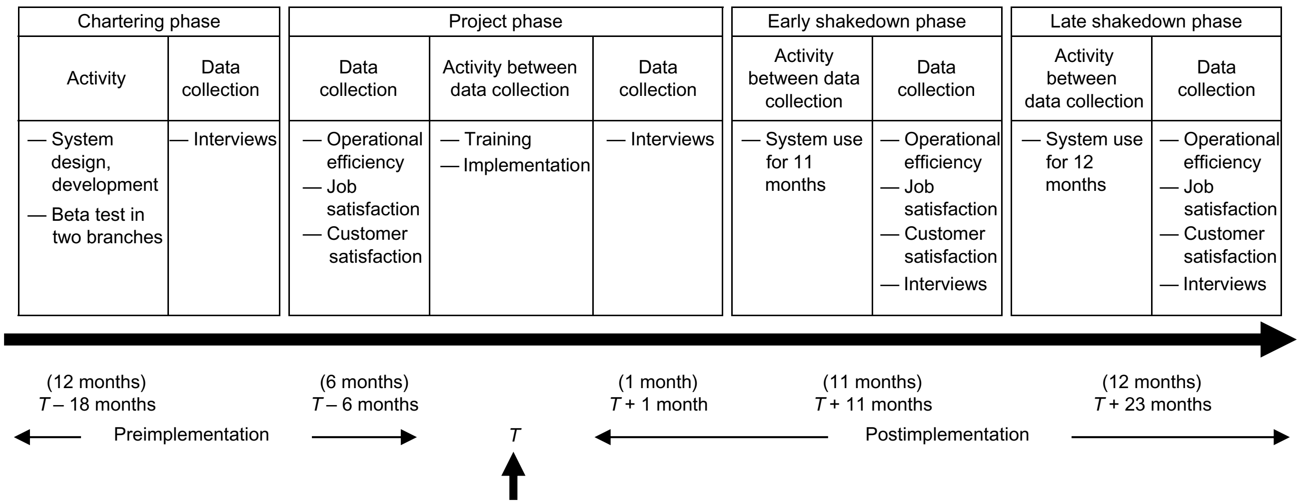
Our first key outcome, *operational efficiency*, was operationalized as the service time needed to perform a transaction for a customer (e.g., depositing a check or cash, withdrawing cash, getting a money order, inquiring about an account balance, checking status of a loan application, meeting a bank employee) and was measured objectively. It included both the waiting time and actual transaction time.[5] The literature on *customer satisfaction* has suggested precise measures of various facets of customer and overall satisfaction. Furthermore, it is possible to measure satisfaction at the level of a transaction or the firm. We collected both transaction-specific and firm-level customer satisfaction. However, in keeping with the spirit and focus of this paper, we use the data from the three-item transaction-specific customer satisfaction scale (e.g., "Overall, I was satisfied with my experience with this transaction"), adapted from Fornell et al. (1996) and Oliver (1980). For *job satisfaction*, an established, extensively used three-item scale (e.g., "Overall, I am satisfied with my job") was adapted from O'Reilly and Caldwell (1981).

3.5. Data Collection Procedure

Figure 3 shows the activities in the organization and the details of when and what data were collected. It shows the different phases of ICT implementation—i.e., chartering, project, and shakedown—and the time span of these phases at BANK. The activities related to the implementation in which the organization was engaged during these phases as we have demarcated them is consistent with those described in Markus and Tanis (2000). Given that the manual, paper-based system was present during the entire two years postimplementation, we considered this entire duration as the shakedown phase because the key criterion of the onward and upward phase, i.e., normal operation of the newly implemented ICT, was never achieved during this period. However, in the interest of highlighting the temporal dynamics of factors that were salient during the shakedown phase, we divided our postimplementation data collection period into two subphases: early shakedown phase (the first 12 months after the implementation) and late shakedown phase (the second 12 months after the implementation).

[5] To measure service time, the branch gave randomly chosen customers an electronic timer device when they walked into the bank. When the customer received the device, the primary timer clock was started. The customer handed the electronic timer device to any employee with whom the customer interacted. Each employee the customer interacted with started a secondary timer—while the primary timer continued to tick. When the interaction with an employee concluded, the secondary timer was stopped by the employee and the timer device was returned to the customer; the secondary timer data were stored on the timer device. This was repeated until the customer was leaving the branch; at that time, the customer returned the device to a representative of the branch who stopped the primary timer clock and transcribed all times and reset the timer.

Figure 3 Organizational Activities and Data Collection



Note. T, Period when ICT was deployed and training was started.

The data collection procedure involved conducting preimplementation (i.e., chartering and project phases) and postimplementation (i.e., early and late shakedown phases) assessments of operational efficiency, job satisfaction, and customer satisfaction. Furthermore, semistructured interviews of members of top management, line employees, and customers were conducted to understand the bases of their reactions and perceptions of the organizational and ICT environments. Although a majority of the participants were proficient in English, participants had the option to answer survey and interview questions in their local languages. In translating the questions from English to the local language, we followed the translation procedures outlined in Brislin et al. (1973) to include back translation.

4. Analysis and Results

4.1. Impacts of the ICT Implementation

Table 1 shows the results of our quantitative analysis. In the ICT branches, relative to $T-6$ months (six months preimplementation), the service time was practically identical (no statistically significant difference) to that at the $T+11$ months (approximately one year postimplementation). Also, in the later part of the shakedown phase (i.e., at $T+23$ months), the service time was not statistically significantly different from preimplementation assessments (i.e., $T-6$ months—six months preimplementation). Second, in the ICT branches, relative to preimplementation levels, job satisfaction was statistically significantly lower at $T+11$ months and $T+23$ months. It is interesting to note that, relative to the early part of the shakedown phase (i.e., $T+11$ months), in the later part of the shakedown phase (i.e., $T+23$ months), job satisfaction improved slightly but did not rebound to preimplementation levels (i.e., $T-6$ months), indicating that normal operation was not achieved and the shakedown phase continued. Third, in the ICT branches, the pattern observed with customer satisfaction was quite similar to that of job satisfaction—i.e., highest was preimplementation (i.e., $T-6$ months), lowest was at the early shakedown phase (i.e., $T+11$ months), and a modest increase was observed in the late shakedown phase (i.e., $T+23$ months) although those levels were still lower than that of preimplementation levels. Job satisfaction and customer satisfaction were significantly lower in the ICT branches in the shakedown phase (i.e., $T+11$ months and $T+23$ months)

Table 1 Impacts of ICT Implementation

			Operational efficiency		Job satisfaction		Customer satisfaction	
Phase	Point of measurement	Branches	Mean	SD	Mean	SD	Mean	SD
Reflective of chartering and project	$T-6$ months: Preimplementation	ICT	22.8	9.4	4.5	1.10	5.1	1.07
		Non-ICT	22.7	9.9	4.4	1.11	5.2	1.05
Early shakedown	$T+11$ months: one year postimplementation	ICT	23.2	8.3	3.5	1.21	3.6	1.19
		Non-ICT	23.0	8.7	4.5	1.20	5.1	1.06
Late shakedown	$T+23$ months: two years postimplementation	ICT	22.7	8.4	3.8	1.04	4.1	1.10
		Non-ICT	22.6	8.8	4.4	1.18	5.2	1.08

Note. T, Start of ICT use; operational efficiency is measured as service time.

compared to the non-ICT branches during the same time. We did not find any statistically significant difference in operational efficiency between ICT and non-ICT branches. In sum, operational efficiency remained the same, whereas job satisfaction and customer satisfaction declined after the ICT implementation.

4.2. Dynamics of the ICT Implementation

The quantitative analysis indicated that the ICT implementation did not result in favorable outcomes. Specifically, operational efficiency did not improve, and job satisfaction and customer satisfaction declined after the implementation. To unearth the dynamics of ICT implementation over time, we collected qualitative data throughout the two years of our study by following the guidelines of positivist case study research in information systems (IS) (e.g., Dubé and Paré 2003). We analyzed this qualitative data to uncover the factors that might have prevented BANK from achieving desirable outcomes from the ICT implementation (see Venkatesh et al. 2013).

4.2.1. Qualitative Data Analysis. The underlying logic of our qualitative data analysis was data reduction and presentation (Krippendorff 1980, Miles and Huberman 1984). We followed a two-step approach to analyze the data. First, we conducted an exploratory analysis to identify patterns from the qualitative data. The interview transcripts were read by one of the authors who used a data reduction and presentation technique for analyzing, triangulating, and documenting the content of the transcripts to identify and group similar quotes. For example, if there were repeated quotes on "abundance of cheap labor," "trade union," and "high unemployment," these quotes were identified and added as a first order concept. A group of similar first order concepts was categorized as a second order theme or theoretical category. Finally, a group of similar second order themes was aggregated to create a higher-level theoretical dimension. The entire coding process was repeated by another individual who was not aware of the research objectives of this work. The coders compared their codes and no significant differences were identified. Minor disagreements were discussed and resolved. Given our focus on the shakedown phase, Figure 4 presents five overarching theoretical dimensions that were salient in this phase: (1) *ICT-induced change*; (2) *labor economics*; (3) *Western isomorphism*; (4) *parallel-manual system*; and (5) *technology adaptation*.

Second, we conducted a content analysis of the qualitative data using the NUD*IST software. Nodes were created in the software to represent the coding categories identified in the process described above. The software performed a search operation in the interview transcripts to identify the relevant quotes for each coding category. Our objective was to identify the number of employees who mentioned a particular first order concept to understand the importance of each of these concepts. For example, the software gave us the count of 50 employees who mentioned something about "labor union" in their interviews. This approach helped us understand the intensity of concepts or factors that were identified in the first step of qualitative analysis. For example, if a factor is mentioned by 40% or more employees either early or late in the shakedown phase, we suggest that this factor had a strong influence (either as a catalyst or as a constraint) on the ICT implementation process during that particular subphase. This approach was consistent with prior IS research that employed a qualitative methodology (e.g., Bala and Venkatesh 2007). Table 2 presents the results of the content analysis and highlights the salience (i.e., intensity) of factors throughout the shakedown phase.

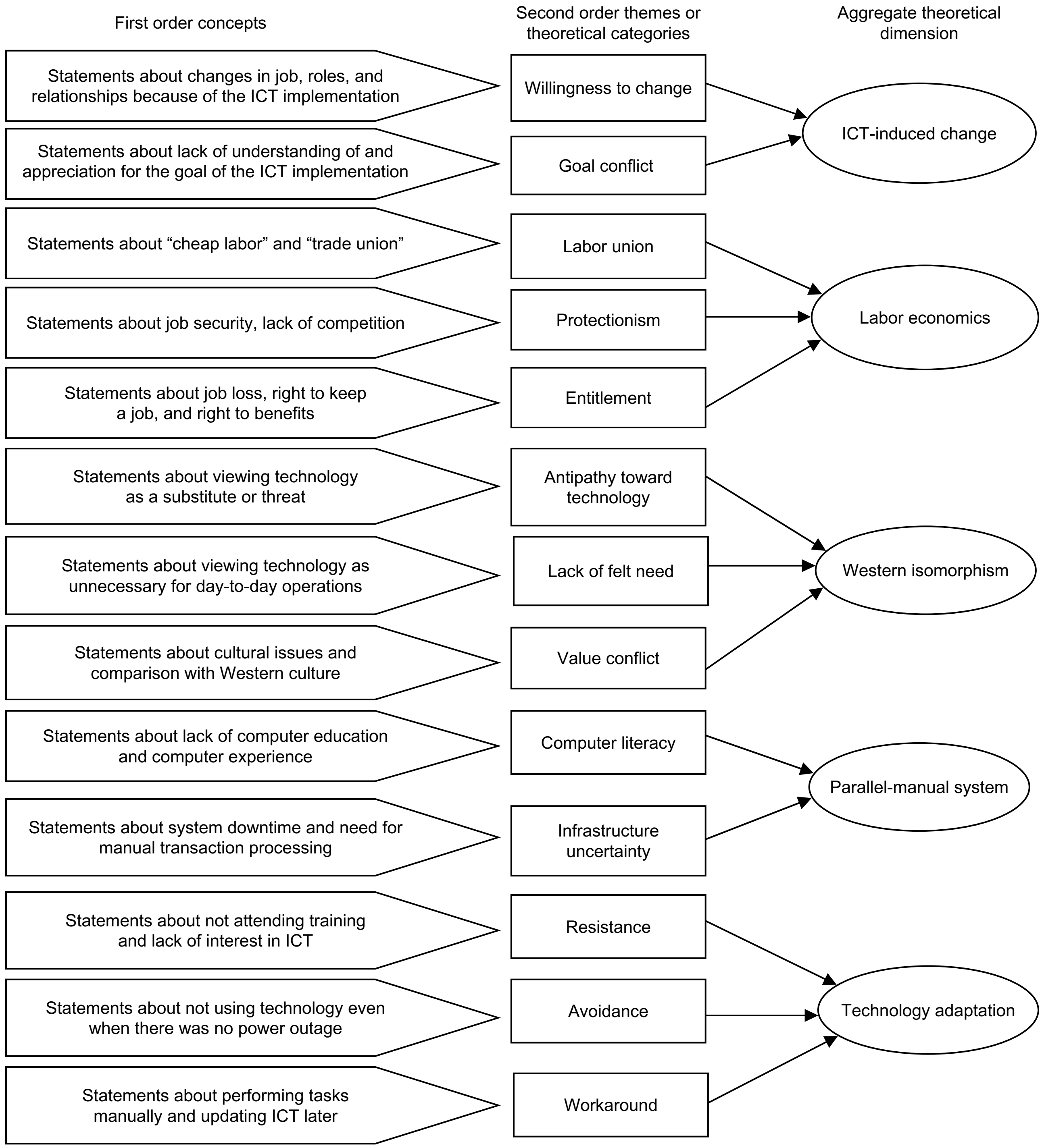
4.2.2. Preimplementation (Chartering and Project Phases). Although the preimplementation phases were not the core focus of our qualitative analysis, we highlight a few findings here to develop insights about the process of the ICT implementation at BANK. First, we found that although top management was clearly supportive of the ICT implementation because they wanted to improve the quality of service and operations, employees did not feel the need to make any changes—i.e., they embraced the status quo. When asked about the goal of the implementation, managers clearly indicated that their goal was to improve efficiency and effectiveness in business processes by eliminating redundant activities and reducing transaction time. In addition, developing and maintaining electronic records of transactions were high-level goals of the top management. However, at the employee level, these goals were not meaningful. Employees perceived that BANK was doing just fine and given that there was no sense of competition and no fear of job loss, we found that employees did not even think about the potential operational and strategic gains from implementing the ICT. The following quotes illustrate this goal incongruence.

> It is evident that something has to change. I am not sure we need so many people. We can probably cut the service time in half if we had only one customer touch point and no additional layers of processing.
> (An ICT branch manager)

> Our biggest problem is the employees. They don't want to learn, they don't want to change, they don't want to grow, they don't want to help us grow.
> (An ICT branch manager)

> Everything is going well. I don't see any need for a change. I am not alone in feeling this way.
> (An ICT branch employee)

Figure 4 Overview of the Qualitative Data Structure



Second, we found that employees were reluctant to accept the implementation because they were concerned about ICT-induced change, such as changes in their jobs, roles, and relationship, and their lack of computer literacy. Some employees had a chance to provide input during the requirements determination phase and also had a chance to perform test transactions using the new ICT. Employees who were not invited to participate in implementation activities might have had a preview of the ICT from employees who participated. Although many employees felt that BANK might not implement the ICT during the chartering phase, most employees were convinced during the project phase that the new ICT would

Table 2 Intensity of Theoretical Categories in the Shakedown Phase

Aggregated theoretical dimensions	Second order themes or theoretical categories	First order concepts	Stakeholders	Intensity of responses: Postimplementation: Early shakedown	Late shakedown
ICT-induced change	Willingness to change	Changes in job, role, and relationships; changes in paper and information flow	Employees	++++	++++
			Management	++	++
			Customers	+	++
	Goal conflict	Lack of understanding of the goal of ICT implementation and process change	Employees	+++	++
			Management	+	+
			Customers	+++	+++
Labor economics	Labor union	Cheap labor, low salary, high unemployment, availability of people; trade union	Employees	+++	+++
			Management	++	++
			Customers	++	++
	Protectionism	Long-term orientation; job security; lack of domestic and foreign competition	Employees	+	+
			Management	+++	+++
			Customers	–	–
	Entitlement	Guarantee of job; right to keep a job; right to benefits; fear of job loss	Employees	++	++
			Management	–	–
			Customers	+	+
Western isomorphism	Antipathy toward technology	ICT is perceived as a substitute; ICT is viewed as a threat, not as a performance enabler	Employees	++++	+++
			Management	–	–
			Customers	+	+
	Lack of felt need	ICT is viewed unnecessary for day-to-day operations; no reason to change the status quo	Employees	+++	++
			Management	–	–
			Customers	+++	+++
	Value conflict	Cultural issues; comparison with Western culture; impersonal service	Employees	+++	++
			Management	–	–
			Customers	++	++
Parallel-manual system	Computer literacy	Educational background; computer experience; computer knowledge	Employees	++	+
			Management	–	–
			Customers	+++	++
	Infrastructure uncertainty	Transaction record; system downtime; manual transaction processing	Employees	–	–
			Management	–	–
			Customers	+++	+++
Technology adaptation	Resistance	Training not attended; speaking negatively about the ICT; lack of interest in ICT	Employees	–	–
			Management	+++	++++
			Customers	+	–
	Avoidance	Not using the ICT even when there is no power outage; manual transaction processing	Employees	–	–
			Management	++	+++
			Customers	–	–
	Workaround	Using ICT in unintended way; perform transaction manually and then update the ICT when the BANK is closed for business	Employees	++	++
			Management	++	++++
			Customers	–	+

Notes. ++++, 40% or more participants; +++, 30% to 39% participants; ++, 20% to 29% participants; +, 10% to 19% participants; –, less than 10% participants.

be implemented soon. Realizing this, many employees started expressing their concerns related to the lack of felt need for BANK to become Westernized by implementing the new ICT. We found that customers also voiced similar concerns. Management did not appear to be tuned into this issue. Some employees even expressed concern that the ICT was nothing but a cultural imposition based on Western ideals. It is important to note that the ICT that BANK was implementing was developed by a company from the United States. Many employees heard about it and voiced their concerns as illustrated by the following quotes.

> I wasn't brought up with computers. I don't see any need to give up the values, the job, and the workplace that made me special. (An ICT branch employee)

> Nothing but an effort to ape Western banks. Our bank has touch [sic] with what makes Indians tick. I don't mean only employees but customers also.
> (An ICT branch employee)

Employees also expressed genuine concerns about their and their fellow employees' job security. Given that BANK was unionized, some employees felt that their job was secure. Many employees voiced their support for protectionism (e.g., long-term orientation, job security) and entitlement (e.g., guarantee of a job, right to keep a job). Management recognized this problem, albeit to a lesser extent. Customers did not express any concern regarding labor issues in these phases. Many employees were not sure whether the new ICT would actually replace them or not as illustrated by the following quote.

> I know my job is fairly secure but I wonder if BANK will be willing to take on the union now that they need a lot fewer people to do the work given the computer system makes things easier and quicker to do. (An ICT branch employee)

4.2.3. Shakedown Phase. As noted earlier, to understand and highlight the temporal dynamics of factors within the shakedown phase, we considered the first 12 months after implementation the early shakedown phase and the second 12 months the late shakedown phase. During this entire period of time (24 months postimplementation), the ICT was fully functional and accessible to the employees of BANK. Nonetheless, some employees were still using the manual, paper-based system (i.e., the parallel, manual system) because of certain limitations of the ICT environment (e.g., unpredictable power supply). Some of the major issues voiced by the employees during the earlier part of the shakedown phase were related to ICT-induced change, technology adaptation, Western isomorphism, and labor economics (see Table 2 for intensity and temporal dynamics of these factors during the entire shakedown phase). Management was most concerned about technology adaptation and labor economics, likely because of the strong pushback from employees in this phase, both based on their comments, views of the labor union, and through their overt behaviors related to using the ICT. Customers were concerned about Western isomorphism and the parallel-manual system as well as ICT-induced change. Yet, customers did not see technology adaptation as a major issue.

As we drilled deeper into the interview data, we noted that customers expressed strong concerns related to Western isomorphism (e.g., antipathy toward technology, lack of felt need) and the parallel-manual system (e.g., computer literacy of employees and infrastructure uncertainty). Customers felt that the redesigned business processes were still inefficient and the ICT only added complexity. Many of them clearly felt that there was no need to implement an ICT that only increased the amount of time needed to complete their transactions. In addition, employees felt that given that labor in India was inexpensive, it was probably cheaper to use employees to perform most tasks instead of implementing complex ICTs. The following quotes represent employees' and customers' concerns related to ICT-induced change, labor economics, and Western isomorphism.

> I understand this system [ICT] well and I see it would help me do the job of 3 or 4 women. But, I find I pass something on to at least two other people and a peon carries this from one desk to another. That's our country—labor is cheap. (An ICT branch employee)

> The entire process is simply too inefficient. The lady hands my cheque to someone and then literally walks over there to show that person how to process it from there. Why couldn't the first person process it? I know why. Because they have all these people working for next to nothing. It's a bureaucracy. (An ICT branch customer)

> I never thought Indian banks would also move toward being impersonal like [foreign bank—name deleted]. Soon, we'll become self-centered and slaves of computers. (An ICT branch customer)

In addition to the issues related to ICT-induced change, labor economics, and Western isomorphism, employees, customers, and managers expressed concerns about the parallel-manual system that BANK decided to continue. Although some employees were visibly upset because they had to record each transaction twice, managers downplayed this issue by suggesting that the parallel-manual system had to be in place because many employees lacked the expertise and experience to operate the ICT effectively to perform different types of transactions. For example, if a transaction required multiple layers of navigation and complex data retrieval, many employees were not able to perform it using the ICT. Besides, because of uncertainties associated with infrastructure, such as power outage, network downtime, and computer hardware issues, BANK wanted to keep the parallel-manual system during the shakedown phase to avoid potential disruption in regular operations and help employees if they were not able to complete a transaction because of their lack of knowledge and experience with computers. Customers were particularly concerned about the presence of the parallel-manual system because it increased service time considerably. As shown in Table 2, customers felt strongly that employees did not have the necessary computer skills to perform transactions efficiently using the new ICT. The following two quotes exemplify the reactions of employees and managers regarding the presence of the parallel-manual system.

> I record every transaction twice. Why have a computer system at all if I have to record everything on paper

> anyway? If the system [ICT] comes back up, until all the manual transactions are entered, we can't resume the use of the computers anyway.
> (An ICT branch employee)

> Having both paper-based and computer-based systems is a reflection of a third-world country infrastructure. I think this would be the problem in all third-world countries. We are learning from these challenges. We will overcome these with time.
> (An ICT branch manager)

Technology adaptation was a major factor in the early part of the shakedown phase, particularly from the management's point of view. Management expressed great concern about employees' resistance, avoidance, and workaround behaviors. Interestingly, although some employees admitted these behaviors, a majority of the employees did not mention these behaviors. Some customers also noticed employees' resistance and avoidance behaviors, but they likely did not have enough information to comment on workaround behaviors. Given that employees strongly voiced their concerns related to labor economics and Western isomorphism, it was quite obvious that many of them were not willing to use the new ICT to perform transactions. This also explains why the ICT implementation did not lead to positive outcomes, such as increasing operational efficiency and job satisfaction. The following comment from a branch manager exemplifies the extent of resistance and workarounds.

> Many employees just will not use the new system at all. They are practically willing to stay at the end of the day and enter all transactions into the computer. This really renders the new system worthless as every new transaction has to be checked against ledgers because the online records are never up-to-date.
> (An ICT branch manager)

During the later part of the shakedown phase (the second year after implementation), we found that normal operation and routine use of the ICT were still not achieved at BANK. It was still going through activities and facing challenges that were consistent with those of the shakedown phase. We underscore that by organizing our findings around two time periods within the entire shakedown phase—i.e., early and late—we were able to identify and highlight factors that were differentially salient during this phase and explain reasons for such a long shakedown phase. Although a majority of the factors that were salient in the early part of the shakedown phase were still salient in the later part of the shakedown phase, we observed changes in intensity of some of the factors (Table 2).

Technology adaptation continued to be a major factor during this time, particularly from the management's point of view. When asked about why the new ICT did not have positive impacts on key outcomes, managers commented about employees' resistance, avoidance, and workarounds. They complained that employees were not using the ICT the way they were supposed to use it to accomplish their tasks. When asked about their view on why the new ICT did not have positive impacts at BANK, many employees reiterated their view that the ICT implementation was unnecessary at BANK. In particular, they were concerned about the changes the new ICT brought in their jobs and whether the ICT would replace them. These sentiments are captured in the following quotes.

> The comparison of per transaction in India vs. USA makes no sense [sic]. It is no comparison. BANK assigns three peons to me. One of them just hangs out at my house in case my wife needs anything. Employees are cheap in India and don't cost thousands of dollars a year. We will never see cost efficiencies unless someone is giving away the technology.
> (An ICT branch manager)

> Why is it that we have to do everything like they do in the west? What was wrong with BANK that we needed this system [ICT]? Things were fine and now, we have to use a system [ICT] because banks in the west use computer systems. (An ICT branch employee)

Customers voiced similar concerns. Customers blamed the lack of computer literacy and infrastructure uncertainty for these negative or unfaithful technology adaptation behaviors. They felt that computerization did not improve the overall service quality of BANK (as also found in our quantitative analysis). Customers felt that there were no noticeable impacts of the changes in the way transactions were performed. In other words, the extensive business process change that was performed during the ICT implementation did not have any marked impact on the quality of services offered by BANK. We found that customers were reluctant to blame employees for the lack of improvement following the ICT implementation. They clearly expressed their concerns that the new ICT increased the workload of the employees. It is important to note that in India (and many other developing countries), bank accounts at the time of our study were branch specific. Customers always went to a specific branch for all their banking needs. Many customers develop a good relationship with bank employees over time. Some customers also know bank employees personally because the banking sector is traditionally one of the largest employers in India. Therefore, it is possible that customers may have heard about the new ICT and associated challenges from employees and developed negative views about it. The following quotes represent common customer reactions during the later part of the shakedown phase.

> I thought the computer system was supposed to make things better here. They even increased some fees. But, I notice that all it has done is instead of entering information on paper, they enter it on a computer, everything else has stayed the same.
> (An ICT branch customer)

> I think the employees do their best. If the system [ICT] is down, we just go to the ledgers.
> (An ICT branch customer)

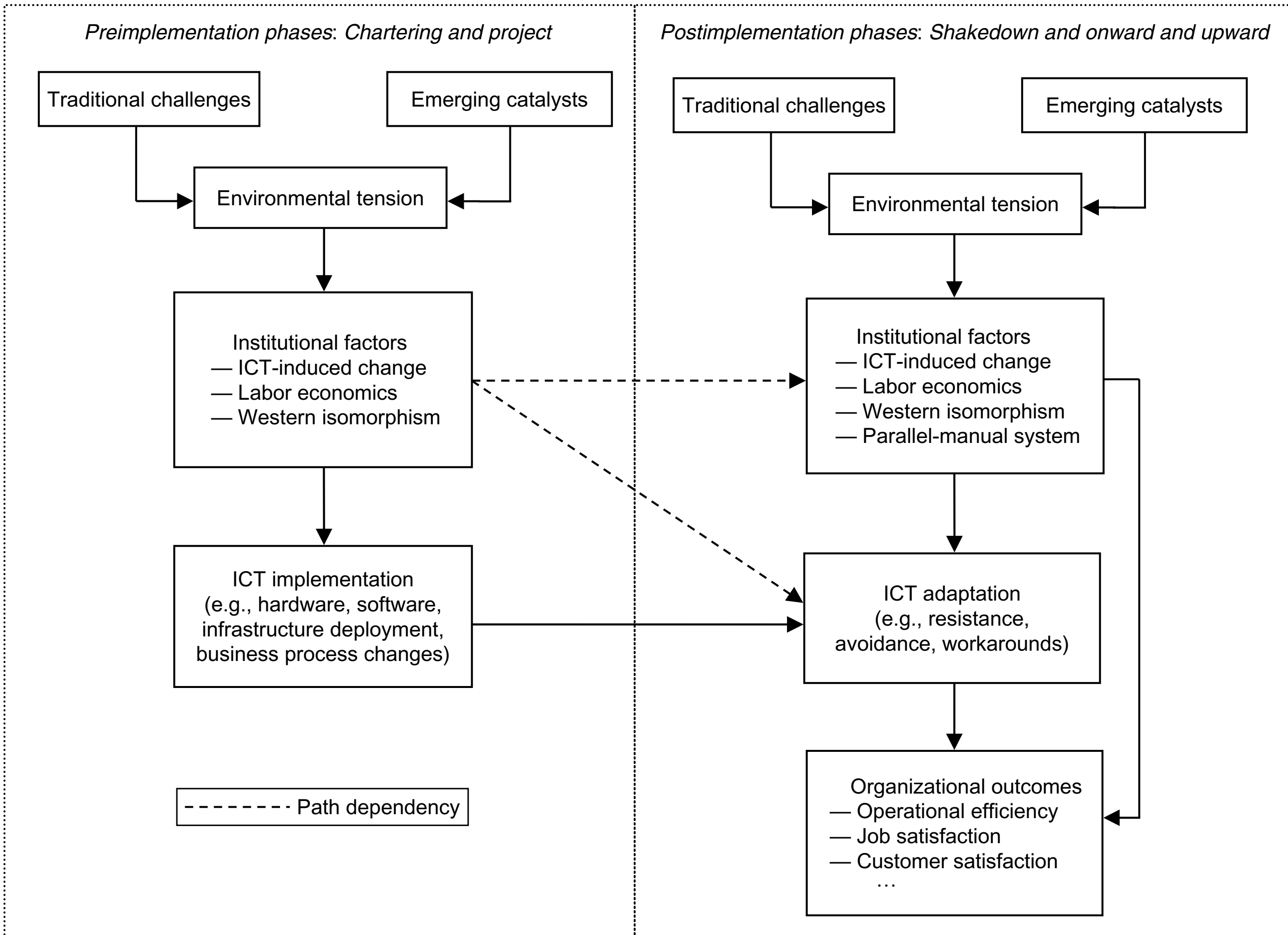
4.2.4. Dynamics of the ICT Implementation at BANK. Our qualitative results have several key aspects that we believe are unique to our context. First, two factors that were *not* related to the characteristics or use of the ICT were consistently important throughout the entire shakedown phase. These factors were related to Western isomorphism and labor economics. This suggests that employees perceived the implementation as a symbol of the Western culture being imposed on them. They clearly had a value and cultural conflict with ICT. They were reluctant to accept it as an integral part of their routine. Furthermore, some employees felt that the ICT might replace them in the long run. They were concerned that many would lose their jobs and were anxious about the situation. Given that India is a collectivistic society (Hofstede 2003), employees in organizations have strong interpersonal relationships. Jobs are perceived to be lifetime appointments, especially in Indian banks. Therefore, the idea that an ICT could replace them in the long run was a consistent theme during the entire shakedown phase. We suggest that these two factors contributed substantially to the declining trajectory in job satisfaction that we observed in our quantitative analysis (Table 1). By contrast, we found that although managers did not view these two factors as important during the early phases of implementation, they realized, in the shakedown phase, that labor economics was an important factor to be considered during the implementation. Nonetheless, they never acknowledged the presence of Western isomorphism during the entire shakedown phase. Employees voiced great concern related to Western isomorphism in both the early and late shakedown phases. This indicates a major gap in the value systems of employees and management. Furthermore, management made no attempt to minimize this gap, thus making Western isomorphism and labor economics as the two major hindering forces of the ICT implementation at BANK.

Second, the importance of factors that were related to the characteristics of the ICT implementation and use, such as ICT-induced change, parallel-manual system, and technology adaptation, changed over the course of the implementation. For example, although technology adaptation and the parallel-manual system were not major concerns during the early phases, they became major concerns during the shakedown phase, especially during the later part of the shakedown phase. This suggests that, although business processes were routinized over time, employees had to adapt to the new ICT in various ways (e.g., workarounds) and using the parallel-manual system, if needed. Management was mostly concerned about technology adaptation during the later part of the shakedown phase as they found that employees were not using the new ICT in the way management intended it to be used. However, as they never acknowledged and acted on certain factors, such as Western isomorphism, it was clear that there was strong incompatibility in the value system of employees and management that led to negative adaptation behaviors. In the end, customers and employees were in agreement with respect to the need for an ICT for BANK and strongly concerned about Western isomorphism. Overall, we found that the ICT implementation increased employees' workloads substantially because in many cases, they had to use both ICT and the parallel-manual system to perform a transaction. We suggest that these were the reasons for declining employee job satisfaction following the ICT implementation. Issues related to technology adaptation provided an additional explanation for poor outcomes of the ICT implementation at BANK.

5. A Process Model of ICT Implementations in Developing Countries

Our findings from both quantitative and qualitative analyses and the contextual factors—i.e., the tension between traditional challenges and emergent catalysts in India—helped us develop a dynamic model of ICT implementation in developing countries. The model, shown in Figure 5, represents a process view of ICT implementations in developing countries across different phases of implementation. Our core thesis is that the set of factors that we identified from our qualitative analysis—i.e., ICT-induced change, labor economics, Western isomorphism, and parallel-manual system—will influence ICT implementations and adaptation in organizations in developing countries. We refer to these factors as institutional factors because they represent a set of prevailing institutional conditions, norms, values, and practices that shaped BANK stakeholders' (i.e., managers, employees, and customers) reactions to the ICT implementation. Another important aspect of the model presented in Figure 5 is that the influence of the environmental tension—i.e., the tension between traditional challenges and emergent catalysts—on institutional factors

Figure 5 **A Model of ICT Implementation and Outcomes in Developing Countries**



does not change across the preimplementation and postimplementation phases, suggesting that organizations in many developing countries will face a continuous challenge from the environment when implementing ICTs and creating routines that embed the ICT in various business processes. This conjecture is consistent with Figure 1 that suggests that organizations will likely be in a confronting state in the presence of many traditional challenges and emergent catalysts. Although our study was conducted in India, we suggest that similar dynamics could be observed in other developing countries because of similar social, political, economic, and cultural challenges and opportunities.

5.1. Changes in Institutional Factors Over Time

We found that the role of institutional factors changed as the ICT implementation progressed from preimplementation to postimplementation phases. These changes took place for two different reasons. First, as BANK progressed through the implementation phases, stakeholders, i.e., employees, managers, and customers, used different sets of values and norms to assess the impact of ICT on them and on BANK. In some cases, the roles of values and norms became more important over time. For example, during the chartering phase, employees expressed deep concerns about the potential ICT-induced changes to their job, role, and relationships with others. When expressing these concerns, employees indicated that labor economics and Western isomorphism were two reasons for why ICT should not be implemented in BANK, with traditional challenges being the driver of their concerns. These factors remained fairly stable over time among employees. Managers were primarily in favor of the implementation because they felt that the ICT would help BANK compete with multinational and private banks. Managers developed this view primarily because of emergent catalysts (factors) in developing countries, such as open economy, foreign direct investment, and the presence of MNCs. Managers expressed significant concerns that employees did not appreciate the importance of the ICT for BANK and they did not adopt and use the ICT faithfully. Employees were mostly influenced by the traditional values of long-term orientation and labor economics. Competition among banks was alien to them as banks in India have long enjoyed the benefits of an economic policy characterized by protectionism. Our findings indicate that as organizations in developing countries progress through the phases of an ICT implementation, the issues related to labor economics and Western isomorphism will likely remain unchanged from the employees' perspective because of the path-dependent nature of knowledge that employees will possess about these factors—knowledge from one phase of implementation will transfer to the next phase (Carlile 2004). Furthermore, other institutional factors, such as parallel-manual system and technology adaptation, will be salient when employees have the opportunity to interact with the new ICT in the shakedown phase. For example, organizations in developing countries may have to maintain a parallel-manual system because (a) employees have low computer literacy and thus may not be able to handle complex, unanticipated transactions; and (b) there is a high degree of infrastructure uncertainty, such as ICT downtime because of power outages. Such a parallel-manual system increases employee workload because they have to record the same transaction twice.

Second, we suggest that the salience of institutional factors during ICT implementations in organizations in developing countries will be shaped by two forces: (a) the environmental tension between traditional challenges and emergent catalysts (see Figure 1); and (b) ICT implementation activities. Environmental tension resulting from the confronting state in many developing countries will play a major role in shaping how stakeholders will attempt to fit the new ICT to their value systems. For example, if an employee is susceptible to old values, such as conservatism and protectionism, grounded in the institutional context, it is more likely that she will view an ICT as incompatible with her value system. Furthermore, ICT implementation activities, such as the decision to adopt, deploy, and configure, during the early stages of implementation will influence how stakeholders will invoke the role of institutional factors in the later phases of implementation (i.e., the shakedown phase). For example, if employees feel that the new ICT will radically change their work processes and eliminate certain roles and jobs in the organization, it is more likely that they will voice their concerns about institutional factors, such as labor economics and Western isomorphism, as a mechanism to defuse the value of the ICT for their organization.

A new ICT will influence or produce new institutional factors or modify existing ones. These institutional factors will in turn influence employees' perceptions regarding the ICT and their jobs. For example, the new ICT changed the core processes of BANK. During the early part of the shakedown phase when employees started using the new ICT, some employees felt that their jobs were going to change significantly and that they might face difficulty advancing their careers because they might not be able to keep up with or master the new ICT and associated changes. Furthermore, in developing countries, labor economics is such that there is an abundance of cheap labor, thus contributing to concerns about ICTs that will undoubtedly upset the already vulnerable and easily replaceable workforce. For years now, one goal of technology has been the automation of processes for efficiency and productivity purposes (e.g., Rai and Paper 1994). We found that during the early and late shakedown phases, many employees of BANK saw the possible automation as a threat to their jobs (i.e., job security) that likely made them even less willing to change (Bala and Venkatesh 2016, Morris and Venkatesh 2010). We observed that these issues were never acknowledged and/or addressed by management during the ICT implementation. Employees and customers alike questioned the need for the new ICT, often blaming BANK for wanting to be like Western companies (i.e., Western isomorphism) rather than the ICT being a sensible business decision. This led employees to fear that they would be replaced, and this fear in turn lowered their job security and willingness to change over time.

5.2. Influence of Institutional Factors on an ICT Implementation

We observed differential impacts of the institutional factors on the ICT implementation over time. For instance, in the preimplementation phases (i.e., chartering and project), institutional factors will influence ICT implementation decisions and selection activities. Although top management is typically supportive of ICT implementations in developing countries, institutional factors, such as labor economics and Western isomorphism, will hinder successful implementation of ICTs. Indeed, much prior research has found a noticeable discrepancy in ICT implementations in developed countries compared to implementations in developing countries (e.g., Dewan et al. 2005). In particular, organizations in developing countries are much less interested in implementing enterprise-level ICTs, such as enterprise resource planning (ERP), supply chain management (SCM), and customer relationship management (CRM) systems, than their more developed counterparts. Consistent with Figure 1, if organizations are in a confronting state during an ICT implementation, they may not have the willingness and resources to overcome and/or avoid the environmental tension related to implementing the ICT.

We suggest that institutional factors will play a critical role in determining how stakeholders will adapt to the new ICT. Our findings suggest that stakeholders in developing countries are likely to adapt ICTs unfaithfully because of the influence of the institutional factors and environmental tension. Unfaithful adaptation refers to the use (or lack thereof) of an ICT in a way that was not intended by the implementation agents, such as top management of an organization (DeSanctis and Poole 1994). Prior research has found that employees in developed countries exhibit two different types of adaptation behaviors—i.e., faithful and unfaithful appropriations. Furthermore, prior research has noted that, although some employees may try to avoid an ICT, many employees will attempt to maximize benefits from an ICT or at least use an ICT to satisfy their needs (Beaudry and Pinsonneault 2005). However, in developing countries, we suggest that, because of strong institutional factors, such as labor economics and Western isomorphism, employees and other stakeholders (e.g., customers) will mostly exhibit unfaithful adaptation behaviors, such as resistance, avoidance, and workarounds. Also, because of the presence of a parallel-manual system, employees in developing countries will likely have a greater proclivity to use the manual system instead of using the ICT. Overall, our findings suggest that some institutional factors will be catalysts and some will be constraints during an ICT implementation in an organization in a developing country. Furthermore, as noted in Section 4.2.4, some factors are not related to the ICT, rather they represent traditional factors that are unique to many developing countries. The ICT-related factors emerge during the process of implementation (see Figure 6), particularly early versus late in the shakedown phase, as discussed earlier.

5.3. Impacts of an ICT Implementation on Organizational Outcomes

We suggest that an ICT implementation will influence key organizational outcomes through two processes. First, an ICT will influence organizational outcomes through the process of *adaptation*. Employees will primarily exhibit unfaithful adaptation behaviors, such as resistance, avoidance, and workarounds, during the shakedown (and potentially subsequent phases). These unfaithful adaptation behaviors will have a negative effect on organizational outcomes. As we found in BANK, the ICT implementation had no effect or a negative effect on the key organizational outcomes of operational efficiency, job satisfaction, and customer satisfaction. We suggest that this is because of the unfaithful adaptation behaviors of employees. In the case of operational efficiency, we found that, in many cases, avoidance and workaround behaviors by employees increased the time it took to complete transactions. Job satisfaction declined because employees found it difficult to perform their jobs using the new ICT. In many cases, we found that employees were reluctant to use the new ICT (i.e., resistance) because they felt that the ICT was threatening their job security and chances of career advancement. We found that customers felt that the new ICT made their interaction with BANK employees less personal as employees were busy figuring out the new ICT and associated business processes. Customers also felt that instead of making transactions efficient, the new ICT actually made it inefficient because of employees' avoidance and workaround behaviors. Many customers voiced their concern about the need for the new ICT when there was no visible improvement in the quality of service delivery leading to an overall lowering of customer satisfaction.

Figure 6 Role of Institutional Factors in ICT Implementations

		Institutional factors	
		Traditional	Emerging
Role	Catalysts	—Top management support	—Normative influence • Aspirations for improving service quality and operational efficiency
	Constraints	—Labor economics • Labor union • Protectionism • Entitlement —Western isomorphism • Antipathy toward technology • Lack of felt need • Value conflict	—ICT-induced change • Willingness to change • Goal conflict —Parallel-manual system • Computer literacy • Infrastructure uncertainty —Technology adaptation • Resistance • Avoidance • Workaround

Second, an ICT implementation will have an effect on organizational outcomes through the process of *mediation*. Institutional factors will mediate the influence of contextual tension on organizational outcomes following an ICT implementation. Contextual tension will render the institutional factors unfavorable to support the implementation and use of ICTs in developing countries. Stakeholders will develop competing views toward the implementation. For instance, BANK managers were in favor of the ICT because they viewed it as a vehicle to improve organizational productivity and performance. Employees and customers did not share this view. Such goal incongruence played a hindering role in realizing the benefits from the ICT implementation. Furthermore, we suggest that ICT adaptation will mediate the influence of institutional factors on organizational outcomes. In particular, employees will feel that a new ICT will bring unnecessary changes to their stable routines and the presence of a parallel-manual system will exacerbate their negative view toward the ICT, leading to unfaithful adaptation behaviors, such as avoidance and workarounds. Consequently, organizational outcomes, such as operational efficiency, job satisfaction, and customer satisfaction, will be negatively affected by the implementation. In sum, we argue that there is a critical interplay between environmental tension and institutional factors, and this interplay influences the relationship between the ICT implementation and organizational outcomes.

6. Discussion

We conducted a multimethod longitudinal study of an ICT implementation in a bank in India to understand the impacts of an ICT implementation on key organizational outcomes, unearth the temporal dynamics of the key drivers of implementation, and inductively develop a model of ICT implementation and outcomes in developing countries. We employed a case study approach that helped us identify several key institutional factors that played a hindering role during the ICT implementation. Furthermore, our findings highlighted several traditional barriers that worked in opposition to emergent catalysts, thus hindering the success of the ICT implementation. We found that it was the tension between traditional challenges and emergent catalysts that had a significant influence on the ICT implementation.

Specifically, we found four important categories of barriers: *ICT-induced change*, *labor economics*, *Western isomorphism*, and *parallel-manual system*. These factors influence whether employees and other stakeholders adapt to the new ICT—i.e., *technology adaptation*—faithfully or unfaithfully (e.g., avoidance, workaround). Because of economic factors and limited slack resources for investment, basic infrastructure elements, such as electric power, computer and network equipment, and training, are typically lacking in India. As a result, the relative advantage of an ICT may not be obvious and it may be difficult to garner the benefits of an ICT implementation. Furthermore, organizations in India may be constrained in their ability to redesign or change the business processes associated with an ICT implementation. Additionally, prevailing cultural norms and values can cause distrust about the implementation and skepticism about isomorphism with Western practices. ICT implementations tend to be viewed as promoting values and norms that might be inappropriate in light of the prevailing labor economics. Inadequate attention to institutional factors could impede the success of ICT implementations. Although some of these issues may hinder ICT deployment even in developed countries, these problems are more severe in developing countries and some of these issues are unique to developing countries.

6.1. Theoretical Contributions and Implications

We conducted a large-scale multimethod longitudinal study in India that involved data collection of objective data, quantitative perceptual data, and qualitative data from different stakeholder groups across different branches of a large bank. The qualitative data provided explanations for patterns observed in the quantitative data. Recently, Venkatesh et al. (2013) underscored the importance of multiple data collection methods and combining qualitative and quantitative methodologies to develop insights and bolster findings. They also highlighted the value of meta-inference—i.e., substantive theory developed by integrating findings from qualitative and quantitative studies. Following their suggestions, we offered meta-inferences by combining our findings from quantitative and qualitative analysis. In particular, the process model that we developed in Section 5 represents a substantive theory of ICT implementations in a developing country. It offers an explanation for challenges that organizations in developing countries face during ICT implementations and why these organizations may not receive favorable outcomes from ICT implementations. Our findings offer a set of contextual factors (i.e., institutional factors) and contingencies (i.e., environmental tension) that were not highlighted in prior ICT implementation research.

Our meta-inferences complement prior research that provided rich descriptions of major ICT implementations and associated challenges over time (e.g., Beaudry and Pinsonneault 2005, Volkoff et al. 2007) by highlighting various factors, such as Western isomorphism, labor economics, parallel-manual system, and the confrontation between traditional challenges and emergent catalysts that were not discussed in prior research. It is important to note that the stakeholders in our study placed importance on factors that were not highlighted in much prior research. For example, stakeholders in developed countries typically underscore factors that are related to the characteristics, use, and/or adaptation of the ICT, such as complexity of the ICT, misfit (functionality, data, role, control, and organizational culture), workarounds, impacts on their job, and instrumental benefits of using the ICT or lack thereof (e.g., Beaudry and Pinsonneault 2005, Volkoff et al. 2007). By contrast, the stakeholders in our study highlighted factors that were much broader in nature (e.g., Western isomorphism, labor economics), and not directly related to the characteristics, use, and/or adaptation of the ICT, thus underscoring the importance of broad contextual factors during ICT implementations in developing countries.

Another strength of our research is that we focus on an ICT implementation—i.e., going from a paper-based system to an enterprise-level ICT, which is a likely situation for many organizations in India and other developing countries because of increasing ICT investments in these countries—that is an important context to understand (UNCTAD 2005, WITSA 2010). Moreover, we studied both implementing and non-implementing branches so as to understand the differences in the outcomes of interest between these sets of branches. Finally, we developed a contingency theory to understand the inherent contextual tension between traditional challenges and emergent catalysts in developing countries. Such theorizing to address potentially competing explanations was encouraged in Poole and Van de Ven (1989) to build richer theories and extend the scope of our understanding of underlying phenomena.

Our research makes substantial contributions to prior research on ICT implementation in developing countries (e.g., Dewan and Kraemer 2000, Dewan and Riggins 2005, Silva and Hirschheim 2007, Walsham et al. 2007). Based on the finding that ICT investments were not providing positive returns in developing countries, Dewan and Kraemer (2000) posed a key question by asking whether developing nations must first build their ordinary capital stocks (e.g., telecommunications, human capital) before they make investments in ICT. Our study provides answers to these questions by showing that despite impressive strides toward alleviating traditional challenges—i.e., physical, socioeconomic, and cultural barriers—they still dominate and must be overcome before the emergent catalysts can create ICT success in developing countries. These barriers are directly associated with the non-ICT ordinary capital stocks or complementary assets suggested by Dewan and Kraemer (2000). Although the United Nations (UN) and other agency reports have identified several challenges in developing countries, our qualitative study yielded some unique challenges that were not found or discussed in prior research. In particular, the institutional factors, such as Western isomorphism, labor economics, and a parallel-manual system, are unique and dominant challenges in developing countries, particularly India. It is important to note that Western values, structural stability, and even challenges may not be automatically applicable as critical success factors or impediments to ICT implementations in developing countries. Furthermore, our research augments prior ICT research that focused on the drivers and consequences of ICT diffusion and assimilation (Fichman 2000, Fichman and Kemerer 1997) by suggesting additional drivers pertinent to ICT implementations. Thus, our model not only explains the dynamic tensions during ICT implementations in developing countries but also offers a dynamic view of ICT design, implementation, and consequences in developing countries.

Our research contributes to the organizational innovation literature. Klein and Knight (2005, p. 244) presented six "stumbling blocks on the road to innovation implementation" that they identified from the rich innovation implementation literature.[6] They also identified six key "antecedents of innovation-implementation effectiveness" (p. 254).[7] Our research extends their lists of barriers to and antecedents of innovation implementation by identifying a set of barriers and catalysts relevant to developing countries. Many of these factors (e.g., Western isomorphism, labor economics, parallel-manual system) have not been issues in the vast body of research on organizational innovation that has been conducted in developed countries (e.g., Anderson et al. 2004, Klein and Sorra 1996, Venkatesh et al. 2011). Furthermore, our findings suggest that outcomes of organizational innovation may vary depending on the antecedents and processes of innovation implementation. In particular, our research demonstrated that organizational innovation can lead to negative consequences in developing countries because of the presence of a set of unique barriers that dominate over the catalysts and disrupt the implementation process.

Because of the qualitative nature of this research and the range of outcomes examined, our research contributes to the marketing literature on the role of technology in improving customer satisfaction (Krishnan et al. 1999, Mithas et al. 2005, Srinivasan and

[6] These are (1) unreliable and imperfectly designed innovation; (2) complexity of the innovation; (3) lack of user involvement; (4) changes in employees' roles, routines, and norms; (5) intensive resource requirements; and (6) organizational norms or routines.

[7] These are (1) implementation policy and practice, (2) organizational climate, (3) management support, (4) availability of resources, (5) learning orientation, and (6) long-term orientation.

Moorman 2005). Although much prior research has focused on how customer satisfaction is increased because of ICT implementations by improving overall service quality and providing alternative channels for service delivery (e.g., self-service technologies), we found that the relationship between ICT implementations and customer satisfaction is significantly more complex than how it has been conceptualized in prior research, especially in developing countries. Our research suggests that ICTs may not improve customer satisfaction when certain sociocultural constraints exist. Particularly, organizations that face a confronting state resulting from a strong friction between traditional challenges and emergent catalysts (see Figure 1), and fail to consider and act on the physical, socioeconomic, and cultural barriers may find that these factors will hinder appropriate utilization and assimilation of customer-targeted ICTs. Investment in such ICTs may not lead to improved customer satisfaction, in contrast to the findings from extant research conducted in developed countries (e.g., Mithas et al. 2005).

6.2. Limitations and Future Research Directions

Our research was conducted in one organization in India. Much like other field research, particularly qualitative research, the richness of one context comes with the trade-off of a potential lack of generalizability. Lee and Baskerville (2003) noted that the commonly held view that findings from one context will generalize to a different context is not reasonable. Our work offers rich contextual findings and theoretical insights based on an ICT implementation in a bank in India. Furthermore, the potential lack of generalizability is traded off against the importance of understanding organizational and human behavior in this context. However, this does spark the need to further investigate the differences between rural and urban development that have often been highlighted in UN and other major agency reports that indicate that urban areas have scaled some of the traditional barriers found in developing countries (Hanafizadeh et al. 2009, Venkatesh and Sykes 2013, UNCTAD 2006). Furthermore, a fruitful avenue of future research will be to study ICT implementations in other developing countries and other industries within India. Although we studied three different stakeholders, there is a need to understand the impact of ICT implementations on these and other stakeholders of different organizations in developing countries, such as government agencies and private organizations (both for-profit and nonprofit).

Another limitation is the temporal stability of our findings. This is also not a unique limitation, as it constrains and challenges virtually all research in developing countries where rapid development on several fronts, such as technological, infrastructural, and policy, continues to occur. Ongoing research is always necessary to stay abreast of phenomena and business environments as they unfold. Furthermore, our research did not treat operational efficiency in the maximally rich way that the quantitative data gathered would have permitted. Such a focus and associated analysis would likely be of interest to researchers studying the business value of ICTs, service chain issues, or even banks in particular (Venkatesh 2006). Similarly, we did not differentiate across transaction types. We felt these choices were reasonable given that our primary interest was in understanding the impacts of ICT implementations on key outcomes in organizations in developing countries. Regardless, these are important opportunities for future research. Finally, the study of potential interventions to assuage the institutional issues identified here is critical. Such work will contribute greatly to furthering our understanding of ICT implementations in developing countries.

6.3. Practical Contributions and Implications

Given the explosion of technologies in India and the extent to which Western countries are outsourcing various business processes to India, a richer understanding of ICT implementations is critical for doing business successfully in India. As we noted earlier, large organizations, such as Microsoft, Cisco, General Electric, BMW, and Intel, have expanded their operations and services to India over the last few years (Zakaria 2006). Thus, our findings have significant implications for managers in these organizations and also in organizations that have strategic plans to extend their business to India and other developing countries. Consideration needs to be given to issues that are nearly irrelevant or taken for granted when implementing ICTs in developed countries. Clearly, resolving infrastructure issues is important, as most UN reports suggest. However, even if the infrastructure barriers are scaled, at least two of the institutional issues we identified—i.e., Western isomorphism and labor economics—could still severely stifle the success of ICTs in Indian organizations. Because of a collectivistic and nationalistic cultural orientation, Indians from a traditional background may find it difficult to accept an ICT that is deeply rooted in a Western value system. Finally, it is important to note that although technology leapfrogging and its associated advantages do exist for developing countries, it is still a significant challenge to sufficiently advance people's knowledge and values to embrace technology. This research gives practitioners a starting point for the design of potential interventions.

ICT implementation is often touted as a *silver bullet* or *panacea* for problems facing developing countries. It is often seen as a way to educate citizens and provide access to information that is otherwise not available on important topics, such as health-care. Others, however, have cautioned that ICTs are neither necessary nor sufficient for the advancement of developing countries. A more middle-of-the-road position that we described in this paper suggests that rather than try to diffuse ICTs throughout a developing country and expect them to improve the quality of life, the best approach is to help organizations benefit from ICTs that in turn could improve productivity, grow the economy, and result in other positive outcomes, such as improved quality of life. Our results call for caution even when thinking along these more conservative lines. The ICT implementation had a negative impact on employees' and customers' satisfaction in an Indian organizational setting where literacy in general, and computer literacy in particular, are about as high as could be expected in a developing country with the exception, perhaps, of ICT firms in these countries. This suggests that diffusion of ICTs in nonorganizational settings in developing countries could be much slower because of generally lower literacy and computer literacy. Therefore, policy makers would be well served to pursue small-scale projects and to understand the considerations of the local community, its value systems, and peoples' reactions before investing in large-scale projects.

7. Conclusions

The objective of our work was to understand the impacts of an ICT implementation and the dynamics of implementation processes in a developing country. To achieve this objective, we conducted a multimethod investigation of an ICT implementation in a bank in India over the course of two years. Relative to preimplementation levels, we found (a) no change in operational efficiency, (b) a decline in job satisfaction, and (c) a decline in customer satisfaction over the two years after the implementation. Interviews of top management, line employees, and customers revealed four sets of institutional factors that hindered ICT implementation success: ICT-induced change, labor economics, Western isomorphism, and parallel-manual system. We found that the salience of these factors changed across different implementation phases and had differential impacts on ICT adaptation and outcomes. These factors are a clear indication that ICT implementations in developing countries require careful and proactive management of a fairly unique set of challenges. We hope that our model will provide a starting point for future studies of interventions to foster the success of ICT implementations in developing countries.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/isre.2016.0638.

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